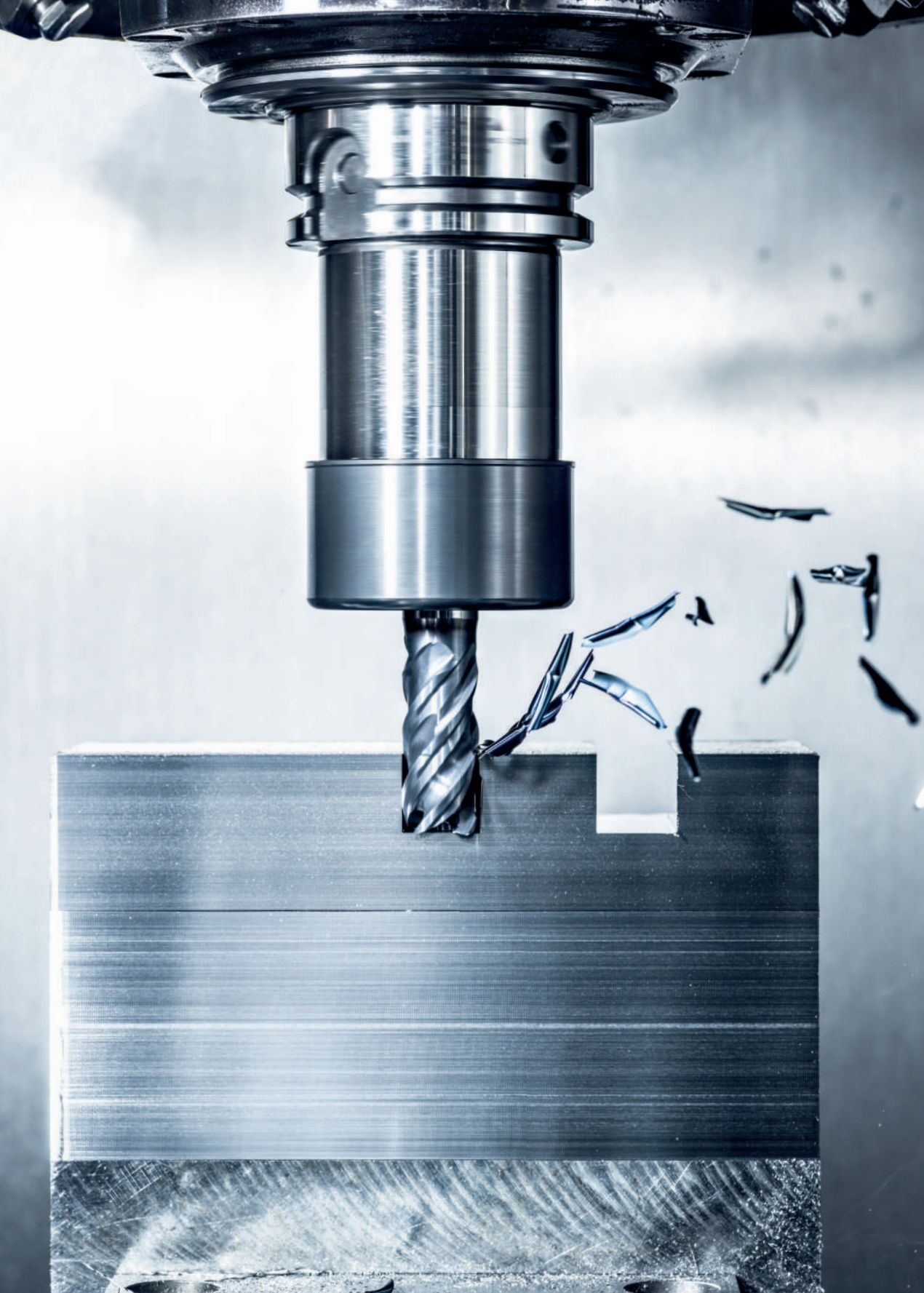


passion
for precision



Utensili frese ad alto rendimento





Prodotti



- Il più grande assortimento in Europa di frese in metallo duro integrale
- Leader nel campo delle innovazioni: 7 % del fatturato investito nella ricerca e sviluppo
- Trend setter con HSC, HPC, HDC e MFC
(HSC: High Speed Cutting; HPC: High Performance Cutting; HDC: High Dynamic Cutting; MFC: Multi-functional Cutting)
- La perfezione è la nostra passione



ArCut X processo di fresatura:
www.fraisa.com/qr/itv4



PRODOTTI

FRAISA ReTool®



- Rigenerazione utensili industriale con garanzia di rendimento per utensili FRAISA e di terzi
- Il più grande centro di assistenza tecnica d'Europa per frese in metallo duro integrale a Willich, Germania
- Oltre 30 anni di esperienza nella rigenerazione utensili e oltre 5.5 milioni di utensili rigenerati.
Modernissimi centri di affilatura CNC come pure impianti propri per la preparazione di bordi di taglio e il rivestimento
- Risparmio sui costi grazie alla riproducibilità della performance al 100 % e massimo mantenimento di qualità
- Risparmio di risorse (50.000 kg di tungsteno e 5.000 kg di cobalto in meno all'anno) grazie alla rigenerazione industriale di utensili e al riciclaggio di utensili non più rigenerabili



FRAISA ReTool®:
www.fraisa.com/qr/itv7



FRAISA ReTool®

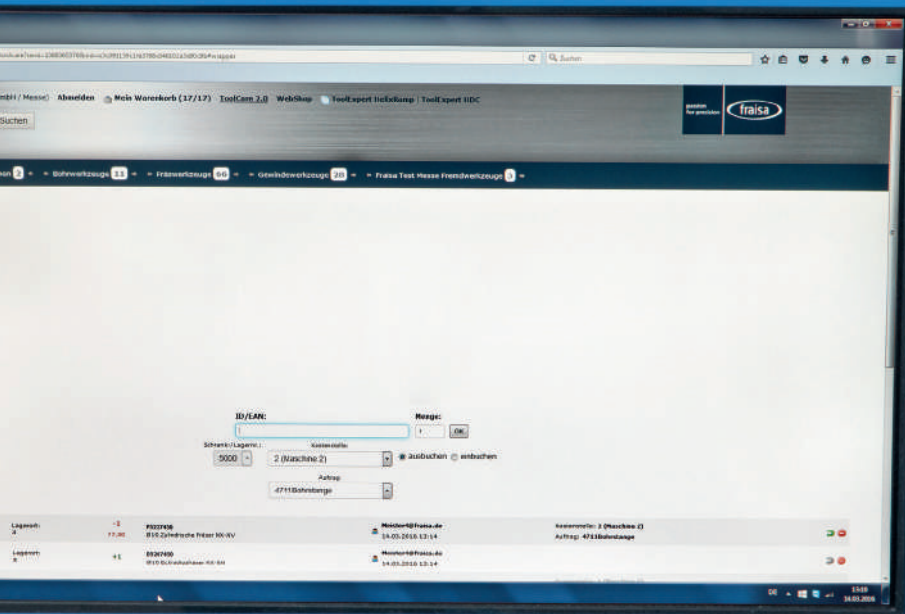
Logistica



- Trend setter per sistemi di gestione utensili ToolCare®: 20 anni di esperienza, 1.000 sistemi installati, versione 2.1
- ToolCareSecure: garanzia di disponibilità alla consegna al 100 %!
- ToolCareConcept: ordinazione di utensili speciali come prodotti di serie
- E-Shop: semplicissima esecuzione delle pratiche di ordinazione ad ogni ora del giorno e della notte
- Consegna il giorno dopo in tutta Europa



ToolCare® 2.1:
www.fraisa.com/qr/itv5



LOGISTICA



Tecnologia applicativa



- 45 anni di esperienza nella gestione di dati tecnologici per sistemi di fresatura
- ToolSchool: 17 anni di valore aggiunto grazie ad intenso trasferimento di know-how e addestramento specifico per oltre 25.500 clienti
- Informazioni applicative precise e affidabili su ogni singolo utensile FRAISA
- FRAISA ToolExpert®: dati applicativi online per tutte le strategie di fresatura e tutti gli utensili FRAISA
- Visualizzazione unica nel suo genere di dati applicativi direttamente in catalogo



FRAISA ToolExpert® 2.0:
www.fraisa.com/qr/itw28



APPLICAZIONE

Contatto personale con i clienti



- Massima competenza grazie all'organizzazione e svolgimento di regolari e intensi corsi di specializzazione e aggiornamento per i propri consulenti
- Contatto con il cliente esclusivamente tramite consulenti FRAISA e qualificati partner di distribuzione FRAISA
- I consulenti FRAISA sono degli specialisti esperti nelle tecnologie di fresatura
- Informazione rapida ed efficiente, in seminari online, su prodotti e tecnologie
- Società di distribuzione su scala nazionale in Germania, Francia, Italia, Ungheria, Stati Uniti, Cina e Svizzera
- Comunicazione rapida e snella tra consulenti e direzione dell'azienda grazie ad una struttura da media impresa e organizzazione trasparente



ToolSchool:
www.fraisa.com/qr/itv8



CONTATTO CON I CLIENTI

Sostituisce l'edizioni 2020



**La maggiorazione sulle
materie prime (MMP)
è compresa nel prezzo.**

Frese per acciaio, acciaio inox, titanio e nichel
15 – 317

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Frese per lavorazioni in 3D
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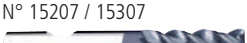


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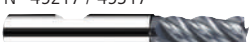




Frese per acciaio, acciaio inox, titanio e nichel

A taglienti lisci, cilindrico

| Esecuzione normale | | | | | | | | | |
|--------------------|--|-----------------------|--------------------------|--|------------------|--------------------------|--------------------------|--------------------------|----|
| N° 8504 / 8604 |  | HX (HX-NVS) | X-Generation X | Sgrossatura HPC Sgrossatura HDC Finitura | d, 3 – 20 r | HRC 48-60 | HSS | | 31 |
| N° 8500 / 8600 |  | NX (NX-NVDS) | X-Generation X | Sgrossatura HPC Sgrossatura HDC Finitura | d, 4 – 20 r | Rm 850-1500 | HRC 48-56 | Ti Titanium | 33 |
| N° 15222 / 15322 |  | NX (NX-NVD) | X-Generation X | Sgrossatura HPC Sgrossatura HDC Finitura | d, 3 – 20 45° | Rm 850-1500 | HRC 48-56 | Ti Titanium | 35 |
| N° 8700 / 8800 |  | ZX (ZX-NV) | X-Generation X | Sgrossatura Finitura | d, 3 – 20 r | Ni-/Mn- Alloys | Ti Titanium | | 37 |
| N° 8705 / 8805 |  | ZX (ZX-NV5) | X-Generation X | Sgrossatura Finitura | d, 6 – 20 r | Ni-/Mn- Alloys | Ti Titanium | | 39 |
| N° 8506 / 8606 |  | SX new! | X-Generation X | Sgrossatura HPC Sgrossatura HDC Finitura | d, 3 – 20 r | Inox Stainless | | | 41 |
| N° 5214 / 5314 |   | SX (SX-N) | X-Generation X | Sgrossatura Finitura | d, 3 – 16 45° | Inox Stainless | | | 43 |
| N° 8101 / 8201 |  | MFC | Base-X B | Sgrossatura HPC Sgrossatura HDC Finitura | d, 4 – 20 r | Rm <850-1500 | HRC 48-56 | Inox Ti | 45 |
| N° 8102 / 8202 |  | MFC | Base-X B | Sgrossatura HPC Sgrossatura HDC Finitura | d, 4 – 20 r | Rm <850-1500 | HRC 48-56 | Inox Ti | 47 |
| N° 8105 / 8205 |  | MFC | Base-X B | Sgrossatura HPC Sgrossatura HDC Finitura | d, 6 – 20 r | Rm <850-1500 | HRC 48-56 | Inox Ti | 49 |
| N° 8100 / 8200 |  | NVDS (NB-NVDS) | Base-X B | Sgrossatura HPC Sgrossatura HDC Finitura | d, 4 – 20 r | Rm <850-1300 | Inox Stainless | Ti Titanium | 51 |
| N° 8304 / 8404 |  | NVS (NB-NVS) | Base-X B | Sgrossatura Finitura | d, 2 – 20 r | Rm <850-1100 | Inox Stainless | | 53 |
| N° 15207 / 15307 |  | NVD (NB-NVD) | Base-X B | Sgrossatura HPC Sgrossatura HDC Finitura | d, 3 – 20 45° | Rm <850-1300 | Inox Stainless | Ti Titanium | 55 |
| N° 8300 / 8400 |  | E-Cut | Base-X B | Sgrossatura HPC Sgrossatura HDC Finitura | d, 1 – 20 r | Rm <850-1500 | Inox Stainless | | 57 |
| N° 8305 / 8405 |  | E-Cut | Base-X B | Sgrossatura HPC Sgrossatura HDC Finitura | d, 4 – 20 r | Rm <850-1500 | Inox Stainless | | 59 |

Frese per acciaio, acciaio inox, titanio e nichel

A taglienti lisci, cilindrico

| Esecuzione normale | | | | | | | | | |
|--------------------|---|-------|---------------------|--|---------------------|------------------------|--------------------------|-----------------------|----|
| N° 5255 / 5355 |  | E-Cut | Base-X B | Sgrossatura Finitura | d_1 3 – 20 45° | Rm <850-1100 | Inox Stainless | Ti Titanium | 61 |
| N° 8303 / 8403 |  | | Base-X B | Sgrossatura HPC Sgrossatura HDC Finitura | d_1 1 – 20 r | Rm <850-1500 | Inox Stainless | | 63 |
| N° 15233 / 15333 |  | | Base-X B | Sgrossatura Finitura | d_1 3 – 20 45° | Rm <850-1300 | | | 65 |
| N° 5200 / 5300 |  | | Base-X B | Sgrossatura Finitura | d_1 2 – 20 45° | Rm <850-1100 | | | 67 |
| N° 45217 / 45317 |  | | Favora® F | Sgrossatura Finitura | d_1 1 – 25 45° | Rm <850-1100 | Inox Stainless | | 69 |
| N° 45255 / 45355 |  | | Favora® F | Sgrossatura Finitura | d_1 3 – 20 45° | Rm <850-1100 | Inox Stainless | Ti Titanium | 71 |
| N° 45233 / 45333 |  | | Favora® F | Sgrossatura Finitura | d_1 2 – 20 45° | Rm <850-1100 | Inox Stainless | | 73 |
| N° 0110 |  | | HSS | Sgrossatura Finitura | d_1 1 – 40 90° | Rm <850-1100 | | | 77 |
| N° 0780 |  | | HSS | Sgrossatura Finitura | d_1 1 – 25 90° | Rm <850-1100 | | | 81 |

Frese per acciaio, acciaio inox, titanio e nichel

A taglienti lisci, cilindrico

Esecuzione normale con scarico

N° 15242 / 15342



NX (NX-VD)

X-Generation
X

Sgrossatura d, 4 – 20
Finitura 45°

Rm
850-1500

HRC
48-56

Ti
Titanium

85

N° 5218 / 5318



SX

X-Generation
X

Sgrossatura d, 3 – 20
Finitura 45°

Inox
Stainless

87

N° 5215 / 5315



SX (SX-3)

X-Generation
X

Sgrossatura d, 3 – 16
Finitura 45°

Inox
Stainless

89

N° 5225 / 5325



Base-X
B

Sgrossatura d, 3 – 20
Finitura 45°














Rm
<850-1300

Inox
Stainless

91

Frese per acciaio, acciaio inox, titanio e nichel

A taglienti lisci, cilindrico

| Esecuzione medio-lunga | | | | | | | | | | |
|------------------------|--|-------------------|--------------|----------|--|---------------------|-------------------|-------------------|----------------|-----|
| N° 8514 / 8614 |  | HX (HX-NVS) | X-Generation | X | Sgrossatura HPC Sgrossatura HDC Finitura | d_1 3 – 20 r | HRC 48 - >60 | HSS | | 93 |
| N° 15223 / 15323 |  | NX (NX-NVD) | X-Generation | X | Sgrossatura HPC Sgrossatura HDC Finitura | d_1 4 – 20 45° | Rm 850-1500 | HRC 48-56 | Ti Titanium | 95 |
| N° 8516 / 8616 |  | new! SX | X-Generation | X | Sgrossatura HPC Sgrossatura HDC Finitura | d_1 3 – 20 r | Inox Stainless | | | 97 |
| N° 8111 / 8211 |  | MFC | Base-X | B | Sgrossatura HPC Sgrossatura HDC Finitura | d_1 4 – 20 r | Rm <850-1500 | HRC 48-56 | Inox Ti | 99 |
| N° 8112 / 8212 |  | MFC | Base-X | B | Sgrossatura HPC Sgrossatura HDC Finitura | d_1 4 – 20 r | Rm <850-1500 | HRC 48-56 | Inox Ti | 101 |
| N° 8115 / 8215 |  | MFC | Base-X | B | Sgrossatura HPC Sgrossatura HDC Finitura | d_1 6 – 20 r | Rm <850-1500 | HRC 48-56 | Inox Ti | 103 |
| N° 15210 / 15310 |  | NVD (NB-NVD) | Base-X | B | Sgrossatura HPC Sgrossatura HDC Finitura | d_1 6 – 20 45° | Rm <850-1300 | Inox Stainless | Ti Titanium | 105 |
| N° 15208 / 15308 |  | NVD (NB-NVD) | Base-X | B | Sgrossatura HPC Sgrossatura HDC Finitura | d_1 4 – 20 45° | Rm <850-1300 | Inox Stainless | Ti Titanium | 107 |
| N° 8310 / 8410 |  | E-Cut | Base-X | B | Sgrossatura HPC Sgrossatura HDC Finitura | d_1 2 – 20 r | Rm <850-1500 | Inox Stainless | | 109 |
| N° 8315 / 8415 |  | E-Cut | Base-X | B | Sgrossatura HPC Sgrossatura HDC Finitura | d_1 4 – 20 r | Rm <850-1500 | Inox Stainless | | 111 |
| N° 8313 / 8413 |  | E-Cut | Base-X | B | Sgrossatura HPC Sgrossatura HDC Finitura | d_1 2 – 20 r | Rm <850-1500 | Inox Stainless | | 113 |
| N° 45222 / 45322 |  | | Favora® | F | Sgrossatura Finitura | d_1 2 – 25 45° | Rm <850-1100 | Inox Stainless | | 115 |
| N° 45234 / 45334 |  | | Favora® | F | Sgrossatura Finitura | d_1 3 – 20 45° | Rm <850-1100 | Inox Stainless | | 117 |

Frese per acciaio, acciaio inox, titanio e nichel

A taglienti lisci, cilindrico

Esecuzione medio-lunga con scarico

N° 15259 / 15359



NX (NX-VD)

X

Sgrossatura d, 4 – 16

Finitura

45°

Rm
850-1500

HRC
48-56

Ti
Titanium

119

N° 5219 / 5319



SX

X

Sgrossatura d, 6 – 16

Finitura

45°

Inox
Stainless

121

N° 15225 / 15325



B

Sgrossatura d, 6 – 16

Finitura

45°

Rm
<850-1300

123

N° 15299 / 15399



B

Sgrossatura d, 3 – 16

Finitura



45°




Rm
<850-1300



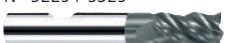
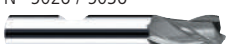
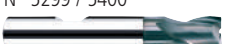

125

Frese per acciaio, acciaio inox, titanio e nichel

A taglienti lisci, cilindrico








| Esecuzione lunga | | | | | | | | | |
|------------------|--|----------------|----------|-------------------------|---------------------|------------------------|--------------------------|--|-----|
| N° 45223 / 45323 |  | Favora® | F | Sgrossatura Finitura | d_1 6 – 20 45° | Rm <850-1100 | Inox Stainless | | 127 |
| N° 0200 |  | HSS | | Sgrossatura Finitura | d_1 2 – 40 90° | Rm <850-1100 | | | 129 |



| Esecuzione 5.2xd | | | | | | | | | |
|------------------|--|--------------|---------------------------|--|-------------------|------------------------|--------------------------|--------------------------|-----|
| N° 8121 / 8221 |  | MFC | Base-X B | Sgrossatura HPC Sgrossatura HDC Finitura | d_1 6 – 20 r | Rm <850-1500 | HRC 48-56 | Inox Ti | 131 |
| N° 8320 / 8420 |  | E-Cut | Base-X B | Sgrossatura HPC Sgrossatura HDC Finitura | d_1 3 – 20 r | Rm <850-1500 | Inox Stainless | | 133 |
| N° 8323 / 8423 |  | E-Cut | Base-X B | Sgrossatura HPC Sgrossatura HDC Finitura | d_1 3 – 20 r | Rm <850-1500 | Inox Stainless | | 135 |

| Esecuzione corta | | | | | | | | | |
|------------------|--|-----------|---------------------------------|-------------------------|-----------------------|--------------------------|--------------------------|--|-----|
| N° 5249 / 5349 |  | HX | X-Generation X | Sgrossatura Finitura | d_1 1 – 16 45° | Rm 1300-1500 | HRC 48-60 | | 137 |
| N° 5213 / 5313 |  | SX | X-Generation X | Sgrossatura Finitura | d_1 3 – 16 45° | Inox Stainless | | | 139 |
| N° 5229 / 5329 |  | | Base-X B | Sgrossatura Finitura | d_1 3 – 16 45° | Rm <850-1100 | Inox Stainless | | 141 |
| N° 5026 / 5036 |  | | Base-X B | Sgrossatura Finitura | d_1 1,5 – 10 90° | Rm <850-1100 | Inox Stainless | | 143 |
| N° 5299 / 5400 |  | | Base-X B | Sgrossatura Finitura | d_1 1 – 6 45° | Rm <850-1100 | | | 145 |
| N° 0700 |  | | HSS | Sgrossatura Finitura | d_1 1 – 25 90° | Rm <850-1100 | | | 147 |

Frese per acciaio, acciaio inox, titanio e nichel

A taglienti lisci, torico


| Esecuzione normale | | | | | | | | | |
|--------------------|--|---------------------|--------------------------|--|---|--------------------------|--------------------------|--------------------------|-----|
| N° 8507 / 8607 |  | HX (HX-RNVS) | X-Generation X | Sgrossatura HPC Sgrossatura HDC Finitura | r 0,2, 0,5, 1,0, 1,5, 2,0, 2,5 3,0 | HRC 48- >60 | HSS | | 151 |
| N° 15268 / 15368 |  | NX (NX-RNVD) | X-Generation X | Sgrossatura Finitura | r 0,2, 0,5 1,0, 1,5, 2,0, 2,5, 4,0 | Rm 850-1500 | HRC 48-56 | Ti Titanium | 155 |
| N° 8720 / 8820 |  | ZX (ZX-RNV) | X-Generation X | Sgrossatura Finitura | r 0,4, 0,5, 0,8, 1,0, 1,5, 2,0, 2,5, 4,0 | Ni-/Mn- Alloys | Ti Titanium | | 159 |
| N° 8107 / 8207 |  | MFC (MFC-R) | Base-X B | Sgrossatura HPC Sgrossatura HDC Finitura | r 0,2, 0,5, 1,0, 1,5, 2,0, 2,5 | Rm <850-1500 | HRC 48-56 | Inox Ti | 165 |
| N° 15226 / 15326 |  | | Base-X B | Sgrossatura Finitura | r 0,5, 1,0, 1,5, 2,0, 2,5, 4,0 | Rm <850-1300 | Inox Stainless | | 169 |
| N° 5234 / 5334 |  | | Base-X B | Sgrossatura Finitura | r 0,2, 0,5 | Rm <850-1100 | | | 173 |
| N° 45219 / 45319 |  | | Favorita® F | Sgrossatura Finitura | r 0,2, 0,5, 0,8, 1,0, 1,5, 2,0, 2,5, 4,0 | Rm <850-1100 | Inox Stainless | | 175 |

| Esecuzione medio-lunga | | | | | | | | | |
|------------------------|--|---------------------------|--------------------------|--|--|------------------------|---------------------|--------------------------|-----|
| N° 8517 / 8617 |  | HX new! | X-Generation X | Sgrossatura HPC Sgrossatura HDC Finitura | r 0,2, 0,5 1,0, 1,5, 2,0, 2,5 3,0 | HRC 48- >60 | HSS | | 181 |
| N° 8117 / 8217 |  | MFC new! | Base-X B | Sgrossatura HPC Sgrossatura HDC Finitura | r 0,2, 0,5 1,0, 1,5, 2,0, 2,5 | Rm <850-1500 | HRC 48-56 | Inox Ti | 185 |

| Esecuzione medio-lunga con scarico | | | | | | | | | |
|------------------------------------|--|------------------|--------------------------|-------------------------|---------------------------------|------------------------|---------------------|--|-----|
| N° 5257 / 5357 |  | HX (HX-R) | X-Generation X | Sgrossatura Finitura | r 1,5, 2,0, 2,5, 3,0, 3,5 | Rm 1300-1500 | HRC 48-60 | | 189 |

Frese per acciaio, acciaio inox, titanio e nichel

Profilata, cilindrica

| Esecuzione normale | | | | | | | | | |
|--------------------|---|------------|--------------------------|-------------------------|---------------------|------------------------|--------------------------|--|-----|
| N° 5279 / 5379 |  | NX (NX-FP) | X-Generation X | Sgrossatura Finitura | d_1 6 – 20 45° | Rm <850-1300 | | | 191 |
| N° 8302 / 8402 | | SupraCarb® | Base-X B | Sgrossatura Finitura | d_1 4 – 20 r | Rm <850-1100 | Inox Stainless | | 193 |
| N° 15236 / 15336 | | SupraCarb® | Base-X B | Sgrossatura Finitura | d_1 3 – 20 45° | Rm <850-1100 | Inox Stainless | | 195 |
| N° 45371 | | | Favora® F | Sgrossatura Finitura | d_1 3 – 20 45° | Rm <850-1100 | | | 197 |
| N° 0619 | | | HSS | Sgrossatura Finitura | d_1 5 – 25 45° | Rm 850-1300 | | | 199 |
| N° 0540 | | | HSS | Sgrossatura Finitura | d_1 6 – 25 45° | Rm <850-1300 | Inox Stainless | | 201 |
| N° 0610 | | | HSS | Sgrossatura Finitura | d_1 5 – 40 45° | Rm <850-1100 | | | 203 |
| N° 0609 | | | HSS | Sgrossatura Finitura | d_1 6 – 32 45° | Rm <850-1100 | Inox Stainless | | 207 |
| N° 0695 | | | HSS | Sgrossatura Finitura | d_1 8 – 32 45° | Rm <850-1100 | Inox Stainless | | 209 |

Frese per acciaio, acciaio inox, titanio e nichel

Profilata, cilindrica

Esecuzione medio-lunga

N° 15238 / 15338



SupraCarb®

| | | | | | | | | |
|--------|------------|-------------|-----------|------------------------|--------------------------|------------------------|--|-----|
| Base-X | B | Sgrossatura | d, 6 – 20 | Rm <850-1100 | Inox Stainless | 211 | | |
| | | Finitura | 45° | | | | | |
| | | Favora® | F | Sgrossatura | d, 3 – 20 | Rm <850-1100 | | 213 |
| | | | | Finitura | 45° | | | |
| HSS | HSS | Sgrossatura | d, 6 – 25 | Rm 850-1300 | | 215 | | |
| | | Finitura | 45° | | | | | |
| HSS | HSS | Sgrossatura | d, 5 – 32 | Rm <850-1100 | | 217 | | |
| | | Finitura | 45° | | | | | |

Esecuzione medio-lunga con scarico

N° 15239 / 15339



SupraCarb®

| | | | | | | |
|--------|----------|-------------|-----------|------------------------|--------------------------|-----|
| Base-X | B | Sgrossatura | d, 6 – 20 | Rm <850-1100 | Inox Stainless | 219 |
| | | Finitura | 45° | | | |

Frese per acciaio, acciaio inox, titanio e nichel Profilata, cilindrica

Esecuzione corta

N° 15260 / 15360




SupraCarb®

| | | | | | | |
|--------------------|-------------|-----------------------|------------------------|--------------------------|--|-----|
| Base-X B | Sgrossatura | d ₁ 3 – 16 | Rm <850-1100 | Inox Stainless | | 221 |
| | Finitura | 45° | | | | |

Esecuzione lunga


N° 15248 / 15348



SupraCarb®

| | | | | | | |
|--------------------|-------------|-----------------------|------------------------|--------------------------|--|-----|
| Base-X B | Sgrossatura | d ₁ 6 – 20 | Rm <850-1100 | Inox Stainless | | 223 |
| | Finitura | 45° | | | | |

N° 0665



| | | | | | | |
|------------|-------------|-----------------------|------------------------|--|--|-----|
| HSS | Sgrossatura | d ₁ 5 – 40 | Rm <850-1100 | | | 225 |
| | Finitura | 45° | | | | |

Versione extralunga con scarico

N° 0621



| | | | | | | |
|------------|-------------|-----------------------|-----------------------|--|--|-----|
| HSS | Sgrossatura | d ₁ 6 – 25 | Rm 850-1300 | | | 227 |
| | Finitura | 45° | | | | |

Frese per acciaio, acciaio inox, titanio e nichel

Finitura, cilindrica

Esecuzione normale

N° 15250



MulticutXF

X-Generation

X

Sgrossatura d, 3 – 20
Finitura 45°

Rm
<850-1500

HRC
48-60

Inox
Stainless

229

N° 8301 / 8401



E-Cut

Base-X

B

Sgrossatura d, 3 – 20
Finitura r

Rm
<850-1500

Inox
Stainless

231

N° 45260 / 45360



Favora®

F

Sgrossatura d, 6 – 20
Finitura 45°

Rm
850-1300

233

Esecuzione medio-lunga

N° 15251



MulticutXF

X-Generation

X

Sgrossatura d, 3 – 20
Finitura 45°

Rm
850-1500

HRC
48-60

Inox
Stainless

235

N° 8311



E-Cut

Base-X

B

Sgrossatura d, 3 – 20
Finitura r

Rm
<850-1500

Inox
Stainless

237

N° 45262 / 45362



Favora®

F

Sgrossatura d, 6 – 20
Finitura 45°

Rm
850-1300

239

Esecuzione lunga

N° 15254



MulticutXF

X-Generation

X

Sgrossatura d, 6 – 20
Finitura 45°

Rm
850-1500

HRC
48-60

Inox
Stainless

241

Esecuzione 5.2xd

N° 8521



MulticutXF

X-Generation

X

Sgrossatura d, 6 – 20
Finitura 45°

Rm
850-1500

HRC
48-60

Inox
Stainless

243

N° 8321



E-Cut

Base-X

B

Sgrossatura d, 6 – 20
Finitura r

Rm
<850-1500

Inox
Stainless

245

Frese per acciaio, acciaio inox, titanio e nichel

Finitura frontale, cilindrica

Esecuzione normale

N° 8502



NX
new!



Sgrossatura $d_1 3 - 16$



Finitura



Rm
1300-1500









HRC
48-56

Inox
Ti

247



















Frese per acciaio, acciaio inox, titanio e nichel

Micro, cilindrico

| Gambo ø 6mm | | | | | | | | | |
|-------------|--|---------------|--------------------------|-------------|---------------------|-----------------------|---------------------|-----------------------|-----|
| N° 6500 |  | MicroX | X-Generation X | 1xd | d, 0,1 – 2,0 45° | Rm 850-1500 | HRC 48-60 | Ti Titanium | 249 |
| N° 6501 |  | MicroX | X-Generation X | 2xd | d, 0,1 – 2,0 45° | Rm 850-1500 | HRC 48-60 | Ti Titanium | 251 |
| N° 6502 |  | MicroX | X-Generation X | 3xd | d, 0,1 – 3,0 45° | Rm 850-1500 | HRC 48-60 | Ti Titanium | 253 |
| N° 6503 |  | MicroX | X-Generation X | 4xd | d, 0,1 – 2,0 45° | Rm 850-1500 | HRC 48-60 | Ti Titanium | 255 |
| N° 6504 |  | MicroX | X-Generation X | 5xd | d, 0,1 – 3,0 45° | Rm 850-1500 | HRC 48-60 | Ti Titanium | 257 |
| N° 6505 |  | MicroX | X-Generation X | 6xd | d, 0,2 – 2,0 45° | Rm 850-1500 | HRC 48-60 | Ti Titanium | 259 |
| N° 6506 |  | MicroX | X-Generation X | 8xd | d, 0,2 – 3,0 45° | Rm 850-1500 | HRC 48-60 | Ti Titanium | 261 |
| N° 6508 |  | MicroX | X-Generation X | 10xd | d, 0,2 – 3,0 45° | Rm 850-1500 | HRC 48-60 | Ti Titanium | 263 |

Frese per acciaio, acciaio inox, titanio e nichel

Micro, cilindrico

| Gambo ø 3mm | | | | | | | | | | |
|-----------------|--|--|--------------|----------|--------------|------------------------|------------------------|--------------------------|---|-----|
| N° 15711 |  |  MicroX (Microcut-C1H) | X-Generation | X | 1xd | d_1 0.2 – 3.0 45° | Rm 850-1500 | HRC 48-60 | Ti Titanium | 265 |
| N° 5722 |  |  MicroX (Microcut-C3H) | X-Generation | X | 3xd | d_1 0.5 – 3.0 45° | Rm 850-1500 | HRC 48-60 | Ti Titanium | 267 |
| N° 5724 |  |  MicroX (Microcut-C5H) | X-Generation | X | 5xd | d_1 0.5 – 3.0 45° | Rm 850-1500 | HRC 48-60 | Ti Titanium | 269 |
| N° 5712 |  | Microcut | Base-X | B | 3xd | d_1 0.2 – 3.0 45° | Rm <850-1500 | Inox Stainless | Ti Titanium | 271 |
| N° 15752 |  | Microcut | Base-X | B | 3xd | d_1 0.5 – 3.0 90° | Rm <850-1500 | Inox Stainless | Ti Titanium | 273 |
| N° 5714 |  | Microcut | Base-X | B | 5xd | d_1 0.5 – 3.0 45° | Rm <850-1500 | Inox Stainless | Ti Titanium | 275 |
| N° 15754 |  | Microcut | Base-X | B | 5xd | d_1 0.5 – 3.0 90° | Rm <850-1500 | Inox Stainless | Ti Titanium | 277 |
| N° 5716 |  | Microcut | Base-X | B | 8xd | d_1 0.5 – 3.0 45° | Rm <850-1500 | Inox Stainless | Ti Titanium | 279 |
| N° 5717 |  | Microcut | Base-X | B | 10xd | d_1 0.5 – 3.0 45° | Rm <850-1500 | Inox Stainless | Ti Titanium | 281 |
| N° 5721 |  | Microcut | Base-X | B | 12xd | d_1 1.0 – 3.0 45° | Rm <850-1300 | | | 283 |
| N° 5723 |  | Microcut | Base-X | B | 15xd | d_1 1.0 – 3.0 45° | Rm <850-1300 | | | 285 |
| N° 15725 |  | Microcut | Base-X | B | 20xd | d_1 1.0 – 3.0 45° | Rm <850-1100 | | | 287 |
| N° 45709 |  | | Favora® | F | 1.5xd | d_1 0.1 – 2.9 90° | Rm <850 | Inox Stainless | CuZn Gold PI | 289 |
| N° 5710 / 45710 |  | | Favora® | F | 3xd | d_1 0.3 – 3.0 90° | Rm <850-1100 | | | 293 |
| N° 45713 |  | | Favora® | F | 3xd | d_1 0.4 – 2.9 90° | Rm <850 | Inox Stainless | CuZn Gold PI | 297 |

Frese per acciaio, acciaio inox, titanio e nichel

A taglienti lisci, cilindrico

Esecuzione a gambo corto

N° 15232



| | | | | | | |
|---------------------|-------------|-------------|------------------------|--------------------------|---|-----|
| Favora® F | Sgrossatura | d, 1,5 – 10 | Rm <850-1100 | Inox Stainless | Al CuZn Gold | 301 |
| | Finitura | 90° | | | | |

N° 5236 / 5336



| | | | | | | |
|---------------------|-------------|-------------|------------------------|--------------------------|--|-----|
| Favora® F | Sgrossatura | d, 1,5 – 10 | Rm <850-1100 | Inox Stainless | | 305 |
| | Finitura | 90° | | | | |

N° 5335



| | | | | | | |
|---------------------|-------------|-----------|------------------------|--------------------------|--|-----|
| Favora® F | Sgrossatura | d, 2 – 10 | Rm <850-1100 | Inox Stainless | | 307 |
| | Finitura | 45° | | | | |

N° 5237 / 5337



| | | | | | | |
|---------------------|-------------|-----------|------------------------|--------------------------|--|-----|
| Favora® F | Sgrossatura | d, 3 – 10 | Rm <850-1300 | Inox Stainless | | 309 |
| | Finitura | 90° | | | | |

N° 5336 / 45336



| | | | | | | |
|---------------------|-------------|-------------|------------------------|--------------------------|--|-----|
| Favora® F | Sgrossatura | d, 1,5 – 10 | Rm <850-1100 | Inox Stainless | | 311 |
| | Finitura | 90° | | | | |

N° 0400



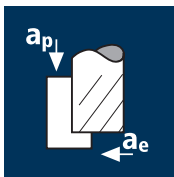
| | | | | | | |
|------------|-------------|-----------|-------------------|--|--|-----|
| HSS | Sgrossatura | d, 1 – 10 | Rm <850 | | | 313 |
| | Finitura | 90° | | | | |

N° 0410



| | | | | | | |
|------------|-------------|-----------|-------------------|--|--|-----|
| HSS | Sgrossatura | d, 2 – 10 | Rm <850 | | | 317 |
| | Finitura | 90° | | | | |

Applicazione

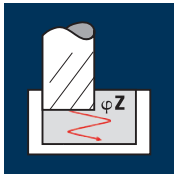


Materiale

Acciaio da utensile temprato 52 - 56 HRC

H

| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 3.00 | 4 | 60 | 0.012 | 4.500 | 1.800 | 6365 | 305 | 2.5 | 5° |
| 4.00 | 4 | 60 | 0.017 | 6.000 | 2.400 | 4775 | 325 | 4.7 | 5° |
| 5.00 | 4 | 60 | 0.022 | 7.500 | 3.000 | 3820 | 335 | 7.6 | 5° |
| 6.00 | 4 | 60 | 0.027 | 9.000 | 3.600 | 3185 | 345 | 11.1 | 5° |
| 8.00 | 4 | 60 | 0.035 | 12.000 | 4.800 | 2385 | 335 | 19.3 | 5° |
| 10.00 | 4 | 60 | 0.045 | 15.000 | 6.000 | 1910 | 345 | 30.9 | 5° |
| 12.00 | 4 | 60 | 0.055 | 18.000 | 7.200 | 1590 | 350 | 45.4 | 5° |
| 16.00 | 4 | 60 | 0.065 | 24.000 | 9.600 | 1195 | 310 | 71.5 | 5° |
| 20.00 | 4 | 60 | 0.080 | 30.000 | 12.000 | 955 | 305 | 110.0 | 5° |



Acciaio da utensile temprato > 60 HRC

H

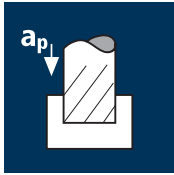
| | | | | | | | | | |
|-------|---|----|-------|--------|--------|------|----|------|----|
| 3.00 | 4 | 25 | 0.006 | 3.750 | 1.800 | 2655 | 65 | 0.4 | 3° |
| 4.00 | 4 | 25 | 0.008 | 5.000 | 2.400 | 1990 | 65 | 0.8 | 4° |
| 5.00 | 4 | 25 | 0.010 | 6.250 | 3.000 | 1590 | 65 | 1.2 | 5° |
| 6.00 | 4 | 25 | 0.012 | 7.500 | 3.600 | 1325 | 65 | 1.7 | 5° |
| 8.00 | 4 | 25 | 0.015 | 10.000 | 4.800 | 995 | 60 | 2.9 | 5° |
| 10.00 | 4 | 25 | 0.020 | 12.500 | 6.000 | 795 | 65 | 4.8 | 5° |
| 12.00 | 4 | 25 | 0.025 | 15.000 | 7.200 | 665 | 65 | 7.2 | 5° |
| 16.00 | 4 | 25 | 0.030 | 20.000 | 9.600 | 495 | 60 | 11.5 | 5° |
| 20.00 | 4 | 25 | 0.035 | 25.000 | 12.000 | 400 | 55 | 16.7 | 3° |

Acciaio rapido temprato 64 - 70 HRC

H

| | | | | | | | | | |
|-------|---|----|-------|--------|--------|------|----|-----|----|
| 3.00 | 4 | 15 | 0.005 | 3.000 | 0.750 | 1590 | 30 | 0.1 | 3° |
| 4.00 | 4 | 15 | 0.010 | 4.000 | 1.000 | 1195 | 50 | 0.2 | 4° |
| 5.00 | 4 | 15 | 0.015 | 5.000 | 1.250 | 955 | 55 | 0.4 | 5° |
| 6.00 | 4 | 15 | 0.009 | 6.000 | 3.600 | 795 | 30 | 0.6 | 5° |
| 8.00 | 4 | 15 | 0.012 | 8.000 | 4.800 | 595 | 30 | 1.1 | 5° |
| 10.00 | 4 | 15 | 0.015 | 10.000 | 6.000 | 475 | 30 | 1.7 | 5° |
| 12.00 | 4 | 15 | 0.018 | 12.000 | 7.200 | 400 | 30 | 2.5 | 5° |
| 16.00 | 4 | 15 | 0.023 | 16.000 | 9.600 | 300 | 25 | 4.2 | 5° |
| 20.00 | 4 | 15 | 0.025 | 20.000 | 12.000 | 240 | 25 | 5.7 | 3° |

Applicazione

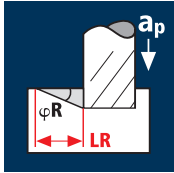


Materiale

Acciaio da utensile temprato 52 - 56 HRC

H

| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] | LR [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|---------|
| 3.00 | 4 | 50 | 0.013 | 3.000 | 3.000 | 5305 | 275 | 2.5 | 5° | 34.3 |
| 4.00 | 4 | 50 | 0.017 | 4.000 | 4.000 | 3980 | 270 | 4.3 | 5° | 45.7 |
| 5.00 | 4 | 50 | 0.022 | 5.000 | 5.000 | 3185 | 280 | 7.0 | 5° | 57.2 |
| 6.00 | 4 | 50 | 0.027 | 6.000 | 6.000 | 2655 | 285 | 10.3 | 5° | 68.6 |
| 8.00 | 4 | 50 | 0.035 | 8.000 | 8.000 | 1990 | 280 | 17.8 | 5° | 91.4 |
| 10.00 | 4 | 50 | 0.045 | 10.000 | 10.000 | 1590 | 285 | 28.6 | 5° | 114.3 |
| 12.00 | 4 | 50 | 0.055 | 12.000 | 12.000 | 1325 | 290 | 42.0 | 5° | 137.2 |
| 16.00 | 4 | 50 | 0.080 | 8.000 | 16.000 | 995 | 320 | 40.7 | 5° | 91.4 |
| 20.00 | 4 | 50 | 0.095 | 10.000 | 20.000 | 795 | 300 | 60.5 | 5° | 114.3 |



Acciaio da utensile temprato > 60 HRC

H

| | | | | | | | | | | |
|-------|---|----|-------|--------|--------|------|----|------|----|-------|
| 3.00 | 4 | 20 | 0.007 | 3.000 | 3.000 | 2120 | 60 | 0.5 | 3° | 57.2 |
| 4.00 | 4 | 20 | 0.010 | 4.000 | 4.000 | 1590 | 65 | 1.0 | 4° | 57.2 |
| 5.00 | 4 | 20 | 0.013 | 5.000 | 5.000 | 1275 | 65 | 1.7 | 5° | 57.2 |
| 6.00 | 4 | 20 | 0.016 | 6.000 | 6.000 | 1060 | 70 | 2.4 | 5° | 68.6 |
| 8.00 | 4 | 20 | 0.021 | 8.000 | 8.000 | 795 | 65 | 4.3 | 5° | 91.4 |
| 10.00 | 4 | 20 | 0.026 | 10.000 | 10.000 | 635 | 65 | 6.6 | 5° | 114.3 |
| 12.00 | 4 | 20 | 0.032 | 12.000 | 12.000 | 530 | 70 | 9.8 | 5° | 137.2 |
| 16.00 | 4 | 20 | 0.050 | 8.000 | 16.000 | 400 | 80 | 10.2 | 5° | 91.4 |
| 20.00 | 4 | 20 | 0.060 | 10.000 | 20.000 | 320 | 75 | 15.3 | 3° | 190.8 |

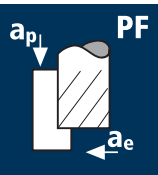
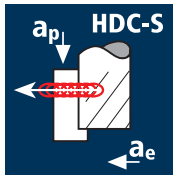
Acciaio rapido temprato 64 - 70 HRC

H

| | | | | | | | | | | |
|-------|---|----|-------|--------|--------|------|----|-----|----|-------|
| 3.00 | 4 | 10 | 0.004 | 1.500 | 3.000 | 1060 | 15 | 0.1 | 3° | 28.6 |
| 4.00 | 4 | 10 | 0.006 | 2.000 | 4.000 | 795 | 20 | 0.2 | 4° | 28.6 |
| 5.00 | 4 | 10 | 0.008 | 3.750 | 5.000 | 635 | 20 | 0.4 | 5° | 42.9 |
| 6.00 | 4 | 10 | 0.009 | 4.500 | 6.000 | 530 | 20 | 0.5 | 5° | 51.4 |
| 8.00 | 4 | 10 | 0.012 | 6.000 | 8.000 | 400 | 20 | 0.9 | 5° | 68.6 |
| 10.00 | 4 | 10 | 0.015 | 7.500 | 10.000 | 320 | 20 | 1.4 | 5° | 85.7 |
| 12.00 | 4 | 10 | 0.020 | 9.000 | 12.000 | 265 | 20 | 2.3 | 5° | 102.9 |
| 16.00 | 4 | 10 | 0.030 | 8.000 | 16.000 | 200 | 25 | 3.1 | 5° | 91.4 |
| 20.00 | 4 | 10 | 0.035 | 10.000 | 20.000 | 160 | 20 | 4.5 | 3° | 190.8 |



Dati di applicazione precisi per ulteriori applicazioni e materiali si trovano nel calcolatore dei parametri di taglio ToolExpert 2.0

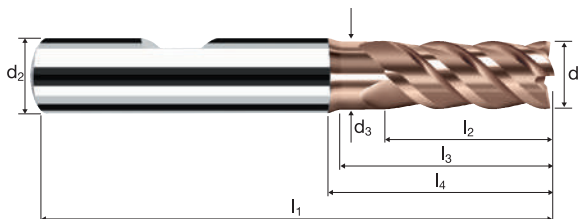
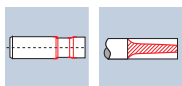


Frese cilindriche HX (HX-NVS)



A taglienti lisci, esecuzione normale con scarico corto
Geometria frontale per fresature in penetrazione ad alto rendimento

HM
XA λ 45°
 γ -10°



Sgrossatura HPC Sgrossatura HDC Finitura



ReTool®

HRC
48-56

HRC
56-60

HRC
> 60

HSS

| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r | α | z | DURO-Si |
|--|----------------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------|------|---|--------------|
| | | | | | | | | | | | EUR |
| Esempio: N° Ordine Rivestimento H Articolo 8604 Codice-Ø 180 | | | | | | | | | | | |
| | | | | | | | | | | | H8604 |
| | | | | | | | | | | | H8504 |
| | | | | | | | | | | | EUR |
| 180 | 3.00 | 6.00 | 2.80 | 57 | 8.00 | 14.00 | 20.37 | 0.100 | 4.5° | 4 | 101.00 |
| 220 | 4.00 | 6.00 | 3.70 | 57 | 11.00 | 16.00 | 20.82 | 0.100 | 3.0° | 4 | 101.00 |
| 260 | 5.00 | 6.00 | 4.60 | 57 | 13.00 | 18.00 | 21.27 | 0.100 | 1.5° | 4 | 101.00 |
| 300 | 6.00 | 6.00 | 5.50 | 57 | 13.00 | 18.15 | 20.00 | 0.150 | 0.0° | 4 | 101.00 |
| 391 | 8.00 | 8.00 | 7.40 | 63 | 19.00 | 23.63 | 26.00 | 0.150 | 0.0° | 4 | 126.00 |
| 450 | 10.00 | 10.00 | 9.20 | 72 | 22.00 | 27.99 | 31.00 | 0.200 | 0.0° | 4 | 171.00 |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 26.00 | 33.29 | 37.00 | 0.200 | 0.0° | 4 | 212.00 |
| 610 | 16.00 | 16.00 | 15.00 | 92 | 32.00 | 38.73 | 43.00 | 0.200 | 0.0° | 4 | 331.00 |
| 682 | 20.00 | 20.00 | 19.00 | 104 | 38.00 | 48.23 | 53.00 | 0.200 | 0.0° | 4 | 483.00 |
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| Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] | | |
|--------------|--|---------|--|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|------|-----|
| | Acciaio 850 - 1100 N/mm ² | 4.00 | 4 | 150 | 0.030 | 6.000 | 1.600 | 11935 | 1430 | 13.8 | 20° | | |
| | | 5.00 | 4 | 150 | 0.035 | 7.500 | 2.000 | 9550 | 1335 | 20.1 | 20° | | |
| | Acciaio 1100 - 1300 N/mm ² | 6.00 | 4 | 150 | 0.040 | 9.000 | 2.400 | 7960 | 1275 | 27.5 | 20° | | |
| | | 8.00 | 4 | 150 | 0.050 | 12.000 | 3.200 | 5970 | 1195 | 45.8 | 20° | | |
| | | 10.00 | 4 | 150 | 0.065 | 15.000 | 4.000 | 4775 | 1240 | 74.5 | 20° | | |
| | | 12.00 | 4 | 150 | 0.075 | 18.000 | 4.800 | 3980 | 1195 | 103.1 | 20° | | |
| | | 16.00 | 4 | 150 | 0.085 | 24.000 | 6.400 | 2985 | 1015 | 155.8 | 20° | | |
| | | 20.00 | 4 | 150 | 0.100 | 30.000 | 8.000 | 2385 | 955 | 229.2 | 20° | | |
| | | 4.00 | 4 | 115 | 0.030 | 6.000 | 1.600 | 9150 | 1100 | 10.5 | 18° | | |
| | | 5.00 | 4 | 115 | 0.035 | 7.500 | 2.000 | 7320 | 1025 | 15.4 | 18° | | |
| | | 6.00 | 4 | 115 | 0.040 | 9.000 | 2.400 | 6100 | 975 | 21.1 | 18° | | |
| | | 8.00 | 4 | 115 | 0.050 | 12.000 | 3.200 | 4575 | 915 | 35.1 | 18° | | |
| 10.00 | 4 | 115 | 0.065 | 15.000 | 4.000 | 3660 | 950 | 57.1 | 18° | | | | |
| 12.00 | 4 | 115 | 0.075 | 18.000 | 4.800 | 3050 | 915 | 79.1 | 18° | | | | |
| 16.00 | 4 | 115 | 0.085 | 24.000 | 6.400 | 2290 | 780 | 119.5 | 18° | | | | |
| 20.00 | 4 | 115 | 0.100 | 30.000 | 8.000 | 1830 | 730 | 175.7 | 18° | | | | |
| | Acciaio da utensile temprato 52 - 56 HRC | 4.00 | 4 | 50 | 0.015 | 6.000 | 1.600 | 3980 | 240 | 2.3 | 15° | | |
| | | 5.00 | 4 | 50 | 0.020 | 7.500 | 2.000 | 3185 | 255 | 3.8 | 15° | | |
| | | 6.00 | 4 | 50 | 0.025 | 9.000 | 2.400 | 2655 | 265 | 5.7 | 15° | | |
| | | 8.00 | 4 | 50 | 0.030 | 12.000 | 3.200 | 1990 | 240 | 9.2 | 15° | | |
| | | 10.00 | 4 | 50 | 0.035 | 15.000 | 4.000 | 1590 | 225 | 13.4 | 15° | | |
| | | 12.00 | 4 | 50 | 0.045 | 18.000 | 4.800 | 1325 | 240 | 20.6 | 15° | | |
| | | 16.00 | 4 | 50 | 0.055 | 24.000 | 6.400 | 995 | 220 | 33.6 | 15° | | |
| | | 20.00 | 4 | 50 | 0.070 | 30.000 | 8.000 | 795 | 225 | 53.5 | 15° | | |
| | | | Leghe di titanio indurite > 300 HB [Ti6Al4V] | 4.00 | 4 | 60 | 0.020 | 6.000 | 1.600 | 4775 | 380 | 3.7 | 12° |
| | | | | 5.00 | 4 | 60 | 0.025 | 7.500 | 2.000 | 3820 | 380 | 5.7 | 12° |
| 6.00 | 4 | | | 60 | 0.030 | 9.000 | 2.400 | 3185 | 380 | 8.3 | 12° | | |
| 8.00 | 4 | | | 60 | 0.040 | 12.000 | 3.200 | 2385 | 380 | 14.7 | 12° | | |
| 10.00 | 4 | | | 60 | 0.045 | 15.000 | 4.000 | 1910 | 345 | 20.6 | 12° | | |
| 12.00 | 4 | | | 60 | 0.055 | 18.000 | 4.800 | 1590 | 350 | 30.3 | 12° | | |
| 16.00 | 4 | | | 60 | 0.065 | 24.000 | 6.400 | 1195 | 310 | 47.7 | 12° | | |
| 20.00 | 4 | | | 60 | 0.080 | 30.000 | 8.000 | 955 | 305 | 73.3 | 12° | | |
| | Acciaio 850 - 1100 N/mm ² | | | 4.00 | 4 | 120 | 0.025 | 5.000 | 4.000 | 9550 | 955 | 19.1 | 32° |
| | | | | 5.00 | 4 | 120 | 0.025 | 6.250 | 5.000 | 7640 | 765 | 23.9 | 32° |
| | Acciaio 1100 - 1300 N/mm ² | 6.00 | 4 | 120 | 0.030 | 7.500 | 6.000 | 6365 | 765 | 34.4 | 32° | | |
| | | 8.00 | 4 | 120 | 0.040 | 10.000 | 8.000 | 4775 | 765 | 61.1 | 32° | | |
| | | 10.00 | 4 | 120 | 0.050 | 12.500 | 10.000 | 3820 | 765 | 95.5 | 32° | | |
| | | 12.00 | 4 | 120 | 0.055 | 15.000 | 12.000 | 3185 | 700 | 126.1 | 32° | | |
| | | 16.00 | 4 | 120 | 0.065 | 20.000 | 16.000 | 2385 | 620 | 198.6 | 32° | | |
| | | 20.00 | 4 | 120 | 0.075 | 25.000 | 20.000 | 1910 | 575 | 286.5 | 32° | | |
| | | 4.00 | 4 | 90 | 0.025 | 5.000 | 4.000 | 7160 | 715 | 14.3 | 28° | | |
| | | 5.00 | 4 | 90 | 0.025 | 6.250 | 5.000 | 5730 | 575 | 17.9 | 28° | | |
| | | 6.00 | 4 | 90 | 0.030 | 7.500 | 6.000 | 4775 | 575 | 25.8 | 28° | | |
| | | 8.00 | 4 | 90 | 0.040 | 10.000 | 8.000 | 3580 | 575 | 45.8 | 28° | | |
| 10.00 | 4 | 90 | 0.050 | 12.500 | 10.000 | 2865 | 575 | 71.6 | 28° | | | | |
| 12.00 | 4 | 90 | 0.055 | 15.000 | 12.000 | 2385 | 525 | 94.5 | 28° | | | | |
| 16.00 | 4 | 90 | 0.065 | 20.000 | 16.000 | 1790 | 465 | 149.0 | 28° | | | | |
| 20.00 | 4 | 90 | 0.075 | 25.000 | 20.000 | 1430 | 430 | 214.9 | 28° | | | | |
| | Acciaio da utensile temprato 52 - 56 HRC | 4.00 | 4 | 40 | 0.010 | 5.000 | 4.000 | 3185 | 125 | 2.5 | 24° | | |
| | | 5.00 | 4 | 40 | 0.015 | 6.250 | 5.000 | 2545 | 155 | 4.8 | 24° | | |
| | | 6.00 | 4 | 40 | 0.020 | 7.500 | 6.000 | 2120 | 170 | 7.6 | 24° | | |
| | | 8.00 | 4 | 40 | 0.025 | 10.000 | 8.000 | 1590 | 160 | 12.7 | 24° | | |
| | | 10.00 | 4 | 40 | 0.025 | 12.500 | 10.000 | 1275 | 125 | 15.9 | 24° | | |
| | | 12.00 | 4 | 40 | 0.035 | 15.000 | 12.000 | 1060 | 150 | 26.7 | 24° | | |
| | | 16.00 | 4 | 40 | 0.040 | 20.000 | 16.000 | 795 | 125 | 40.7 | 24° | | |
| | | 20.00 | 4 | 40 | 0.055 | 25.000 | 20.000 | 635 | 140 | 70.0 | 24° | | |
| | | | Leghe di titanio indurite > 300 HB [Ti6Al4V] | 4.00 | 4 | 50 | 0.015 | 5.000 | 4.000 | 3980 | 240 | 4.8 | 19° |
| | | | | 5.00 | 4 | 50 | 0.020 | 6.250 | 5.000 | 3185 | 255 | 8.0 | 19° |
| 6.00 | 4 | | | 50 | 0.025 | 7.500 | 6.000 | 2655 | 265 | 11.9 | 19° | | |
| 8.00 | 4 | | | 50 | 0.030 | 10.000 | 8.000 | 1990 | 240 | 19.1 | 19° | | |
| 10.00 | 4 | | | 50 | 0.035 | 12.500 | 10.000 | 1590 | 225 | 27.9 | 19° | | |
| 12.00 | 4 | | | 50 | 0.040 | 15.000 | 12.000 | 1325 | 210 | 38.2 | 19° | | |
| 16.00 | 4 | | | 50 | 0.050 | 20.000 | 16.000 | 995 | 200 | 63.7 | 19° | | |
| 20.00 | 4 | | | 50 | 0.060 | 25.000 | 20.000 | 795 | 190 | 95.5 | 19° | | |

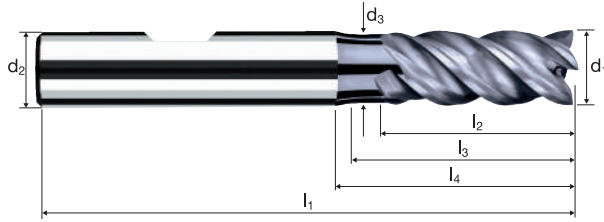
Frese cilindriche NX (NX-NVDS)

A taglienti lisci, esecuzione normale con scarico corto
Geometria frontale per fresature in penetrazione ad alto rendimento



HM MG10 λ 45°
 γ -20°

Vario



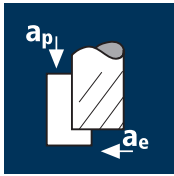
Sgrossatura HPC Sgrossatura HDC Finitura



| | | | | | | | |
|-----------------------|------------------------|------------------------|---------------------|---------------------|--|-----------------------|----------------------------|
| Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | | Ti Titanium | GG(G) Tool Steel |
|-----------------------|------------------------|------------------------|---------------------|---------------------|--|-----------------------|----------------------------|

| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r | α | z | POLYCHROM | |
|--|----------------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------|------|---|-----------|--------------|
| | | | | | | | | | | | | |
| Esempio: N° Ordine Rivestimento P Articolo 8600 Codice-ø 220 | | | | | | | | | | | | |
| | | | | | | | | | | | | P8600 |
| | | | | | | | | | | | | P8500 |
| | | | | | | | | | | | | EUR |
| 220 | 4.00 | 6.00 | 3.70 | 57 | 8.00 | 16.00 | 20.82 | 0.100 | 3.0° | 4 | | 92.00 |
| 260 | 5.00 | 6.00 | 4.60 | 57 | 10.00 | 18.00 | 21.27 | 0.100 | 1.5° | 4 | | 92.00 |
| 300 | 6.00 | 6.00 | 5.50 | 57 | 12.00 | 18.15 | 20.00 | 0.100 | 0.0° | 4 | | 92.00 |
| 391 | 8.00 | 8.00 | 7.40 | 63 | 19.00 | 23.63 | 26.00 | 0.150 | 0.0° | 4 | | 115.00 |
| 450 | 10.00 | 10.00 | 9.20 | 72 | 23.00 | 27.99 | 31.00 | 0.200 | 0.0° | 4 | | 156.00 |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 27.00 | 33.29 | 37.00 | 0.200 | 0.0° | 4 | | 193.00 |
| 610 | 16.00 | 16.00 | 15.00 | 92 | 32.00 | 38.73 | 43.00 | 0.200 | 0.0° | 4 | | 301.00 |
| 682 | 20.00 | 20.00 | 19.00 | 104 | 39.00 | 48.23 | 53.00 | 0.200 | 0.0° | 4 | | 440.00 |

Applicazione



Materiale

Acciaio
850 - 1100 N/mm²



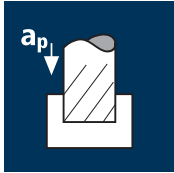
Acciaio
1100 - 1300 N/mm²



Acciaio da
utensile temprato
52 - 56 HRC



Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



Acciaio
850 - 1100 N/mm²



Acciaio
1100 - 1300 N/mm²



Acciaio da
utensile temprato
52 - 56 HRC



Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 4.00 | 4 | 150 | 0.030 | 6.000 | 1.600 | 11935 | 1430 | 13.8 |
| 5.00 | 4 | 150 | 0.035 | 7.500 | 2.000 | 9550 | 1335 | 20.1 |
| 6.00 | 4 | 150 | 0.040 | 9.000 | 2.400 | 7960 | 1275 | 27.5 |
| 8.00 | 4 | 150 | 0.050 | 12.000 | 3.200 | 5970 | 1195 | 45.8 |
| 10.00 | 4 | 150 | 0.065 | 15.000 | 4.000 | 4775 | 1240 | 74.5 |
| 12.00 | 4 | 150 | 0.075 | 18.000 | 4.800 | 3980 | 1195 | 103.1 |
| 16.00 | 4 | 150 | 0.085 | 24.000 | 6.400 | 2985 | 1015 | 155.8 |
| 20.00 | 4 | 150 | 0.100 | 30.000 | 8.000 | 2385 | 955 | 229.2 |

| | | | | | | | | |
|-------|---|-----|-------|--------|-------|------|------|-------|
| 4.00 | 4 | 115 | 0.030 | 6.000 | 1.600 | 9150 | 1100 | 10.5 |
| 5.00 | 4 | 115 | 0.035 | 7.500 | 2.000 | 7320 | 1025 | 15.4 |
| 6.00 | 4 | 115 | 0.040 | 9.000 | 2.400 | 6100 | 975 | 21.1 |
| 8.00 | 4 | 115 | 0.050 | 12.000 | 3.200 | 4575 | 915 | 35.1 |
| 10.00 | 4 | 115 | 0.065 | 15.000 | 4.000 | 3660 | 950 | 57.1 |
| 12.00 | 4 | 115 | 0.075 | 18.000 | 4.800 | 3050 | 915 | 79.1 |
| 16.00 | 4 | 115 | 0.085 | 24.000 | 6.400 | 2290 | 780 | 119.5 |
| 20.00 | 4 | 115 | 0.100 | 30.000 | 8.000 | 1830 | 730 | 175.7 |

| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 4.00 | 4 | 50 | 0.015 | 6.000 | 1.600 | 3980 | 240 | 2.3 |
| 5.00 | 4 | 50 | 0.020 | 7.500 | 2.000 | 3185 | 255 | 3.8 |
| 6.00 | 4 | 50 | 0.025 | 9.000 | 2.400 | 2655 | 265 | 5.7 |
| 8.00 | 4 | 50 | 0.030 | 12.000 | 3.200 | 1990 | 240 | 9.2 |
| 10.00 | 4 | 50 | 0.035 | 15.000 | 4.000 | 1590 | 225 | 13.4 |
| 12.00 | 4 | 50 | 0.045 | 18.000 | 4.800 | 1325 | 240 | 20.6 |
| 16.00 | 4 | 50 | 0.055 | 24.000 | 6.400 | 995 | 220 | 33.6 |
| 20.00 | 4 | 50 | 0.070 | 30.000 | 8.000 | 795 | 225 | 53.5 |

| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 4.00 | 4 | 60 | 0.020 | 6.000 | 1.600 | 4775 | 380 | 3.7 |
| 5.00 | 4 | 60 | 0.025 | 7.500 | 2.000 | 3820 | 380 | 5.7 |
| 6.00 | 4 | 60 | 0.030 | 9.000 | 2.400 | 3185 | 380 | 8.3 |
| 8.00 | 4 | 60 | 0.040 | 12.000 | 3.200 | 2385 | 380 | 14.7 |
| 10.00 | 4 | 60 | 0.045 | 15.000 | 4.000 | 1910 | 345 | 20.6 |
| 12.00 | 4 | 60 | 0.055 | 18.000 | 4.800 | 1590 | 350 | 30.3 |
| 16.00 | 4 | 60 | 0.065 | 24.000 | 6.400 | 1195 | 310 | 47.7 |
| 20.00 | 4 | 60 | 0.080 | 30.000 | 8.000 | 955 | 305 | 73.3 |

| | | | | | | | | |
|-------|---|-----|-------|--------|--------|------|-----|-------|
| 4.00 | 4 | 120 | 0.025 | 5.000 | 4.000 | 9550 | 955 | 19.1 |
| 5.00 | 4 | 120 | 0.025 | 6.250 | 5.000 | 7640 | 765 | 23.9 |
| 6.00 | 4 | 120 | 0.030 | 7.500 | 6.000 | 6365 | 765 | 34.4 |
| 8.00 | 4 | 120 | 0.040 | 10.000 | 8.000 | 4775 | 765 | 61.1 |
| 10.00 | 4 | 120 | 0.050 | 12.500 | 10.000 | 3820 | 765 | 95.5 |
| 12.00 | 4 | 120 | 0.055 | 15.000 | 12.000 | 3185 | 700 | 126.1 |
| 16.00 | 4 | 120 | 0.065 | 20.000 | 16.000 | 2385 | 620 | 198.6 |
| 20.00 | 4 | 120 | 0.075 | 25.000 | 20.000 | 1910 | 575 | 286.5 |

| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|-------|
| 4.00 | 4 | 90 | 0.025 | 5.000 | 4.000 | 7160 | 715 | 14.3 |
| 5.00 | 4 | 90 | 0.025 | 6.250 | 5.000 | 5730 | 575 | 17.9 |
| 6.00 | 4 | 90 | 0.030 | 7.500 | 6.000 | 4775 | 575 | 25.8 |
| 8.00 | 4 | 90 | 0.040 | 10.000 | 8.000 | 3580 | 575 | 45.8 |
| 10.00 | 4 | 90 | 0.050 | 12.500 | 10.000 | 2865 | 575 | 71.6 |
| 12.00 | 4 | 90 | 0.055 | 15.000 | 12.000 | 2385 | 525 | 94.5 |
| 16.00 | 4 | 90 | 0.065 | 20.000 | 16.000 | 1790 | 465 | 149.0 |
| 20.00 | 4 | 90 | 0.075 | 25.000 | 20.000 | 1430 | 430 | 214.9 |

| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 4.00 | 4 | 40 | 0.010 | 5.000 | 4.000 | 3185 | 125 | 2.5 |
| 5.00 | 4 | 40 | 0.015 | 6.250 | 5.000 | 2545 | 155 | 4.8 |
| 6.00 | 4 | 40 | 0.020 | 7.500 | 6.000 | 2120 | 170 | 7.6 |
| 8.00 | 4 | 40 | 0.025 | 10.000 | 8.000 | 1590 | 160 | 12.7 |
| 10.00 | 4 | 40 | 0.025 | 12.500 | 10.000 | 1275 | 125 | 15.9 |
| 12.00 | 4 | 40 | 0.035 | 15.000 | 12.000 | 1060 | 150 | 26.7 |
| 16.00 | 4 | 40 | 0.040 | 20.000 | 16.000 | 795 | 125 | 40.7 |
| 20.00 | 4 | 40 | 0.055 | 25.000 | 20.000 | 635 | 140 | 70.0 |

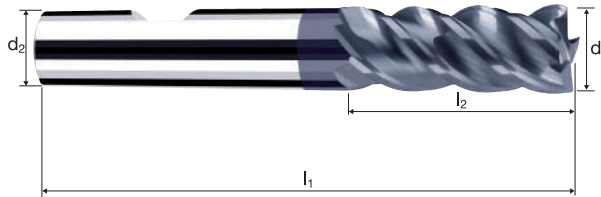
| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 4.00 | 4 | 50 | 0.015 | 5.000 | 4.000 | 3980 | 240 | 4.8 |
| 5.00 | 4 | 50 | 0.020 | 6.250 | 5.000 | 3185 | 255 | 8.0 |
| 6.00 | 4 | 50 | 0.025 | 7.500 | 6.000 | 2655 | 265 | 11.9 |
| 8.00 | 4 | 50 | 0.030 | 10.000 | 8.000 | 1990 | 240 | 19.1 |
| 10.00 | 4 | 50 | 0.035 | 12.500 | 10.000 | 1590 | 225 | 27.9 |
| 12.00 | 4 | 50 | 0.040 | 15.000 | 12.000 | 1325 | 210 | 38.2 |
| 16.00 | 4 | 50 | 0.050 | 20.000 | 16.000 | 995 | 200 | 63.7 |
| 20.00 | 4 | 50 | 0.060 | 25.000 | 20.000 | 795 | 190 | 95.5 |

Frese cilindriche NX (NX-NVD)

A taglienti lisci, esecuzione normale



HM λ 45°
MG10 γ -20°



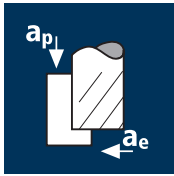
Sgrossatura HPC Sgrossatura HDC Finitura



| | | | | | | | |
|-----------------------|------------------------|------------------------|---------------------|---------------------|--|-----------------------|----------------------------|
| Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | | Ti Titanium | GG(G) Tool Steel |
|-----------------------|------------------------|------------------------|---------------------|---------------------|--|-----------------------|----------------------------|

| Esempio: N° Ordine | Rivestimento | | Articolo | | Codice-Ø | | | | | | POLYCHROM | |
|-----------------------|----------------------|----------------------|----------------|----------------|----------------|------|------|---|--|--|-----------|--------|
| | P | 15322 | 180 | | | | | | | | P15322 | |
| Ø Code | d ₁ e8 | d ₂ h6 | l ₁ | l ₂ | l ₄ | 45° | α | z | | | | EUR |
| 180 | 3.00 | 6.00 | 57 | 8.00 | 15.56 | 0.10 | 6.0° | 4 | | | | 80.00 |
| 220 | 4.00 | 6.00 | 57 | 8.00 | 14.59 | 0.10 | 4.5° | 4 | | | | 80.00 |
| 260 | 5.00 | 6.00 | 57 | 10.00 | 14.72 | 0.15 | 2.5° | 4 | | | | 80.00 |
| 300 | 6.00 | 6.00 | 57 | 12.00 | - | 0.15 | 0.0° | 4 | | | | 80.00 |
| 391 | 8.00 | 8.00 | 63 | 19.00 | - | 0.15 | 0.0° | 4 | | | | 100.00 |
| 450 | 10.00 | 10.00 | 72 | 23.00 | - | 0.20 | 0.0° | 4 | | | | 136.00 |
| 501 | 12.00 | 12.00 | 83 | 27.00 | - | 0.20 | 0.0° | 4 | | | | 167.00 |
| 610 | 16.00 | 16.00 | 92 | 32.00 | - | 0.20 | 0.0° | 4 | | | | 262.00 |
| 682 | 20.00 | 20.00 | 104 | 39.00 | - | 0.20 | 0.0° | 4 | | | | 382.00 |
| | | | | | | | | | | | | |
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| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

Applicazione



Materiale

Leghe a base di nichel
ricotte
Rm <1000 N/mm²
[Inconel 718]



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 3.00 | 4 | 35 | 0.010 | 5.400 | 1.800 | 3715 | 150 | 1.4 |
| 4.00 | 4 | 35 | 0.015 | 7.200 | 2.400 | 2785 | 165 | 2.9 |
| 5.00 | 4 | 35 | 0.020 | 9.000 | 3.000 | 2230 | 180 | 4.8 |
| 6.00 | 4 | 35 | 0.020 | 10.800 | 3.600 | 1855 | 150 | 5.8 |
| 8.00 | 4 | 35 | 0.030 | 14.400 | 4.800 | 1395 | 165 | 11.6 |
| 10.00 | 4 | 35 | 0.035 | 18.000 | 6.000 | 1115 | 155 | 16.8 |
| 12.00 | 4 | 35 | 0.045 | 21.600 | 7.200 | 930 | 165 | 26.0 |
| 16.00 | 4 | 35 | 0.050 | 28.800 | 9.600 | 695 | 140 | 38.5 |
| 20.00 | 4 | 35 | 0.060 | 36.000 | 12.000 | 555 | 135 | 57.8 |

Leghe a base di nichel
indurite
Rm > 1000 N/mm²
[Inconel 718]



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 3.00 | 4 | 25 | 0.010 | 5.400 | 1.800 | 2655 | 105 | 1.0 |
| 4.00 | 4 | 25 | 0.010 | 7.200 | 2.400 | 1990 | 80 | 1.4 |
| 5.00 | 4 | 25 | 0.015 | 9.000 | 3.000 | 1590 | 95 | 2.6 |
| 6.00 | 4 | 25 | 0.015 | 10.800 | 3.600 | 1325 | 80 | 3.1 |
| 8.00 | 4 | 25 | 0.025 | 14.400 | 4.800 | 995 | 100 | 6.9 |
| 10.00 | 4 | 25 | 0.030 | 18.000 | 6.000 | 795 | 95 | 10.3 |
| 12.00 | 4 | 25 | 0.035 | 21.600 | 7.200 | 665 | 95 | 14.4 |
| 16.00 | 4 | 25 | 0.040 | 28.800 | 9.600 | 495 | 80 | 22.0 |
| 20.00 | 4 | 25 | 0.050 | 36.000 | 12.000 | 400 | 80 | 34.4 |

Acciaio al manganese
Mn >5%
[1.3964 / Nitronic]
[1.3401 / X120Mn12]



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 3.00 | 4 | 40 | 0.010 | 5.400 | 1.800 | 4245 | 170 | 1.7 |
| 4.00 | 4 | 40 | 0.015 | 7.200 | 2.400 | 3185 | 190 | 3.3 |
| 5.00 | 4 | 40 | 0.020 | 9.000 | 3.000 | 2545 | 205 | 5.5 |
| 6.00 | 4 | 40 | 0.020 | 10.800 | 3.600 | 2120 | 170 | 6.6 |
| 8.00 | 4 | 40 | 0.030 | 14.400 | 4.800 | 1590 | 190 | 13.2 |
| 10.00 | 4 | 40 | 0.035 | 18.000 | 6.000 | 1275 | 180 | 19.3 |
| 12.00 | 4 | 40 | 0.045 | 21.600 | 7.200 | 1060 | 190 | 29.7 |
| 16.00 | 4 | 40 | 0.050 | 28.800 | 9.600 | 795 | 160 | 44.0 |
| 20.00 | 4 | 40 | 0.060 | 36.000 | 12.000 | 635 | 155 | 66.0 |

Inox difficile
[Cr-Ni-Mo+/1.4529]
Acciaio resistente al calore
[1.4841]



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|-------|
| 3.00 | 4 | 50 | 0.015 | 5.400 | 1.800 | 5305 | 320 | 3.1 |
| 4.00 | 4 | 50 | 0.020 | 7.200 | 2.400 | 3980 | 320 | 5.5 |
| 5.00 | 4 | 50 | 0.030 | 9.000 | 3.000 | 3185 | 380 | 10.3 |
| 6.00 | 4 | 50 | 0.035 | 10.800 | 3.600 | 2655 | 370 | 14.4 |
| 8.00 | 4 | 50 | 0.045 | 14.400 | 4.800 | 1990 | 360 | 24.8 |
| 10.00 | 4 | 50 | 0.055 | 18.000 | 6.000 | 1590 | 350 | 37.8 |
| 12.00 | 4 | 50 | 0.065 | 21.600 | 7.200 | 1325 | 345 | 53.6 |
| 16.00 | 4 | 50 | 0.070 | 28.800 | 9.600 | 995 | 280 | 77.0 |
| 20.00 | 4 | 50 | 0.085 | 36.000 | 12.000 | 795 | 270 | 116.9 |

Acciaio rapido PM
ricotto
[Böhler S390]
[ASP 2023]

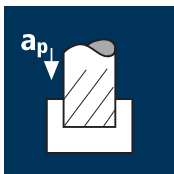


| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|-------|
| 3.00 | 4 | 80 | 0.010 | 5.400 | 1.800 | 8490 | 340 | 3.3 |
| 4.00 | 4 | 80 | 0.015 | 7.200 | 2.400 | 6365 | 380 | 6.6 |
| 5.00 | 4 | 80 | 0.020 | 9.000 | 3.000 | 5095 | 405 | 11.0 |
| 6.00 | 4 | 80 | 0.020 | 10.800 | 3.600 | 4245 | 340 | 13.2 |
| 8.00 | 4 | 80 | 0.030 | 14.400 | 4.800 | 3185 | 380 | 26.4 |
| 10.00 | 4 | 80 | 0.035 | 18.000 | 6.000 | 2545 | 355 | 38.5 |
| 12.00 | 4 | 80 | 0.045 | 21.600 | 7.200 | 2120 | 380 | 59.4 |
| 16.00 | 4 | 80 | 0.050 | 28.800 | 9.600 | 1590 | 320 | 88.0 |
| 20.00 | 4 | 80 | 0.060 | 36.000 | 12.000 | 1275 | 305 | 132.0 |

Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|-------|
| 3.00 | 4 | 70 | 0.010 | 5.400 | 1.800 | 7425 | 295 | 2.9 |
| 4.00 | 4 | 70 | 0.015 | 7.200 | 2.400 | 5570 | 335 | 5.8 |
| 5.00 | 4 | 70 | 0.015 | 9.000 | 3.000 | 4455 | 265 | 7.2 |
| 6.00 | 4 | 70 | 0.020 | 10.800 | 3.600 | 3715 | 295 | 11.6 |
| 8.00 | 4 | 70 | 0.025 | 14.400 | 4.800 | 2785 | 280 | 19.3 |
| 10.00 | 4 | 70 | 0.035 | 18.000 | 6.000 | 2230 | 310 | 33.7 |
| 12.00 | 4 | 70 | 0.040 | 21.600 | 7.200 | 1855 | 295 | 46.2 |
| 16.00 | 4 | 70 | 0.045 | 28.800 | 9.600 | 1395 | 250 | 69.3 |
| 20.00 | 4 | 70 | 0.055 | 36.000 | 12.000 | 1115 | 245 | 105.9 |



Leghe a base di nichel
ricotte
Rm <1000 N/mm²
[Inconel 718]



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 3.00 | 4 | 25 | 0.010 | 4.200 | 3.000 | 2655 | 105 | 1.3 |
| 4.00 | 4 | 25 | 0.010 | 5.600 | 4.000 | 1990 | 80 | 1.8 |
| 5.00 | 4 | 25 | 0.015 | 7.000 | 5.000 | 1590 | 95 | 3.3 |
| 6.00 | 4 | 25 | 0.015 | 8.400 | 6.000 | 1325 | 80 | 4.0 |
| 8.00 | 4 | 25 | 0.025 | 11.200 | 8.000 | 995 | 100 | 8.9 |
| 10.00 | 4 | 25 | 0.030 | 14.000 | 10.000 | 795 | 95 | 13.4 |
| 12.00 | 4 | 25 | 0.035 | 16.800 | 12.000 | 665 | 95 | 18.7 |
| 16.00 | 4 | 25 | 0.040 | 22.400 | 16.000 | 495 | 80 | 28.5 |
| 20.00 | 4 | 25 | 0.050 | 28.000 | 20.000 | 400 | 80 | 44.6 |

Leghe a base di nichel
indurite
Rm > 1000 N/mm²
[Inconel 718]



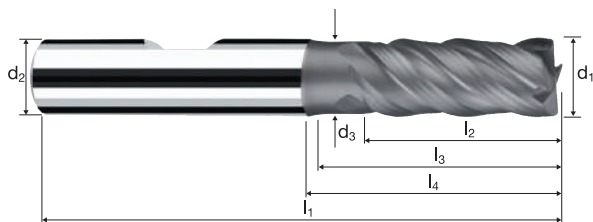
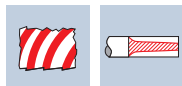
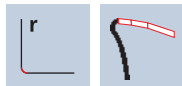
| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|----|------|
| 3.00 | 4 | 20 | 0.005 | 4.200 | 3.000 | 2120 | 40 | 0.5 |
| 4.00 | 4 | 20 | 0.010 | 5.600 | 4.000 | 1590 | 65 | 1.4 |
| 5.00 | 4 | 20 | 0.010 | 7.000 | 5.000 | 1275 | 50 | 1.8 |
| 6.00 | 4 | 20 | 0.015 | 8.400 | 6.000 | 1060 | 65 | 3.2 |
| 8.00 | 4 | 20 | 0.020 | 11.200 | 8.000 | 795 | 65 | 5.7 |
| 10.00 | 4 | 20 | 0.020 | 14.000 | 10.000 | 635 | 50 | 7.1 |
| 12.00 | 4 | 20 | 0.025 | 16.800 | 12.000 | 530 | 55 | 10.7 |
| 16.00 | 4 | 20 | 0.030 | 22.400 | 16.000 | 400 | 50 | 17.1 |
| 20.00 | 4 | 20 | 0.040 | 28.000 | 20.000 | 320 | 50 | 28.5 |

Frese cilindriche ZX (ZX-NV)

A taglienti lisci, esecuzione normale con scarico corto



HM
MG10 λ 40°
 γ 5°



Sgrossatura

Finitura

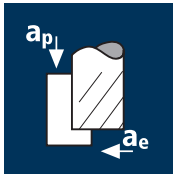


ReTool®

| | | | | | | | | | |
|--|--|--|--|--|--|--|-------------------|----------------|---------------------------------------|
| | | | | | | | Inox Stainless | Ti Titanium | Nickel-Alloys Mangan-Steels HSS |
|--|--|--|--|--|--|--|-------------------|----------------|---------------------------------------|

| Esempio: N° Ordine | Rivestimento | | Articolo | Codice-ø | | | | | | | TICUT | POLYCHROM |
|---|----------------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------|------|-------|--------|-----------|
| | P | | 8800 | 180 | | | | | | | 18800 | P8800 |
| | | | | | | | | | | 18700 | P8700 | |
| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r | α | z | EUR | EUR |
| 180 | 3.00 | 6.00 | 2.80 | 57 | 8.00 | 14.00 | 20.37 | 0.100 | 4.5° | 4 | 95.00 | 93.00 |
| 220 | 4.00 | 6.00 | 3.70 | 57 | 11.00 | 16.00 | 20.82 | 0.100 | 3.0° | 4 | 95.00 | 93.00 |
| 260 | 5.00 | 6.00 | 4.60 | 57 | 13.00 | 18.00 | 21.27 | 0.150 | 1.5° | 4 | 95.00 | 93.00 |
| 300 | 6.00 | 6.00 | 5.50 | 57 | 13.00 | 18.15 | 20.00 | 0.150 | 0.0° | 4 | 95.00 | 93.00 |
| 391 | 8.00 | 8.00 | 7.40 | 63 | 19.00 | 23.63 | 26.00 | 0.150 | 0.0° | 4 | 118.00 | 116.00 |
| 450 | 10.00 | 10.00 | 9.20 | 72 | 22.00 | 27.99 | 31.00 | 0.200 | 0.0° | 4 | 161.00 | 157.00 |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 26.00 | 33.29 | 37.00 | 0.200 | 0.0° | 4 | 199.00 | 194.00 |
| 610 | 16.00 | 16.00 | 15.00 | 92 | 32.00 | 38.73 | 43.00 | 0.300 | 0.0° | 4 | 311.00 | 304.00 |
| 682 | 20.00 | 20.00 | 19.00 | 104 | 38.00 | 48.23 | 53.00 | 0.300 | 0.0° | 4 | 454.00 | 444.00 |
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| I Disponibilità e date di consegna su richiesta | | | | | | | | | | | | |

Applicazione



Materiale

Leghe a base di nichel
ricotte
Rm < 1000 N/mm²
[Inconel 718]



Leghe a base di nichel
indurite
Rm > 1000 N/mm²
[Inconel 718]



Acciaio al manganese
Mn > 5%
[1.3964 / Nitronic]
[1.3401 / X120Mn12]



Inox difficult
[Cr-Ni-Mo++/1.4529]
Acciaio resistente al calore
[1.4841]



Acciaio rapido PM
ricotto
[Böhler S390]
[ASP 2023]



Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 6.00 | 5 | 45 | 0.020 | 10.800 | 1.200 | 2385 | 240 | 3.1 |
| 8.00 | 5 | 45 | 0.030 | 14.400 | 1.600 | 1790 | 270 | 6.2 |
| 10.00 | 5 | 45 | 0.035 | 18.000 | 2.000 | 1430 | 250 | 9.0 |
| 12.00 | 5 | 45 | 0.045 | 21.600 | 2.400 | 1195 | 270 | 13.9 |
| 16.00 | 5 | 45 | 0.050 | 28.800 | 3.200 | 895 | 225 | 20.6 |
| 20.00 | 5 | 45 | 0.060 | 36.000 | 4.000 | 715 | 215 | 30.9 |

| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 6.00 | 5 | 30 | 0.015 | 10.800 | 1.200 | 1590 | 120 | 1.5 |
| 8.00 | 5 | 30 | 0.025 | 14.400 | 1.600 | 1195 | 150 | 3.4 |
| 10.00 | 5 | 30 | 0.030 | 18.000 | 2.000 | 955 | 145 | 5.2 |
| 12.00 | 5 | 30 | 0.035 | 21.600 | 2.400 | 795 | 140 | 7.2 |
| 16.00 | 5 | 30 | 0.040 | 28.800 | 3.200 | 595 | 120 | 11.0 |
| 20.00 | 5 | 30 | 0.050 | 36.000 | 4.000 | 475 | 120 | 17.2 |

| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 6.00 | 5 | 50 | 0.020 | 10.800 | 1.200 | 2655 | 265 | 3.4 |
| 8.00 | 5 | 50 | 0.030 | 14.400 | 1.600 | 1990 | 300 | 6.9 |
| 10.00 | 5 | 50 | 0.035 | 18.000 | 2.000 | 1590 | 280 | 10.0 |
| 12.00 | 5 | 50 | 0.045 | 21.600 | 2.400 | 1325 | 300 | 15.5 |
| 16.00 | 5 | 50 | 0.050 | 28.800 | 3.200 | 995 | 250 | 22.9 |
| 20.00 | 5 | 50 | 0.060 | 36.000 | 4.000 | 795 | 240 | 34.4 |

| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 6.00 | 5 | 60 | 0.035 | 10.800 | 1.200 | 3185 | 555 | 7.2 |
| 8.00 | 5 | 60 | 0.045 | 14.400 | 1.600 | 2385 | 535 | 12.4 |
| 10.00 | 5 | 60 | 0.055 | 18.000 | 2.000 | 1910 | 525 | 18.9 |
| 12.00 | 5 | 60 | 0.065 | 21.600 | 2.400 | 1590 | 515 | 26.8 |
| 16.00 | 5 | 60 | 0.070 | 28.800 | 3.200 | 1195 | 420 | 38.5 |
| 20.00 | 5 | 60 | 0.085 | 36.000 | 4.000 | 955 | 405 | 58.4 |

| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 6.00 | 5 | 90 | 0.020 | 10.800 | 1.200 | 4775 | 475 | 6.2 |
| 8.00 | 5 | 90 | 0.030 | 14.400 | 1.600 | 3580 | 535 | 12.4 |
| 10.00 | 5 | 90 | 0.035 | 18.000 | 2.000 | 2865 | 500 | 18.0 |
| 12.00 | 5 | 90 | 0.045 | 21.600 | 2.400 | 2385 | 535 | 27.8 |
| 16.00 | 5 | 90 | 0.050 | 28.800 | 3.200 | 1790 | 450 | 41.3 |
| 20.00 | 5 | 90 | 0.060 | 36.000 | 4.000 | 1430 | 430 | 61.9 |

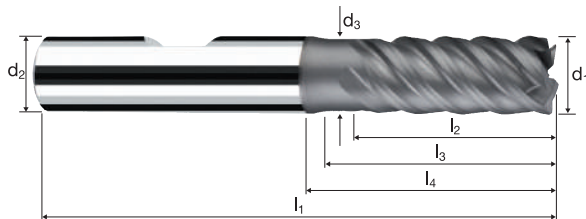
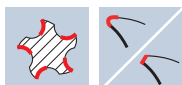
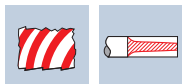
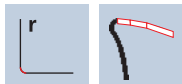
| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 6.00 | 5 | 85 | 0.020 | 10.800 | 1.200 | 4510 | 450 | 5.8 |
| 8.00 | 5 | 85 | 0.025 | 14.400 | 1.600 | 3380 | 425 | 9.7 |
| 10.00 | 5 | 85 | 0.035 | 18.000 | 2.000 | 2705 | 475 | 17.0 |
| 12.00 | 5 | 85 | 0.040 | 21.600 | 2.400 | 2255 | 450 | 23.4 |
| 16.00 | 5 | 85 | 0.045 | 28.800 | 3.200 | 1690 | 380 | 35.1 |
| 20.00 | 5 | 85 | 0.055 | 36.000 | 4.000 | 1355 | 370 | 53.6 |

Frese cilindriche ZX (ZX-NV5)

A taglienti lisci, esecuzione normale con scarico corto



HM
MG10 λ 40°
 γ 5°



Sgrossatura



Finitura

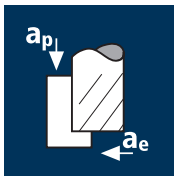


ReTool®



| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r | z | TICUT | POLYCHROM | |
|---|----------------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------|---|--------|--------------|--------------|
| | | | | | | | | | | EUR | EUR | |
| Esempio: N° Ordine Rivestimento P Articolo 8805 Codice-Ø 300 | | | | | | | | | | | 18805 | P8805 |
| | | | | | | | | | | | 18705 | P8705 |
| 300 | 6.00 | 6.00 | 5.50 | 57 | 13.00 | 18.15 | 20.00 | 0.150 | 5 | 100.00 | 98.00 | |
| 391 | 8.00 | 8.00 | 7.40 | 63 | 19.00 | 23.63 | 26.00 | 0.150 | 5 | 125.00 | 122.00 | |
| 450 | 10.00 | 10.00 | 9.20 | 72 | 22.00 | 27.99 | 31.00 | 0.200 | 5 | 170.00 | 166.00 | |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 26.00 | 33.29 | 37.00 | 0.200 | 5 | 210.00 | 205.00 | |
| 610 | 16.00 | 16.00 | 15.00 | 92 | 32.00 | 38.73 | 43.00 | 0.300 | 5 | 329.00 | 321.00 | |
| 682 | 20.00 | 20.00 | 19.00 | 104 | 38.00 | 48.23 | 53.00 | 0.300 | 5 | 480.00 | 469.00 | |
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| I Disponibilità e date di consegna su richiesta | | | | | | | | | | | | |

Applicazione



Materiale

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 3.00 | 4 | 96 | 0.015 | 3.750 | 1.200 | 10185 | 610 | 2.8 |
| 4.00 | 4 | 96 | 0.020 | 5.000 | 1.600 | 7640 | 610 | 4.9 |
| 5.00 | 4 | 80 | 0.023 | 6.250 | 3.250 | 5095 | 470 | 9.5 |
| 6.00 | 4 | 80 | 0.027 | 9.000 | 3.900 | 4245 | 460 | 16.1 |
| 8.00 | 4 | 80 | 0.036 | 12.000 | 5.200 | 3185 | 460 | 28.6 |
| 10.00 | 4 | 80 | 0.045 | 15.000 | 6.500 | 2545 | 460 | 44.7 |
| 12.00 | 4 | 80 | 0.054 | 18.000 | 7.800 | 2120 | 460 | 64.4 |
| 16.00 | 4 | 80 | 0.064 | 20.000 | 10.400 | 1590 | 405 | 84.7 |
| 20.00 | 4 | 80 | 0.080 | 25.000 | 13.000 | 1275 | 405 | 132.4 |

Inox medium
[Cr-Ni-Mo+/1.4539]
Acciaio duplex
[17-4 PH]



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 3.00 | 4 | 59 | 0.014 | 3.750 | 1.200 | 6260 | 340 | 1.5 |
| 4.00 | 4 | 59 | 0.020 | 5.000 | 1.600 | 4695 | 375 | 3.0 |
| 5.00 | 4 | 59 | 0.023 | 6.250 | 3.250 | 3755 | 340 | 6.9 |
| 6.00 | 4 | 59 | 0.027 | 9.000 | 3.900 | 3130 | 340 | 11.9 |
| 8.00 | 4 | 59 | 0.036 | 12.000 | 5.200 | 2350 | 340 | 21.1 |
| 10.00 | 4 | 59 | 0.045 | 15.000 | 6.500 | 1880 | 340 | 33.0 |
| 12.00 | 4 | 59 | 0.054 | 18.000 | 7.800 | 1565 | 340 | 47.5 |
| 16.00 | 4 | 59 | 0.064 | 20.000 | 10.400 | 1175 | 300 | 62.5 |
| 20.00 | 4 | 59 | 0.080 | 25.000 | 13.000 | 940 | 300 | 97.7 |

Inox difficile
[Cr-Ni-Mo+/1.4529]
Acciaio resistente al calore
[1.4841]



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 3.00 | 4 | 48 | 0.014 | 3.750 | 1.200 | 5095 | 275 | 1.2 |
| 4.00 | 4 | 48 | 0.018 | 5.000 | 1.600 | 3820 | 275 | 2.2 |
| 5.00 | 4 | 44 | 0.020 | 6.250 | 3.250 | 2800 | 225 | 4.6 |
| 6.00 | 4 | 44 | 0.024 | 9.000 | 3.900 | 2335 | 225 | 7.9 |
| 8.00 | 4 | 44 | 0.032 | 12.000 | 5.200 | 1750 | 225 | 14.0 |
| 10.00 | 4 | 44 | 0.040 | 15.000 | 6.500 | 1400 | 225 | 21.8 |
| 12.00 | 4 | 44 | 0.048 | 18.000 | 7.800 | 1165 | 225 | 31.5 |
| 16.00 | 4 | 44 | 0.056 | 20.000 | 10.400 | 875 | 195 | 40.8 |
| 20.00 | 4 | 44 | 0.070 | 25.000 | 13.000 | 700 | 195 | 63.7 |

Inox martensitic
C < 0.3%
[Cr/1.4021]



| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|-------|
| 3.00 | 4 | 122 | 0.020 | 3.750 | 1.200 | 12945 | 1010 | 4.5 |
| 4.00 | 4 | 122 | 0.026 | 5.000 | 1.600 | 9710 | 1010 | 8.1 |
| 5.00 | 4 | 102 | 0.030 | 6.250 | 3.250 | 6495 | 780 | 15.8 |
| 6.00 | 4 | 102 | 0.036 | 9.000 | 3.900 | 5410 | 780 | 27.4 |
| 8.00 | 4 | 102 | 0.048 | 12.000 | 5.200 | 4060 | 780 | 48.6 |
| 10.00 | 4 | 102 | 0.060 | 15.000 | 6.500 | 3245 | 780 | 76.0 |
| 12.00 | 4 | 102 | 0.072 | 18.000 | 7.800 | 2705 | 780 | 109.4 |
| 16.00 | 4 | 102 | 0.088 | 20.000 | 10.400 | 2030 | 715 | 148.6 |
| 20.00 | 4 | 102 | 0.110 | 25.000 | 13.000 | 1625 | 715 | 232.1 |



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|-------|
| 3.00 | 4 | 70 | 0.009 | 2.250 | 3.000 | 7425 | 265 | 1.8 |
| 4.00 | 4 | 70 | 0.012 | 3.000 | 4.000 | 5570 | 265 | 3.2 |
| 5.00 | 4 | 70 | 0.015 | 6.250 | 5.000 | 4455 | 265 | 8.3 |
| 6.00 | 4 | 70 | 0.022 | 9.000 | 6.000 | 3715 | 320 | 17.3 |
| 8.00 | 4 | 70 | 0.029 | 12.000 | 8.000 | 2785 | 320 | 30.8 |
| 10.00 | 4 | 70 | 0.036 | 15.000 | 10.000 | 2230 | 320 | 48.1 |
| 12.00 | 4 | 70 | 0.043 | 18.000 | 12.000 | 1855 | 320 | 69.3 |
| 16.00 | 4 | 70 | 0.051 | 20.000 | 16.000 | 1395 | 285 | 91.3 |
| 20.00 | 4 | 70 | 0.064 | 25.000 | 20.000 | 1115 | 285 | 142.6 |

Inox medium
[Cr-Ni-Mo+/1.4539]
Acciaio duplex
[17-4 PH]



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|-------|
| 3.00 | 4 | 47 | 0.008 | 2.250 | 3.000 | 4985 | 160 | 1.1 |
| 4.00 | 4 | 47 | 0.012 | 3.000 | 4.000 | 3740 | 180 | 2.2 |
| 5.00 | 4 | 52 | 0.015 | 6.250 | 5.000 | 3310 | 195 | 6.1 |
| 6.00 | 4 | 52 | 0.022 | 9.000 | 6.000 | 2760 | 240 | 12.9 |
| 8.00 | 4 | 52 | 0.029 | 12.000 | 8.000 | 2070 | 240 | 22.9 |
| 10.00 | 4 | 52 | 0.036 | 15.000 | 10.000 | 1655 | 240 | 35.8 |
| 12.00 | 4 | 52 | 0.043 | 18.000 | 12.000 | 1380 | 240 | 51.5 |
| 16.00 | 4 | 52 | 0.051 | 20.000 | 16.000 | 1035 | 210 | 67.8 |
| 20.00 | 4 | 52 | 0.064 | 25.000 | 20.000 | 830 | 210 | 105.9 |

Inox difficile
[Cr-Ni-Mo+/1.4529]
Acciaio resistente al calore
[1.4841]



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 3.00 | 4 | 39 | 0.008 | 2.250 | 3.000 | 4140 | 135 | 0.9 |
| 4.00 | 4 | 39 | 0.011 | 3.000 | 4.000 | 3105 | 135 | 1.6 |
| 5.00 | 4 | 39 | 0.013 | 6.250 | 5.000 | 2485 | 130 | 4.0 |
| 6.00 | 4 | 39 | 0.019 | 9.000 | 6.000 | 2070 | 160 | 8.6 |
| 8.00 | 4 | 39 | 0.026 | 12.000 | 8.000 | 1550 | 160 | 15.3 |
| 10.00 | 4 | 39 | 0.032 | 15.000 | 10.000 | 1240 | 160 | 23.8 |
| 12.00 | 4 | 39 | 0.038 | 18.000 | 12.000 | 1035 | 160 | 34.3 |
| 16.00 | 4 | 39 | 0.045 | 20.000 | 16.000 | 775 | 140 | 44.5 |
| 20.00 | 4 | 39 | 0.056 | 25.000 | 20.000 | 620 | 140 | 69.5 |

Inox martensitic
C < 0.3%
[Cr/1.4021]



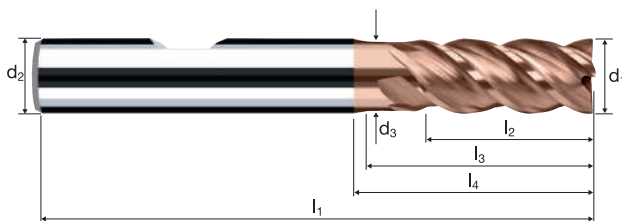
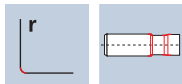
| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|-------|
| 3.00 | 4 | 89 | 0.009 | 2.250 | 3.000 | 9445 | 340 | 2.3 |
| 4.00 | 4 | 89 | 0.012 | 3.000 | 4.000 | 7080 | 340 | 4.1 |
| 5.00 | 4 | 89 | 0.015 | 5.000 | 5.000 | 5665 | 340 | 8.5 |
| 6.00 | 4 | 89 | 0.022 | 7.500 | 6.000 | 4720 | 410 | 18.4 |
| 8.00 | 4 | 89 | 0.029 | 10.000 | 8.000 | 3540 | 410 | 32.6 |
| 10.00 | 4 | 89 | 0.036 | 12.500 | 10.000 | 2835 | 410 | 51.0 |
| 12.00 | 4 | 89 | 0.043 | 15.000 | 12.000 | 2360 | 410 | 73.4 |
| 16.00 | 4 | 89 | 0.053 | 16.000 | 16.000 | 1770 | 375 | 95.7 |
| 20.00 | 4 | 89 | 0.066 | 20.000 | 20.000 | 1415 | 375 | 149.6 |

Frese cilindriche SX

A taglienti lisci, esecuzione normale con scarico corto



HM
MG10 λ 43°
 γ 3°



new!

Sgrossatura HPC Sgrossatura HDC Finitura

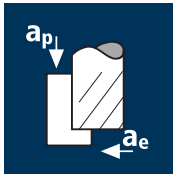


ReTool®

| | | | | | | | | | | | | |
|-------------|--|--|--|--|--|--|--|--|--|-------------------|----------------|--|
| Rm < 850 | | | | | | | | | | Inox Stainless | Ti Titanium | Nickel-Alloys Mangan-Steels Tool Steel |
|-------------|--|--|--|--|--|--|--|--|--|-------------------|----------------|--|

| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r | α | z | Esempio: N° Ordine | | Rivestimento | | Articolo | | Codice-ø | | DURO-Si | | | |
|-----------|----------------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------|------|---|-----------------------|------|--------------|------|----------|-----|----------|--|---------|--|--------|--------|
| | | | | | | | | | | | H | 8606 | H | 8606 | 180 | 180 | | | | | | |
| 180 | 3.00 | 6.00 | 2.80 | 57 | 8.00 | 14.00 | 20.37 | 0.050 | 4.5° | 4 | | | | | | | | | | | H8606 | |
| 220 | 4.00 | 6.00 | 3.70 | 57 | 11.00 | 16.00 | 20.82 | 0.100 | 3.0° | 4 | | | | | | | | | | | H8506 | |
| 260 | 5.00 | 6.00 | 4.60 | 57 | 13.00 | 18.00 | 21.27 | 0.100 | 1.5° | 4 | | | | | | | | | | | EUR | |
| 300 | 6.00 | 6.00 | 5.50 | 57 | 13.00 | 18.15 | 20.00 | 0.150 | 0.0° | 4 | | | | | | | | | | | 83.00 | |
| 391 | 8.00 | 8.00 | 7.40 | 63 | 19.00 | 23.63 | 26.00 | 0.150 | 0.0° | 4 | | | | | | | | | | | 83.00 | |
| 450 | 10.00 | 10.00 | 9.20 | 72 | 22.00 | 27.99 | 31.00 | 0.200 | 0.0° | 4 | | | | | | | | | | | 83.00 | |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 26.00 | 33.29 | 37.00 | 0.200 | 0.0° | 4 | | | | | | | | | | | 104.00 | |
| 610 | 16.00 | 16.00 | 15.00 | 92 | 32.00 | 38.73 | 43.00 | 0.200 | 0.0° | 4 | | | | | | | | | | | 142.00 | |
| 682 | 20.00 | 20.00 | 19.00 | 104 | 38.00 | 48.23 | 53.00 | 0.250 | 0.0° | 4 | | | | | | | | | | | 175.00 | |
| | | | | | | | | | | | | | | | | | | | | | 274.00 | |
| | | | | | | | | | | | | | | | | | | | | | | 399.00 |

Applicazione



Materiale

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 3.00 | 4 | 80 | 0.010 | 4.500 | 1.200 | 8490 | 340 | 1.8 |
| 4.00 | 4 | 80 | 0.015 | 6.000 | 1.600 | 6365 | 380 | 3.7 |
| 5.00 | 4 | 80 | 0.020 | 7.500 | 2.000 | 5095 | 405 | 6.1 |
| 6.00 | 4 | 80 | 0.025 | 9.000 | 2.400 | 4245 | 425 | 9.2 |
| 8.00 | 4 | 80 | 0.035 | 12.000 | 3.200 | 3185 | 445 | 17.1 |
| 10.00 | 4 | 80 | 0.045 | 15.000 | 4.000 | 2545 | 460 | 27.5 |
| 12.00 | 4 | 80 | 0.050 | 18.000 | 4.800 | 2120 | 425 | 36.7 |
| 16.00 | 4 | 80 | 0.075 | 24.000 | 3.200 | 1590 | 475 | 36.7 |

Inox medium
[Cr-Ni-Mo+/1.4539]
Acciaio duplex
[17-4 PH]



| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 3.00 | 4 | 40 | 0.010 | 4.500 | 1.200 | 4245 | 170 | 0.9 |
| 4.00 | 4 | 40 | 0.015 | 6.000 | 1.600 | 3185 | 190 | 1.8 |
| 5.00 | 4 | 40 | 0.020 | 7.500 | 2.000 | 2545 | 205 | 3.1 |
| 6.00 | 4 | 40 | 0.025 | 9.000 | 2.400 | 2120 | 210 | 4.6 |
| 8.00 | 4 | 40 | 0.035 | 12.000 | 3.200 | 1590 | 225 | 8.6 |
| 10.00 | 4 | 40 | 0.045 | 15.000 | 4.000 | 1275 | 230 | 13.8 |
| 12.00 | 4 | 40 | 0.050 | 18.000 | 4.800 | 1060 | 210 | 18.3 |
| 16.00 | 4 | 40 | 0.075 | 24.000 | 3.200 | 795 | 240 | 18.3 |

Inox difficile
[Cr-Ni-Mo+/1.4529]
Acciaio resistente al calore
[1.4841]



| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|-----|
| 3.00 | 4 | 25 | 0.010 | 4.500 | 1.200 | 2655 | 105 | 0.6 |
| 4.00 | 4 | 25 | 0.015 | 6.000 | 1.600 | 1990 | 120 | 1.1 |
| 5.00 | 4 | 25 | 0.020 | 7.500 | 2.000 | 1590 | 125 | 1.9 |
| 6.00 | 4 | 25 | 0.020 | 9.000 | 2.400 | 1325 | 105 | 2.3 |
| 8.00 | 4 | 25 | 0.030 | 12.000 | 3.200 | 995 | 120 | 4.6 |
| 10.00 | 4 | 25 | 0.035 | 15.000 | 4.000 | 795 | 110 | 6.7 |
| 12.00 | 4 | 25 | 0.040 | 18.000 | 4.800 | 665 | 105 | 9.2 |
| 16.00 | 4 | 25 | 0.060 | 24.000 | 3.200 | 495 | 120 | 9.2 |

Leghe a base di nichel
indurite
Rm > 1000 N/mm²
[Inconel 718]



| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|----|-----|
| 3.00 | 4 | 15 | 0.010 | 4.500 | 1.200 | 1590 | 65 | 0.3 |
| 4.00 | 4 | 15 | 0.015 | 6.000 | 1.600 | 1195 | 70 | 0.7 |
| 5.00 | 4 | 15 | 0.020 | 7.500 | 2.000 | 955 | 75 | 1.1 |
| 6.00 | 4 | 15 | 0.020 | 9.000 | 2.400 | 795 | 65 | 1.4 |
| 8.00 | 4 | 15 | 0.030 | 12.000 | 3.200 | 595 | 70 | 2.8 |
| 10.00 | 4 | 15 | 0.035 | 15.000 | 4.000 | 475 | 65 | 4.0 |
| 12.00 | 4 | 15 | 0.040 | 18.000 | 4.800 | 400 | 65 | 5.5 |
| 16.00 | 4 | 15 | 0.060 | 24.000 | 3.200 | 300 | 70 | 5.5 |



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| | | | | | | | | |
|-------|---|----|-------|-------|--------|------|-----|------|
| 3.00 | 4 | 60 | 0.010 | 1.500 | 3.000 | 6365 | 255 | 1.1 |
| 4.00 | 4 | 60 | 0.015 | 2.000 | 4.000 | 4775 | 285 | 2.3 |
| 5.00 | 4 | 60 | 0.020 | 2.500 | 5.000 | 3820 | 305 | 3.8 |
| 6.00 | 4 | 60 | 0.030 | 3.000 | 6.000 | 3185 | 380 | 6.9 |
| 8.00 | 4 | 60 | 0.040 | 4.000 | 8.000 | 2385 | 380 | 12.2 |
| 10.00 | 4 | 60 | 0.055 | 5.000 | 10.000 | 1910 | 420 | 21.0 |
| 12.00 | 4 | 60 | 0.055 | 6.000 | 12.000 | 1590 | 350 | 25.2 |
| 16.00 | 4 | 60 | 0.085 | 4.000 | 16.000 | 1195 | 405 | 26.0 |

Inox medium
[Cr-Ni-Mo+/1.4539]
Acciaio duplex
[17-4 PH]



| | | | | | | | | |
|-------|---|----|-------|-------|--------|------|-----|------|
| 3.00 | 4 | 30 | 0.010 | 1.500 | 3.000 | 3185 | 125 | 0.6 |
| 4.00 | 4 | 30 | 0.015 | 2.000 | 4.000 | 2385 | 145 | 1.1 |
| 5.00 | 4 | 30 | 0.020 | 2.500 | 5.000 | 1910 | 155 | 1.9 |
| 6.00 | 4 | 30 | 0.030 | 3.000 | 6.000 | 1590 | 190 | 3.4 |
| 8.00 | 4 | 30 | 0.040 | 4.000 | 8.000 | 1195 | 190 | 6.1 |
| 10.00 | 4 | 30 | 0.055 | 5.000 | 10.000 | 955 | 210 | 10.5 |
| 12.00 | 4 | 30 | 0.055 | 6.000 | 12.000 | 795 | 175 | 12.6 |
| 16.00 | 4 | 30 | 0.085 | 4.000 | 16.000 | 595 | 205 | 13.0 |

Inox difficile
[Cr-Ni-Mo+/1.4529]
Acciaio resistente al calore
[1.4841]



| | | | | | | | | |
|-------|---|----|-------|-------|--------|------|-----|-----|
| 3.00 | 4 | 20 | 0.015 | 1.500 | 3.000 | 2120 | 125 | 0.6 |
| 4.00 | 4 | 20 | 0.020 | 2.000 | 4.000 | 1590 | 125 | 1.0 |
| 5.00 | 4 | 20 | 0.025 | 2.500 | 5.000 | 1275 | 125 | 1.6 |
| 6.00 | 4 | 20 | 0.025 | 3.000 | 6.000 | 1060 | 105 | 1.9 |
| 8.00 | 4 | 20 | 0.035 | 4.000 | 8.000 | 795 | 110 | 3.6 |
| 10.00 | 4 | 20 | 0.045 | 5.000 | 10.000 | 635 | 115 | 5.7 |
| 12.00 | 4 | 20 | 0.050 | 6.000 | 12.000 | 530 | 105 | 7.6 |
| 16.00 | 4 | 20 | 0.075 | 4.000 | 16.000 | 400 | 120 | 7.6 |

Leghe a base di nichel
indurite
Rm > 1000 N/mm²
[Inconel 718]



| | | | | | | | | |
|-------|---|----|-------|-------|--------|------|----|-----|
| 3.00 | 4 | 10 | 0.015 | 1.500 | 3.000 | 1060 | 65 | 0.3 |
| 4.00 | 4 | 10 | 0.020 | 2.000 | 4.000 | 795 | 65 | 0.5 |
| 5.00 | 4 | 10 | 0.025 | 2.500 | 5.000 | 635 | 65 | 0.8 |
| 6.00 | 4 | 10 | 0.025 | 3.000 | 6.000 | 530 | 55 | 1.0 |
| 8.00 | 4 | 10 | 0.035 | 4.000 | 8.000 | 400 | 55 | 1.8 |
| 10.00 | 4 | 10 | 0.045 | 5.000 | 10.000 | 320 | 55 | 2.9 |
| 12.00 | 4 | 10 | 0.050 | 6.000 | 12.000 | 265 | 55 | 3.8 |
| 16.00 | 4 | 10 | 0.075 | 4.000 | 16.000 | 200 | 60 | 3.8 |

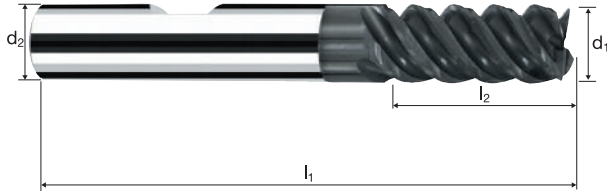
Frese cilindriche SX (SX-N)

A taglienti lisci, esecuzione normale



HM
MG10

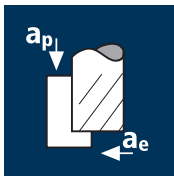
λ 55°
 γ 15°



| | | | | | | | | |
|----------|-------------|--|--|--|--|-------------------|----------------|-----------------------------|
| Rm < 850 | Rm 850-1100 | | | | | Inox Stainless | Ti Titanium | Nickel-Alloys Tool Steel |
|----------|-------------|--|--|--|--|-------------------|----------------|-----------------------------|

| | | | | | | | | | | POLYCHROM | |
|-----------------------|----------------------|----------------------|------------------|-----------------|----------------|----------------|------|------|---|-----------|--|
| Esempio: N° Ordine | | Rivestimento P | Articolo 5314 | Codice-Ø 180 | | | | | | | |
| Ø Code | d ₁ e8 | d ₂ h6 | | l ₁ | l ₂ | l ₄ | 45° | α | z | EUR | |
| 180 | 3.00 | 6.00 | | 57 | 8.00 | 15.76 | 0.10 | 6.0° | 4 | 84.00 | |
| 220 | 4.00 | 6.00 | | 57 | 11.00 | 16.89 | 0.10 | 4.0° | 4 | 84.00 | |
| 260 | 5.00 | 6.00 | | 57 | 13.00 | 17.02 | 0.15 | 2.0° | 4 | 84.00 | |
| 300 | 6.00 | 6.00 | | 57 | 13.00 | - | 0.15 | 0.0° | 4 | 84.00 | |
| 391 | 8.00 | 8.00 | | 63 | 19.00 | - | 0.15 | 0.0° | 4 | 104.00 | |
| 450 | 10.00 | 10.00 | | 72 | 22.00 | - | 0.20 | 0.0° | 4 | 142.00 | |
| 501 | 12.00 | 12.00 | | 83 | 26.00 | - | 0.20 | 0.0° | 4 | 175.00 | |
| 610 | 16.00 | 16.00 | | 92 | 32.00 | - | 0.20 | 0.0° | 4 | 274.00 | |
| | | | | | | | | | | | |
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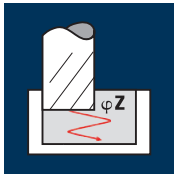
Applicazione



Materiale

Acciaio
850 - 1100 N/mm²

| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 4.00 | 4 | 150 | 0.030 | 7.200 | 1.600 | 11935 | 1430 | 16.5 | 18° |
| 5.00 | 4 | 150 | 0.035 | 9.000 | 2.000 | 9550 | 1335 | 24.1 | 18° |
| 6.00 | 4 | 150 | 0.040 | 10.800 | 2.400 | 7960 | 1275 | 33.0 | 18° |
| 8.00 | 4 | 150 | 0.050 | 14.400 | 3.200 | 5970 | 1195 | 55.0 | 18° |
| 10.00 | 4 | 150 | 0.065 | 18.000 | 4.000 | 4775 | 1240 | 89.4 | 18° |
| 12.00 | 4 | 150 | 0.075 | 21.600 | 4.800 | 3980 | 1195 | 123.8 | 18° |
| 16.00 | 4 | 150 | 0.085 | 24.000 | 6.400 | 2985 | 1015 | 155.8 | 18° |
| 20.00 | 4 | 150 | 0.100 | 30.000 | 8.000 | 2385 | 955 | 229.2 | 18° |



Acciaio
1100 - 1300 N/mm²

| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 4.00 | 4 | 115 | 0.025 | 7.200 | 1.600 | 9150 | 915 | 10.5 | 15° |
| 5.00 | 4 | 115 | 0.030 | 9.000 | 2.000 | 7320 | 880 | 15.8 | 15° |
| 6.00 | 4 | 115 | 0.035 | 10.800 | 2.400 | 6100 | 855 | 22.1 | 15° |
| 8.00 | 4 | 115 | 0.045 | 14.400 | 3.200 | 4575 | 825 | 38.0 | 15° |
| 10.00 | 4 | 115 | 0.055 | 18.000 | 4.000 | 3660 | 805 | 58.0 | 15° |
| 12.00 | 4 | 115 | 0.065 | 21.600 | 4.800 | 3050 | 795 | 82.2 | 15° |
| 16.00 | 4 | 115 | 0.075 | 24.000 | 6.400 | 2290 | 685 | 105.4 | 15° |
| 20.00 | 4 | 115 | 0.090 | 30.000 | 8.000 | 1830 | 660 | 158.1 | 15° |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 4.00 | 4 | 90 | 0.020 | 7.200 | 1.600 | 7160 | 575 | 6.6 | 12° |
| 5.00 | 4 | 90 | 0.025 | 9.000 | 2.000 | 5730 | 575 | 10.3 | 12° |
| 6.00 | 4 | 90 | 0.030 | 10.800 | 2.400 | 4775 | 575 | 14.9 | 12° |
| 8.00 | 4 | 90 | 0.035 | 14.400 | 3.200 | 3580 | 500 | 23.1 | 12° |
| 10.00 | 4 | 90 | 0.045 | 18.000 | 4.000 | 2865 | 515 | 37.1 | 12° |
| 12.00 | 4 | 90 | 0.055 | 21.600 | 4.800 | 2385 | 525 | 54.5 | 12° |
| 16.00 | 4 | 90 | 0.065 | 24.000 | 6.400 | 1790 | 465 | 71.5 | 12° |
| 20.00 | 4 | 90 | 0.080 | 30.000 | 8.000 | 1430 | 460 | 110.0 | 12° |

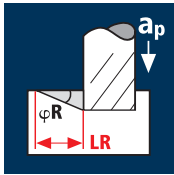
Applicazione



Materiale

Acciaio
850 - 1100 N/mm²

| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] | LR [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|---------|
| 4.00 | 4 | 120 | 0.020 | 6.000 | 4.000 | 9550 | 765 | 18.3 | 20° | 16.5 |
| 5.00 | 4 | 120 | 0.023 | 7.500 | 5.000 | 7640 | 705 | 26.4 | 20° | 20.6 |
| 6.00 | 4 | 120 | 0.026 | 9.000 | 6.000 | 6365 | 660 | 35.8 | 20° | 24.7 |
| 8.00 | 4 | 120 | 0.033 | 12.000 | 8.000 | 4775 | 630 | 60.5 | 20° | 33.0 |
| 10.00 | 4 | 120 | 0.042 | 15.000 | 10.000 | 3820 | 640 | 96.3 | 20° | 41.2 |
| 12.00 | 4 | 120 | 0.049 | 18.000 | 12.000 | 3185 | 625 | 134.8 | 20° | 49.5 |
| 16.00 | 4 | 120 | 0.055 | 24.000 | 16.000 | 2385 | 525 | 201.7 | 20° | 65.9 |
| 20.00 | 4 | 120 | 0.065 | 25.000 | 20.000 | 1910 | 495 | 248.3 | 20° | 68.7 |



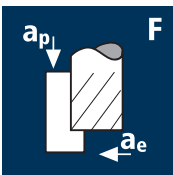
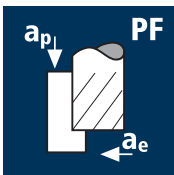
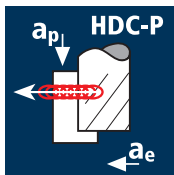
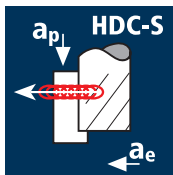
Acciaio
1100 - 1300 N/mm²

| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] | LR [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|---------|
| 4.00 | 4 | 90 | 0.016 | 6.000 | 4.000 | 7160 | 460 | 11.0 | 20° | 16.5 |
| 5.00 | 4 | 90 | 0.020 | 7.500 | 5.000 | 5730 | 460 | 17.2 | 20° | 20.6 |
| 6.00 | 4 | 90 | 0.023 | 9.000 | 6.000 | 4775 | 440 | 23.7 | 20° | 24.7 |
| 8.00 | 4 | 90 | 0.029 | 12.000 | 8.000 | 3580 | 415 | 39.9 | 20° | 33.0 |
| 10.00 | 4 | 90 | 0.036 | 15.000 | 10.000 | 2865 | 415 | 61.9 | 20° | 41.2 |
| 12.00 | 4 | 90 | 0.042 | 18.000 | 12.000 | 2385 | 400 | 86.6 | 20° | 49.5 |
| 16.00 | 4 | 90 | 0.049 | 24.000 | 16.000 | 1790 | 350 | 134.8 | 20° | 65.9 |
| 20.00 | 4 | 90 | 0.058 | 25.000 | 20.000 | 1430 | 330 | 166.2 | 20° | 68.7 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] | LR [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|---------|
| 4.00 | 4 | 70 | 0.013 | 6.000 | 4.000 | 5570 | 290 | 7.0 | 14° | 24.1 |
| 5.00 | 4 | 70 | 0.016 | 7.500 | 5.000 | 4455 | 285 | 10.7 | 14° | 30.1 |
| 6.00 | 4 | 70 | 0.020 | 9.000 | 6.000 | 3715 | 295 | 16.0 | 14° | 36.1 |
| 8.00 | 4 | 70 | 0.023 | 12.000 | 8.000 | 2785 | 255 | 24.6 | 14° | 48.1 |
| 10.00 | 4 | 70 | 0.029 | 15.000 | 10.000 | 2230 | 260 | 38.8 | 14° | 60.2 |
| 12.00 | 4 | 70 | 0.036 | 18.000 | 12.000 | 1855 | 265 | 57.8 | 14° | 72.2 |
| 16.00 | 4 | 70 | 0.042 | 24.000 | 16.000 | 1395 | 235 | 89.8 | 14° | 96.3 |
| 20.00 | 4 | 70 | 0.052 | 25.000 | 20.000 | 1115 | 230 | 115.9 | 14° | 100.3 |

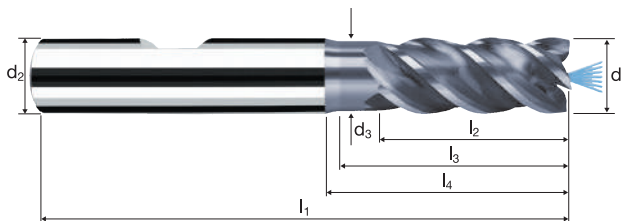
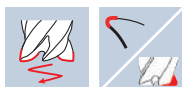
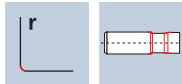
Cliccare qui per accedere al ToolExpert MFC. Veloce, semplice, affidabile



Frese cilindriche MFC

A taglienti lisci, esecuzione normale con scarico corto
Geometria frontale per fresature in penetrazione ad alto rendimento
con canale di raffreddamento/aria centrale

HM λ 45°
MG10 γ 10°



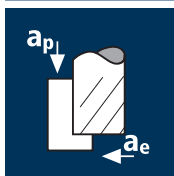
Sgrossatura HPC Sgrossatura HDC Finitura

ReTool®

| | | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--------------|--|--|-------------------|----------------|---------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | | | Inox Stainless | Ti Titanium | GG(G) Tool Steel |
|-------------|----------------|-----------------|-----------------|--------------|--|--|-------------------|----------------|---------------------|

| Esempio: N° Ordine | | | | | | | | | | | POLYCHROM | |
|-----------------------|----------------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------|------|---|-----------|--|
| | | | | | | | | | | | P8201 | |
| | | | | | | | | | | | P8101 | |
| | | | | | | | | | | | EUR | |
| Ø Code | d ₁ e8 | d ₂ h5 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r | α | z | | |
| 220 | 4.00 | 6.00 | 3.70 | 57 | 8.00 | 16.00 | 20.82 | 0.100 | 3.0° | 4 | 81.00 | |
| 260 | 5.00 | 6.00 | 4.60 | 57 | 10.00 | 18.00 | 21.27 | 0.100 | 1.5° | 4 | 81.00 | |
| 300 | 6.00 | 6.00 | 5.50 | 57 | 12.00 | 18.15 | 20.00 | 0.100 | 0.0° | 4 | 81.00 | |
| 391 | 8.00 | 8.00 | 7.40 | 63 | 19.00 | 23.63 | 26.00 | 0.150 | 0.0° | 4 | 101.00 | |
| 450 | 10.00 | 10.00 | 9.20 | 72 | 23.00 | 27.99 | 31.00 | 0.200 | 0.0° | 4 | 137.00 | |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 27.00 | 33.29 | 37.00 | 0.200 | 0.0° | 4 | 169.00 | |
| 503* | 12.00 | 12.00 | 11.00 | 83 | 27.00 | 33.29 | 37.00 | 0.200 | 0.0° | 4 | 180.00 | |
| 610 | 16.00 | 16.00 | 15.00 | 92 | 32.00 | 38.73 | 43.00 | 0.200 | 0.0° | 4 | 265.00 | |
| 612* | 16.00 | 16.00 | 15.00 | 92 | 32.00 | 38.73 | 43.00 | 0.200 | 0.0° | 4 | 281.00 | |
| 682 | 20.00 | 20.00 | 19.00 | 104 | 39.00 | 48.23 | 53.00 | 0.200 | 0.0° | 4 | 386.00 | |
| 684* | 20.00 | 20.00 | 19.00 | 104 | 39.00 | 48.23 | 53.00 | 0.200 | 0.0° | 4 | 411.00 | |
| * con rompitruciolo | | | | | | | | | | | | |

Applicazione

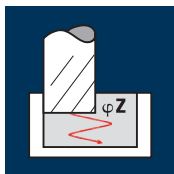


Materiale

Acciaio
850 - 1100 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 4.00 | 4 | 150 | 0.030 | 7.200 | 1.600 | 11935 | 1430 | 16.5 | 18° |
| 5.00 | 4 | 150 | 0.035 | 9.000 | 2.000 | 9550 | 1335 | 24.1 | 18° |
| 6.00 | 4 | 150 | 0.040 | 10.800 | 2.400 | 7960 | 1275 | 33.0 | 18° |
| 8.00 | 4 | 150 | 0.050 | 14.400 | 3.200 | 5970 | 1195 | 55.0 | 18° |
| 10.00 | 4 | 150 | 0.065 | 18.000 | 4.000 | 4775 | 1240 | 89.4 | 18° |
| 12.00 | 4 | 150 | 0.075 | 21.600 | 4.800 | 3980 | 1195 | 123.8 | 18° |
| 16.00 | 4 | 150 | 0.085 | 24.000 | 6.400 | 2985 | 1015 | 155.8 | 18° |
| 20.00 | 4 | 150 | 0.100 | 30.000 | 8.000 | 2385 | 955 | 229.2 | 18° |



Acciaio
1100 - 1300 N/mm²



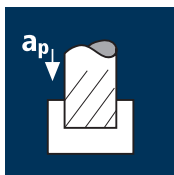
| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 4.00 | 4 | 115 | 0.025 | 7.200 | 1.600 | 9150 | 915 | 10.5 | 15° |
| 5.00 | 4 | 115 | 0.030 | 9.000 | 2.000 | 7320 | 880 | 15.8 | 15° |
| 6.00 | 4 | 115 | 0.035 | 10.800 | 2.400 | 6100 | 855 | 22.1 | 15° |
| 8.00 | 4 | 115 | 0.045 | 14.400 | 3.200 | 4575 | 825 | 38.0 | 15° |
| 10.00 | 4 | 115 | 0.055 | 18.000 | 4.000 | 3660 | 805 | 58.0 | 15° |
| 12.00 | 4 | 115 | 0.065 | 21.600 | 4.800 | 3050 | 795 | 82.2 | 15° |
| 16.00 | 4 | 115 | 0.075 | 24.000 | 6.400 | 2290 | 685 | 105.4 | 15° |
| 20.00 | 4 | 115 | 0.090 | 30.000 | 8.000 | 1830 | 660 | 158.1 | 15° |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 4.00 | 4 | 90 | 0.020 | 7.200 | 1.600 | 7160 | 575 | 6.6 | 12° |
| 5.00 | 4 | 90 | 0.025 | 9.000 | 2.000 | 5730 | 575 | 10.3 | 12° |
| 6.00 | 4 | 90 | 0.030 | 10.800 | 2.400 | 4775 | 575 | 14.9 | 12° |
| 8.00 | 4 | 90 | 0.035 | 14.400 | 3.200 | 3580 | 500 | 23.1 | 12° |
| 10.00 | 4 | 90 | 0.045 | 18.000 | 4.000 | 2865 | 515 | 37.1 | 12° |
| 12.00 | 4 | 90 | 0.055 | 21.600 | 4.800 | 2385 | 525 | 54.5 | 12° |
| 16.00 | 4 | 90 | 0.065 | 24.000 | 6.400 | 1790 | 465 | 71.5 | 12° |
| 20.00 | 4 | 90 | 0.080 | 30.000 | 8.000 | 1430 | 460 | 110.0 | 12° |

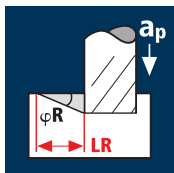
Applicazione



Acciaio
850 - 1100 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] | LR [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|---------|
| 4.00 | 4 | 120 | 0.021 | 6.000 | 4.000 | 9550 | 800 | 19.3 | 20° | 16.5 |
| 5.00 | 4 | 120 | 0.025 | 7.500 | 5.000 | 7640 | 765 | 28.6 | 20° | 20.6 |
| 6.00 | 4 | 120 | 0.028 | 9.000 | 6.000 | 6365 | 715 | 38.5 | 20° | 24.7 |
| 8.00 | 4 | 120 | 0.035 | 12.000 | 8.000 | 4775 | 670 | 64.2 | 20° | 33.0 |
| 10.00 | 4 | 120 | 0.046 | 15.000 | 10.000 | 3820 | 705 | 105.4 | 20° | 41.2 |
| 12.00 | 4 | 120 | 0.053 | 18.000 | 12.000 | 3185 | 675 | 145.8 | 20° | 49.5 |
| 16.00 | 4 | 120 | 0.059 | 24.000 | 16.000 | 2385 | 565 | 216.3 | 20° | 65.9 |
| 20.00 | 4 | 120 | 0.070 | 25.000 | 20.000 | 1910 | 535 | 267.4 | 20° | 68.7 |



Acciaio
1100 - 1300 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] | LR [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|---------|
| 4.00 | 4 | 90 | 0.018 | 6.000 | 4.000 | 7160 | 515 | 12.4 | 20° | 16.5 |
| 5.00 | 4 | 90 | 0.021 | 7.500 | 5.000 | 5730 | 480 | 18.0 | 20° | 20.6 |
| 6.00 | 4 | 90 | 0.025 | 9.000 | 6.000 | 4775 | 475 | 25.8 | 20° | 24.7 |
| 8.00 | 4 | 90 | 0.032 | 12.000 | 8.000 | 3580 | 460 | 44.0 | 20° | 33.0 |
| 10.00 | 4 | 90 | 0.039 | 15.000 | 10.000 | 2865 | 445 | 67.0 | 20° | 41.2 |
| 12.00 | 4 | 90 | 0.046 | 18.000 | 12.000 | 2385 | 440 | 94.9 | 20° | 49.5 |
| 16.00 | 4 | 90 | 0.053 | 24.000 | 16.000 | 1790 | 380 | 145.8 | 20° | 65.9 |
| 20.00 | 4 | 90 | 0.063 | 25.000 | 20.000 | 1430 | 360 | 180.5 | 20° | 68.7 |

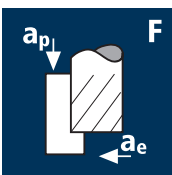
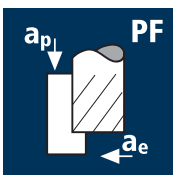
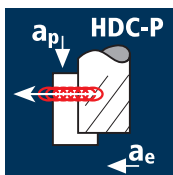
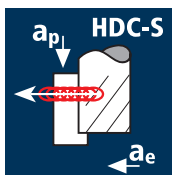
Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] | LR [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|---------|
| 4.00 | 4 | 70 | 0.014 | 6.000 | 4.000 | 5570 | 310 | 7.5 | 14° | 24.1 |
| 5.00 | 4 | 70 | 0.018 | 7.500 | 5.000 | 4455 | 320 | 12.0 | 14° | 30.1 |
| 6.00 | 4 | 70 | 0.021 | 9.000 | 6.000 | 3715 | 310 | 16.8 | 14° | 36.1 |
| 8.00 | 4 | 70 | 0.025 | 12.000 | 8.000 | 2785 | 280 | 26.7 | 14° | 48.1 |
| 10.00 | 4 | 70 | 0.032 | 15.000 | 10.000 | 2230 | 285 | 42.8 | 14° | 60.2 |
| 12.00 | 4 | 70 | 0.039 | 18.000 | 12.000 | 1855 | 290 | 62.6 | 14° | 72.2 |
| 16.00 | 4 | 70 | 0.046 | 24.000 | 16.000 | 1395 | 255 | 98.4 | 14° | 96.3 |
| 20.00 | 4 | 70 | 0.056 | 25.000 | 20.000 | 1115 | 250 | 124.8 | 14° | 100.3 |



Cliccare qui per accedere al
ToolExpert MFC.
Veloce, semplice, affidabile

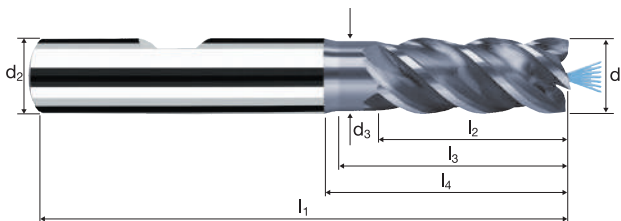
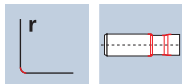


Frese cilindriche MFC



A taglienti lisci, esecuzione normale con scarico corto
Geometria frontale per fresature in penetrazione ad alto rendimento
con canale di raffreddamento/aria centrale

HM λ 45°
MG10 γ 0°



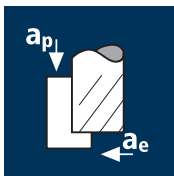
Sgrossatura HPC Sgrossatura HDC Finitura



| | | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--------------|--|--|-------------------|----------------|---------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | | | Inox Stainless | Ti Titanium | GG(G) Tool Steel |
|-------------|----------------|-----------------|-----------------|--------------|--|--|-------------------|----------------|---------------------|

| Esempio: N° Ordine | | | | | | | | | | | POLYCHROM | |
|-----------------------|----------------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------|------|---|-----------|--|
| | | | | | | | | | | | P8202 | |
| | | | | | | | | | | | P8102 | |
| | | | | | | | | | | | EUR | |
| Ø Code | d ₁ e8 | d ₂ h5 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r | α | z | | |
| 220 | 4.00 | 6.00 | 3.70 | 57 | 8.00 | 16.00 | 20.82 | 0.100 | 3.0° | 4 | 81.00 | |
| 260 | 5.00 | 6.00 | 4.60 | 57 | 10.00 | 18.00 | 21.27 | 0.100 | 1.5° | 4 | 81.00 | |
| 300 | 6.00 | 6.00 | 5.50 | 57 | 12.00 | 18.15 | 20.00 | 0.100 | 0.0° | 4 | 81.00 | |
| 391 | 8.00 | 8.00 | 7.40 | 63 | 19.00 | 23.63 | 26.00 | 0.150 | 0.0° | 4 | 101.00 | |
| 450 | 10.00 | 10.00 | 9.20 | 72 | 23.00 | 27.99 | 31.00 | 0.200 | 0.0° | 4 | 137.00 | |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 27.00 | 33.29 | 37.00 | 0.200 | 0.0° | 4 | 169.00 | |
| 610 | 16.00 | 16.00 | 15.00 | 92 | 32.00 | 38.73 | 43.00 | 0.200 | 0.0° | 4 | 265.00 | |
| 612* | 16.00 | 16.00 | 15.00 | 92 | 32.00 | 38.73 | 43.00 | 0.200 | 0.0° | 4 | 281.00 | |
| 682 | 20.00 | 20.00 | 19.00 | 104 | 39.00 | 48.23 | 53.00 | 0.200 | 0.0° | 4 | 386.00 | |
| 684* | 20.00 | 20.00 | 19.00 | 104 | 39.00 | 48.23 | 53.00 | 0.200 | 0.0° | 4 | 411.00 | |
| * con rompitruciolo | | | | | | | | | | | | |

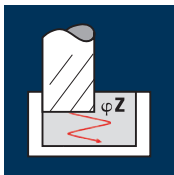
Applicazione



Materiale

Acciaio
850 - 1100 N/mm²

| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 6.00 | 5 | 150 | 0.040 | 10.800 | 2.100 | 7960 | 1590 | 36.1 | 10° |
| 8.00 | 5 | 150 | 0.050 | 14.400 | 2.800 | 5970 | 1490 | 60.2 | 12° |
| 10.00 | 5 | 150 | 0.065 | 18.000 | 3.500 | 4775 | 1550 | 97.8 | 12° |
| 12.00 | 5 | 150 | 0.075 | 21.600 | 4.200 | 3980 | 1490 | 135.4 | 12° |
| 16.00 | 5 | 150 | 0.085 | 24.000 | 5.600 | 2985 | 1270 | 170.5 | 12° |
| 20.00 | 5 | 150 | 0.100 | 30.000 | 7.000 | 2385 | 1195 | 250.7 | 12° |



Acciaio
1100 - 1300 N/mm²

| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 6.00 | 5 | 115 | 0.035 | 10.800 | 2.100 | 6100 | 1070 | 24.2 | 10° |
| 8.00 | 5 | 115 | 0.045 | 14.400 | 2.800 | 4575 | 1030 | 41.5 | 11° |
| 10.00 | 5 | 115 | 0.055 | 18.000 | 3.500 | 3660 | 1005 | 63.4 | 11° |
| 12.00 | 5 | 115 | 0.065 | 21.600 | 4.200 | 3050 | 990 | 89.9 | 11° |
| 16.00 | 5 | 115 | 0.075 | 24.000 | 5.600 | 2290 | 860 | 115.3 | 11° |
| 20.00 | 5 | 115 | 0.090 | 30.000 | 7.000 | 1830 | 825 | 173.0 | 11° |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 6.00 | 5 | 90 | 0.030 | 10.800 | 2.100 | 4775 | 715 | 16.2 | 8° |
| 8.00 | 5 | 90 | 0.035 | 14.400 | 2.800 | 3580 | 625 | 25.3 | 8° |
| 10.00 | 5 | 90 | 0.045 | 18.000 | 3.500 | 2865 | 645 | 40.6 | 8° |
| 12.00 | 5 | 90 | 0.055 | 21.600 | 4.200 | 2385 | 655 | 59.6 | 8° |
| 16.00 | 5 | 90 | 0.065 | 24.000 | 5.600 | 1790 | 580 | 78.2 | 8° |
| 20.00 | 5 | 90 | 0.080 | 30.000 | 7.000 | 1430 | 575 | 120.3 | 8° |

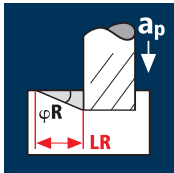
Applicazione



Materiale

Acciaio
850 - 1100 N/mm²

| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] | LR [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|---------|
| 6.00 | 5 | 120 | 0.024 | 6.000 | 6.000 | 6365 | 765 | 27.5 | 12° | 28.2 |
| 8.00 | 5 | 120 | 0.030 | 8.000 | 8.000 | 4775 | 715 | 45.8 | 12° | 37.6 |
| 10.00 | 5 | 120 | 0.039 | 10.000 | 10.000 | 3820 | 745 | 74.5 | 12° | 47.0 |
| 12.00 | 5 | 120 | 0.045 | 12.000 | 12.000 | 3185 | 715 | 103.1 | 12° | 56.5 |
| 16.00 | 5 | 120 | 0.051 | 16.000 | 16.000 | 2385 | 610 | 155.8 | 12° | 75.3 |
| 20.00 | 5 | 120 | 0.060 | 20.000 | 20.000 | 1910 | 575 | 229.2 | 12° | 94.1 |



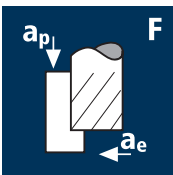
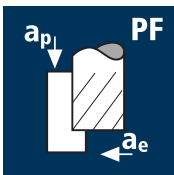
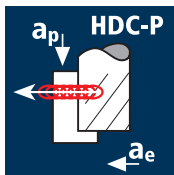
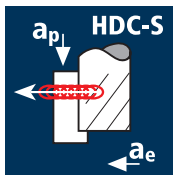
Acciaio
1100 - 1300 N/mm²

| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] | LR [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|---------|
| 6.00 | 5 | 90 | 0.021 | 6.000 | 6.000 | 4775 | 500 | 18.0 | 12° | 28.2 |
| 8.00 | 5 | 90 | 0.027 | 8.000 | 8.000 | 3580 | 485 | 30.9 | 12° | 37.6 |
| 10.00 | 5 | 90 | 0.033 | 10.000 | 10.000 | 2865 | 475 | 47.3 | 12° | 47.0 |
| 12.00 | 5 | 90 | 0.039 | 12.000 | 12.000 | 2385 | 465 | 67.0 | 12° | 56.5 |
| 16.00 | 5 | 90 | 0.045 | 16.000 | 16.000 | 1790 | 405 | 103.1 | 12° | 75.3 |
| 20.00 | 5 | 90 | 0.054 | 20.000 | 20.000 | 1430 | 385 | 154.7 | 12° | 94.1 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] | LR [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|---------|
| 6.00 | 5 | 70 | 0.018 | 6.000 | 6.000 | 3715 | 335 | 12.0 | 12° | 28.2 |
| 8.00 | 5 | 70 | 0.021 | 8.000 | 8.000 | 2785 | 290 | 18.7 | 12° | 37.6 |
| 10.00 | 5 | 70 | 0.027 | 10.000 | 10.000 | 2230 | 300 | 30.1 | 12° | 47.0 |
| 12.00 | 5 | 70 | 0.033 | 12.000 | 12.000 | 1855 | 305 | 44.1 | 12° | 56.5 |
| 16.00 | 5 | 70 | 0.039 | 16.000 | 16.000 | 1395 | 270 | 69.5 | 12° | 75.3 |
| 20.00 | 5 | 70 | 0.048 | 20.000 | 20.000 | 1115 | 265 | 107.0 | 12° | 94.1 |

Cliccare qui per accedere al **ToolExpert MFC**.
Veloce, semplice, affidabile

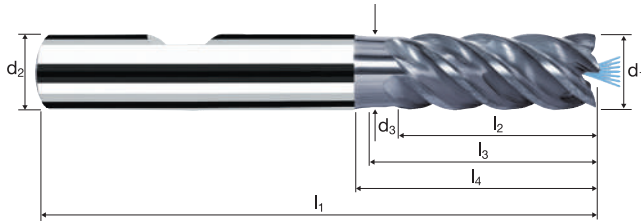


Frese cilindriche MFC



A taglienti lisci, esecuzione normale con scarico corto
Geometria frontale per fresature in penetrazione ad alto rendimento
con canale di raffreddamento/aria centrale

HM λ 45°
MG10 γ 0°



ReTool®

| | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--------------|--|-------------------|----------------|---------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | | Inox Stainless | Ti Titanium | GG(G) Tool Steel |
|-------------|----------------|-----------------|-----------------|--------------|--|-------------------|----------------|---------------------|

| | | | | | | | | | | POLYCHROM |
|---------------------|-----------------------|----------------------|------------------|-----------------|----------------|----------------|----------------|-------|---|-----------|
| | Esempio: N° Ordine | Rivestimento P | Articolo 8205 | Codice-ø 300 | | | | | | |
| Ø Code | d ₁ e8 | d ₂ h5 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r | z | EUR |
| 300 | 6.00 | 6.00 | 5.50 | 57 | 12.00 | 18.15 | 20.00 | 0.100 | 5 | 81.00 |
| 391 | 8.00 | 8.00 | 7.40 | 63 | 19.00 | 23.63 | 26.00 | 0.150 | 5 | 101.00 |
| 450 | 10.00 | 10.00 | 9.20 | 72 | 23.00 | 27.99 | 31.00 | 0.200 | 5 | 137.00 |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 27.00 | 33.29 | 37.00 | 0.200 | 5 | 169.00 |
| 610 | 16.00 | 16.00 | 15.00 | 92 | 32.00 | 38.73 | 43.00 | 0.200 | 5 | 265.00 |
| 612* | 16.00 | 16.00 | 15.00 | 92 | 32.00 | 38.73 | 43.00 | 0.200 | 5 | 281.00 |
| 682 | 20.00 | 20.00 | 19.00 | 104 | 39.00 | 48.23 | 53.00 | 0.200 | 5 | 386.00 |
| 684* | 20.00 | 20.00 | 19.00 | 104 | 39.00 | 48.23 | 53.00 | 0.200 | 5 | 411.00 |
| | | | | | | | | | | |
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| * con rompitruciolo | | | | | | | | | | |

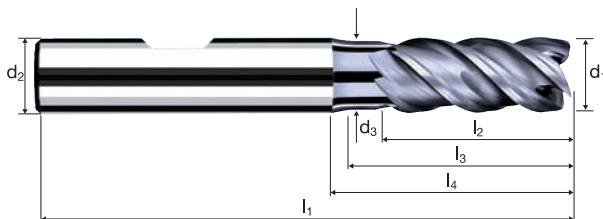
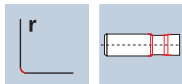
| Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] |
|--------------|---|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| | Acciaio < 850 N/mm ² | 4.00 | 4 | 180 | 0.035 | 6.000 | 1.600 | 14325 | 2005 | 19.3 | 20° |
| | | 5.00 | 4 | 180 | 0.040 | 7.500 | 2.000 | 11460 | 1835 | 27.5 | 20° |
| | Acciaio 850 - 1100 N/mm ² | 6.00 | 4 | 180 | 0.050 | 9.000 | 2.400 | 9550 | 1910 | 41.3 | 20° |
| | | 8.00 | 4 | 180 | 0.060 | 12.000 | 3.200 | 7160 | 1720 | 66.0 | 20° |
| | Acciaio per lavorazione a freddo (12% Cr) fortemente legati [1.2379] | 10.00 | 4 | 180 | 0.075 | 15.000 | 4.000 | 5730 | 1720 | 103.1 | 20° |
| | | 12.00 | 4 | 180 | 0.085 | 18.000 | 4.800 | 4775 | 1625 | 140.3 | 20° |
| | Inox normal [Cr-Ni/1.4301] [Cr-Ni-Mo/1.4571] | 16.00 | 4 | 180 | 0.095 | 24.000 | 6.400 | 3580 | 1360 | 209.0 | 20° |
| | | 20.00 | 4 | 180 | 0.110 | 30.000 | 8.000 | 2865 | 1260 | 302.5 | 20° |
| | Acciaio < 850 N/mm ² | 4.00 | 4 | 150 | 0.030 | 6.000 | 1.600 | 11935 | 1430 | 13.8 | 18° |
| | | 5.00 | 4 | 150 | 0.035 | 7.500 | 2.000 | 9550 | 1335 | 20.1 | 18° |
| | Acciaio per lavorazione a freddo (12% Cr) fortemente legati [1.2379] | 6.00 | 4 | 150 | 0.040 | 9.000 | 2.400 | 7960 | 1275 | 27.5 | 18° |
| | | 8.00 | 4 | 150 | 0.050 | 12.000 | 3.200 | 5970 | 1195 | 45.8 | 18° |
| | Inox normal [Cr-Ni/1.4301] [Cr-Ni-Mo/1.4571] | 10.00 | 4 | 150 | 0.065 | 15.000 | 4.000 | 4775 | 1240 | 74.5 | 18° |
| | | 12.00 | 4 | 150 | 0.075 | 18.000 | 4.800 | 3980 | 1195 | 103.1 | 18° |
| | Acciaio < 850 N/mm ² | 16.00 | 4 | 150 | 0.085 | 24.000 | 6.400 | 2985 | 1015 | 155.8 | 18° |
| | | 20.00 | 4 | 150 | 0.100 | 30.000 | 8.000 | 2385 | 955 | 229.2 | 18° |
| | Acciaio per lavorazione a freddo (12% Cr) fortemente legati [1.2379] | 4.00 | 4 | 70 | 0.030 | 6.000 | 1.600 | 5570 | 670 | 6.4 | 12° |
| | | 5.00 | 4 | 70 | 0.035 | 7.500 | 2.000 | 4455 | 625 | 9.4 | 12° |
| | Inox normal [Cr-Ni/1.4301] [Cr-Ni-Mo/1.4571] | 6.00 | 4 | 70 | 0.040 | 9.000 | 2.400 | 3715 | 595 | 12.8 | 12° |
| | | 8.00 | 4 | 70 | 0.050 | 12.000 | 3.200 | 2785 | 555 | 21.4 | 12° |
| | Acciaio < 850 N/mm ² | 10.00 | 4 | 70 | 0.060 | 15.000 | 4.000 | 2230 | 535 | 32.1 | 12° |
| | | 12.00 | 4 | 70 | 0.075 | 18.000 | 4.800 | 1855 | 555 | 48.1 | 12° |
| | Acciaio per lavorazione a freddo (12% Cr) fortemente legati [1.2379] | 16.00 | 4 | 70 | 0.085 | 24.000 | 6.400 | 1395 | 475 | 72.7 | 12° |
| | | 20.00 | 4 | 70 | 0.095 | 30.000 | 8.000 | 1115 | 425 | 101.6 | 12° |
| | Inox normal [Cr-Ni/1.4301] [Cr-Ni-Mo/1.4571] | 4.00 | 4 | 90 | 0.020 | 6.000 | 1.600 | 7160 | 575 | 5.5 | 12° |
| | | 5.00 | 4 | 90 | 0.025 | 7.500 | 2.000 | 5730 | 575 | 8.6 | 12° |
| | Acciaio < 850 N/mm ² | 6.00 | 4 | 90 | 0.030 | 9.000 | 2.400 | 4775 | 575 | 12.4 | 12° |
| | | 8.00 | 4 | 90 | 0.035 | 12.000 | 3.200 | 3580 | 500 | 19.3 | 12° |
| | Acciaio per lavorazione a freddo (12% Cr) fortemente legati [1.2379] | 10.00 | 4 | 90 | 0.045 | 15.000 | 4.000 | 2865 | 515 | 30.9 | 12° |
| | | 12.00 | 4 | 90 | 0.055 | 18.000 | 4.800 | 2385 | 525 | 45.4 | 12° |
| | Inox normal [Cr-Ni/1.4301] [Cr-Ni-Mo/1.4571] | 16.00 | 4 | 90 | 0.065 | 24.000 | 6.400 | 1790 | 465 | 71.5 | 12° |
| | | 20.00 | 4 | 90 | 0.080 | 30.000 | 8.000 | 1430 | 460 | 110.0 | 12° |
| | Acciaio < 850 N/mm ² | 4.00 | 4 | 145 | 0.025 | 5.000 | 4.000 | 11540 | 1155 | 23.1 | 32° |
| | | 5.00 | 4 | 145 | 0.030 | 6.250 | 5.000 | 9230 | 1110 | 34.6 | 32° |
| | Acciaio per lavorazione a freddo (12% Cr) fortemente legati [1.2379] | 6.00 | 4 | 145 | 0.040 | 7.500 | 6.000 | 7690 | 1230 | 55.4 | 32° |
| | | 8.00 | 4 | 145 | 0.045 | 10.000 | 8.000 | 5770 | 1040 | 83.1 | 32° |
| | Acciaio < 850 N/mm ² | 10.00 | 4 | 145 | 0.055 | 12.500 | 10.000 | 4615 | 1015 | 126.9 | 32° |
| | | 12.00 | 4 | 145 | 0.065 | 15.000 | 12.000 | 3845 | 1000 | 180.0 | 32° |
| | Acciaio per lavorazione a freddo (12% Cr) fortemente legati [1.2379] | 16.00 | 4 | 145 | 0.070 | 20.000 | 16.000 | 2885 | 810 | 258.5 | 32° |
| | | 20.00 | 4 | 145 | 0.085 | 25.000 | 20.000 | 2310 | 785 | 392.3 | 32° |
| | Acciaio < 850 N/mm ² | 4.00 | 4 | 120 | 0.020 | 5.000 | 4.000 | 9550 | 765 | 15.3 | 29° |
| | | 5.00 | 4 | 120 | 0.025 | 6.250 | 5.000 | 7640 | 765 | 23.9 | 29° |
| | Acciaio per lavorazione a freddo (12% Cr) fortemente legati [1.2379] | 6.00 | 4 | 120 | 0.030 | 7.500 | 6.000 | 6365 | 765 | 34.4 | 29° |
| | | 8.00 | 4 | 120 | 0.040 | 10.000 | 8.000 | 4775 | 765 | 61.1 | 29° |
| | Acciaio 850 - 1100 N/mm ² | 10.00 | 4 | 120 | 0.050 | 12.500 | 10.000 | 3820 | 765 | 95.5 | 29° |
| | | 12.00 | 4 | 120 | 0.055 | 15.000 | 12.000 | 3185 | 700 | 126.1 | 29° |
| | Acciaio per lavorazione a freddo (12% Cr) fortemente legati [1.2379] | 16.00 | 4 | 120 | 0.065 | 20.000 | 16.000 | 2385 | 620 | 198.6 | 29° |
| | | 20.00 | 4 | 120 | 0.075 | 25.000 | 20.000 | 1910 | 575 | 286.5 | 29° |
| | Inox normal [Cr-Ni/1.4301] [Cr-Ni-Mo/1.4571] | 4.00 | 4 | 55 | 0.025 | 5.000 | 4.000 | 4375 | 440 | 8.8 | 19° |
| | | 5.00 | 4 | 55 | 0.025 | 6.250 | 5.000 | 3500 | 350 | 10.9 | 19° |
| | Acciaio < 850 N/mm ² | 6.00 | 4 | 55 | 0.030 | 7.500 | 6.000 | 2920 | 350 | 15.8 | 19° |
| | | 8.00 | 4 | 55 | 0.040 | 10.000 | 8.000 | 2190 | 350 | 28.0 | 19° |
| | Acciaio per lavorazione a freddo (12% Cr) fortemente legati [1.2379] | 10.00 | 4 | 55 | 0.045 | 12.500 | 10.000 | 1750 | 315 | 39.4 | 19° |
| | | 12.00 | 4 | 55 | 0.055 | 15.000 | 12.000 | 1460 | 320 | 57.8 | 19° |
| | Inox normal [Cr-Ni/1.4301] [Cr-Ni-Mo/1.4571] | 16.00 | 4 | 55 | 0.065 | 20.000 | 16.000 | 1095 | 285 | 91.0 | 19° |
| | | 20.00 | 4 | 55 | 0.070 | 25.000 | 20.000 | 875 | 245 | 122.5 | 19° |
| | Acciaio < 850 N/mm ² | 4.00 | 4 | 70 | 0.015 | 5.000 | 4.000 | 5570 | 335 | 6.7 | 14° |
| | | 5.00 | 4 | 70 | 0.020 | 6.250 | 5.000 | 4455 | 355 | 11.1 | 14° |
| | Acciaio per lavorazione a freddo (12% Cr) fortemente legati [1.2379] | 6.00 | 4 | 70 | 0.025 | 7.500 | 6.000 | 3715 | 370 | 16.7 | 14° |
| | | 8.00 | 4 | 70 | 0.025 | 10.000 | 8.000 | 2785 | 280 | 22.3 | 14° |
| | Inox normal [Cr-Ni/1.4301] [Cr-Ni-Mo/1.4571] | 10.00 | 4 | 70 | 0.035 | 12.500 | 10.000 | 2230 | 310 | 39.0 | 14° |
| | | 12.00 | 4 | 70 | 0.040 | 15.000 | 12.000 | 1855 | 295 | 53.5 | 14° |
| | Acciaio < 850 N/mm ² | 16.00 | 4 | 70 | 0.050 | 20.000 | 16.000 | 1395 | 280 | 89.1 | 14° |
| | | 20.00 | 4 | 70 | 0.060 | 25.000 | 20.000 | 1115 | 265 | 133.7 | 14° |

Frese cilindriche NVDS (NB-NVDS)

A taglienti lisci, esecuzione normale con scarico corto
Geometria frontale per fresature in penetrazione ad alto rendimento



HM λ 45°
MG10 γ 0°



Sgrossatura HPC Sgrossatura HDC Finitura



ReTool®

| | | | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--|--|--|--|-------------------|----------------|--------------------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | | | | | Inox Stainless | Ti Titanium | GG(G) Tool Steel Nickel-Alloys |
|-------------|----------------|-----------------|-----------------|--|--|--|--|-------------------|----------------|--------------------------------------|

| Ø Code | d ₁ e8 | d ₂ h5 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r | α | z | POLYCHROM | |
|--------------------------------------|----------------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------|------|---|-----------|--------|
| | | | | | | | | | | | | |
| Esempio: N° Ordine | | | | | | | | | | | | |
| Rivestimento Articolo Codice-ø | | | | | | | | | | | | |
| P 8200 220 | | | | | | | | | | | | |
| 220 | 4.00 | 6.00 | 3.70 | 57 | 8.00 | 16.00 | 20.82 | 0.100 | 3.0° | 4 | | P8200 |
| 260 | 5.00 | 6.00 | 4.60 | 57 | 10.00 | 18.00 | 21.27 | 0.100 | 1.5° | 4 | | P8100 |
| 300 | 6.00 | 6.00 | 5.50 | 57 | 12.00 | 18.15 | 20.00 | 0.100 | 0.0° | 4 | | EUR |
| 391 | 8.00 | 8.00 | 7.40 | 63 | 19.00 | 23.63 | 26.00 | 0.150 | 0.0° | 4 | | 73.00 |
| 450 | 10.00 | 10.00 | 9.20 | 72 | 23.00 | 27.99 | 31.00 | 0.200 | 0.0° | 4 | | 73.00 |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 27.00 | 33.29 | 37.00 | 0.200 | 0.0° | 4 | | 73.00 |
| 610 | 16.00 | 16.00 | 15.00 | 92 | 32.00 | 38.73 | 43.00 | 0.200 | 0.0° | 4 | | 91.00 |
| 682 | 20.00 | 20.00 | 19.00 | 104 | 39.00 | 48.23 | 53.00 | 0.200 | 0.0° | 4 | | 124.00 |
| | | | | | | | | | | | | 153.00 |
| | | | | | | | | | | | | 240.00 |
| | | | | | | | | | | | | 350.00 |

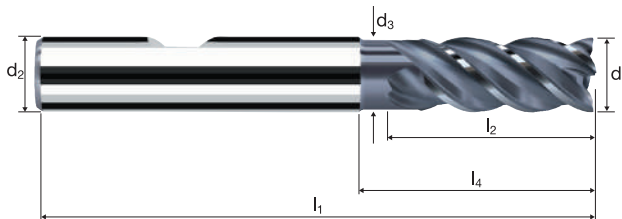
| Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] | |
|--------------|--|---------|--|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|-------|
| | Acciaio < 850 N/mm ² | 3.00 | 4 | 150 | 0.018 | 4.500 | 1.200 | 15915 | 1145 | 6.2 | 16° | |
| | | 4.00 | 4 | 150 | 0.022 | 6.000 | 1.600 | 11935 | 1050 | 10.1 | 16° | |
| | | 5.00 | 4 | 150 | 0.028 | 7.500 | 2.000 | 9550 | 1070 | 16.0 | 16° | |
| | | 6.00 | 4 | 150 | 0.035 | 9.000 | 2.400 | 7960 | 1115 | 24.1 | 16° | |
| | | 8.00 | 4 | 150 | 0.045 | 12.000 | 3.200 | 5970 | 1075 | 41.3 | 16° | |
| | | 10.00 | 4 | 150 | 0.060 | 15.000 | 4.000 | 4775 | 1145 | 68.8 | 16° | |
| | | 12.00 | 4 | 150 | 0.065 | 18.000 | 4.800 | 3980 | 1035 | 89.4 | 16° | |
| | | 16.00 | 4 | 150 | 0.075 | 24.000 | 6.400 | 2985 | 895 | 137.5 | 16° | |
| | | 20.00 | 4 | 150 | 0.090 | 30.000 | 8.000 | 2385 | 860 | 206.3 | 16° | |
| | | | Acciaio 850 - 1100 N/mm ² | 3.00 | 4 | 125 | 0.015 | 4.500 | 1.200 | 13265 | 795 | 4.3 |
| 4.00 | 4 | | | 125 | 0.018 | 6.000 | 1.600 | 9945 | 715 | 6.9 | 15° | |
| 5.00 | 4 | | | 125 | 0.024 | 7.500 | 2.000 | 7960 | 765 | 11.5 | 15° | |
| 6.00 | 4 | | | 125 | 0.030 | 9.000 | 2.400 | 6630 | 795 | 17.2 | 15° | |
| 8.00 | 4 | | | 125 | 0.040 | 12.000 | 3.200 | 4975 | 795 | 30.6 | 15° | |
| 10.00 | 4 | | | 125 | 0.055 | 15.000 | 4.000 | 3980 | 875 | 52.5 | 15° | |
| 12.00 | 4 | | | 125 | 0.060 | 18.000 | 4.800 | 3315 | 795 | 68.8 | 15° | |
| 16.00 | 4 | | | 125 | 0.070 | 24.000 | 6.400 | 2485 | 695 | 107.0 | 15° | |
| 20.00 | 4 | | | 125 | 0.080 | 30.000 | 8.000 | 1990 | 635 | 152.8 | 15° | |
| | Inox normal [Cr-Ni/1.4301] [Cr-Ni-Mo/1.4571] | | | 3.00 | 4 | 85 | 0.013 | 4.500 | 1.200 | 9020 | 470 | 2.5 |
| | | 4.00 | 4 | 85 | 0.016 | 6.000 | 1.600 | 6765 | 435 | 4.2 | 9° | |
| | | 5.00 | 4 | 85 | 0.020 | 7.500 | 2.000 | 5410 | 435 | 6.5 | 9° | |
| | | 6.00 | 4 | 85 | 0.025 | 9.000 | 2.400 | 4510 | 450 | 9.7 | 9° | |
| | | 8.00 | 4 | 85 | 0.035 | 12.000 | 3.200 | 3380 | 475 | 18.2 | 9° | |
| | | 10.00 | 4 | 85 | 0.045 | 15.000 | 4.000 | 2705 | 485 | 29.2 | 9° | |
| | | 12.00 | 4 | 85 | 0.050 | 18.000 | 4.800 | 2255 | 450 | 39.0 | 9° | |
| | | 16.00 | 4 | 85 | 0.060 | 24.000 | 6.400 | 1690 | 405 | 62.3 | 9° | |
| | | 20.00 | 4 | 85 | 0.070 | 30.000 | 8.000 | 1355 | 380 | 90.9 | 9° | |
| | | | Inox difficile [Cr-Ni-Mo+/1.4529] Acciaio resistente al calore [1.4841] | 3.00 | 4 | 45 | 0.013 | 4.500 | 1.200 | 4775 | 250 | 1.3 |
| 4.00 | 4 | | | 45 | 0.016 | 6.000 | 1.600 | 3580 | 230 | 2.2 | 7° | |
| 5.00 | 4 | | | 45 | 0.020 | 7.500 | 2.000 | 2865 | 230 | 3.4 | 7° | |
| 6.00 | 4 | | | 45 | 0.025 | 9.000 | 2.400 | 2385 | 240 | 5.2 | 7° | |
| 8.00 | 4 | | | 45 | 0.035 | 12.000 | 3.200 | 1790 | 250 | 9.6 | 7° | |
| 10.00 | 4 | | | 45 | 0.045 | 15.000 | 4.000 | 1430 | 260 | 15.5 | 7° | |
| 12.00 | 4 | | | 45 | 0.050 | 18.000 | 4.800 | 1195 | 240 | 20.6 | 7° | |
| 16.00 | 4 | | | 45 | 0.060 | 24.000 | 6.400 | 895 | 215 | 33.0 | 7° | |
| 20.00 | 4 | | | 45 | 0.070 | 30.000 | 8.000 | 715 | 200 | 48.1 | 7° | |
| | Acciaio < 850 N/mm ² | | | 3.00 | 4 | 120 | 0.014 | 1.800 | 3.000 | 12730 | 715 | 3.9 |
| | | 4.00 | 4 | 120 | 0.018 | 2.800 | 4.000 | 9550 | 690 | 7.7 | 26° | 5.7 |
| | | 5.00 | 4 | 120 | 0.022 | 4.000 | 5.000 | 7640 | 670 | 13.4 | 26° | 8.2 |
| | | 6.00 | 4 | 120 | 0.028 | 6.000 | 6.000 | 6365 | 715 | 25.7 | 26° | 12.3 |
| | | 8.00 | 4 | 120 | 0.036 | 8.000 | 8.000 | 4775 | 690 | 44.0 | 26° | 16.4 |
| | | 10.00 | 4 | 120 | 0.048 | 10.000 | 10.000 | 3820 | 735 | 73.3 | 26° | 20.5 |
| | | 12.00 | 4 | 120 | 0.052 | 12.000 | 12.000 | 3185 | 660 | 95.3 | 26° | 24.6 |
| | | 16.00 | 4 | 120 | 0.060 | 16.000 | 16.000 | 2385 | 575 | 146.7 | 26° | 32.8 |
| | | 20.00 | 4 | 120 | 0.072 | 20.000 | 20.000 | 1910 | 550 | 220.0 | 26° | 41.0 |
| | | | Acciaio 850 - 1100 N/mm ² | 3.00 | 4 | 100 | 0.011 | 1.800 | 3.000 | 10610 | 465 | 2.5 |
| 4.00 | 4 | | | 100 | 0.014 | 2.800 | 4.000 | 7960 | 445 | 5.0 | 24° | 6.3 |
| 5.00 | 4 | | | 100 | 0.020 | 4.000 | 5.000 | 6365 | 510 | 10.2 | 24° | 9.0 |
| 6.00 | 4 | | | 100 | 0.024 | 6.000 | 6.000 | 5305 | 510 | 18.3 | 24° | 13.5 |
| 8.00 | 4 | | | 100 | 0.032 | 8.000 | 8.000 | 3980 | 510 | 32.6 | 24° | 18.0 |
| 10.00 | 4 | | | 100 | 0.044 | 10.000 | 10.000 | 3185 | 560 | 56.0 | 24° | 22.5 |
| 12.00 | 4 | | | 100 | 0.048 | 12.000 | 12.000 | 2655 | 510 | 73.3 | 24° | 27.0 |
| 16.00 | 4 | | | 100 | 0.056 | 16.000 | 16.000 | 1990 | 445 | 114.1 | 24° | 35.9 |
| 20.00 | 4 | | | 100 | 0.064 | 20.000 | 20.000 | 1590 | 405 | 163.0 | 24° | 44.9 |
| | Inox normal [Cr-Ni/1.4301] [Cr-Ni-Mo/1.4571] | | | 3.00 | 4 | 70 | 0.010 | 1.800 | 3.000 | 7425 | 295 | 1.6 |
| | | 4.00 | 4 | 70 | 0.013 | 2.800 | 4.000 | 5570 | 290 | 3.2 | 11° | 14.4 |
| | | 5.00 | 4 | 70 | 0.016 | 4.000 | 5.000 | 4455 | 285 | 5.7 | 11° | 20.6 |
| | | 6.00 | 4 | 70 | 0.020 | 6.000 | 6.000 | 3715 | 295 | 10.7 | 11° | 30.9 |
| | | 8.00 | 4 | 70 | 0.028 | 8.000 | 8.000 | 2785 | 310 | 20.0 | 11° | 41.2 |
| | | 10.00 | 4 | 70 | 0.036 | 10.000 | 10.000 | 2230 | 320 | 32.1 | 11° | 51.4 |
| | | 12.00 | 4 | 70 | 0.040 | 12.000 | 12.000 | 1855 | 295 | 42.8 | 11° | 61.7 |
| | | 16.00 | 4 | 70 | 0.048 | 16.000 | 16.000 | 1395 | 265 | 68.4 | 11° | 82.3 |
| | | 20.00 | 4 | 70 | 0.056 | 20.000 | 20.000 | 1115 | 250 | 99.8 | 11° | 102.9 |
| | | | Inox difficile [Cr-Ni-Mo+/1.4529] Acciaio resistente al calore [1.4841] | 3.00 | 4 | 35 | 0.010 | 1.800 | 3.000 | 3715 | 150 | 0.8 |
| 4.00 | 4 | | | 35 | 0.013 | 2.800 | 4.000 | 2785 | 145 | 1.6 | 10° | 15.9 |
| 5.00 | 4 | | | 35 | 0.016 | 4.000 | 5.000 | 2230 | 145 | 2.9 | 10° | 22.7 |
| 6.00 | 4 | | | 35 | 0.020 | 6.000 | 6.000 | 1855 | 150 | 5.3 | 10° | 34.0 |
| 8.00 | 4 | | | 35 | 0.028 | 8.000 | 8.000 | 1395 | 155 | 10.0 | 10° | 45.4 |
| 10.00 | 4 | | | 35 | 0.036 | 10.000 | 10.000 | 1115 | 160 | 16.0 | 10° | 56.7 |
| 12.00 | 4 | | | 35 | 0.040 | 12.000 | 12.000 | 930 | 150 | 21.4 | 10° | 68.1 |
| 16.00 | 4 | | | 35 | 0.048 | 16.000 | 16.000 | 695 | 135 | 34.2 | 10° | 90.7 |
| 20.00 | 4 | | | 35 | 0.056 | 20.000 | 20.000 | 555 | 125 | 49.9 | 10° | 113.4 |

Frese cilindriche NVS (NB-NVS)

A taglienti lisci, esecuzione normale con scarico corto
Geometria frontale per fresature in penetrazione ad alto rendimento



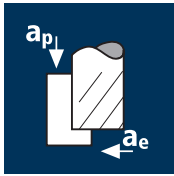
HM
MG10 λ 45°
 γ 15°



| | | | | | | | | | |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|-------------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | | | | | Inox Stainless | Ti Titanium | GG(G) Copper Tool Steel |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|-------------------------------|

| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r | α | z | POLYCHROM | |
|--|----------------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------|------|---|-----------|--------------|
| | | | | | | | | | | | | |
| Esempio: N° Ordine Rivestimento P Articolo 8404 Codice-Ø 140 | | | | | | | | | | | | |
| | | | | | | | | | | | | P8404 |
| | | | | | | | | | | | | P8304 |
| | | | | | | | | | | | | EUR |
| 140 | 2.00 | 6.00 | 1.90 | 57 | 7.00 | 10.00 | 18.31 | 0.050 | 7.0° | 4 | | 53.10 |
| 160 | 2.50 | 6.00 | 2.30 | 57 | 8.00 | 10.00 | 17.56 | 0.050 | 6.5° | 4 | | 53.10 |
| 178* | 3.00 | 3.00 | 2.80 | 45 | 8.00 | 13.56 | 14.00 | 0.050 | 0.0° | 4 | | 53.10 |
| 180 | 3.00 | 6.00 | 2.80 | 57 | 8.00 | 14.00 | 20.63 | 0.050 | 4.5° | 4 | | 53.10 |
| 200 | 3.50 | 6.00 | 3.20 | 57 | 8.00 | 14.00 | 19.88 | 0.050 | 4.0° | 4 | | 53.10 |
| 218* | 4.00 | 4.00 | 3.70 | 50 | 11.00 | 15.47 | 16.00 | 0.100 | 0.0° | 4 | | 53.10 |
| 220 | 4.00 | 6.00 | 3.70 | 57 | 11.00 | 16.00 | 20.95 | 0.100 | 3.0° | 4 | | 53.10 |
| 240 | 4.50 | 6.00 | 4.10 | 57 | 12.00 | 16.00 | 20.20 | 0.100 | 2.5° | 4 | | 53.10 |
| 258* | 5.00 | 5.00 | 4.60 | 50 | 13.00 | 15.40 | 16.00 | 0.100 | 0.0° | 4 | | 53.10 |
| 260 | 5.00 | 6.00 | 4.60 | 57 | 13.00 | 18.00 | 21.27 | 0.100 | 1.5° | 4 | | 53.10 |
| 280 | 5.50 | 6.00 | 5.00 | 57 | 13.00 | 20.00 | 22.52 | 0.100 | 1.0° | 4 | | 53.10 |
| 300 | 6.00 | 6.00 | 5.50 | 57 | 13.00 | 19.34 | 20.00 | 0.100 | 0.0° | 4 | | 53.10 |
| 331 | 7.00 | 8.00 | 6.40 | 63 | 16.00 | 24.00 | 27.64 | 0.100 | 1.5° | 4 | | 66.00 |
| 391 | 8.00 | 8.00 | 7.40 | 63 | 19.00 | 25.29 | 26.00 | 0.150 | 0.0° | 4 | | 66.00 |
| 420 | 9.00 | 10.00 | 8.20 | 72 | 19.00 | 26.00 | 30.02 | 0.200 | 1.5° | 4 | | 90.00 |
| 450 | 10.00 | 10.00 | 9.20 | 72 | 22.00 | 30.20 | 31.00 | 0.200 | 0.0° | 4 | | 90.00 |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 26.00 | 36.13 | 37.00 | 0.200 | 0.0° | 4 | | 112.00 |
| 610 | 16.00 | 16.00 | 15.00 | 92 | 32.00 | 42.13 | 43.00 | 0.200 | 0.0° | 4 | | 174.00 |
| 682 | 20.00 | 20.00 | 19.00 | 104 | 38.00 | 52.13 | 53.00 | 0.200 | 0.0° | 4 | | 255.00 |
| * solo senza weldon | | | | | | | | | | | | |

Applicazione



Materiale

Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 4.00 | 4 | 180 | 0.035 | 6.000 | 1.600 | 14325 | 2005 | 19.3 |
| 5.00 | 4 | 180 | 0.040 | 7.500 | 2.000 | 11460 | 1835 | 27.5 |
| 6.00 | 4 | 180 | 0.050 | 9.000 | 2.400 | 9550 | 1910 | 41.3 |
| 8.00 | 4 | 180 | 0.060 | 12.000 | 3.200 | 7160 | 1720 | 66.0 |
| 10.00 | 4 | 180 | 0.075 | 15.000 | 4.000 | 5730 | 1720 | 103.1 |
| 12.00 | 4 | 180 | 0.085 | 18.000 | 4.800 | 4775 | 1625 | 140.3 |
| 16.00 | 4 | 180 | 0.095 | 24.000 | 6.400 | 3580 | 1360 | 209.0 |
| 20.00 | 4 | 180 | 0.110 | 30.000 | 8.000 | 2865 | 1260 | 302.5 |

Acciaio
850 - 1100 N/mm²



| | | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|------|-------|
| 4.00 | 4 | 150 | 0.030 | 6.000 | 1.600 | 11935 | 1430 | 13.8 |
| 5.00 | 4 | 150 | 0.035 | 7.500 | 2.000 | 9550 | 1335 | 20.1 |
| 6.00 | 4 | 150 | 0.040 | 9.000 | 2.400 | 7960 | 1275 | 27.5 |
| 8.00 | 4 | 150 | 0.050 | 12.000 | 3.200 | 5970 | 1195 | 45.8 |
| 10.00 | 4 | 150 | 0.065 | 15.000 | 4.000 | 4775 | 1240 | 74.5 |
| 12.00 | 4 | 150 | 0.075 | 18.000 | 4.800 | 3980 | 1195 | 103.1 |
| 16.00 | 4 | 150 | 0.085 | 24.000 | 6.400 | 2985 | 1015 | 155.8 |
| 20.00 | 4 | 150 | 0.100 | 30.000 | 8.000 | 2385 | 955 | 229.2 |

Acciaio per lavorazione
a freddo (12% Cr)
fortemente legati
[1.2379]

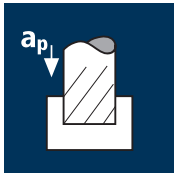


| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|-------|
| 4.00 | 4 | 70 | 0.030 | 6.000 | 1.600 | 5570 | 670 | 6.4 |
| 5.00 | 4 | 70 | 0.035 | 7.500 | 2.000 | 4455 | 625 | 9.4 |
| 6.00 | 4 | 70 | 0.040 | 9.000 | 2.400 | 3715 | 595 | 12.8 |
| 8.00 | 4 | 70 | 0.050 | 12.000 | 3.200 | 2785 | 555 | 21.4 |
| 10.00 | 4 | 70 | 0.060 | 15.000 | 4.000 | 2230 | 535 | 32.1 |
| 12.00 | 4 | 70 | 0.075 | 18.000 | 4.800 | 1855 | 555 | 48.1 |
| 16.00 | 4 | 70 | 0.085 | 24.000 | 6.400 | 1395 | 475 | 72.7 |
| 20.00 | 4 | 70 | 0.095 | 30.000 | 8.000 | 1115 | 425 | 101.6 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|-------|
| 4.00 | 4 | 90 | 0.020 | 6.000 | 1.600 | 7160 | 575 | 5.5 |
| 5.00 | 4 | 90 | 0.025 | 7.500 | 2.000 | 5730 | 575 | 8.6 |
| 6.00 | 4 | 90 | 0.030 | 9.000 | 2.400 | 4775 | 575 | 12.4 |
| 8.00 | 4 | 90 | 0.035 | 12.000 | 3.200 | 3580 | 500 | 19.3 |
| 10.00 | 4 | 90 | 0.045 | 15.000 | 4.000 | 2865 | 515 | 30.9 |
| 12.00 | 4 | 90 | 0.055 | 18.000 | 4.800 | 2385 | 525 | 45.4 |
| 16.00 | 4 | 90 | 0.065 | 24.000 | 6.400 | 1790 | 465 | 71.5 |
| 20.00 | 4 | 90 | 0.080 | 30.000 | 8.000 | 1430 | 460 | 110.0 |



Acciaio
< 850 N/mm²



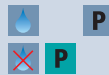
| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|-------|
| 4.00 | 4 | 145 | 0.025 | 5.000 | 4.000 | 11540 | 1155 | 23.1 |
| 5.00 | 4 | 145 | 0.030 | 6.250 | 5.000 | 9230 | 1110 | 34.6 |
| 6.00 | 4 | 145 | 0.040 | 7.500 | 6.000 | 7600 | 1230 | 55.4 |
| 8.00 | 4 | 145 | 0.045 | 10.000 | 8.000 | 5770 | 1040 | 83.1 |
| 10.00 | 4 | 145 | 0.055 | 12.500 | 10.000 | 4615 | 1015 | 126.9 |
| 12.00 | 4 | 145 | 0.065 | 15.000 | 12.000 | 3845 | 1000 | 180.0 |
| 16.00 | 4 | 145 | 0.070 | 20.000 | 16.000 | 2885 | 810 | 258.5 |
| 20.00 | 4 | 145 | 0.085 | 25.000 | 20.000 | 2310 | 785 | 392.3 |

Acciaio
850 - 1100 N/mm²



| | | | | | | | | |
|-------|---|-----|-------|--------|--------|------|-----|-------|
| 4.00 | 4 | 120 | 0.020 | 5.000 | 4.000 | 9550 | 765 | 15.3 |
| 5.00 | 4 | 120 | 0.025 | 6.250 | 5.000 | 7640 | 765 | 23.9 |
| 6.00 | 4 | 120 | 0.030 | 7.500 | 6.000 | 6365 | 765 | 34.4 |
| 8.00 | 4 | 120 | 0.040 | 10.000 | 8.000 | 4775 | 765 | 61.1 |
| 10.00 | 4 | 120 | 0.050 | 12.500 | 10.000 | 3820 | 765 | 95.5 |
| 12.00 | 4 | 120 | 0.055 | 15.000 | 12.000 | 3185 | 700 | 126.1 |
| 16.00 | 4 | 120 | 0.065 | 20.000 | 16.000 | 2385 | 620 | 198.6 |
| 20.00 | 4 | 120 | 0.075 | 25.000 | 20.000 | 1910 | 575 | 286.5 |

Acciaio per lavorazione
a freddo (12% Cr)
fortemente legati
[1.2379]



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|-------|
| 4.00 | 4 | 55 | 0.025 | 5.000 | 4.000 | 4375 | 440 | 8.8 |
| 5.00 | 4 | 55 | 0.025 | 6.250 | 5.000 | 3500 | 350 | 10.9 |
| 6.00 | 4 | 55 | 0.030 | 7.500 | 6.000 | 2920 | 350 | 15.8 |
| 8.00 | 4 | 55 | 0.040 | 10.000 | 8.000 | 2190 | 350 | 28.0 |
| 10.00 | 4 | 55 | 0.045 | 12.500 | 10.000 | 1750 | 315 | 39.4 |
| 12.00 | 4 | 55 | 0.055 | 15.000 | 12.000 | 1460 | 320 | 57.8 |
| 16.00 | 4 | 55 | 0.065 | 20.000 | 16.000 | 1095 | 285 | 91.0 |
| 20.00 | 4 | 55 | 0.070 | 25.000 | 20.000 | 875 | 245 | 122.5 |

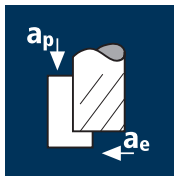
Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|-------|
| 4.00 | 4 | 70 | 0.015 | 5.000 | 4.000 | 5570 | 335 | 6.7 |
| 5.00 | 4 | 70 | 0.020 | 6.250 | 5.000 | 4455 | 355 | 11.1 |
| 6.00 | 4 | 70 | 0.025 | 7.500 | 6.000 | 3715 | 370 | 16.7 |
| 8.00 | 4 | 70 | 0.025 | 10.000 | 8.000 | 2785 | 280 | 22.3 |
| 10.00 | 4 | 70 | 0.035 | 12.500 | 10.000 | 2230 | 310 | 39.0 |
| 12.00 | 4 | 70 | 0.040 | 15.000 | 12.000 | 1855 | 295 | 53.5 |
| 16.00 | 4 | 70 | 0.050 | 20.000 | 16.000 | 1395 | 280 | 89.1 |
| 20.00 | 4 | 70 | 0.060 | 25.000 | 20.000 | 1115 | 265 | 133.7 |

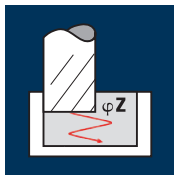
Applicazione

Materiale



Acciaio
< 850 N/mm²

| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _s [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 3.00 | 4 | 155 | 0.024 | 3.750 | 1.200 | 16445 | 1580 | 7.1 | 1.5° |
| 4.00 | 4 | 155 | 0.034 | 5.000 | 1.600 | 12335 | 1675 | 13.4 | 1.5° |
| 5.00 | 4 | 155 | 0.042 | 6.250 | 2.000 | 9870 | 1660 | 20.7 | 1.5° |
| 6.00 | 4 | 155 | 0.045 | 9.000 | 2.400 | 8225 | 1480 | 32.0 | 1.5° |
| 8.00 | 4 | 155 | 0.060 | 12.000 | 3.200 | 6165 | 1480 | 56.8 | 1.5° |
| 10.00 | 4 | 155 | 0.075 | 15.000 | 4.000 | 4935 | 1480 | 88.8 | 1.5° |
| 12.00 | 4 | 155 | 0.084 | 18.000 | 4.800 | 4110 | 1380 | 119.4 | 1.5° |
| 16.00 | 4 | 155 | 0.096 | 24.000 | 6.400 | 3085 | 1185 | 181.9 | 1.5° |
| 20.00 | 4 | 155 | 0.110 | 30.000 | 8.000 | 2465 | 1085 | 260.5 | 1.5° |



Acciaio
850 - 1100 N/mm²

| | | | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|------|-------|----|
| 3.00 | 4 | 140 | 0.022 | 3.750 | 1.200 | 14855 | 1305 | 5.9 | 2° |
| 4.00 | 4 | 140 | 0.032 | 5.000 | 1.600 | 11140 | 1425 | 11.4 | 2° |
| 5.00 | 4 | 140 | 0.040 | 6.250 | 2.000 | 8915 | 1425 | 17.8 | 2° |
| 6.00 | 4 | 140 | 0.039 | 9.000 | 2.400 | 7425 | 1160 | 25.0 | 2° |
| 8.00 | 4 | 140 | 0.052 | 12.000 | 3.200 | 5570 | 1160 | 44.5 | 2° |
| 10.00 | 4 | 140 | 0.065 | 15.000 | 4.000 | 4455 | 1160 | 69.5 | 2° |
| 12.00 | 4 | 140 | 0.078 | 18.000 | 4.800 | 3715 | 1160 | 100.1 | 2° |
| 16.00 | 4 | 140 | 0.088 | 24.000 | 6.400 | 2785 | 980 | 150.6 | 2° |
| 20.00 | 4 | 140 | 0.100 | 30.000 | 8.000 | 2230 | 890 | 213.9 | 2° |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

| | | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|------|
| 3.00 | 4 | 90 | 0.015 | 3.750 | 1.200 | 9550 | 575 | 2.6 | 1.5° |
| 4.00 | 4 | 90 | 0.022 | 5.000 | 1.600 | 7160 | 630 | 5.0 | 1.5° |
| 5.00 | 4 | 90 | 0.027 | 6.250 | 2.000 | 5730 | 620 | 7.7 | 1.5° |
| 6.00 | 4 | 90 | 0.027 | 9.000 | 2.400 | 4775 | 515 | 11.1 | 1.5° |
| 8.00 | 4 | 90 | 0.036 | 12.000 | 3.200 | 3580 | 515 | 19.8 | 1.5° |
| 10.00 | 4 | 90 | 0.045 | 15.000 | 4.000 | 2865 | 515 | 30.9 | 1.5° |
| 12.00 | 4 | 90 | 0.054 | 18.000 | 4.800 | 2385 | 515 | 44.6 | 1.5° |
| 16.00 | 4 | 90 | 0.056 | 24.000 | 6.400 | 1790 | 400 | 61.6 | 1.5° |
| 20.00 | 4 | 90 | 0.070 | 30.000 | 8.000 | 1430 | 400 | 96.3 | 1.5° |

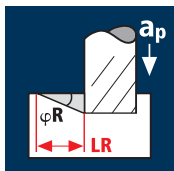
Applicazione

Materiale



Acciaio
< 850 N/mm²

| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _s [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 3.00 | 4 | 125 | 0.012 | 2.250 | 3.000 | 13265 | 635 | 4.3 | 1.5° |
| 4.00 | 4 | 125 | 0.017 | 4.000 | 4.000 | 9945 | 675 | 10.8 | 1.5° |
| 5.00 | 4 | 125 | 0.021 | 5.000 | 5.000 | 7960 | 670 | 16.7 | 1.5° |
| 6.00 | 4 | 125 | 0.029 | 7.500 | 6.000 | 6630 | 770 | 34.6 | 1.5° |
| 8.00 | 4 | 125 | 0.039 | 10.000 | 8.000 | 4975 | 775 | 62.1 | 1.5° |
| 10.00 | 4 | 125 | 0.049 | 12.500 | 10.000 | 3980 | 780 | 97.5 | 1.5° |
| 12.00 | 4 | 125 | 0.055 | 15.000 | 12.000 | 3315 | 730 | 131.3 | 1.5° |
| 16.00 | 4 | 125 | 0.062 | 20.000 | 16.000 | 2485 | 615 | 197.4 | 1.5° |
| 20.00 | 4 | 125 | 0.072 | 25.000 | 20.000 | 1990 | 575 | 286.5 | 1.5° |



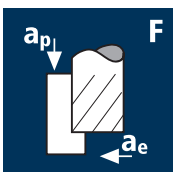
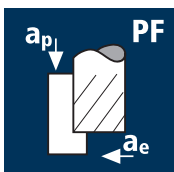
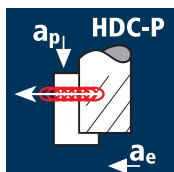
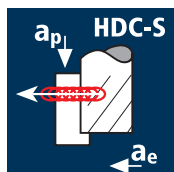
Acciaio
850 - 1100 N/mm²

| | | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|-----|-------|----|
| 3.00 | 4 | 110 | 0.011 | 2.250 | 3.000 | 11670 | 515 | 3.5 | 2° |
| 4.00 | 4 | 110 | 0.016 | 4.000 | 4.000 | 8755 | 560 | 9.0 | 2° |
| 5.00 | 4 | 110 | 0.020 | 5.000 | 5.000 | 7005 | 560 | 14.0 | 2° |
| 6.00 | 4 | 110 | 0.025 | 7.500 | 6.000 | 5835 | 585 | 26.3 | 2° |
| 8.00 | 4 | 110 | 0.034 | 10.000 | 8.000 | 4375 | 595 | 47.6 | 2° |
| 10.00 | 4 | 110 | 0.042 | 12.500 | 10.000 | 3500 | 590 | 73.5 | 2° |
| 12.00 | 4 | 110 | 0.051 | 15.000 | 12.000 | 2920 | 595 | 107.1 | 2° |
| 16.00 | 4 | 110 | 0.057 | 20.000 | 16.000 | 2190 | 500 | 159.7 | 2° |
| 20.00 | 4 | 110 | 0.065 | 25.000 | 20.000 | 1750 | 455 | 227.6 | 2° |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

| | | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|-------|------|
| 3.00 | 4 | 70 | 0.008 | 2.250 | 3.000 | 7425 | 240 | 1.6 | 1.5° |
| 4.00 | 4 | 70 | 0.011 | 4.000 | 4.000 | 5570 | 245 | 3.9 | 1.5° |
| 5.00 | 4 | 70 | 0.014 | 5.000 | 5.000 | 4455 | 250 | 6.2 | 1.5° |
| 6.00 | 4 | 70 | 0.018 | 7.500 | 6.000 | 3715 | 265 | 12.0 | 1.5° |
| 8.00 | 4 | 70 | 0.023 | 10.000 | 8.000 | 2785 | 255 | 20.5 | 1.5° |
| 10.00 | 4 | 70 | 0.029 | 12.500 | 10.000 | 2230 | 260 | 32.3 | 1.5° |
| 12.00 | 4 | 70 | 0.035 | 15.000 | 12.000 | 1855 | 260 | 46.8 | 1.5° |
| 16.00 | 4 | 70 | 0.036 | 20.000 | 16.000 | 1395 | 200 | 64.2 | 1.5° |
| 20.00 | 4 | 70 | 0.046 | 25.000 | 20.000 | 1115 | 205 | 102.5 | 1.5° |

I dati di taglio adatti per altre applicazioni e materiali si trovano nel calcolatore dei parametri di taglio **ToolExpert E-Cut**



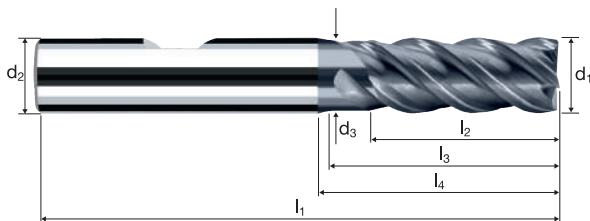
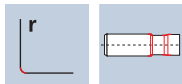
Frese cilindriche E-Cut

A taglienti lisci, esecuzione normale con scarico corto



HM
MG10

λ 45°
 γ 10°



Sgrossatura HPC Sgrossatura HDC Finitura

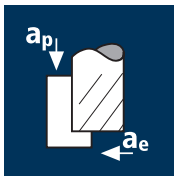


ReTool®

| | | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--------------|--|--|-------------------|----------------|---------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | | | Inox Stainless | Ti Titanium | GG(G) Tool Steel |
|-------------|----------------|-----------------|-----------------|--------------|--|--|-------------------|----------------|---------------------|

| Esempio: N° Ordine | Rivestimento | | Articolo | | Codice-Ø | | | | | | | POLYCHROM |
|-----------------------|----------------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------|-------|---|--------|-----------|
| | P | 8400 | 100 | | | | | | | | | P8400 |
| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r | α | z | EUR | P8300 |
| 100 | 1.00 | 6.00 | 0.95 | 57 | 3.00 | 5.00 | 14.82 | 0.050 | 10.0° | 4 | 48.90 | |
| 140 | 2.00 | 6.00 | 1.90 | 57 | 5.00 | 8.00 | 16.05 | 0.050 | 7.5° | 4 | 48.90 | |
| new! 160 | 2.50 | 6.00 | 2.30 | 57 | 7.00 | 10.00 | 17.30 | 0.050 | 6.5° | 4 | 48.90 | |
| 180 | 3.00 | 6.00 | 2.80 | 57 | 8.00 | 14.00 | 20.37 | 0.050 | 4.5° | 4 | 48.90 | |
| 220 | 4.00 | 6.00 | 3.70 | 57 | 11.00 | 16.00 | 20.82 | 0.100 | 3.0° | 4 | 48.90 | |
| 260 | 5.00 | 6.00 | 4.60 | 57 | 13.00 | 18.00 | 21.27 | 0.100 | 1.5° | 4 | 48.90 | |
| 300 | 6.00 | 6.00 | 5.50 | 57 | 13.00 | 18.15 | 20.00 | 0.100 | 0.0° | 4 | 48.90 | |
| 391 | 8.00 | 8.00 | 7.40 | 63 | 19.00 | 23.63 | 26.00 | 0.150 | 0.0° | 4 | 61.00 | |
| 450 | 10.00 | 10.00 | 9.20 | 72 | 23.00 | 27.99 | 31.00 | 0.200 | 0.0° | 4 | 83.00 | |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 27.00 | 33.29 | 37.00 | 0.200 | 0.0° | 4 | 103.00 | |
| 570 | 14.00 | 14.00 | 13.00 | 83 | 28.00 | 32.97 | 37.00 | 0.200 | 0.0° | 4 | 131.00 | |
| 610 | 16.00 | 16.00 | 15.00 | 92 | 32.00 | 38.73 | 43.00 | 0.200 | 0.0° | 4 | 161.00 | |
| 682 | 20.00 | 20.00 | 19.00 | 104 | 40.00 | 48.23 | 53.00 | 0.250 | 0.0° | 4 | 234.00 | |

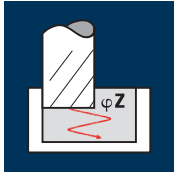
Applicazione



Materiale

Acciaio
< 850 N/mm²

| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 4.00 | 5 | 165 | 0.040 | 6.000 | 1.200 | 13130 | 2625 | 18.9 | 1° |
| 5.00 | 5 | 165 | 0.049 | 7.500 | 1.500 | 10505 | 2575 | 29.0 | 1° |
| 6.00 | 5 | 165 | 0.051 | 9.000 | 1.800 | 8755 | 2230 | 36.2 | 1° |
| 8.00 | 5 | 165 | 0.069 | 12.000 | 2.400 | 6565 | 2265 | 65.2 | 1° |
| 10.00 | 5 | 165 | 0.085 | 15.000 | 3.000 | 5250 | 2230 | 100.4 | 1° |
| 12.00 | 5 | 165 | 0.096 | 18.000 | 3.600 | 4375 | 2100 | 136.1 | 1° |
| 16.00 | 5 | 165 | 0.111 | 24.000 | 4.800 | 3285 | 1820 | 209.9 | 1° |
| 20.00 | 5 | 165 | 0.127 | 30.000 | 6.000 | 2625 | 1670 | 300.2 | 1° |



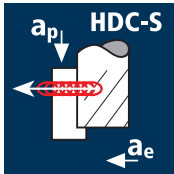
Acciaio
850 - 1100 N/mm²

| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 4.00 | 5 | 150 | 0.036 | 6.000 | 1.200 | 11935 | 2150 | 15.5 | 1.5° |
| 5.00 | 5 | 150 | 0.045 | 7.500 | 1.500 | 9550 | 2150 | 24.2 | 1.5° |
| 6.00 | 5 | 150 | 0.045 | 9.000 | 1.800 | 7960 | 1790 | 29.0 | 1.5° |
| 8.00 | 5 | 150 | 0.060 | 12.000 | 2.400 | 5970 | 1790 | 51.6 | 1.5° |
| 10.00 | 5 | 150 | 0.074 | 15.000 | 3.000 | 4775 | 1765 | 79.5 | 1.5° |
| 12.00 | 5 | 150 | 0.089 | 18.000 | 3.600 | 3980 | 1770 | 114.7 | 1.5° |
| 16.00 | 5 | 150 | 0.102 | 24.000 | 4.800 | 2985 | 1520 | 175.3 | 1.5° |
| 20.00 | 5 | 150 | 0.115 | 30.000 | 6.000 | 2385 | 1375 | 247.1 | 1.5° |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 4.00 | 5 | 95 | 0.025 | 6.000 | 1.200 | 7560 | 945 | 6.8 | 1° |
| 5.00 | 5 | 95 | 0.031 | 7.500 | 1.500 | 6050 | 935 | 10.5 | 1° |
| 6.00 | 5 | 95 | 0.031 | 9.000 | 1.800 | 5040 | 780 | 12.7 | 1° |
| 8.00 | 5 | 95 | 0.042 | 12.000 | 2.400 | 3780 | 795 | 22.9 | 1° |
| 10.00 | 5 | 95 | 0.051 | 15.000 | 3.000 | 3025 | 770 | 34.7 | 1° |
| 12.00 | 5 | 95 | 0.062 | 18.000 | 3.600 | 2520 | 780 | 50.6 | 1° |
| 16.00 | 5 | 95 | 0.064 | 24.000 | 4.800 | 1890 | 605 | 69.7 | 1° |
| 20.00 | 5 | 95 | 0.080 | 30.000 | 6.000 | 1510 | 605 | 108.9 | 1° |

Applicazione



Materiale

Acciaio
< 850 N/mm²

| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 4.00 | 5 | 243 | 0.073 | 11.000 | 0.400 | 19335 | 7100 | 31.2 |
| 5.00 | 5 | 243 | 0.092 | 13.000 | 0.500 | 15470 | 7150 | 46.5 |
| 6.00 | 5 | 243 | 0.112 | 13.000 | 0.600 | 12890 | 7190 | 56.1 |
| 8.00 | 5 | 243 | 0.150 | 19.000 | 0.800 | 9670 | 7230 | 109.9 |
| 10.00 | 5 | 243 | 0.185 | 23.000 | 1.000 | 7735 | 7155 | 164.5 |
| 12.00 | 5 | 243 | 0.223 | 27.000 | 1.200 | 6445 | 7190 | 232.9 |
| 16.00 | 5 | 243 | 0.245 | 32.000 | 1.600 | 4835 | 5915 | 302.9 |
| 20.00 | 5 | 243 | 0.307 | 40.000 | 2.000 | 3865 | 5945 | 475.5 |

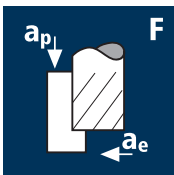
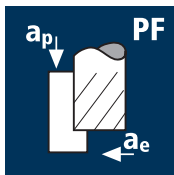
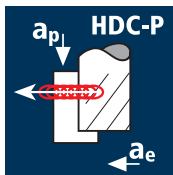
Acciaio
850 - 1100 N/mm²

| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 4.00 | 5 | 195 | 0.073 | 11.000 | 0.400 | 15520 | 5700 | 25.1 |
| 5.00 | 5 | 195 | 0.092 | 13.000 | 0.500 | 12415 | 5740 | 37.3 |
| 6.00 | 5 | 195 | 0.112 | 13.000 | 0.600 | 10345 | 5770 | 45.0 |
| 8.00 | 5 | 195 | 0.150 | 19.000 | 0.800 | 7760 | 5805 | 88.2 |
| 10.00 | 5 | 195 | 0.185 | 23.000 | 1.000 | 6205 | 5740 | 132.0 |
| 12.00 | 5 | 195 | 0.223 | 27.000 | 1.200 | 5175 | 5770 | 186.9 |
| 16.00 | 5 | 195 | 0.245 | 32.000 | 1.600 | 3880 | 4750 | 243.1 |
| 20.00 | 5 | 195 | 0.307 | 40.000 | 2.000 | 3105 | 4770 | 381.5 |

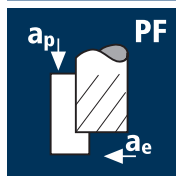
Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 4.00 | 5 | 135 | 0.070 | 11.000 | 0.200 | 10745 | 3780 | 8.3 |
| 5.00 | 5 | 135 | 0.088 | 13.000 | 0.250 | 8595 | 3780 | 12.3 |
| 6.00 | 5 | 135 | 0.106 | 13.000 | 0.300 | 7160 | 3780 | 14.7 |
| 8.00 | 5 | 135 | 0.141 | 19.000 | 0.400 | 5370 | 3780 | 28.7 |
| 10.00 | 5 | 135 | 0.176 | 23.000 | 0.500 | 4295 | 3780 | 43.5 |
| 12.00 | 5 | 135 | 0.211 | 27.000 | 0.600 | 3580 | 3780 | 61.2 |
| 16.00 | 5 | 135 | 0.229 | 32.000 | 0.800 | 2685 | 3070 | 78.6 |
| 20.00 | 5 | 135 | 0.295 | 40.000 | 1.000 | 2150 | 3165 | 126.6 |

I dati di taglio adatti per altre applicazioni e materiali si trovano nel calcolatore dei parametri di taglio **ToolExpert E-Cut**



Applicazione



Materiale

Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|
| 4.00 | 4 | 160 | 0.015 | 6.000 | 1.000 | 12730 | 765 |
| 6.00 | 4 | 160 | 0.020 | 9.000 | 1.500 | 8490 | 680 |
| 8.00 | 4 | 160 | 0.025 | 12.000 | 2.000 | 6365 | 635 |
| 10.00 | 4 | 160 | 0.035 | 15.000 | 2.500 | 5095 | 715 |
| 12.00 | 4 | 160 | 0.040 | 18.000 | 3.000 | 4245 | 680 |
| 14.00 | 4 | 160 | 0.045 | 21.000 | 3.500 | 3640 | 655 |
| 16.00 | 4 | 160 | 0.055 | 24.000 | 4.000 | 3185 | 700 |
| 18.00 | 4 | 160 | 0.060 | 27.000 | 4.500 | 2830 | 680 |
| 20.00 | 4 | 160 | 0.065 | 30.000 | 5.000 | 2545 | 660 |

Acciaio
850 - 1100 N/mm²



| | | | | | | | |
|-------|---|-----|-------|--------|-------|------|-----|
| 4.00 | 4 | 100 | 0.015 | 6.000 | 1.000 | 7960 | 475 |
| 6.00 | 4 | 100 | 0.020 | 9.000 | 1.500 | 5305 | 425 |
| 8.00 | 4 | 100 | 0.025 | 12.000 | 2.000 | 3980 | 400 |
| 10.00 | 4 | 100 | 0.035 | 15.000 | 2.500 | 3185 | 445 |
| 12.00 | 4 | 100 | 0.040 | 18.000 | 3.000 | 2655 | 425 |
| 14.00 | 4 | 100 | 0.045 | 21.000 | 3.500 | 2275 | 410 |
| 16.00 | 4 | 100 | 0.055 | 24.000 | 4.000 | 1990 | 440 |
| 18.00 | 4 | 100 | 0.060 | 27.000 | 4.500 | 1770 | 425 |
| 20.00 | 4 | 100 | 0.065 | 30.000 | 5.000 | 1590 | 415 |

Acciaio
1100 - 1300 N/mm²



| | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|
| 4.00 | 4 | 75 | 0.015 | 6.000 | 0.400 | 5970 | 360 |
| 6.00 | 4 | 75 | 0.020 | 9.000 | 0.600 | 3980 | 320 |
| 8.00 | 4 | 75 | 0.025 | 12.000 | 0.800 | 2985 | 300 |
| 10.00 | 4 | 75 | 0.035 | 15.000 | 1.000 | 2385 | 335 |
| 12.00 | 4 | 75 | 0.040 | 18.000 | 1.200 | 1990 | 320 |
| 14.00 | 4 | 75 | 0.045 | 21.000 | 1.400 | 1705 | 305 |
| 16.00 | 4 | 75 | 0.055 | 24.000 | 1.600 | 1490 | 330 |
| 18.00 | 4 | 75 | 0.060 | 27.000 | 1.800 | 1325 | 320 |
| 20.00 | 4 | 75 | 0.065 | 30.000 | 2.000 | 1195 | 310 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|
| 4.00 | 4 | 90 | 0.015 | 6.000 | 1.000 | 7160 | 430 |
| 6.00 | 4 | 90 | 0.020 | 9.000 | 1.500 | 4775 | 380 |
| 8.00 | 4 | 90 | 0.025 | 12.000 | 2.000 | 3580 | 360 |
| 10.00 | 4 | 90 | 0.035 | 15.000 | 2.500 | 2865 | 400 |
| 12.00 | 4 | 90 | 0.040 | 18.000 | 3.000 | 2385 | 380 |
| 14.00 | 4 | 90 | 0.045 | 21.000 | 3.500 | 2045 | 370 |
| 16.00 | 4 | 90 | 0.055 | 24.000 | 4.000 | 1790 | 395 |
| 18.00 | 4 | 90 | 0.060 | 27.000 | 4.500 | 1590 | 380 |
| 20.00 | 4 | 90 | 0.065 | 30.000 | 5.000 | 1430 | 370 |

Ghisa
(grigia / sferoidale)



| | | | | | | | |
|-------|---|-----|-------|--------|-------|------|-----|
| 4.00 | 4 | 120 | 0.015 | 6.000 | 1.000 | 9550 | 575 |
| 6.00 | 4 | 120 | 0.020 | 9.000 | 1.500 | 6365 | 510 |
| 8.00 | 4 | 120 | 0.025 | 12.000 | 2.000 | 4775 | 475 |
| 10.00 | 4 | 120 | 0.035 | 15.000 | 2.500 | 3820 | 535 |
| 12.00 | 4 | 120 | 0.040 | 18.000 | 3.000 | 3185 | 510 |
| 14.00 | 4 | 120 | 0.045 | 21.000 | 3.500 | 2730 | 490 |
| 16.00 | 4 | 120 | 0.055 | 24.000 | 4.000 | 2385 | 525 |
| 18.00 | 4 | 120 | 0.060 | 27.000 | 4.500 | 2120 | 510 |
| 20.00 | 4 | 120 | 0.065 | 30.000 | 5.000 | 1910 | 495 |

Rame non legato



| | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|------|
| 4.00 | 4 | 230 | 0.015 | 6.000 | 1.000 | 18305 | 1100 |
| 6.00 | 4 | 230 | 0.020 | 9.000 | 1.500 | 12200 | 975 |
| 8.00 | 4 | 230 | 0.025 | 12.000 | 2.000 | 9150 | 915 |
| 10.00 | 4 | 230 | 0.035 | 15.000 | 2.500 | 7320 | 1025 |
| 12.00 | 4 | 230 | 0.040 | 18.000 | 3.000 | 6100 | 975 |
| 14.00 | 4 | 230 | 0.045 | 21.000 | 3.500 | 5230 | 940 |
| 16.00 | 4 | 230 | 0.055 | 24.000 | 4.000 | 4575 | 1005 |
| 18.00 | 4 | 230 | 0.060 | 27.000 | 4.500 | 4065 | 975 |
| 20.00 | 4 | 230 | 0.065 | 30.000 | 5.000 | 3660 | 950 |

Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]



| | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|
| 4.00 | 4 | 95 | 0.015 | 6.000 | 1.000 | 7560 | 455 |
| 6.00 | 4 | 95 | 0.020 | 9.000 | 1.500 | 5040 | 405 |
| 8.00 | 4 | 95 | 0.025 | 12.000 | 2.000 | 3780 | 380 |
| 10.00 | 4 | 95 | 0.035 | 15.000 | 2.500 | 3025 | 425 |
| 12.00 | 4 | 95 | 0.040 | 18.000 | 3.000 | 2520 | 405 |
| 14.00 | 4 | 95 | 0.045 | 21.000 | 3.500 | 2160 | 390 |
| 16.00 | 4 | 95 | 0.055 | 24.000 | 4.000 | 1890 | 415 |
| 18.00 | 4 | 95 | 0.060 | 27.000 | 4.500 | 1680 | 405 |
| 20.00 | 4 | 95 | 0.065 | 30.000 | 5.000 | 1510 | 395 |

Inox difficult
[Cr-Ni-Mo++/1.4529]
Acciaio resistente al calore
[1.4841]



| | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|
| 4.00 | 4 | 50 | 0.015 | 6.000 | 1.000 | 3980 | 240 |
| 6.00 | 4 | 50 | 0.020 | 9.000 | 1.500 | 2655 | 210 |
| 8.00 | 4 | 50 | 0.025 | 12.000 | 2.000 | 1990 | 200 |
| 10.00 | 4 | 50 | 0.035 | 15.000 | 2.500 | 1590 | 225 |
| 12.00 | 4 | 50 | 0.040 | 18.000 | 3.000 | 1325 | 210 |
| 14.00 | 4 | 50 | 0.045 | 21.000 | 3.500 | 1135 | 205 |
| 16.00 | 4 | 50 | 0.055 | 24.000 | 4.000 | 995 | 220 |
| 18.00 | 4 | 50 | 0.060 | 27.000 | 4.500 | 885 | 210 |
| 20.00 | 4 | 50 | 0.065 | 30.000 | 5.000 | 795 | 205 |

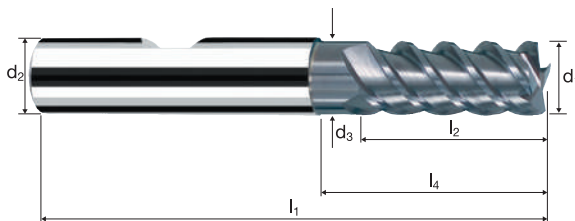
Frese cilindriche

A taglienti lisci, esecuzione normale con scarico corto



HM
MG10

λ 55°
 γ 15°



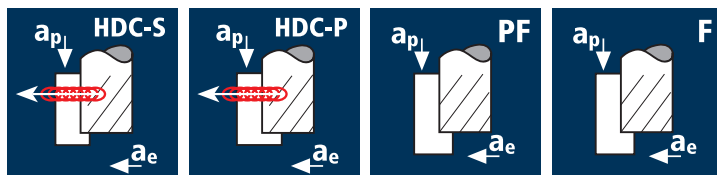
| | | | | | | | | | |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|--------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | | | | | Inox Stainless | Ti Titanium | GG(G) Gold / Platinum |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|--------------------------|

| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | 45° | α | z | POLYCHROM | TRIBO | |
|----------------------------|----------------------|----------------------|----------------|----------------|----------------|----------------|----------------|------|------|---|-----------|--------|--|
| | | | | | | | | | | | EUR | EUR | |
| Esempio: N° Ordine | | | | | | | | | | | | | |
| Rivestimento T | | | | | | | | | | | | | |
| Articolo 5355 | | | | | | | | | | | | | |
| Codice-ø 180 | | | | | | | | | | | | | |
| 180 | 3.00 | 6.00 | 2.80 | 57 | 8.00 | 14.00 | 20.63 | 0.10 | 4.5° | 4 | 58.80 | 61.00 | |
| 220 | 4.00 | 6.00 | 3.70 | 57 | 11.00 | 16.00 | 20.95 | 0.10 | 3.0° | 4 | 58.80 | 61.00 | |
| 260 | 5.00 | 6.00 | 4.60 | 57 | 13.00 | 18.00 | 21.27 | 0.15 | 1.5° | 4 | 58.80 | 61.00 | |
| 300 | 6.00 | 6.00 | 5.50 | 57 | 13.00 | 19.34 | 20.00 | 0.15 | 0.0° | 4 | 58.80 | 61.00 | |
| 331* | 7.00 | 8.00 | - | 63 | 16.00 | - | 20.02 | 0.15 | 1.5° | 4 | 72.00 | 75.00 | |
| 391 | 8.00 | 8.00 | 7.40 | 63 | 19.00 | 25.29 | 26.00 | 0.15 | 0.0° | 4 | 73.00 | 76.00 | |
| 420* | 9.00 | 10.00 | - | 72 | 19.00 | - | 23.02 | 0.20 | 1.5° | 4 | 98.00 | 102.00 | |
| 450 | 10.00 | 10.00 | 9.20 | 72 | 22.00 | 30.20 | 31.00 | 0.20 | 0.0° | 4 | 100.00 | 103.00 | |
| 470* | 11.00 | 12.00 | - | 83 | 26.00 | - | 30.52 | 0.20 | 1.0° | 4 | 122.00 | 126.00 | |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 26.00 | 36.13 | 37.00 | 0.20 | 0.0° | 4 | 123.00 | 128.00 | |
| 570 | 14.00 | 14.00 | 13.00 | 83 | 26.00 | 36.13 | 37.00 | 0.20 | 0.0° | 4 | 193.00 | 200.00 | |
| 610 | 16.00 | 16.00 | 15.00 | 92 | 32.00 | 42.13 | 43.00 | 0.20 | 0.0° | 4 | 193.00 | 200.00 | |
| 640 | 18.00 | 18.00 | 17.00 | 92 | 32.00 | 42.13 | 43.00 | 0.20 | 0.0° | 4 | 282.00 | 292.00 | |
| 682 | 20.00 | 20.00 | 19.00 | 104 | 38.00 | 52.13 | 53.00 | 0.20 | 0.0° | 4 | 282.00 | 292.00 | |
| * solo senza scarico corto | | | | | | | | | | | | | |

| Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _s [mm] | a _s [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] | | |
|--------------|--|--------------|---|------------------------|---------------------|------------------------|---------------------|------------------------|-------------------------|--------------------------|-------------------------|--------------------------|--------|
| | Acciaio < 850 N/mm ² | 3.00 | 3 | 145 | 0.021 | 3.750 | 1.950 | 15385 | 970 | 7.1 | 2° | | |
| | | 4.00 | 3 | 145 | 0.030 | 5.000 | 2.600 | 11540 | 1040 | 13.5 | 2° | | |
| | | 5.00 | 3 | 145 | 0.038 | 6.250 | 3.250 | 9230 | 1050 | 21.4 | 2° | | |
| | | 6.00 | 3 | 145 | 0.041 | 9.000 | 3.900 | 7690 | 945 | 33.2 | 2° | | |
| | | 8.00 | 3 | 145 | 0.054 | 12.000 | 5.200 | 5770 | 935 | 58.3 | 2° | | |
| | | 10.00 | 3 | 145 | 0.068 | 15.000 | 6.500 | 4615 | 940 | 91.8 | 2° | | |
| | | 12.00 | 3 | 145 | 0.076 | 18.000 | 7.800 | 3845 | 875 | 123.1 | 2° | | |
| | | 16.00 | 3 | 145 | 0.086 | 24.000 | 10.400 | 2885 | 745 | 185.8 | 2° | | |
| | | 20.00 | 3 | 145 | 0.099 | 30.000 | 13.000 | 2310 | 685 | 267.3 | 2° | | |
| | | | Acciaio 850 - 1100 N/mm ² | 3.00 | 3 | 130 | 0.020 | 3.750 | 1.950 | 13795 | 830 | 6.1 | 3° |
| 4.00 | 3 | | | 130 | 0.029 | 5.000 | 2.600 | 10345 | 900 | 11.7 | 3° | | |
| 5.00 | 3 | | | 130 | 0.036 | 6.250 | 3.250 | 8275 | 895 | 18.2 | 3° | | |
| 6.00 | 3 | | | 130 | 0.035 | 9.000 | 3.900 | 6895 | 725 | 25.4 | 3° | | |
| 8.00 | 3 | | | 130 | 0.047 | 12.000 | 5.200 | 5175 | 730 | 45.5 | 3° | | |
| 10.00 | 3 | | | 130 | 0.059 | 15.000 | 6.500 | 4140 | 730 | 71.4 | 3° | | |
| 12.00 | 3 | | | 130 | 0.070 | 18.000 | 7.800 | 3450 | 725 | 101.7 | 3° | | |
| 16.00 | 3 | | | 130 | 0.079 | 24.000 | 10.400 | 2585 | 615 | 153.0 | 3° | | |
| 20.00 | 3 | | | 130 | 0.099 | 30.000 | 13.000 | 2070 | 615 | 239.7 | 3° | | |
| | Inox normal [Cr-Ni/1.4301] [Cr-Ni-Mo/1.4571] | | | 3.00 | 3 | 80 | 0.015 | 3.750 | 1.950 | 8490 | 380 | 2.8 | 2° |
| | | 4.00 | 3 | 80 | 0.022 | 5.000 | 2.600 | 6365 | 420 | 5.5 | 2° | | |
| | | 5.00 | 3 | 80 | 0.027 | 6.250 | 3.250 | 5095 | 415 | 8.4 | 2° | | |
| | | 6.00 | 3 | 80 | 0.027 | 9.000 | 3.900 | 4245 | 345 | 12.1 | 2° | | |
| | | 8.00 | 3 | 80 | 0.036 | 12.000 | 5.200 | 3185 | 345 | 21.5 | 2° | | |
| | | 10.00 | 3 | 80 | 0.045 | 15.000 | 6.500 | 2545 | 345 | 33.5 | 2° | | |
| | | 12.00 | 3 | 80 | 0.054 | 18.000 | 7.800 | 2120 | 345 | 48.3 | 2° | | |
| | | 16.00 | 3 | 80 | 0.056 | 24.000 | 10.400 | 1590 | 265 | 66.7 | 2° | | |
| | | 20.00 | 3 | 80 | 0.070 | 30.000 | 13.000 | 1275 | 265 | 104.3 | 2° | | |
| | | Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _s [mm] | a _s [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] |
| | Acciaio < 850 N/mm ² | | | 3.00 | 3 | 125 | 0.017 | 3.000 | 3.000 | 13265 | 675 | 6.1 | 2° |
| | | | | 4.00 | 3 | 125 | 0.024 | 5.000 | 4.000 | 9945 | 715 | 14.3 | 2° |
| | | | | 5.00 | 3 | 125 | 0.030 | 6.250 | 5.000 | 7960 | 715 | 22.4 | 2° |
| | | | | 6.00 | 3 | 125 | 0.033 | 9.000 | 6.000 | 6630 | 655 | 35.5 | 2° |
| | | | | 8.00 | 3 | 125 | 0.043 | 12.000 | 8.000 | 4975 | 640 | 61.6 | 2° |
| | | | | 10.00 | 3 | 125 | 0.054 | 15.000 | 10.000 | 3980 | 645 | 96.7 | 2° |
| | | | | 12.00 | 3 | 125 | 0.061 | 18.000 | 12.000 | 3315 | 605 | 131.1 | 2° |
| | | | | 16.00 | 3 | 125 | 0.069 | 24.000 | 16.000 | 2485 | 515 | 197.7 | 2° |
| | | | | 20.00 | 3 | 125 | 0.079 | 30.000 | 20.000 | 1990 | 470 | 282.9 | 2° |
| | | | Acciaio 850 - 1100 N/mm ² | 3.00 | 3 | 110 | 0.016 | 3.000 | 3.000 | 11670 | 560 | 5.0 | 2° |
| 4.00 | 3 | | | 110 | 0.023 | 5.000 | 4.000 | 8755 | 605 | 12.1 | 2° | | |
| 5.00 | 3 | | | 110 | 0.029 | 6.250 | 5.000 | 7005 | 610 | 19.0 | 2° | | |
| 6.00 | 3 | | | 110 | 0.028 | 9.000 | 6.000 | 5835 | 490 | 26.5 | 2° | | |
| 8.00 | 3 | | | 110 | 0.038 | 12.000 | 8.000 | 4375 | 500 | 47.9 | 2° | | |
| 10.00 | 3 | | | 110 | 0.047 | 15.000 | 10.000 | 3500 | 495 | 74.1 | 2° | | |
| 12.00 | 3 | | | 110 | 0.056 | 18.000 | 12.000 | 2920 | 490 | 105.9 | 2° | | |
| 16.00 | 3 | | | 110 | 0.063 | 24.000 | 16.000 | 2190 | 415 | 158.8 | 2° | | |
| 20.00 | 3 | | | 110 | 0.079 | 30.000 | 20.000 | 1750 | 415 | 249.0 | 2° | | |
| | Inox normal [Cr-Ni/1.4301] [Cr-Ni-Mo/1.4571] | | | 3.00 | 3 | 70 | 0.012 | 3.000 | 3.000 | 7425 | 265 | 2.4 | 2° |
| | | 4.00 | 3 | 70 | 0.018 | 5.000 | 4.000 | 5570 | 300 | 6.0 | 2° | | |
| | | 5.00 | 3 | 70 | 0.022 | 6.250 | 5.000 | 4455 | 295 | 9.2 | 2° | | |
| | | 6.00 | 3 | 70 | 0.022 | 9.000 | 6.000 | 3715 | 245 | 13.2 | 2° | | |
| | | 8.00 | 3 | 70 | 0.029 | 12.000 | 8.000 | 2785 | 240 | 23.3 | 2° | | |
| | | 10.00 | 3 | 70 | 0.036 | 15.000 | 10.000 | 2230 | 240 | 36.1 | 2° | | |
| | | 12.00 | 3 | 70 | 0.043 | 18.000 | 12.000 | 1855 | 240 | 51.7 | 2° | | |
| | | 16.00 | 3 | 70 | 0.045 | 24.000 | 16.000 | 1395 | 190 | 72.2 | 2° | | |
| | | 20.00 | 3 | 70 | 0.056 | 30.000 | 20.000 | 1115 | 185 | 112.3 | 2° | | |



I dati di taglio adatti per altre applicazioni e materiali si trovano nel calcolatore dei parametri di taglio **ToolExpert E-Cut**



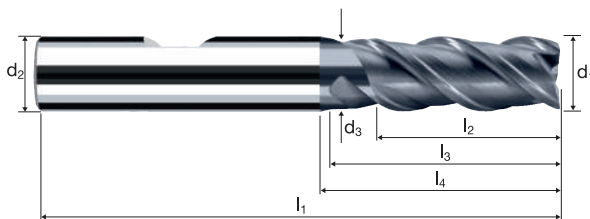
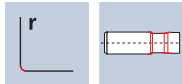
Frese cilindriche E-Cut

A taglienti lisci, esecuzione normale con scarico corto



HM
MG10

λ 45°
 γ 10°



Sgrossatura HPC Sgrossatura HDC Finitura

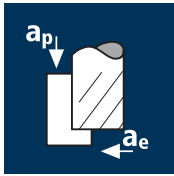


ReTool®

| | | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--------------|--|--|-------------------|----------------|---------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | | | Inox Stainless | Ti Titanium | GG(G) Tool Steel |
|-------------|----------------|-----------------|-----------------|--------------|--|--|-------------------|----------------|---------------------|

| Esempio: N° Ordine | | | | | | | | | | | POLYCHROM | |
|--------------------------------|----------------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------|-------|---|-----------|--|
| Rivestimento Articolo Codice-ø | | | | | | | | | | | | |
| P 8403 100 | | | | | | | | | | | | |
| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r | α | z | EUR | |
| 100 | 1.00 | 6.00 | 0.95 | 57 | 3.00 | 5.00 | 14.82 | 0.050 | 10.0° | 3 | 43.20 | |
| 140 | 2.00 | 6.00 | 1.90 | 57 | 5.00 | 8.00 | 16.05 | 0.050 | 7.5° | 3 | 43.20 | |
| new! 160 | 2.50 | 6.00 | 2.30 | 57 | 7.00 | 10.00 | 17.30 | 0.050 | 6.5° | 3 | 43.20 | |
| 180 | 3.00 | 6.00 | 2.80 | 57 | 8.00 | 14.00 | 20.37 | 0.050 | 4.5° | 3 | 43.20 | |
| new! 200 | 3.50 | 6.00 | 3.20 | 57 | 9.00 | 14.00 | 19.69 | 0.050 | 4.0° | 3 | 43.20 | |
| 220 | 4.00 | 6.00 | 3.70 | 57 | 11.00 | 16.00 | 20.82 | 0.100 | 3.0° | 3 | 43.20 | |
| new! 240 | 4.50 | 6.00 | 4.10 | 57 | 12.00 | 17.00 | 21.14 | 0.100 | 2.5° | 3 | 43.20 | |
| 260 | 5.00 | 6.00 | 4.60 | 57 | 13.00 | 18.00 | 21.27 | 0.100 | 1.5° | 3 | 43.20 | |
| new! 280 | 5.50 | 6.00 | 5.00 | 57 | 13.00 | 18.00 | 20.59 | 0.100 | 1.0° | 3 | 43.20 | |
| 300 | 6.00 | 6.00 | 5.50 | 57 | 13.00 | 18.15 | 20.00 | 0.100 | 0.0° | 3 | 43.20 | |
| 391 | 8.00 | 8.00 | 7.40 | 63 | 19.00 | 23.63 | 26.00 | 0.150 | 0.0° | 3 | 54.00 | |
| 450 | 10.00 | 10.00 | 9.20 | 72 | 23.00 | 27.99 | 31.00 | 0.200 | 0.0° | 3 | 73.00 | |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 27.00 | 33.29 | 37.00 | 0.200 | 0.0° | 3 | 91.00 | |
| 570 | 14.00 | 14.00 | 13.00 | 83 | 28.00 | 32.97 | 37.00 | 0.200 | 0.0° | 3 | 116.00 | |
| 610 | 16.00 | 16.00 | 15.00 | 92 | 32.00 | 38.73 | 43.00 | 0.200 | 0.0° | 3 | 142.00 | |
| 682 | 20.00 | 20.00 | 19.00 | 104 | 40.00 | 48.23 | 53.00 | 0.250 | 0.0° | 3 | 207.00 | |

Applicazione



Materiale

Acciaio
< 850 N/mm²



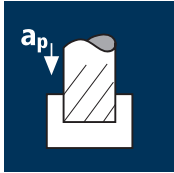
Acciaio
850 - 1100 N/mm²



Acciaio per lavorazione
a freddo (12% Cr)
fortemente legati
[1.2379]



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Acciaio
< 850 N/mm²



Acciaio
850 - 1100 N/mm²



Acciaio per lavorazione
a freddo (12% Cr)
fortemente legati
[1.2379]



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 3.00 | 3 | 190 | 0.015 | 4.500 | 1.400 | 20160 | 905 | 5.7 |
| 4.00 | 3 | 190 | 0.015 | 6.000 | 1.800 | 15120 | 680 | 7.3 |
| 5.00 | 3 | 190 | 0.020 | 7.500 | 2.250 | 12095 | 725 | 12.2 |
| 6.00 | 3 | 190 | 0.040 | 9.000 | 2.700 | 10080 | 1210 | 29.4 |
| 8.00 | 3 | 190 | 0.050 | 12.000 | 3.600 | 7560 | 1135 | 49.0 |
| 10.00 | 3 | 190 | 0.065 | 15.000 | 4.500 | 6050 | 1180 | 79.6 |
| 12.00 | 3 | 190 | 0.075 | 18.000 | 5.400 | 5040 | 1135 | 110.2 |
| 16.00 | 3 | 190 | 0.100 | 24.000 | 7.200 | 3780 | 1135 | 196.0 |
| 20.00 | 3 | 190 | 0.125 | 30.000 | 9.000 | 3025 | 1135 | 306.2 |
| 3.00 | 3 | 140 | 0.015 | 4.500 | 1.400 | 14855 | 670 | 4.2 |
| 4.00 | 3 | 140 | 0.015 | 6.000 | 1.800 | 11140 | 500 | 5.4 |
| 5.00 | 3 | 140 | 0.020 | 7.500 | 2.250 | 8915 | 535 | 9.0 |
| 6.00 | 3 | 140 | 0.040 | 9.000 | 2.700 | 7425 | 890 | 21.7 |
| 8.00 | 3 | 140 | 0.050 | 12.000 | 3.600 | 5570 | 835 | 36.1 |
| 10.00 | 3 | 140 | 0.065 | 15.000 | 4.500 | 4455 | 870 | 58.7 |
| 12.00 | 3 | 140 | 0.075 | 18.000 | 5.400 | 3715 | 835 | 81.2 |
| 16.00 | 3 | 140 | 0.100 | 24.000 | 7.200 | 2785 | 835 | 144.4 |
| 20.00 | 3 | 140 | 0.125 | 30.000 | 9.000 | 2230 | 835 | 225.6 |
| 3.00 | 3 | 70 | 0.010 | 4.500 | 1.350 | 7425 | 225 | 1.4 |
| 4.00 | 3 | 70 | 0.015 | 6.000 | 1.800 | 5570 | 250 | 2.7 |
| 5.00 | 3 | 70 | 0.015 | 7.500 | 2.250 | 4455 | 200 | 3.4 |
| 6.00 | 3 | 70 | 0.035 | 9.000 | 2.700 | 3715 | 390 | 9.5 |
| 8.00 | 3 | 70 | 0.045 | 12.000 | 3.600 | 2785 | 375 | 16.2 |
| 10.00 | 3 | 70 | 0.055 | 15.000 | 4.500 | 2230 | 370 | 24.8 |
| 12.00 | 3 | 70 | 0.065 | 18.000 | 5.400 | 1855 | 360 | 35.2 |
| 16.00 | 3 | 70 | 0.085 | 24.000 | 7.200 | 1395 | 355 | 61.4 |
| 20.00 | 3 | 70 | 0.110 | 30.000 | 9.000 | 1115 | 370 | 99.3 |
| 3.00 | 3 | 90 | 0.005 | 4.500 | 1.350 | 9550 | 145 | 0.9 |
| 4.00 | 3 | 90 | 0.010 | 6.000 | 1.800 | 7160 | 215 | 2.3 |
| 5.00 | 3 | 90 | 0.010 | 7.500 | 2.250 | 5730 | 170 | 2.9 |
| 6.00 | 3 | 90 | 0.025 | 9.000 | 2.700 | 4775 | 360 | 8.7 |
| 8.00 | 3 | 90 | 0.030 | 12.000 | 3.600 | 3580 | 320 | 13.9 |
| 10.00 | 3 | 90 | 0.040 | 15.000 | 4.500 | 2865 | 345 | 23.2 |
| 12.00 | 3 | 90 | 0.045 | 18.000 | 5.400 | 2385 | 320 | 31.3 |
| 16.00 | 3 | 90 | 0.060 | 24.000 | 7.200 | 1790 | 320 | 55.7 |
| 20.00 | 3 | 90 | 0.080 | 30.000 | 9.000 | 1430 | 345 | 92.8 |
| 3.00 | 3 | 155 | 0.015 | 4.500 | 3.000 | 16445 | 740 | 10.0 |
| 4.00 | 3 | 155 | 0.015 | 6.000 | 4.000 | 12335 | 555 | 13.3 |
| 5.00 | 3 | 155 | 0.025 | 7.500 | 5.000 | 9870 | 740 | 27.8 |
| 6.00 | 3 | 155 | 0.030 | 9.000 | 6.000 | 8225 | 740 | 40.0 |
| 8.00 | 3 | 155 | 0.040 | 12.000 | 8.000 | 6165 | 740 | 71.0 |
| 10.00 | 3 | 155 | 0.050 | 15.000 | 10.000 | 4935 | 740 | 111.0 |
| 12.00 | 3 | 155 | 0.060 | 18.000 | 12.000 | 4110 | 740 | 159.9 |
| 16.00 | 3 | 155 | 0.080 | 16.000 | 16.000 | 3085 | 740 | 189.5 |
| 20.00 | 3 | 155 | 0.100 | 20.000 | 20.000 | 2465 | 740 | 296.0 |
| 3.00 | 3 | 105 | 0.015 | 4.500 | 3.000 | 11140 | 500 | 6.8 |
| 4.00 | 3 | 105 | 0.015 | 6.000 | 4.000 | 8355 | 375 | 9.0 |
| 5.00 | 3 | 105 | 0.025 | 7.500 | 5.000 | 6685 | 500 | 18.8 |
| 6.00 | 3 | 105 | 0.030 | 9.000 | 6.000 | 5570 | 500 | 27.1 |
| 8.00 | 3 | 105 | 0.040 | 12.000 | 8.000 | 4180 | 500 | 48.1 |
| 10.00 | 3 | 105 | 0.050 | 15.000 | 10.000 | 3340 | 500 | 75.2 |
| 12.00 | 3 | 105 | 0.060 | 18.000 | 12.000 | 2785 | 500 | 108.3 |
| 16.00 | 3 | 105 | 0.080 | 16.000 | 16.000 | 2090 | 500 | 128.3 |
| 20.00 | 3 | 105 | 0.100 | 20.000 | 20.000 | 1670 | 500 | 200.5 |
| 3.00 | 3 | 55 | 0.010 | 4.500 | 3.000 | 5835 | 175 | 2.4 |
| 4.00 | 3 | 55 | 0.015 | 6.000 | 4.000 | 4375 | 195 | 4.7 |
| 5.00 | 3 | 55 | 0.015 | 7.500 | 5.000 | 3500 | 160 | 5.9 |
| 6.00 | 3 | 55 | 0.030 | 9.000 | 6.000 | 2920 | 265 | 14.2 |
| 8.00 | 3 | 55 | 0.040 | 12.000 | 8.000 | 2190 | 265 | 25.2 |
| 10.00 | 3 | 55 | 0.050 | 15.000 | 10.000 | 1750 | 265 | 39.4 |
| 12.00 | 3 | 55 | 0.060 | 18.000 | 12.000 | 1460 | 265 | 56.7 |
| 16.00 | 3 | 55 | 0.080 | 16.000 | 16.000 | 1095 | 265 | 67.2 |
| 20.00 | 3 | 55 | 0.100 | 20.000 | 20.000 | 875 | 265 | 105.0 |
| 3.00 | 3 | 75 | 0.010 | 1.500 | 3.000 | 7960 | 240 | 1.1 |
| 4.00 | 3 | 75 | 0.015 | 2.000 | 4.000 | 5970 | 270 | 2.1 |
| 5.00 | 3 | 75 | 0.015 | 2.500 | 5.000 | 4775 | 215 | 2.7 |
| 6.00 | 3 | 75 | 0.025 | 3.000 | 6.000 | 3980 | 300 | 5.4 |
| 8.00 | 3 | 75 | 0.035 | 4.000 | 8.000 | 2985 | 315 | 10.0 |
| 10.00 | 3 | 75 | 0.045 | 5.000 | 10.000 | 2385 | 320 | 16.1 |
| 12.00 | 3 | 75 | 0.050 | 6.000 | 12.000 | 1990 | 300 | 21.5 |
| 16.00 | 3 | 75 | 0.070 | 8.000 | 16.000 | 1490 | 315 | 40.1 |
| 20.00 | 3 | 75 | 0.085 | 10.000 | 20.000 | 1195 | 305 | 60.9 |

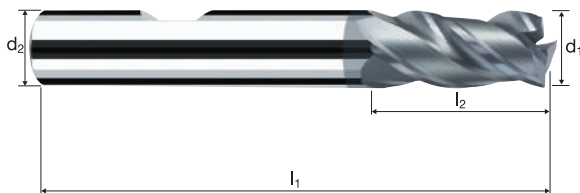
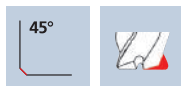
Frese cilindriche

A taglienti lisci, esecuzione normale



HM
MG10

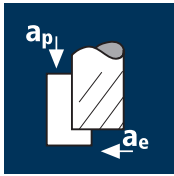
λ **40°**
 γ **0°**



| | | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--|--|--|-------------------|----------------|---------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | | | | Inox Stainless | Ti Titanium | GG(G) Tool Steel |
|-------------|----------------|-----------------|-----------------|--|--|--|-------------------|----------------|---------------------|

| | | | | | | | | | | POLYCHROM |
|------------|----------------------|----------------------|--|----------------|----------------|----------------|------|------|---|-----------|
| | | | | | | | | | | P15333 |
| | | | | | | | | | | P15233 |
| | | | | | | | | | | EUR |
| Ø Code | d ₁ e8 | d ₂ h6 | | l ₁ | l ₂ | l ₄ | 45° | α | z | |
| 180 | 3.00 | 6.00 | | 57 | 7.00 | 14.96 | 0.10 | 6.0° | 3 | 59.10 |
| 220 | 4.00 | 6.00 | | 57 | 8.00 | 14.59 | 0.10 | 4.5° | 3 | 59.10 |
| 260 | 5.00 | 6.00 | | 57 | 10.00 | 14.72 | 0.15 | 2.5° | 3 | 59.10 |
| 300 | 6.00 | 6.00 | | 57 | 10.00 | - | 0.15 | 0.0° | 3 | 59.10 |
| 391 | 8.00 | 8.00 | | 63 | 16.00 | - | 0.15 | 0.0° | 3 | 74.00 |
| 450 | 10.00 | 10.00 | | 72 | 19.00 | - | 0.20 | 0.0° | 3 | 101.00 |
| 501 | 12.00 | 12.00 | | 83 | 22.00 | - | 0.20 | 0.0° | 3 | 124.00 |
| 610 | 16.00 | 16.00 | | 92 | 26.00 | - | 0.20 | 0.0° | 3 | 194.00 |
| 682 | 20.00 | 20.00 | | 104 | 32.00 | - | 0.20 | 0.0° | 3 | 284.00 |
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Applicazione



Materiale

Acciaio
< 850 N/mm²



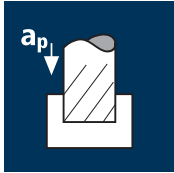
Acciaio
850 - 1100 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Ghisa
(grigia / sferoidale)



Acciaio
< 850 N/mm²



Acciaio
850 - 1100 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Ghisa
(grigia / sferoidale)



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 3.00 | 2 | 115 | 0.010 | 3.000 | 1.400 | 12200 | 245 | 1.0 |
| 4.00 | 2 | 115 | 0.015 | 4.000 | 1.800 | 9150 | 275 | 2.0 |
| 5.00 | 2 | 115 | 0.020 | 5.000 | 2.300 | 7320 | 295 | 3.4 |
| 6.00 | 2 | 115 | 0.025 | 6.000 | 2.700 | 6100 | 305 | 4.9 |
| 8.00 | 2 | 115 | 0.030 | 8.000 | 3.600 | 4575 | 275 | 7.9 |
| 10.00 | 2 | 115 | 0.040 | 10.000 | 4.500 | 3660 | 295 | 13.2 |
| 12.00 | 2 | 115 | 0.050 | 12.000 | 5.400 | 3050 | 305 | 19.8 |
| 16.00 | 2 | 115 | 0.065 | 16.000 | 7.200 | 2290 | 295 | 34.3 |
| 20.00 | 2 | 115 | 0.080 | 20.000 | 9.000 | 1830 | 295 | 52.7 |
| 3.00 | 2 | 75 | 0.010 | 3.000 | 1.400 | 7960 | 160 | 0.7 |
| 4.00 | 2 | 75 | 0.015 | 4.000 | 1.800 | 5970 | 180 | 1.3 |
| 5.00 | 2 | 75 | 0.020 | 5.000 | 2.300 | 4775 | 190 | 2.2 |
| 6.00 | 2 | 75 | 0.020 | 6.000 | 2.700 | 3980 | 160 | 2.6 |
| 8.00 | 2 | 75 | 0.030 | 8.000 | 3.600 | 2985 | 180 | 5.2 |
| 10.00 | 2 | 75 | 0.035 | 10.000 | 4.500 | 2385 | 165 | 7.5 |
| 12.00 | 2 | 75 | 0.045 | 12.000 | 5.400 | 1990 | 180 | 11.6 |
| 16.00 | 2 | 75 | 0.060 | 16.000 | 7.200 | 1490 | 180 | 20.6 |
| 20.00 | 2 | 75 | 0.070 | 20.000 | 9.000 | 1195 | 165 | 30.1 |
| 3.00 | 2 | 40 | 0.010 | 3.000 | 1.400 | 4245 | 85 | 0.4 |
| 4.00 | 2 | 40 | 0.015 | 4.000 | 1.800 | 3185 | 95 | 0.7 |
| 5.00 | 2 | 40 | 0.020 | 5.000 | 2.300 | 2545 | 100 | 1.2 |
| 6.00 | 2 | 40 | 0.020 | 6.000 | 2.700 | 2120 | 85 | 1.4 |
| 8.00 | 2 | 40 | 0.030 | 8.000 | 3.600 | 1590 | 95 | 2.8 |
| 10.00 | 2 | 40 | 0.035 | 10.000 | 4.500 | 1275 | 90 | 4.0 |
| 12.00 | 2 | 40 | 0.045 | 12.000 | 5.400 | 1060 | 95 | 6.2 |
| 16.00 | 2 | 40 | 0.060 | 16.000 | 7.200 | 795 | 95 | 11.0 |
| 20.00 | 2 | 40 | 0.070 | 20.000 | 9.000 | 635 | 90 | 16.0 |
| 3.00 | 2 | 150 | 0.015 | 3.000 | 1.400 | 15915 | 475 | 2.0 |
| 4.00 | 2 | 150 | 0.020 | 4.000 | 1.800 | 11935 | 475 | 3.4 |
| 5.00 | 2 | 150 | 0.020 | 5.000 | 2.300 | 9550 | 380 | 4.4 |
| 6.00 | 2 | 150 | 0.025 | 6.000 | 2.700 | 7960 | 400 | 6.4 |
| 8.00 | 2 | 150 | 0.035 | 8.000 | 3.600 | 5970 | 420 | 12.0 |
| 10.00 | 2 | 150 | 0.045 | 10.000 | 4.500 | 4775 | 430 | 19.3 |
| 12.00 | 2 | 150 | 0.055 | 12.000 | 5.400 | 3980 | 440 | 28.4 |
| 16.00 | 2 | 150 | 0.070 | 16.000 | 7.200 | 2985 | 420 | 48.1 |
| 20.00 | 2 | 150 | 0.090 | 20.000 | 9.000 | 2385 | 430 | 77.3 |
| 3.00 | 2 | 85 | 0.010 | 0.750 | 3.000 | 9020 | 180 | 0.4 |
| 4.00 | 2 | 85 | 0.010 | 1.000 | 4.000 | 6765 | 135 | 0.5 |
| 5.00 | 2 | 85 | 0.015 | 1.250 | 5.000 | 5410 | 160 | 1.0 |
| 6.00 | 2 | 85 | 0.015 | 1.500 | 6.000 | 4510 | 135 | 1.2 |
| 8.00 | 2 | 85 | 0.020 | 2.000 | 8.000 | 3380 | 135 | 2.2 |
| 10.00 | 2 | 85 | 0.030 | 2.500 | 10.000 | 2705 | 160 | 4.1 |
| 12.00 | 2 | 85 | 0.035 | 3.000 | 12.000 | 2255 | 160 | 5.7 |
| 16.00 | 2 | 85 | 0.045 | 4.000 | 16.000 | 1690 | 150 | 9.7 |
| 20.00 | 2 | 85 | 0.055 | 5.000 | 20.000 | 1355 | 150 | 14.9 |
| 3.00 | 2 | 60 | 0.010 | 0.750 | 3.000 | 6365 | 125 | 0.3 |
| 4.00 | 2 | 60 | 0.010 | 1.000 | 4.000 | 4775 | 95 | 0.4 |
| 5.00 | 2 | 60 | 0.015 | 1.250 | 5.000 | 3820 | 115 | 0.7 |
| 6.00 | 2 | 60 | 0.015 | 1.500 | 6.000 | 3185 | 95 | 0.9 |
| 8.00 | 2 | 60 | 0.020 | 2.000 | 8.000 | 2385 | 95 | 1.5 |
| 10.00 | 2 | 60 | 0.025 | 2.500 | 10.000 | 1910 | 95 | 2.4 |
| 12.00 | 2 | 60 | 0.030 | 3.000 | 12.000 | 1590 | 95 | 3.4 |
| 16.00 | 2 | 60 | 0.040 | 4.000 | 16.000 | 1195 | 95 | 6.1 |
| 20.00 | 2 | 60 | 0.050 | 5.000 | 20.000 | 955 | 95 | 9.5 |
| 3.00 | 2 | 30 | 0.010 | 0.750 | 3.000 | 3185 | 65 | 0.1 |
| 4.00 | 2 | 30 | 0.010 | 1.000 | 4.000 | 2385 | 50 | 0.2 |
| 5.00 | 2 | 30 | 0.015 | 1.250 | 5.000 | 1910 | 55 | 0.4 |
| 6.00 | 2 | 30 | 0.015 | 1.500 | 6.000 | 1590 | 50 | 0.4 |
| 8.00 | 2 | 30 | 0.020 | 2.000 | 8.000 | 1195 | 50 | 0.8 |
| 10.00 | 2 | 30 | 0.025 | 2.500 | 10.000 | 955 | 50 | 1.2 |
| 12.00 | 2 | 30 | 0.030 | 3.000 | 12.000 | 795 | 50 | 1.7 |
| 16.00 | 2 | 30 | 0.040 | 4.000 | 16.000 | 595 | 50 | 3.1 |
| 20.00 | 2 | 30 | 0.050 | 5.000 | 20.000 | 475 | 50 | 4.8 |
| 3.00 | 2 | 105 | 0.010 | 1.500 | 3.000 | 11140 | 225 | 1.0 |
| 4.00 | 2 | 105 | 0.010 | 2.000 | 4.000 | 8355 | 165 | 1.3 |
| 5.00 | 2 | 105 | 0.015 | 2.500 | 5.000 | 6685 | 200 | 2.5 |
| 6.00 | 2 | 105 | 0.020 | 3.000 | 6.000 | 5570 | 225 | 4.0 |
| 8.00 | 2 | 105 | 0.025 | 4.000 | 8.000 | 4180 | 210 | 6.7 |
| 10.00 | 2 | 105 | 0.030 | 5.000 | 10.000 | 3340 | 200 | 10.0 |
| 12.00 | 2 | 105 | 0.035 | 6.000 | 12.000 | 2785 | 195 | 14.0 |
| 16.00 | 2 | 105 | 0.050 | 8.000 | 16.000 | 2090 | 210 | 26.7 |
| 20.00 | 2 | 105 | 0.060 | 10.000 | 20.000 | 1670 | 200 | 40.1 |

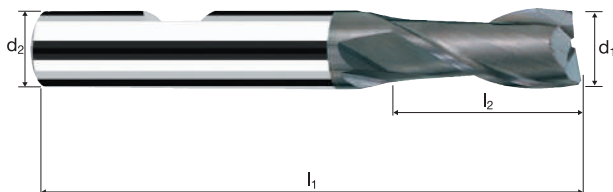
Frese cilindriche

A taglienti lisci, esecuzione normale



HM
MG10

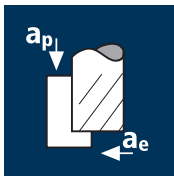
λ 30°
 γ 12°



| | | | | | | | | | |
|-------------|----------------|-----------------|--|--|--|--|-------------------|--|-----------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | | | | | Inox Stainless | | GG(G) Copper |
|-------------|----------------|-----------------|--|--|--|--|-------------------|--|-----------------|

| | | | | | | | | | | POLYCHROM |
|--|----------------------|----------------------|----------------|----------------|----------------|------|------|---|--|-----------|
| Esempio: N° Ordine | | | | | | | | | | P5300 |
| Rivestimento Articolo Codice-ø | | | | | | | | | | P5200 |
| P 5300 138 | | | | | | | | | | EUR |
| Ø Code | d ₁ e8 | d ₂ h6 | l ₁ | l ₂ | l ₄ | 45° | α | z | | |
| 138* | 2.00 | 2.00 | 42 | 6.00 | - | 0.10 | 0.0° | 2 | | 43.20 |
| 140 | 2.00 | 6.00 | 54 | 6.00 | 15.32 | 0.10 | 8.0° | 2 | | 43.20 |
| 158* | 2.50 | 2.50 | 42 | 7.00 | - | 0.10 | 0.0° | 2 | | 43.20 |
| 160 | 2.50 | 6.00 | 54 | 6.00 | 14.89 | 0.10 | 7.5° | 2 | | 43.20 |
| 178* | 3.00 | 3.00 | 45 | 7.00 | - | 0.10 | 0.0° | 2 | | 43.20 |
| 180 | 3.00 | 6.00 | 57 | 7.00 | 14.96 | 0.10 | 6.0° | 2 | | 43.20 |
| 200 | 3.50 | 6.00 | 57 | 7.00 | 14.02 | 0.10 | 5.5° | 2 | | 43.20 |
| 218* | 4.00 | 4.00 | 50 | 8.00 | - | 0.10 | 0.0° | 2 | | 43.20 |
| 220 | 4.00 | 6.00 | 57 | 8.00 | 14.59 | 0.10 | 4.5° | 2 | | 43.20 |
| 240 | 4.50 | 6.00 | 57 | 8.00 | 13.66 | 0.15 | 3.5° | 2 | | 43.20 |
| 258* | 5.00 | 5.00 | 50 | 10.00 | - | 0.15 | 0.0° | 2 | | 43.20 |
| 260 | 5.00 | 6.00 | 57 | 10.00 | 14.72 | 0.15 | 2.5° | 2 | | 43.20 |
| 280 | 5.50 | 6.00 | 57 | 10.00 | 13.79 | 0.15 | 1.5° | 2 | | 43.20 |
| 300 | 6.00 | 6.00 | 57 | 10.00 | - | 0.15 | 0.0° | 2 | | 43.20 |
| 331 | 7.00 | 8.00 | 63 | 13.00 | 17.72 | 0.15 | 2.0° | 2 | | 54.00 |
| 391 | 8.00 | 8.00 | 63 | 16.00 | - | 0.15 | 0.0° | 2 | | 54.00 |
| 420 | 9.00 | 10.00 | 72 | 16.00 | 20.72 | 0.20 | 1.5° | 2 | | 73.00 |
| 450 | 10.00 | 10.00 | 72 | 19.00 | - | 0.20 | 0.0° | 2 | | 73.00 |
| 501 | 12.00 | 12.00 | 83 | 22.00 | - | 0.20 | 0.0° | 2 | | 91.00 |
| 610 | 16.00 | 16.00 | 92 | 26.00 | - | 0.20 | 0.0° | 2 | | 142.00 |
| 682 | 20.00 | 20.00 | 104 | 32.00 | - | 0.20 | 0.0° | 2 | | 207.00 |
| * solo senza weldon | | | | | | | | | | |

Applicazione



Materiale

Acciaio
< 850 N/mm²



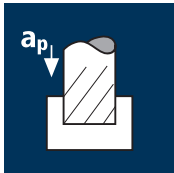
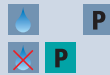
Acciaio
850 - 1100 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Ghisa
(griglia / sferoidale)



Acciaio
< 850 N/mm²



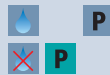
Acciaio
850 - 1100 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Ghisa
(griglia / sferoidale)



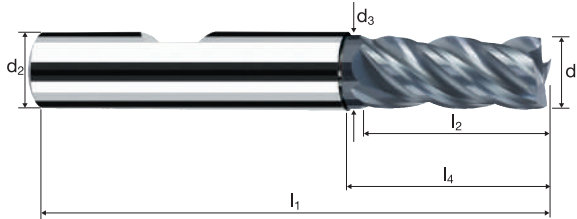
| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 3.00 | 4 | 170 | 0.015 | 4.500 | 0.750 | 18040 | 1080 | 3.7 |
| 4.00 | 4 | 170 | 0.020 | 6.000 | 1.200 | 13530 | 1080 | 7.8 |
| 5.00 | 4 | 170 | 0.025 | 7.500 | 1.750 | 10825 | 1080 | 14.2 |
| 6.00 | 4 | 170 | 0.030 | 9.000 | 2.400 | 9020 | 1080 | 23.4 |
| 8.00 | 4 | 170 | 0.040 | 12.000 | 3.200 | 6765 | 1080 | 41.6 |
| 10.00 | 4 | 170 | 0.050 | 15.000 | 4.000 | 5410 | 1080 | 64.9 |
| 12.00 | 4 | 170 | 0.060 | 18.000 | 4.800 | 4510 | 1080 | 93.5 |
| 16.00 | 4 | 170 | 0.075 | 24.000 | 6.400 | 3380 | 1015 | 155.8 |
| 20.00 | 4 | 170 | 0.095 | 30.000 | 8.000 | 2705 | 1030 | 246.8 |
| 3.00 | 4 | 120 | 0.015 | 4.500 | 0.750 | 12730 | 765 | 2.6 |
| 4.00 | 4 | 120 | 0.020 | 6.000 | 1.200 | 9550 | 765 | 5.5 |
| 5.00 | 4 | 120 | 0.025 | 7.500 | 1.750 | 7640 | 765 | 10.0 |
| 6.00 | 4 | 120 | 0.030 | 9.000 | 2.400 | 6365 | 765 | 16.5 |
| 8.00 | 4 | 120 | 0.040 | 12.000 | 3.200 | 4775 | 765 | 29.3 |
| 10.00 | 4 | 120 | 0.050 | 15.000 | 4.000 | 3820 | 765 | 45.8 |
| 12.00 | 4 | 120 | 0.060 | 18.000 | 4.800 | 3185 | 765 | 66.0 |
| 16.00 | 4 | 120 | 0.075 | 24.000 | 6.400 | 2385 | 715 | 110.0 |
| 20.00 | 4 | 120 | 0.095 | 30.000 | 8.000 | 1910 | 725 | 174.2 |
| 3.00 | 4 | 80 | 0.010 | 4.500 | 0.750 | 8490 | 340 | 1.1 |
| 4.00 | 4 | 80 | 0.015 | 6.000 | 1.200 | 6365 | 380 | 2.8 |
| 5.00 | 4 | 80 | 0.020 | 7.500 | 1.750 | 5095 | 405 | 5.3 |
| 6.00 | 4 | 80 | 0.025 | 9.000 | 2.400 | 4245 | 425 | 9.2 |
| 8.00 | 4 | 80 | 0.030 | 12.000 | 3.200 | 3185 | 380 | 14.7 |
| 10.00 | 4 | 80 | 0.040 | 15.000 | 4.000 | 2545 | 405 | 24.4 |
| 12.00 | 4 | 80 | 0.050 | 18.000 | 4.800 | 2120 | 425 | 36.7 |
| 16.00 | 4 | 80 | 0.060 | 24.000 | 6.400 | 1590 | 380 | 58.7 |
| 20.00 | 4 | 80 | 0.075 | 30.000 | 8.000 | 1275 | 380 | 91.7 |
| 3.00 | 4 | 135 | 0.015 | 4.500 | 0.750 | 14325 | 860 | 2.9 |
| 4.00 | 4 | 135 | 0.020 | 6.000 | 1.200 | 10745 | 860 | 6.2 |
| 5.00 | 4 | 135 | 0.025 | 7.500 | 1.750 | 8595 | 860 | 11.3 |
| 6.00 | 4 | 135 | 0.030 | 9.000 | 2.400 | 7160 | 860 | 18.6 |
| 8.00 | 4 | 135 | 0.040 | 12.000 | 3.200 | 5370 | 860 | 33.0 |
| 10.00 | 4 | 135 | 0.050 | 15.000 | 4.000 | 4295 | 860 | 51.6 |
| 12.00 | 4 | 135 | 0.060 | 18.000 | 4.800 | 3580 | 860 | 74.3 |
| 16.00 | 4 | 135 | 0.085 | 24.000 | 6.400 | 2685 | 915 | 140.3 |
| 20.00 | 4 | 135 | 0.105 | 30.000 | 8.000 | 2150 | 900 | 216.6 |
| 3.00 | 4 | 135 | 0.010 | 1.800 | 3.000 | 14325 | 575 | 3.1 |
| 4.00 | 4 | 135 | 0.015 | 2.800 | 4.000 | 10745 | 645 | 7.2 |
| 5.00 | 4 | 135 | 0.020 | 4.000 | 5.000 | 8595 | 690 | 13.8 |
| 6.00 | 4 | 135 | 0.025 | 6.000 | 6.000 | 7160 | 715 | 25.8 |
| 8.00 | 4 | 135 | 0.030 | 8.000 | 8.000 | 5370 | 645 | 41.3 |
| 10.00 | 4 | 135 | 0.040 | 10.000 | 10.000 | 4295 | 690 | 68.8 |
| 12.00 | 4 | 135 | 0.045 | 12.000 | 12.000 | 3580 | 645 | 92.8 |
| 16.00 | 4 | 135 | 0.055 | 8.000 | 16.000 | 2685 | 590 | 75.6 |
| 20.00 | 4 | 135 | 0.070 | 10.000 | 20.000 | 2150 | 600 | 120.3 |
| 3.00 | 4 | 95 | 0.010 | 1.800 | 3.000 | 10080 | 405 | 2.2 |
| 4.00 | 4 | 95 | 0.015 | 2.800 | 4.000 | 7560 | 455 | 5.1 |
| 5.00 | 4 | 95 | 0.020 | 4.000 | 5.000 | 6050 | 485 | 9.7 |
| 6.00 | 4 | 95 | 0.025 | 6.000 | 6.000 | 5040 | 505 | 18.1 |
| 8.00 | 4 | 95 | 0.030 | 8.000 | 8.000 | 3780 | 455 | 29.0 |
| 10.00 | 4 | 95 | 0.040 | 10.000 | 10.000 | 3025 | 485 | 48.4 |
| 12.00 | 4 | 95 | 0.045 | 12.000 | 12.000 | 2520 | 455 | 65.3 |
| 16.00 | 4 | 95 | 0.055 | 8.000 | 16.000 | 1890 | 415 | 53.2 |
| 20.00 | 4 | 95 | 0.070 | 10.000 | 20.000 | 1510 | 425 | 84.7 |
| 3.00 | 4 | 65 | 0.008 | 1.300 | 3.000 | 6895 | 220 | 0.9 |
| 4.00 | 4 | 65 | 0.010 | 2.000 | 4.000 | 5175 | 205 | 1.7 |
| 5.00 | 4 | 65 | 0.015 | 2.800 | 5.000 | 4140 | 250 | 3.5 |
| 6.00 | 4 | 65 | 0.020 | 4.200 | 6.000 | 3450 | 275 | 7.0 |
| 8.00 | 4 | 65 | 0.025 | 8.000 | 8.000 | 2585 | 260 | 16.6 |
| 10.00 | 4 | 65 | 0.030 | 10.000 | 10.000 | 2070 | 250 | 24.8 |
| 12.00 | 4 | 65 | 0.040 | 12.000 | 12.000 | 1725 | 275 | 39.7 |
| 16.00 | 4 | 65 | 0.045 | 8.000 | 16.000 | 1295 | 235 | 29.8 |
| 20.00 | 4 | 65 | 0.055 | 10.000 | 20.000 | 1035 | 230 | 45.5 |
| 3.00 | 4 | 115 | 0.010 | 1.800 | 3.000 | 12200 | 490 | 2.6 |
| 4.00 | 4 | 115 | 0.015 | 2.800 | 4.000 | 9150 | 550 | 6.1 |
| 5.00 | 4 | 115 | 0.025 | 4.000 | 5.000 | 7320 | 730 | 14.6 |
| 6.00 | 4 | 115 | 0.025 | 6.000 | 6.000 | 6100 | 610 | 22.0 |
| 8.00 | 4 | 115 | 0.035 | 8.000 | 8.000 | 4575 | 640 | 41.0 |
| 10.00 | 4 | 115 | 0.040 | 10.000 | 10.000 | 3660 | 585 | 58.6 |
| 12.00 | 4 | 115 | 0.050 | 12.000 | 12.000 | 3050 | 610 | 87.9 |
| 16.00 | 4 | 115 | 0.065 | 8.000 | 16.000 | 2290 | 595 | 76.1 |
| 20.00 | 4 | 115 | 0.080 | 10.000 | 20.000 | 1830 | 585 | 117.1 |

Frese cilindriche

A taglienti lisci, esecuzione normale con scarico corto



HM
MG10 λ 40°
 γ 6°



Sgrossatura

Finitura

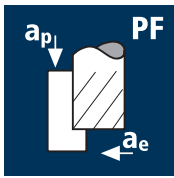


ReTool®

| | | | | | | | | | |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|--------------------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | | | | | Inox Stainless | Ti Titanium | GG(G) Tool Steel Nickel-Alloys |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|--------------------------------------|

| Esempio: N° Ordine | | | | | | | | | | | POLYCHROM | |
|--|----------------------|----------------------|----------------|----------------|----------------|----------------|----------------|------|------|---|-----------|--|
| | | | | | | | | | | | P45317 | |
| | | | | | | | | | | | P45217 | |
| | | | | | | | | | | | EUR | |
| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | 45° | α | z | | |
| 100 | 1.00 | 6.00 | 0.95 | 57 | 5.00 | 7.00 | 17.08 | 0.07 | 9.5° | 4 | 40.30 | |
| 140 | 2.00 | 6.00 | 1.90 | 57 | 7.00 | 10.00 | 18.31 | 0.10 | 7.5° | 4 | 40.30 | |
| 178* | 3.00 | 3.00 | - | 45 | 8.00 | - | - | 0.10 | 0.0° | 4 | 34.80 | |
| 180 | 3.00 | 6.00 | 2.80 | 57 | 8.00 | 14.00 | 20.63 | 0.10 | 4.5° | 4 | 40.30 | |
| 218* | 4.00 | 4.00 | - | 50 | 11.00 | - | - | 0.10 | 0.0° | 4 | 34.80 | |
| 220 | 4.00 | 6.00 | 3.70 | 57 | 11.00 | 16.00 | 20.95 | 0.10 | 3.0° | 4 | 40.30 | |
| 258* | 5.00 | 5.00 | - | 50 | 13.00 | - | - | 0.15 | 0.0° | 4 | 34.80 | |
| 260 | 5.00 | 6.00 | 4.60 | 57 | 13.00 | 18.00 | 21.27 | 0.15 | 1.5° | 4 | 40.30 | |
| 300 | 6.00 | 6.00 | 5.50 | 57 | 13.00 | 19.34 | 20.00 | 0.15 | 0.0° | 4 | 40.30 | |
| 391 | 8.00 | 8.00 | 7.40 | 63 | 19.00 | 25.29 | 26.00 | 0.15 | 0.0° | 4 | 50.40 | |
| 450 | 10.00 | 10.00 | 9.20 | 72 | 22.00 | 30.20 | 31.00 | 0.20 | 0.0° | 4 | 69.00 | |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 26.00 | 36.13 | 37.00 | 0.20 | 0.0° | 4 | 85.00 | |
| 570 | 14.00 | 14.00 | 13.00 | 83 | 26.00 | 36.13 | 37.00 | 0.20 | 0.0° | 4 | 132.00 | |
| 610 | 16.00 | 16.00 | 15.00 | 92 | 32.00 | 42.13 | 43.00 | 0.20 | 0.0° | 4 | 132.00 | |
| 682 | 20.00 | 20.00 | 19.00 | 104 | 38.00 | 52.13 | 53.00 | 0.20 | 0.0° | 4 | 193.00 | |
| 772 | 25.00 | 25.00 | 24.00 | 121 | 45.00 | 63.13 | 64.00 | 0.25 | 0.0° | 4 | 366.00 | |
| * solo senza weldon, senza scarico corto | | | | | | | | | | | | |

Applicazione



Materiale

Acciaio
< 850 N/mm²



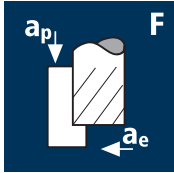
Acciaio
850 - 1100 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



Acciaio
< 850 N/mm²



Acciaio
850 - 1100 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



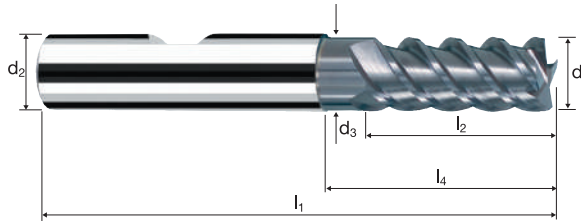
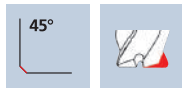
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|
| 4.00 | 4 | 160 | 0.015 | 6.000 | 1.000 | 12730 | 765 |
| 6.00 | 4 | 160 | 0.020 | 9.000 | 1.500 | 8490 | 680 |
| 8.00 | 4 | 160 | 0.025 | 12.000 | 2.000 | 6365 | 635 |
| 10.00 | 4 | 160 | 0.035 | 15.000 | 2.500 | 5095 | 715 |
| 12.00 | 4 | 160 | 0.040 | 18.000 | 3.000 | 4245 | 680 |
| 14.00 | 4 | 160 | 0.045 | 21.000 | 3.500 | 3640 | 655 |
| 16.00 | 4 | 160 | 0.055 | 24.000 | 4.000 | 3185 | 700 |
| 18.00 | 4 | 160 | 0.060 | 27.000 | 4.500 | 2830 | 680 |
| 20.00 | 4 | 160 | 0.065 | 30.000 | 5.000 | 2545 | 660 |
| 4.00 | 4 | 120 | 0.015 | 6.000 | 1.000 | 9550 | 575 |
| 6.00 | 4 | 120 | 0.020 | 9.000 | 1.500 | 6365 | 510 |
| 8.00 | 4 | 120 | 0.025 | 12.000 | 2.000 | 4775 | 475 |
| 10.00 | 4 | 120 | 0.035 | 15.000 | 2.500 | 3820 | 535 |
| 12.00 | 4 | 120 | 0.040 | 18.000 | 3.000 | 3185 | 510 |
| 14.00 | 4 | 120 | 0.045 | 21.000 | 3.500 | 2730 | 490 |
| 16.00 | 4 | 120 | 0.055 | 24.000 | 4.000 | 2385 | 525 |
| 18.00 | 4 | 120 | 0.060 | 27.000 | 4.500 | 2120 | 510 |
| 20.00 | 4 | 120 | 0.065 | 30.000 | 5.000 | 1910 | 495 |
| 4.00 | 4 | 90 | 0.015 | 6.000 | 1.000 | 7160 | 430 |
| 6.00 | 4 | 90 | 0.020 | 9.000 | 1.500 | 4775 | 380 |
| 8.00 | 4 | 90 | 0.025 | 12.000 | 2.000 | 3580 | 360 |
| 10.00 | 4 | 90 | 0.035 | 15.000 | 2.500 | 2865 | 400 |
| 12.00 | 4 | 90 | 0.040 | 18.000 | 3.000 | 2385 | 380 |
| 14.00 | 4 | 90 | 0.045 | 21.000 | 3.500 | 2045 | 370 |
| 16.00 | 4 | 90 | 0.055 | 24.000 | 4.000 | 1790 | 395 |
| 18.00 | 4 | 90 | 0.060 | 27.000 | 4.500 | 1590 | 380 |
| 20.00 | 4 | 90 | 0.065 | 30.000 | 5.000 | 1430 | 370 |
| 4.00 | 4 | 50 | 0.015 | 6.000 | 1.000 | 3980 | 240 |
| 6.00 | 4 | 50 | 0.020 | 9.000 | 1.500 | 2655 | 210 |
| 8.00 | 4 | 50 | 0.025 | 12.000 | 2.000 | 1990 | 200 |
| 10.00 | 4 | 50 | 0.035 | 15.000 | 2.500 | 1590 | 225 |
| 12.00 | 4 | 50 | 0.040 | 18.000 | 3.000 | 1325 | 210 |
| 14.00 | 4 | 50 | 0.045 | 21.000 | 3.500 | 1135 | 205 |
| 16.00 | 4 | 50 | 0.055 | 24.000 | 4.000 | 995 | 220 |
| 18.00 | 4 | 50 | 0.060 | 27.000 | 4.500 | 885 | 210 |
| 20.00 | 4 | 50 | 0.065 | 30.000 | 5.000 | 795 | 205 |
| 4.00 | 4 | 170 | 0.010 | 6.000 | 0.100 | 13530 | 540 |
| 6.00 | 4 | 170 | 0.015 | 9.000 | 0.100 | 9020 | 540 |
| 8.00 | 4 | 170 | 0.025 | 12.000 | 0.150 | 6765 | 675 |
| 10.00 | 4 | 170 | 0.030 | 15.000 | 0.150 | 5410 | 650 |
| 12.00 | 4 | 170 | 0.035 | 18.000 | 0.200 | 4510 | 630 |
| 14.00 | 4 | 170 | 0.040 | 21.000 | 0.200 | 3865 | 620 |
| 16.00 | 4 | 170 | 0.045 | 24.000 | 0.250 | 3380 | 610 |
| 18.00 | 4 | 170 | 0.050 | 27.000 | 0.250 | 3005 | 600 |
| 20.00 | 4 | 170 | 0.055 | 30.000 | 0.300 | 2705 | 595 |
| 4.00 | 4 | 140 | 0.010 | 6.000 | 0.100 | 11140 | 445 |
| 6.00 | 4 | 140 | 0.015 | 9.000 | 0.100 | 7425 | 445 |
| 8.00 | 4 | 140 | 0.025 | 12.000 | 0.150 | 5570 | 555 |
| 10.00 | 4 | 140 | 0.030 | 15.000 | 0.150 | 4455 | 535 |
| 12.00 | 4 | 140 | 0.035 | 18.000 | 0.200 | 3715 | 520 |
| 14.00 | 4 | 140 | 0.040 | 21.000 | 0.200 | 3185 | 510 |
| 16.00 | 4 | 140 | 0.045 | 24.000 | 0.250 | 2785 | 500 |
| 18.00 | 4 | 140 | 0.050 | 27.000 | 0.250 | 2475 | 495 |
| 20.00 | 4 | 140 | 0.055 | 30.000 | 0.300 | 2230 | 490 |
| 4.00 | 4 | 100 | 0.010 | 6.000 | 0.100 | 7960 | 320 |
| 6.00 | 4 | 100 | 0.015 | 9.000 | 0.100 | 5305 | 320 |
| 8.00 | 4 | 100 | 0.025 | 12.000 | 0.150 | 3980 | 400 |
| 10.00 | 4 | 100 | 0.030 | 15.000 | 0.150 | 3185 | 380 |
| 12.00 | 4 | 100 | 0.035 | 18.000 | 0.200 | 2655 | 370 |
| 14.00 | 4 | 100 | 0.040 | 21.000 | 0.200 | 2275 | 365 |
| 16.00 | 4 | 100 | 0.045 | 24.000 | 0.250 | 1990 | 360 |
| 18.00 | 4 | 100 | 0.050 | 27.000 | 0.250 | 1770 | 355 |
| 20.00 | 4 | 100 | 0.055 | 30.000 | 0.300 | 1590 | 350 |
| 4.00 | 4 | 60 | 0.010 | 6.000 | 0.100 | 4775 | 190 |
| 6.00 | 4 | 60 | 0.015 | 9.000 | 0.100 | 3185 | 190 |
| 8.00 | 4 | 60 | 0.025 | 12.000 | 0.150 | 2385 | 240 |
| 10.00 | 4 | 60 | 0.030 | 15.000 | 0.150 | 1910 | 230 |
| 12.00 | 4 | 60 | 0.035 | 18.000 | 0.200 | 1590 | 225 |
| 14.00 | 4 | 60 | 0.040 | 21.000 | 0.200 | 1365 | 220 |
| 16.00 | 4 | 60 | 0.045 | 24.000 | 0.250 | 1195 | 215 |
| 18.00 | 4 | 60 | 0.050 | 27.000 | 0.250 | 1060 | 210 |
| 20.00 | 4 | 60 | 0.055 | 30.000 | 0.300 | 955 | 210 |

Frese cilindriche

A taglienti lisci, esecuzione normale con scarico corto



HM λ 55°
MG10 γ 15°



Sgrossatura

Finitura

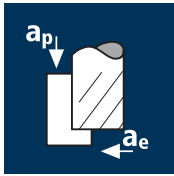


ReTool®

| | | | | | | | | | |
|----------|-------------|--------------|--|--|--|--|----------------|-------------|-------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | | | | | Inox Stainless | Ti Titanium | GG(G) |
|----------|-------------|--------------|--|--|--|--|----------------|-------------|-------|

| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | 45° | α | z | POLYCHROM | |
|-----------------------|-------------------|--------------------------|--------------------------|------------------------|----------------|----------------|----------------|------|------|---|-----------|---------------|
| | | | | | | | | | | | EUR | |
| Esempio: N° Ordine | | Rivestimento P | Articolo 45355 | Codice-ø 180 | | | | | | | | P45355 |
| | | | | | | | | | | | | P45255 |
| 180 | 3.00 | 6.00 | 2.80 | 57 | 8.00 | 14.00 | 20.63 | 0.10 | 4.5° | 4 | 46.40 | |
| 220 | 4.00 | 6.00 | 3.70 | 57 | 11.00 | 16.00 | 20.95 | 0.10 | 3.0° | 4 | 46.40 | |
| 260 | 5.00 | 6.00 | 4.60 | 57 | 13.00 | 18.00 | 21.27 | 0.15 | 1.5° | 4 | 46.40 | |
| 300 | 6.00 | 6.00 | 5.50 | 57 | 13.00 | 19.34 | 20.00 | 0.15 | 0.0° | 4 | 46.40 | |
| 391 | 8.00 | 8.00 | 7.40 | 63 | 19.00 | 25.29 | 26.00 | 0.15 | 0.0° | 4 | 58.00 | |
| 450 | 10.00 | 10.00 | 9.20 | 72 | 22.00 | 30.20 | 31.00 | 0.20 | 0.0° | 4 | 79.00 | |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 26.00 | 36.13 | 37.00 | 0.20 | 0.0° | 4 | 97.00 | |
| 570 | 14.00 | 14.00 | 13.00 | 83 | 26.00 | 36.13 | 37.00 | 0.20 | 0.0° | 4 | 152.00 | |
| 610 | 16.00 | 16.00 | 15.00 | 92 | 32.00 | 42.13 | 43.00 | 0.20 | 0.0° | 4 | 152.00 | |
| 640 | 18.00 | 18.00 | 17.00 | 92 | 32.00 | 42.13 | 43.00 | 0.20 | 0.0° | 4 | 222.00 | |
| 682 | 20.00 | 20.00 | 19.00 | 104 | 38.00 | 52.13 | 53.00 | 0.20 | 0.0° | 4 | 222.00 | |

Applicazione



Materiale

Acciaio
< 850 N/mm²



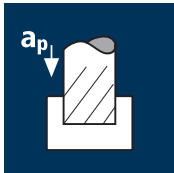
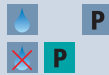
Acciaio
850 - 1100 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Ghisa
(grigia / sferoidale)



Acciaio
< 850 N/mm²



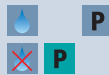
Acciaio
850 - 1100 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Ghisa
(grigia / sferoidale)



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 2.00 | 3 | 165 | 0.005 | 3.000 | 1.300 | 26260 | 395 | 1.5 |
| 3.00 | 3 | 165 | 0.010 | 4.500 | 1.950 | 17505 | 525 | 4.6 |
| 4.00 | 3 | 165 | 0.015 | 6.000 | 2.600 | 13130 | 590 | 9.2 |
| 5.00 | 3 | 165 | 0.020 | 7.500 | 3.250 | 10505 | 630 | 15.4 |
| 6.00 | 3 | 165 | 0.020 | 9.000 | 3.900 | 8755 | 525 | 18.4 |
| 7.00 | 3 | 165 | 0.025 | 10.500 | 4.550 | 7505 | 565 | 26.9 |
| 8.00 | 3 | 165 | 0.030 | 12.000 | 5.200 | 6565 | 590 | 36.9 |
| 9.00 | 3 | 165 | 0.030 | 13.500 | 5.850 | 5835 | 525 | 41.5 |
| 10.00 | 3 | 165 | 0.035 | 15.000 | 6.500 | 5250 | 550 | 53.8 |
| 2.00 | 3 | 110 | 0.005 | 3.000 | 1.300 | 17505 | 265 | 1.0 |
| 3.00 | 3 | 110 | 0.010 | 4.500 | 1.950 | 11670 | 350 | 3.1 |
| 4.00 | 3 | 110 | 0.015 | 6.000 | 2.600 | 8755 | 395 | 6.1 |
| 5.00 | 3 | 110 | 0.020 | 7.500 | 3.250 | 7005 | 420 | 10.2 |
| 6.00 | 3 | 110 | 0.020 | 9.000 | 3.900 | 5835 | 350 | 12.3 |
| 7.00 | 3 | 110 | 0.025 | 10.500 | 4.550 | 5000 | 375 | 17.9 |
| 8.00 | 3 | 110 | 0.030 | 12.000 | 5.200 | 4375 | 395 | 24.6 |
| 9.00 | 3 | 110 | 0.030 | 13.500 | 5.850 | 3890 | 350 | 27.7 |
| 10.00 | 3 | 110 | 0.035 | 15.000 | 6.500 | 3500 | 370 | 35.8 |
| 2.00 | 3 | 80 | 0.005 | 3.000 | 1.300 | 12730 | 190 | 0.7 |
| 3.00 | 3 | 80 | 0.010 | 4.500 | 1.950 | 8490 | 255 | 2.2 |
| 4.00 | 3 | 80 | 0.010 | 6.000 | 2.600 | 6365 | 190 | 3.0 |
| 5.00 | 3 | 80 | 0.015 | 7.500 | 3.250 | 5095 | 230 | 5.6 |
| 6.00 | 3 | 80 | 0.015 | 9.000 | 3.900 | 4245 | 190 | 6.7 |
| 7.00 | 3 | 80 | 0.020 | 10.500 | 4.550 | 3640 | 220 | 10.4 |
| 8.00 | 3 | 80 | 0.020 | 12.000 | 5.200 | 3185 | 190 | 11.9 |
| 9.00 | 3 | 80 | 0.025 | 13.500 | 5.850 | 2830 | 210 | 16.8 |
| 10.00 | 3 | 80 | 0.025 | 15.000 | 6.500 | 2545 | 190 | 18.6 |
| 2.00 | 3 | 130 | 0.005 | 3.000 | 1.300 | 20690 | 310 | 1.2 |
| 3.00 | 3 | 130 | 0.010 | 4.500 | 1.950 | 13795 | 415 | 3.6 |
| 4.00 | 3 | 130 | 0.015 | 6.000 | 2.600 | 10345 | 465 | 7.3 |
| 5.00 | 3 | 130 | 0.020 | 7.500 | 3.250 | 8275 | 495 | 12.1 |
| 6.00 | 3 | 130 | 0.020 | 9.000 | 3.900 | 6895 | 415 | 14.5 |
| 7.00 | 3 | 130 | 0.025 | 10.500 | 4.550 | 5910 | 445 | 21.2 |
| 8.00 | 3 | 130 | 0.030 | 12.000 | 5.200 | 5175 | 465 | 29.0 |
| 9.00 | 3 | 130 | 0.030 | 13.500 | 5.850 | 4600 | 415 | 32.7 |
| 10.00 | 3 | 130 | 0.035 | 15.000 | 6.500 | 4140 | 435 | 42.4 |
| 2.00 | 3 | 130 | 0.005 | 2.800 | 2.000 | 20690 | 310 | 1.7 |
| 3.00 | 3 | 130 | 0.010 | 4.200 | 3.000 | 13795 | 415 | 5.2 |
| 4.00 | 3 | 130 | 0.015 | 5.600 | 4.000 | 10345 | 465 | 10.4 |
| 5.00 | 3 | 130 | 0.015 | 7.000 | 5.000 | 8275 | 370 | 13.0 |
| 6.00 | 3 | 130 | 0.020 | 8.400 | 6.000 | 6895 | 415 | 20.9 |
| 7.00 | 3 | 130 | 0.025 | 9.800 | 7.000 | 5910 | 445 | 30.4 |
| 8.00 | 3 | 130 | 0.025 | 11.200 | 8.000 | 5175 | 390 | 34.8 |
| 9.00 | 3 | 130 | 0.030 | 12.600 | 9.000 | 4600 | 415 | 46.9 |
| 10.00 | 3 | 130 | 0.030 | 14.000 | 10.000 | 4140 | 370 | 52.1 |
| 2.00 | 3 | 85 | 0.005 | 2.800 | 2.000 | 13530 | 205 | 1.1 |
| 3.00 | 3 | 85 | 0.010 | 4.200 | 3.000 | 9020 | 270 | 3.4 |
| 4.00 | 3 | 85 | 0.015 | 5.600 | 4.000 | 6765 | 305 | 6.8 |
| 5.00 | 3 | 85 | 0.015 | 7.000 | 5.000 | 5410 | 245 | 8.5 |
| 6.00 | 3 | 85 | 0.020 | 8.400 | 6.000 | 4510 | 270 | 13.6 |
| 7.00 | 3 | 85 | 0.025 | 9.800 | 7.000 | 3865 | 290 | 19.9 |
| 8.00 | 3 | 85 | 0.025 | 11.200 | 8.000 | 3380 | 255 | 22.7 |
| 9.00 | 3 | 85 | 0.030 | 12.600 | 9.000 | 3005 | 270 | 30.7 |
| 10.00 | 3 | 85 | 0.030 | 14.000 | 10.000 | 2705 | 245 | 34.1 |
| 2.00 | 3 | 65 | 0.005 | 2.800 | 2.000 | 10345 | 155 | 0.9 |
| 3.00 | 3 | 65 | 0.005 | 4.200 | 3.000 | 6895 | 105 | 1.3 |
| 4.00 | 3 | 65 | 0.010 | 5.600 | 4.000 | 5175 | 155 | 3.5 |
| 5.00 | 3 | 65 | 0.010 | 7.000 | 5.000 | 4140 | 125 | 4.3 |
| 6.00 | 3 | 65 | 0.015 | 8.400 | 6.000 | 3450 | 155 | 7.8 |
| 7.00 | 3 | 65 | 0.015 | 9.800 | 7.000 | 2955 | 135 | 9.1 |
| 8.00 | 3 | 65 | 0.020 | 11.200 | 8.000 | 2585 | 155 | 13.9 |
| 9.00 | 3 | 65 | 0.020 | 12.600 | 9.000 | 2300 | 140 | 15.6 |
| 10.00 | 3 | 65 | 0.025 | 14.000 | 10.000 | 2070 | 155 | 21.7 |
| 2.00 | 3 | 110 | 0.005 | 2.800 | 2.000 | 17505 | 265 | 1.5 |
| 3.00 | 3 | 110 | 0.010 | 4.200 | 3.000 | 11670 | 350 | 4.4 |
| 4.00 | 3 | 110 | 0.015 | 5.600 | 4.000 | 8755 | 395 | 8.8 |
| 5.00 | 3 | 110 | 0.015 | 7.000 | 5.000 | 7005 | 315 | 11.0 |
| 6.00 | 3 | 110 | 0.020 | 8.400 | 6.000 | 5835 | 350 | 17.6 |
| 7.00 | 3 | 110 | 0.025 | 9.800 | 7.000 | 5000 | 375 | 25.7 |
| 8.00 | 3 | 110 | 0.025 | 11.200 | 8.000 | 4375 | 330 | 29.4 |
| 9.00 | 3 | 110 | 0.030 | 12.600 | 9.000 | 3890 | 350 | 39.7 |
| 10.00 | 3 | 110 | 0.030 | 14.000 | 10.000 | 3500 | 315 | 44.1 |

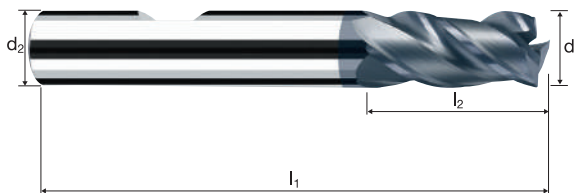
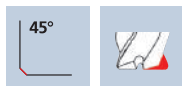
Frese cilindriche

A taglienti lisci, esecuzione normale



HM
MG10

λ **40°**
 γ **6°**



Sgrossatura

Finitura

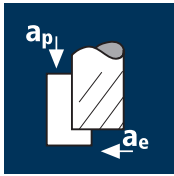


ReTool®

| | | | | | | | | | |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|--------------------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | | | | | Inox Stainless | Ti Titanium | GG(G) Tool Steel Nickel-Alloys |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|--------------------------------------|

| Esempio: N° Ordine | | | | | | | | | | POLYCHROM |
|-----------------------|----------------------|----------------------|----------------|----------------|----------------|------|------|---|--|-----------|
| | | | | | | | | | | P45333 |
| | | | | | | | | | | P45233 |
| | | | | | | | | | | EUR |
| Ø Code | d ₁ e8 | d ₂ h6 | l ₁ | l ₂ | l ₄ | 45° | α | z | | |
| 140 | 2.00 | 6.00 | 54 | 6.00 | 15.32 | 0.10 | 8.0° | 3 | | 39.50 |
| 160 | 2.50 | 6.00 | 54 | 6.00 | 14.89 | 0.10 | 7.5° | 3 | | 39.50 |
| 180 | 3.00 | 6.00 | 57 | 7.00 | 14.96 | 0.10 | 6.0° | 3 | | 39.50 |
| 200 | 3.50 | 6.00 | 57 | 7.00 | 14.02 | 0.10 | 5.5° | 3 | | 39.50 |
| 220 | 4.00 | 6.00 | 57 | 8.00 | 14.59 | 0.10 | 4.5° | 3 | | 39.50 |
| 240 | 4.50 | 6.00 | 57 | 8.00 | 13.66 | 0.15 | 3.5° | 3 | | 39.50 |
| 260 | 5.00 | 6.00 | 57 | 10.00 | 14.72 | 0.15 | 2.5° | 3 | | 39.50 |
| 280 | 5.50 | 6.00 | 57 | 10.00 | 13.79 | 0.15 | 1.5° | 3 | | 39.50 |
| 300 | 6.00 | 6.00 | 57 | 10.00 | - | 0.15 | 0.0° | 3 | | 39.50 |
| 322 | 6.50 | 8.00 | 63 | 13.00 | 18.66 | 0.15 | 2.5° | 3 | | 49.30 |
| 331 | 7.00 | 8.00 | 63 | 13.00 | 17.72 | 0.15 | 2.0° | 3 | | 49.30 |
| 362 | 7.50 | 8.00 | 63 | 16.00 | 19.79 | 0.15 | 1.0° | 3 | | 49.30 |
| 391 | 8.00 | 8.00 | 63 | 16.00 | - | 0.15 | 0.0° | 3 | | 49.30 |
| 410 | 8.50 | 10.00 | 72 | 16.00 | 21.66 | 0.20 | 2.5° | 3 | | 67.00 |
| 420 | 9.00 | 10.00 | 72 | 16.00 | 20.72 | 0.20 | 1.5° | 3 | | 67.00 |
| 430 | 9.50 | 10.00 | 72 | 19.00 | 22.79 | 0.20 | 1.0° | 3 | | 67.00 |
| 450 | 10.00 | 10.00 | 72 | 19.00 | - | 0.20 | 0.0° | 3 | | 67.00 |

Applicazione



Materiale

Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 11.00 | 3 | 165 | 0.040 | 16.500 | 7.150 | 4775 | 575 | 67.6 |
| 12.00 | 3 | 165 | 0.045 | 18.000 | 7.440 | 4375 | 590 | 79.1 |
| 13.00 | 3 | 165 | 0.045 | 19.500 | 7.800 | 4040 | 545 | 83.0 |
| 14.00 | 3 | 165 | 0.050 | 21.000 | 8.120 | 3750 | 565 | 96.0 |
| 15.00 | 3 | 165 | 0.055 | 22.500 | 8.400 | 3500 | 580 | 109.2 |
| 16.00 | 3 | 165 | 0.055 | 24.000 | 8.800 | 3285 | 540 | 114.4 |
| 20.00 | 3 | 165 | 0.070 | 30.000 | 11.000 | 2625 | 550 | 182.0 |

Acciaio
850 - 1100 N/mm²



| | | | | | | | | |
|-------|---|-----|-------|--------|--------|------|-----|-------|
| 11.00 | 3 | 110 | 0.040 | 16.500 | 7.150 | 3185 | 380 | 45.1 |
| 12.00 | 3 | 110 | 0.045 | 18.000 | 7.440 | 2920 | 395 | 52.8 |
| 13.00 | 3 | 110 | 0.045 | 19.500 | 7.800 | 2695 | 365 | 55.3 |
| 14.00 | 3 | 110 | 0.050 | 21.000 | 8.120 | 2500 | 375 | 64.0 |
| 15.00 | 3 | 110 | 0.055 | 22.500 | 8.400 | 2335 | 385 | 72.8 |
| 16.00 | 3 | 110 | 0.055 | 24.000 | 8.800 | 2190 | 360 | 76.3 |
| 20.00 | 3 | 110 | 0.070 | 30.000 | 11.000 | 1750 | 370 | 121.3 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 11.00 | 3 | 80 | 0.030 | 16.500 | 7.150 | 2315 | 210 | 24.6 |
| 12.00 | 3 | 80 | 0.030 | 18.000 | 7.440 | 2120 | 190 | 25.6 |
| 13.00 | 3 | 80 | 0.035 | 19.500 | 7.800 | 1960 | 205 | 31.3 |
| 14.00 | 3 | 80 | 0.035 | 21.000 | 8.120 | 1820 | 190 | 32.6 |
| 15.00 | 3 | 80 | 0.040 | 22.500 | 8.400 | 1700 | 205 | 38.5 |
| 16.00 | 3 | 80 | 0.040 | 24.000 | 8.800 | 1590 | 190 | 40.3 |
| 20.00 | 3 | 80 | 0.055 | 30.000 | 11.000 | 1275 | 210 | 69.3 |

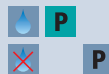
Ghisa
(griglia / sferoidale)



| | | | | | | | | |
|-------|---|-----|-------|--------|--------|------|-----|-------|
| 11.00 | 3 | 130 | 0.040 | 16.500 | 7.150 | 3760 | 450 | 53.3 |
| 12.00 | 3 | 130 | 0.045 | 18.000 | 7.440 | 3450 | 465 | 62.3 |
| 13.00 | 3 | 130 | 0.045 | 19.500 | 7.800 | 3185 | 430 | 65.4 |
| 14.00 | 3 | 130 | 0.050 | 21.000 | 8.120 | 2955 | 445 | 75.6 |
| 15.00 | 3 | 130 | 0.055 | 22.500 | 8.400 | 2760 | 455 | 86.0 |
| 16.00 | 3 | 130 | 0.055 | 24.000 | 8.800 | 2585 | 425 | 90.1 |
| 20.00 | 3 | 130 | 0.070 | 30.000 | 11.000 | 2070 | 435 | 143.4 |



Acciaio
< 850 N/mm²



| | | | | | | | | |
|-------|---|-----|-------|--------|--------|------|-----|-------|
| 11.00 | 3 | 130 | 0.035 | 15.400 | 11.000 | 3760 | 395 | 66.9 |
| 12.00 | 3 | 130 | 0.040 | 16.200 | 12.000 | 3450 | 415 | 80.4 |
| 13.00 | 3 | 130 | 0.040 | 17.030 | 13.000 | 3185 | 380 | 84.6 |
| 14.00 | 3 | 130 | 0.045 | 17.990 | 14.000 | 2955 | 400 | 100.5 |
| 15.00 | 3 | 130 | 0.050 | 18.750 | 15.000 | 2760 | 415 | 116.4 |
| 16.00 | 3 | 130 | 0.050 | 19.200 | 16.000 | 2585 | 390 | 119.2 |
| 20.00 | 3 | 130 | 0.065 | 22.000 | 20.000 | 2070 | 405 | 177.5 |

Acciaio
850 - 1100 N/mm²



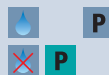
| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|-------|
| 11.00 | 3 | 85 | 0.035 | 15.400 | 11.000 | 2460 | 260 | 43.8 |
| 12.00 | 3 | 85 | 0.040 | 16.200 | 12.000 | 2255 | 270 | 52.6 |
| 13.00 | 3 | 85 | 0.040 | 17.030 | 13.000 | 2080 | 250 | 55.3 |
| 14.00 | 3 | 85 | 0.045 | 17.990 | 14.000 | 1935 | 260 | 65.7 |
| 15.00 | 3 | 85 | 0.050 | 18.750 | 15.000 | 1805 | 270 | 76.1 |
| 16.00 | 3 | 85 | 0.050 | 19.200 | 16.000 | 1690 | 255 | 77.9 |
| 20.00 | 3 | 85 | 0.065 | 22.000 | 20.000 | 1355 | 265 | 116.1 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 11.00 | 3 | 65 | 0.025 | 15.400 | 11.000 | 1880 | 140 | 23.9 |
| 12.00 | 3 | 65 | 0.030 | 16.200 | 12.000 | 1725 | 155 | 30.2 |
| 13.00 | 3 | 65 | 0.030 | 17.030 | 13.000 | 1590 | 145 | 31.7 |
| 14.00 | 3 | 65 | 0.035 | 17.990 | 14.000 | 1480 | 155 | 39.1 |
| 15.00 | 3 | 65 | 0.035 | 18.750 | 15.000 | 1380 | 145 | 40.7 |
| 16.00 | 3 | 65 | 0.040 | 19.200 | 16.000 | 1295 | 155 | 47.7 |
| 20.00 | 3 | 65 | 0.045 | 22.000 | 20.000 | 1035 | 140 | 61.4 |

Ghisa
(griglia / sferoidale)



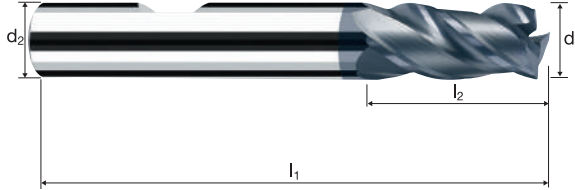
| | | | | | | | | |
|-------|---|-----|-------|--------|--------|------|-----|-------|
| 11.00 | 3 | 110 | 0.035 | 15.400 | 11.000 | 3185 | 335 | 56.6 |
| 12.00 | 3 | 110 | 0.040 | 16.200 | 12.000 | 2920 | 350 | 68.1 |
| 13.00 | 3 | 110 | 0.040 | 17.030 | 13.000 | 2695 | 325 | 71.6 |
| 14.00 | 3 | 110 | 0.045 | 17.990 | 14.000 | 2500 | 340 | 85.0 |
| 15.00 | 3 | 110 | 0.050 | 18.750 | 15.000 | 2335 | 350 | 98.5 |
| 16.00 | 3 | 110 | 0.050 | 19.200 | 16.000 | 2190 | 330 | 100.8 |
| 20.00 | 3 | 110 | 0.065 | 22.000 | 20.000 | 1750 | 340 | 150.2 |

Frese cilindriche

A taglienti lisci, esecuzione normale



HM
MG10 λ **40°**
 γ **6°**



Sgrossatura

Finitura

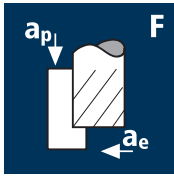


ReTool®

| | | | | | | | | | |
|--------------------|-----------------------|------------------------|--|--|--|--|--------------------------|-----------------------|---|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | | | | | Inox Stainless | Ti Titanium | GG(G) Tool Steel Nickel-Alloys |
|--------------------|-----------------------|------------------------|--|--|--|--|--------------------------|-----------------------|---|

| | | | | | | | | | | POLYCHROM | |
|-----------------------|----------------------|--------------------------|--------------------------|------------------------|----------------|----------------|----------------|------|------|-----------|---------------|
| Esempio: N° Ordine | | Rivestimento P | Articolo 45333 | Codice-Ø 470 | | | | | | | P45333 |
| Ø Code | d ₁ e8 | d ₂ h6 | | | l ₁ | l ₂ | l ₄ | 45° | α | z | P45233 |
| 470 | 11.00 | 12.00 | | | 83 | 22.00 | 27.22 | 0.20 | 1.5° | 3 | EUR |
| 501 | 12.00 | 12.00 | | | 83 | 22.00 | - | 0.20 | 0.0° | 3 | 83.00 |
| 540 | 13.00 | 14.00 | | | 83 | 22.00 | 27.22 | 0.20 | 1.5° | 3 | 130.00 |
| 570 | 14.00 | 14.00 | | | 83 | 22.00 | - | 0.20 | 0.0° | 3 | 130.00 |
| 581 | 15.00 | 16.00 | | | 92 | 26.00 | 31.22 | 0.20 | 1.0° | 3 | 130.00 |
| 610 | 16.00 | 16.00 | | | 92 | 26.00 | - | 0.20 | 0.0° | 3 | 130.00 |
| 682 | 20.00 | 20.00 | | | 104 | 32.00 | - | 0.20 | 0.0° | 3 | 189.00 |
| | | | | | | | | | | | |
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Applicazione



Materiale

Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|
| 2.00 | 4 | 65 | 0.005 | 3.000 | 0.050 | 10345 | 205 |
| 4.00 | 4 | 65 | 0.010 | 6.000 | 0.100 | 5175 | 205 |
| 5.00 | 4 | 65 | 0.015 | 7.500 | 0.150 | 4140 | 250 |
| 6.00 | 4 | 65 | 0.015 | 9.000 | 0.150 | 3450 | 205 |
| 8.00 | 4 | 65 | 0.025 | 12.000 | 0.200 | 2585 | 260 |
| 10.00 | 4 | 65 | 0.030 | 15.000 | 0.250 | 2070 | 250 |
| 12.00 | 4 | 65 | 0.035 | 18.000 | 0.300 | 1725 | 240 |
| 16.00 | 4 | 65 | 0.045 | 24.000 | 0.400 | 1295 | 235 |

Acciaio
850 - 1100 N/mm²



| | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|
| 2.00 | 4 | 54 | 0.005 | 3.000 | 0.050 | 8595 | 170 |
| 4.00 | 4 | 54 | 0.010 | 6.000 | 0.100 | 4295 | 170 |
| 5.00 | 4 | 54 | 0.015 | 7.500 | 0.150 | 3440 | 205 |
| 6.00 | 4 | 54 | 0.015 | 9.000 | 0.150 | 2865 | 170 |
| 8.00 | 4 | 54 | 0.025 | 12.000 | 0.200 | 2150 | 215 |
| 10.00 | 4 | 54 | 0.030 | 15.000 | 0.250 | 1720 | 205 |
| 12.00 | 4 | 54 | 0.035 | 18.000 | 0.300 | 1430 | 200 |
| 16.00 | 4 | 54 | 0.045 | 24.000 | 0.400 | 1075 | 195 |

Acciaio
1100 - 1300 N/mm²



| | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|
| 2.00 | 4 | 42 | 0.005 | 3.000 | 0.050 | 6685 | 135 |
| 4.00 | 4 | 42 | 0.010 | 6.000 | 0.100 | 3340 | 135 |
| 5.00 | 4 | 42 | 0.015 | 7.500 | 0.150 | 2675 | 160 |
| 6.00 | 4 | 42 | 0.015 | 9.000 | 0.150 | 2230 | 135 |
| 8.00 | 4 | 42 | 0.025 | 12.000 | 0.200 | 1670 | 165 |
| 10.00 | 4 | 42 | 0.030 | 15.000 | 0.250 | 1335 | 160 |
| 12.00 | 4 | 42 | 0.035 | 18.000 | 0.300 | 1115 | 155 |
| 16.00 | 4 | 42 | 0.045 | 24.000 | 0.400 | 835 | 150 |

Acciaio per lavorazione
a freddo (12% Cr)
fortemente legati
[1.2379]



| | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|
| 2.00 | 4 | 30 | 0.005 | 3.000 | 0.050 | 4775 | 95 |
| 4.00 | 4 | 30 | 0.010 | 6.000 | 0.100 | 2385 | 95 |
| 5.00 | 4 | 30 | 0.015 | 7.500 | 0.150 | 1910 | 115 |
| 6.00 | 4 | 30 | 0.015 | 9.000 | 0.150 | 1590 | 95 |
| 8.00 | 4 | 30 | 0.025 | 12.000 | 0.200 | 1195 | 120 |
| 10.00 | 4 | 30 | 0.030 | 15.000 | 0.250 | 955 | 115 |
| 12.00 | 4 | 30 | 0.035 | 18.000 | 0.300 | 795 | 110 |
| 16.00 | 4 | 30 | 0.045 | 24.000 | 0.400 | 595 | 105 |

Ghisa
(grigia / sferoidale)



| | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|
| 2.00 | 4 | 50 | 0.005 | 3.000 | 0.050 | 7960 | 160 |
| 4.00 | 4 | 50 | 0.010 | 6.000 | 0.100 | 3980 | 160 |
| 5.00 | 4 | 50 | 0.015 | 7.500 | 0.150 | 3185 | 190 |
| 6.00 | 4 | 50 | 0.015 | 9.000 | 0.150 | 2655 | 160 |
| 8.00 | 4 | 50 | 0.025 | 12.000 | 0.200 | 1990 | 200 |
| 10.00 | 4 | 50 | 0.030 | 15.000 | 0.250 | 1590 | 190 |
| 12.00 | 4 | 50 | 0.035 | 18.000 | 0.300 | 1325 | 185 |
| 16.00 | 4 | 50 | 0.045 | 24.000 | 0.400 | 995 | 180 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|
| 2.00 | 4 | 26 | 0.005 | 3.000 | 0.050 | 4140 | 85 |
| 4.00 | 4 | 26 | 0.010 | 6.000 | 0.100 | 2070 | 85 |
| 5.00 | 4 | 26 | 0.015 | 7.500 | 0.150 | 1655 | 100 |
| 6.00 | 4 | 26 | 0.015 | 9.000 | 0.150 | 1380 | 85 |
| 8.00 | 4 | 26 | 0.025 | 12.000 | 0.200 | 1035 | 105 |
| 10.00 | 4 | 26 | 0.030 | 15.000 | 0.250 | 830 | 100 |
| 12.00 | 4 | 26 | 0.035 | 18.000 | 0.300 | 690 | 95 |
| 16.00 | 4 | 26 | 0.045 | 24.000 | 0.400 | 515 | 95 |

Rame non legato



| | | | | | | | |
|-------|---|----|-------|--------|-------|-------|-----|
| 2.00 | 4 | 80 | 0.005 | 3.000 | 0.050 | 12730 | 255 |
| 4.00 | 4 | 80 | 0.010 | 6.000 | 0.100 | 6365 | 255 |
| 5.00 | 4 | 80 | 0.015 | 7.500 | 0.150 | 5095 | 305 |
| 6.00 | 4 | 80 | 0.015 | 9.000 | 0.150 | 4245 | 255 |
| 8.00 | 4 | 80 | 0.025 | 12.000 | 0.200 | 3185 | 320 |
| 10.00 | 4 | 80 | 0.030 | 15.000 | 0.250 | 2545 | 305 |
| 12.00 | 4 | 80 | 0.035 | 18.000 | 0.300 | 2120 | 295 |
| 16.00 | 4 | 80 | 0.045 | 24.000 | 0.400 | 1590 | 285 |

Alluminio malleabile
Costruzione integrale Al



| | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|-----|
| 2.00 | 4 | 100 | 0.005 | 3.000 | 0.050 | 15915 | 320 |
| 4.00 | 4 | 100 | 0.010 | 6.000 | 0.100 | 7960 | 320 |
| 5.00 | 4 | 100 | 0.015 | 7.500 | 0.150 | 6365 | 380 |
| 6.00 | 4 | 100 | 0.015 | 9.000 | 0.150 | 5305 | 320 |
| 8.00 | 4 | 100 | 0.025 | 12.000 | 0.200 | 3980 | 400 |
| 10.00 | 4 | 100 | 0.030 | 15.000 | 0.250 | 3185 | 380 |
| 12.00 | 4 | 100 | 0.035 | 18.000 | 0.300 | 2655 | 370 |
| 16.00 | 4 | 100 | 0.045 | 24.000 | 0.400 | 1990 | 360 |

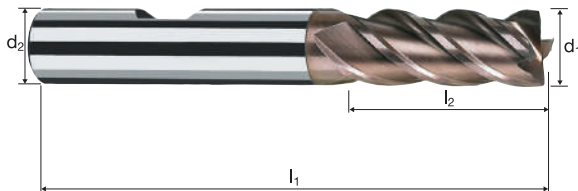
Frese cilindriche

A taglienti lisci, esecuzione normale

HSS

HSS-E λ 40°
Co8 γ 15°

90°



Sgrossatura

Finitura



ReTool®

Rm
< 850

Rm
850-1100

Rm
1100-1300

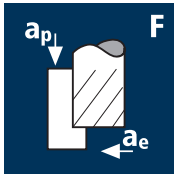
Inox
Stainless

Ti
Titanium

GG(G)
Aluminium
Copper

| Esempio: N° Ordine | | | | | | | | | UNICUT-4X |
|--------------------------------------|-------------|-------------|-------|-------|-------|----------|---|--|-----------|
| Rivestimento Articolo Codice-Ø | | | | | | | | | U0110 |
| U 0110 100 | | | | | | | | | EUR |
| Ø Code | d_1 k8 | d_2 h6 | l_1 | l_2 | l_4 | α | z | | EUR |
| 100 | 1.00 | 6.00 | 49 | 5.00 | 12.48 | 3.0° | 4 | | 22.30 |
| 120 | 1.50 | 6.00 | 50 | 6.00 | 12.99 | 3.0° | 4 | | 22.30 |
| 140 | 2.00 | 6.00 | 51 | 7.00 | 13.61 | 2.5° | 4 | | 22.30 |
| 160 | 2.50 | 6.00 | 52 | 8.00 | 15.50 | 2.0° | 4 | | 22.30 |
| 180 | 3.00 | 6.00 | 52 | 8.00 | 15.50 | 2.0° | 4 | | 22.30 |
| 200 | 3.50 | 6.00 | 54 | 10.00 | 17.50 | 1.5° | 4 | | 22.30 |
| 220 | 4.00 | 6.00 | 55 | 11.00 | 18.50 | 1.5° | 4 | | 22.30 |
| 240 | 4.50 | 6.00 | 55 | 11.00 | 18.50 | 1.0° | 4 | | 22.30 |
| 260 | 5.00 | 6.00 | 57 | 13.00 | 20.50 | 1.0° | 4 | | 22.30 |
| 280 | 5.50 | 6.00 | 57 | 13.00 | 20.50 | 1.0° | 4 | | 22.30 |
| 300 | 6.00 | 6.00 | 57 | 13.00 | - | 0.0° | 4 | | 22.30 |
| 342 | 7.00 | 10.00 | 66 | 16.00 | 25.50 | 1.5° | 4 | | 31.20 |
| 391 | 8.00 | 8.00 | 63 | 19.00 | - | 0.0° | 4 | | 31.20 |
| 420 | 9.00 | 10.00 | 69 | 19.00 | 28.50 | 0.5° | 4 | | 33.40 |
| 450 | 10.00 | 10.00 | 72 | 22.00 | - | 0.0° | 4 | | 33.40 |
| 470 | 11.00 | 12.00 | 79 | 22.00 | 33.50 | 0.5° | 4 | | 37.90 |
| 501 | 12.00 | 12.00 | 83 | 26.00 | - | 0.0° | 4 | | 37.90 |
| 570 | 14.00 | 12.00 | 83 | 26.00 | - | 0.0° | 4 | | 53.50 |
| 581 | 15.00 | 12.00 | 83 | 26.00 | - | 0.0° | 4 | | 53.50 |
| 610 | 16.00 | 16.00 | 92 | 32.00 | - | 0.0° | 4 | | 53.50 |
| 640 | 18.00 | 16.00 | 92 | 32.00 | - | 0.0° | 4 | | 68.00 |

Applicazione



Materiale

Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|
| 20.00 | 4 | 65 | 0.055 | 30.000 | 0.500 | 1035 | 230 |
| 22.00 | 4 | 65 | 0.065 | 33.000 | 0.550 | 940 | 245 |
| 24.00 | 4 | 65 | 0.070 | 36.000 | 0.600 | 860 | 240 |
| 25.00 | 4 | 65 | 0.070 | 37.500 | 0.650 | 830 | 230 |
| 28.00 | 6 | 65 | 0.080 | 42.000 | 0.700 | 740 | 355 |
| 30.00 | 6 | 65 | 0.085 | 45.000 | 0.750 | 690 | 350 |
| 32.00 | 6 | 65 | 0.090 | 48.000 | 0.800 | 645 | 350 |
| 36.00 | 6 | 65 | 0.105 | 54.000 | 0.900 | 575 | 360 |
| 40.00 | 6 | 65 | 0.115 | 60.000 | 1.000 | 515 | 355 |

Acciaio
850 - 1100 N/mm²



| | | | | | | | |
|-------|---|----|-------|--------|-------|-----|-----|
| 20.00 | 4 | 54 | 0.055 | 30.000 | 0.500 | 860 | 190 |
| 22.00 | 4 | 54 | 0.065 | 33.000 | 0.550 | 780 | 205 |
| 24.00 | 4 | 54 | 0.070 | 36.000 | 0.600 | 715 | 200 |
| 25.00 | 4 | 54 | 0.070 | 37.500 | 0.650 | 690 | 195 |
| 28.00 | 6 | 54 | 0.080 | 42.000 | 0.700 | 615 | 295 |
| 30.00 | 6 | 54 | 0.085 | 45.000 | 0.750 | 575 | 290 |
| 32.00 | 6 | 54 | 0.090 | 48.000 | 0.800 | 535 | 290 |
| 36.00 | 6 | 54 | 0.105 | 54.000 | 0.900 | 475 | 300 |
| 40.00 | 6 | 54 | 0.115 | 60.000 | 1.000 | 430 | 295 |

Acciaio
1100 - 1300 N/mm²



| | | | | | | | |
|-------|---|----|-------|--------|-------|-----|-----|
| 20.00 | 4 | 42 | 0.055 | 30.000 | 0.500 | 670 | 145 |
| 22.00 | 4 | 42 | 0.065 | 33.000 | 0.550 | 610 | 160 |
| 24.00 | 4 | 42 | 0.070 | 36.000 | 0.600 | 555 | 155 |
| 25.00 | 4 | 42 | 0.070 | 37.500 | 0.650 | 535 | 150 |
| 28.00 | 6 | 42 | 0.080 | 42.000 | 0.700 | 475 | 230 |
| 30.00 | 6 | 42 | 0.085 | 45.000 | 0.750 | 445 | 225 |
| 32.00 | 6 | 42 | 0.090 | 48.000 | 0.800 | 420 | 225 |
| 36.00 | 6 | 42 | 0.105 | 54.000 | 0.900 | 370 | 235 |
| 40.00 | 6 | 42 | 0.115 | 60.000 | 1.000 | 335 | 230 |

Acciaio per lavorazione
a freddo (12% Cr)
fortemente legati
[1.2379]



| | | | | | | | |
|-------|---|----|-------|--------|-------|-----|-----|
| 20.00 | 4 | 30 | 0.055 | 30.000 | 0.500 | 475 | 105 |
| 22.00 | 4 | 30 | 0.065 | 33.000 | 0.550 | 435 | 115 |
| 24.00 | 4 | 30 | 0.070 | 36.000 | 0.600 | 400 | 110 |
| 25.00 | 4 | 30 | 0.070 | 37.500 | 0.650 | 380 | 105 |
| 28.00 | 6 | 30 | 0.080 | 42.000 | 0.700 | 340 | 165 |
| 30.00 | 6 | 30 | 0.085 | 45.000 | 0.750 | 320 | 160 |
| 32.00 | 6 | 30 | 0.090 | 48.000 | 0.800 | 300 | 160 |
| 36.00 | 6 | 30 | 0.105 | 54.000 | 0.900 | 265 | 165 |
| 40.00 | 6 | 30 | 0.115 | 60.000 | 1.000 | 240 | 165 |

Ghisa
(grigia / sferoidale)



| | | | | | | | |
|-------|---|----|-------|--------|-------|-----|-----|
| 20.00 | 4 | 50 | 0.055 | 30.000 | 0.500 | 795 | 175 |
| 22.00 | 4 | 50 | 0.065 | 33.000 | 0.550 | 725 | 190 |
| 24.00 | 4 | 50 | 0.070 | 36.000 | 0.600 | 665 | 185 |
| 25.00 | 4 | 50 | 0.070 | 37.500 | 0.650 | 635 | 180 |
| 28.00 | 6 | 50 | 0.080 | 42.000 | 0.700 | 570 | 275 |
| 30.00 | 6 | 50 | 0.085 | 45.000 | 0.750 | 530 | 270 |
| 32.00 | 6 | 50 | 0.090 | 48.000 | 0.800 | 495 | 270 |
| 36.00 | 6 | 50 | 0.105 | 54.000 | 0.900 | 440 | 280 |
| 40.00 | 6 | 50 | 0.115 | 60.000 | 1.000 | 400 | 275 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| | | | | | | | |
|-------|---|----|-------|--------|-------|-----|-----|
| 20.00 | 4 | 26 | 0.055 | 30.000 | 0.500 | 415 | 90 |
| 22.00 | 4 | 26 | 0.065 | 33.000 | 0.550 | 375 | 100 |
| 24.00 | 4 | 26 | 0.070 | 36.000 | 0.600 | 345 | 95 |
| 25.00 | 4 | 26 | 0.070 | 37.500 | 0.650 | 330 | 95 |
| 28.00 | 6 | 26 | 0.080 | 42.000 | 0.700 | 295 | 140 |
| 30.00 | 6 | 26 | 0.085 | 45.000 | 0.750 | 275 | 140 |
| 32.00 | 6 | 26 | 0.090 | 48.000 | 0.800 | 260 | 140 |
| 36.00 | 6 | 26 | 0.105 | 54.000 | 0.900 | 230 | 145 |
| 40.00 | 6 | 26 | 0.115 | 60.000 | 1.000 | 205 | 145 |

Rame non legato



| | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|
| 20.00 | 4 | 80 | 0.055 | 30.000 | 0.500 | 1275 | 280 |
| 22.00 | 4 | 80 | 0.065 | 33.000 | 0.550 | 1155 | 300 |
| 24.00 | 4 | 80 | 0.070 | 36.000 | 0.600 | 1060 | 295 |
| 25.00 | 4 | 80 | 0.070 | 37.500 | 0.650 | 1020 | 285 |
| 28.00 | 6 | 80 | 0.080 | 42.000 | 0.700 | 910 | 435 |
| 30.00 | 6 | 80 | 0.085 | 45.000 | 0.750 | 850 | 435 |
| 32.00 | 6 | 80 | 0.090 | 48.000 | 0.800 | 795 | 430 |
| 36.00 | 6 | 80 | 0.105 | 54.000 | 0.900 | 705 | 445 |
| 40.00 | 6 | 80 | 0.115 | 60.000 | 1.000 | 635 | 440 |

Alluminio malleabile
Costruzione integrale Al



| | | | | | | | |
|-------|---|-----|-------|--------|-------|------|-----|
| 20.00 | 4 | 100 | 0.055 | 30.000 | 0.500 | 1590 | 350 |
| 22.00 | 4 | 100 | 0.065 | 33.000 | 0.550 | 1445 | 375 |
| 24.00 | 4 | 100 | 0.070 | 36.000 | 0.600 | 1325 | 370 |
| 25.00 | 4 | 100 | 0.070 | 37.500 | 0.650 | 1275 | 355 |
| 28.00 | 6 | 100 | 0.080 | 42.000 | 0.700 | 1135 | 545 |
| 30.00 | 6 | 100 | 0.085 | 45.000 | 0.750 | 1060 | 540 |
| 32.00 | 6 | 100 | 0.090 | 48.000 | 0.800 | 995 | 535 |
| 36.00 | 6 | 100 | 0.105 | 54.000 | 0.900 | 885 | 555 |
| 40.00 | 6 | 100 | 0.115 | 60.000 | 1.000 | 795 | 550 |

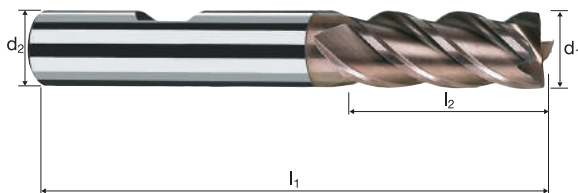
Frese cilindriche

A taglienti lisci, esecuzione normale

HSS

HSS-E λ 40°
Co8 γ 15°

90°



Sgrossatura

Finitura



ReTool®

Rm
< 850

Rm
850-1100

Rm
1100-1300

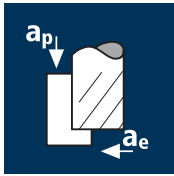
Inox
Stainless

Ti
Titanium

GG(G)
Aluminium
Copper

| Esempio: N° Ordine | | Rivestimento U | Articolo 0110 | Codice-Ø 682 | | | | | UNICUT-4X |
|-----------------------|----------------------|----------------------|------------------|-----------------|----------------|------|---|--------|-----------|
| Ø Code | d ₁ k8 | d ₂ h6 | l ₁ | l ₂ | l ₄ | α | z | EUR | |
| 682 | 20.00 | 20.00 | 104 | 38.00 | - | 0.0° | 4 | 68.00 | |
| 690 | 21.00 | 20.00 | 104 | 38.00 | - | 0.0° | 4 | 68.00 | |
| 710 | 22.00 | 20.00 | 104 | 38.00 | - | 0.0° | 4 | 114.00 | |
| 741 | 24.00 | 20.00 | 111 | 45.00 | - | 0.0° | 4 | 114.00 | |
| 772 | 25.00 | 25.00 | 121 | 45.00 | - | 0.0° | 4 | 114.00 | |
| 800 | 28.00 | 25.00 | 121 | 45.00 | - | 0.0° | 6 | 204.00 | |
| 810 | 30.00 | 25.00 | 121 | 45.00 | - | 0.0° | 6 | 204.00 | |
| 832 | 32.00 | 32.00 | 133 | 53.00 | - | 0.0° | 6 | 204.00 | |
| 860 | 36.00 | 32.00 | 133 | 53.00 | - | 0.0° | 6 | 366.00 | |
| 881 | 40.00 | 32.00 | 143 | 63.00 | - | 0.0° | 6 | 366.00 | |
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| | | | | | | | | | |

Applicazione



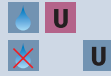
Materiale

Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 3.00 | 3 | 64 | 0.010 | 4.500 | 0.200 | 6790 | 205 | 0.2 |
| 4.00 | 3 | 64 | 0.010 | 6.000 | 0.300 | 5095 | 155 | 0.3 |
| 5.00 | 3 | 64 | 0.015 | 7.500 | 0.350 | 4075 | 185 | 0.5 |
| 6.00 | 3 | 64 | 0.020 | 9.000 | 0.400 | 3395 | 205 | 0.7 |
| 7.00 | 3 | 64 | 0.020 | 10.500 | 0.500 | 2910 | 175 | 0.9 |
| 8.00 | 3 | 64 | 0.025 | 12.000 | 0.550 | 2545 | 190 | 1.3 |
| 10.00 | 3 | 64 | 0.030 | 15.000 | 0.700 | 2035 | 185 | 1.9 |
| 12.00 | 3 | 64 | 0.045 | 18.000 | 0.850 | 1700 | 230 | 3.5 |
| 14.00 | 3 | 64 | 0.055 | 21.000 | 1.000 | 1455 | 240 | 5.0 |

Acciaio
850 - 1100 N/mm²



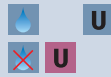
| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|-----|
| 3.00 | 3 | 52 | 0.010 | 4.500 | 0.200 | 5515 | 165 | 0.1 |
| 4.00 | 3 | 52 | 0.010 | 6.000 | 0.300 | 4140 | 125 | 0.2 |
| 5.00 | 3 | 52 | 0.015 | 7.500 | 0.350 | 3310 | 150 | 0.4 |
| 6.00 | 3 | 52 | 0.020 | 9.000 | 0.400 | 2760 | 165 | 0.6 |
| 7.00 | 3 | 52 | 0.020 | 10.500 | 0.500 | 2365 | 140 | 0.7 |
| 8.00 | 3 | 52 | 0.025 | 12.000 | 0.550 | 2070 | 155 | 1.0 |
| 10.00 | 3 | 52 | 0.030 | 15.000 | 0.700 | 1655 | 150 | 1.6 |
| 12.00 | 3 | 52 | 0.045 | 18.000 | 0.850 | 1380 | 185 | 2.8 |
| 14.00 | 3 | 52 | 0.055 | 21.000 | 1.000 | 1180 | 195 | 4.1 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|-----|
| 3.00 | 3 | 26 | 0.010 | 4.500 | 0.200 | 2760 | 85 | 0.1 |
| 4.00 | 3 | 26 | 0.010 | 6.000 | 0.300 | 2070 | 60 | 0.1 |
| 5.00 | 3 | 26 | 0.015 | 7.500 | 0.350 | 1655 | 75 | 0.2 |
| 6.00 | 3 | 26 | 0.020 | 9.000 | 0.400 | 1380 | 85 | 0.3 |
| 7.00 | 3 | 26 | 0.020 | 10.500 | 0.500 | 1180 | 70 | 0.4 |
| 8.00 | 3 | 26 | 0.025 | 12.000 | 0.550 | 1035 | 80 | 0.5 |
| 10.00 | 3 | 26 | 0.030 | 15.000 | 0.700 | 830 | 75 | 0.8 |
| 12.00 | 3 | 26 | 0.045 | 18.000 | 0.850 | 690 | 95 | 1.4 |
| 14.00 | 3 | 26 | 0.055 | 21.000 | 1.000 | 590 | 100 | 2.0 |

Ghisa
(griglia / sferoidale)



| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|-----|
| 3.00 | 3 | 45 | 0.010 | 4.500 | 0.200 | 4775 | 145 | 0.1 |
| 4.00 | 3 | 45 | 0.010 | 6.000 | 0.300 | 3580 | 105 | 0.2 |
| 5.00 | 3 | 45 | 0.015 | 7.500 | 0.350 | 2865 | 130 | 0.3 |
| 6.00 | 3 | 45 | 0.020 | 9.000 | 0.400 | 2385 | 145 | 0.5 |
| 7.00 | 3 | 45 | 0.020 | 10.500 | 0.500 | 2045 | 125 | 0.6 |
| 8.00 | 3 | 45 | 0.025 | 12.000 | 0.550 | 1790 | 135 | 0.9 |
| 10.00 | 3 | 45 | 0.030 | 15.000 | 0.700 | 1430 | 130 | 1.4 |
| 12.00 | 3 | 45 | 0.045 | 18.000 | 0.850 | 1195 | 160 | 2.5 |
| 14.00 | 3 | 45 | 0.055 | 21.000 | 1.000 | 1025 | 170 | 3.5 |

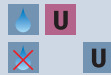


Acciaio
< 850 N/mm²



| | | | | | | | | |
|-------|---|----|-------|-------|--------|------|-----|------|
| 3.00 | 3 | 60 | 0.010 | 1.500 | 3.000 | 6365 | 190 | 0.9 |
| 4.00 | 3 | 60 | 0.010 | 2.000 | 4.000 | 4775 | 145 | 1.1 |
| 5.00 | 3 | 60 | 0.015 | 2.500 | 5.000 | 3820 | 170 | 2.1 |
| 6.00 | 3 | 60 | 0.020 | 3.000 | 6.000 | 3185 | 190 | 3.4 |
| 7.00 | 3 | 60 | 0.020 | 3.500 | 7.000 | 2730 | 165 | 4.0 |
| 8.00 | 3 | 60 | 0.025 | 4.000 | 8.000 | 2385 | 180 | 5.7 |
| 10.00 | 3 | 60 | 0.030 | 5.000 | 10.000 | 1910 | 170 | 8.6 |
| 12.00 | 3 | 60 | 0.045 | 6.000 | 12.000 | 1590 | 215 | 15.5 |
| 14.00 | 3 | 60 | 0.055 | 7.000 | 14.000 | 1365 | 225 | 22.1 |

Acciaio
850 - 1100 N/mm²



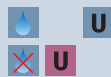
| | | | | | | | | |
|-------|---|----|-------|-------|--------|------|-----|------|
| 3.00 | 3 | 50 | 0.010 | 1.500 | 3.000 | 5305 | 160 | 0.7 |
| 4.00 | 3 | 50 | 0.010 | 2.000 | 4.000 | 3980 | 120 | 1.0 |
| 5.00 | 3 | 50 | 0.015 | 2.500 | 5.000 | 3185 | 145 | 1.8 |
| 6.00 | 3 | 50 | 0.020 | 3.000 | 6.000 | 2655 | 160 | 2.9 |
| 7.00 | 3 | 50 | 0.020 | 3.500 | 7.000 | 2275 | 135 | 3.3 |
| 8.00 | 3 | 50 | 0.025 | 4.000 | 8.000 | 1990 | 150 | 4.8 |
| 10.00 | 3 | 50 | 0.030 | 5.000 | 10.000 | 1590 | 145 | 7.2 |
| 12.00 | 3 | 50 | 0.045 | 6.000 | 12.000 | 1325 | 180 | 12.9 |
| 14.00 | 3 | 50 | 0.055 | 7.000 | 14.000 | 1135 | 190 | 18.4 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| | | | | | | | | |
|-------|---|----|-------|-------|--------|------|----|-----|
| 3.00 | 3 | 23 | 0.010 | 1.500 | 3.000 | 2440 | 75 | 0.3 |
| 4.00 | 3 | 23 | 0.010 | 2.000 | 4.000 | 1830 | 55 | 0.4 |
| 5.00 | 3 | 23 | 0.015 | 2.500 | 5.000 | 1465 | 65 | 0.8 |
| 6.00 | 3 | 23 | 0.020 | 3.000 | 6.000 | 1220 | 75 | 1.3 |
| 7.00 | 3 | 23 | 0.020 | 3.500 | 7.000 | 1045 | 65 | 1.5 |
| 8.00 | 3 | 23 | 0.025 | 4.000 | 8.000 | 915 | 70 | 2.2 |
| 10.00 | 3 | 23 | 0.030 | 5.000 | 10.000 | 730 | 65 | 3.3 |
| 12.00 | 3 | 23 | 0.045 | 6.000 | 12.000 | 610 | 80 | 5.9 |
| 14.00 | 3 | 23 | 0.055 | 7.000 | 14.000 | 525 | 85 | 8.5 |

Ghisa
(griglia / sferoidale)



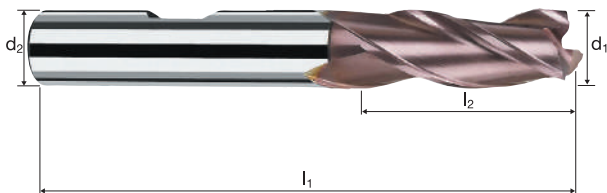
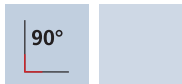
| | | | | | | | | |
|-------|---|----|-------|-------|--------|------|-----|------|
| 3.00 | 3 | 40 | 0.010 | 1.500 | 3.000 | 4245 | 125 | 0.6 |
| 4.00 | 3 | 40 | 0.010 | 2.000 | 4.000 | 3185 | 95 | 0.8 |
| 5.00 | 3 | 40 | 0.015 | 2.500 | 5.000 | 2545 | 115 | 1.4 |
| 6.00 | 3 | 40 | 0.020 | 3.000 | 6.000 | 2120 | 125 | 2.3 |
| 7.00 | 3 | 40 | 0.020 | 3.500 | 7.000 | 1820 | 110 | 2.7 |
| 8.00 | 3 | 40 | 0.025 | 4.000 | 8.000 | 1590 | 120 | 3.8 |
| 10.00 | 3 | 40 | 0.030 | 5.000 | 10.000 | 1275 | 115 | 5.7 |
| 12.00 | 3 | 40 | 0.045 | 6.000 | 12.000 | 1060 | 145 | 10.3 |
| 14.00 | 3 | 40 | 0.055 | 7.000 | 14.000 | 910 | 150 | 14.7 |

Frese cilindriche

A taglienti lisci, esecuzione normale

HSS

HSS-E λ 30°
Co8 γ 15°



Sgrossatura

Finitura



ReTool®

Rm
< 850

Rm
850-1100

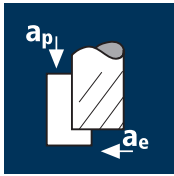
Rm
1100-1300

Inox
Stainless

GG(G)
Aluminium
Copper

| Esempio: N° Ordine | | Rivestimento U | Articolo 0780 | Codice-Ø 100 | | | | | UNICUT-4X |
|-----------------------|----------------------|----------------------|------------------|-----------------|----------------|-------|---|-------|-----------|
| Ø Code | d ₁ f8 | d ₂ h6 | l ₁ | l ₂ | l ₄ | α | z | EUR | |
| 100 | 1.00 | 6.00 | 49 | 5.00 | 12.48 | 10.5° | 3 | 22.30 | |
| 120 | 1.50 | 6.00 | 50 | 6.00 | 12.99 | 10.0° | 3 | 22.30 | |
| 140 | 2.00 | 6.00 | 51 | 7.00 | 13.61 | 8.5° | 3 | 22.30 | |
| 160 | 2.50 | 6.00 | 52 | 8.00 | 15.50 | 6.5° | 3 | 22.30 | |
| 180 | 3.00 | 6.00 | 52 | 8.00 | 15.50 | 6.0° | 3 | 22.30 | |
| 200 | 3.50 | 6.00 | 54 | 10.00 | 17.50 | 4.5° | 3 | 22.30 | |
| 220 | 4.00 | 6.00 | 55 | 11.00 | 18.50 | 3.5° | 3 | 22.30 | |
| 240 | 4.50 | 6.00 | 55 | 11.00 | 18.50 | 2.5° | 3 | 22.30 | |
| 260 | 5.00 | 6.00 | 57 | 13.00 | 20.50 | 1.5° | 3 | 22.30 | |
| 280 | 5.50 | 6.00 | 57 | 13.00 | 20.50 | 1.0° | 3 | 22.30 | |
| 300 | 6.00 | 6.00 | 57 | 13.00 | - | 0.0° | 3 | 22.30 | |
| 322 | 6.50 | 10.00 | 66 | 16.00 | 25.50 | 4.0° | 3 | 31.20 | |
| 342 | 7.00 | 10.00 | 66 | 16.00 | 25.50 | 3.5° | 3 | 31.20 | |
| 391 | 8.00 | 8.00 | 63 | 19.00 | - | 0.0° | 3 | 31.20 | |
| 402 | 8.00 | 10.00 | 69 | 19.00 | 28.50 | 2.5° | 3 | 31.20 | |
| 420 | 9.00 | 10.00 | 69 | 19.00 | 28.50 | 1.5° | 3 | 33.40 | |
| 450 | 10.00 | 10.00 | 72 | 22.00 | - | 0.0° | 3 | 33.40 | |
| 470 | 11.00 | 12.00 | 79 | 22.00 | 33.50 | 1.0° | 3 | 37.90 | |
| 501 | 12.00 | 12.00 | 83 | 26.00 | - | 0.0° | 3 | 37.90 | |
| 540 | 13.00 | 12.00 | 83 | 26.00 | - | 0.0° | 3 | 53.50 | |
| 570 | 14.00 | 12.00 | 83 | 26.00 | - | 0.0° | 3 | 53.50 | |

Applicazione



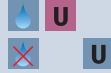
Materiale

Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 15.00 | 3 | 64 | 0.060 | 22.500 | 1.050 | 1360 | 245 | 5.8 |
| 16.00 | 3 | 64 | 0.060 | 24.000 | 1.100 | 1275 | 230 | 6.1 |
| 18.00 | 3 | 64 | 0.070 | 27.000 | 1.250 | 1130 | 240 | 8.0 |
| 20.00 | 3 | 64 | 0.080 | 30.000 | 1.400 | 1020 | 245 | 10.3 |
| 22.00 | 3 | 64 | 0.085 | 33.000 | 1.550 | 925 | 235 | 12.1 |
| 25.00 | 3 | 64 | 0.100 | 37.500 | 1.750 | 815 | 245 | 16.0 |

Acciaio
850 - 1100 N/mm²



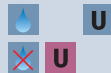
| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 15.00 | 3 | 52 | 0.060 | 22.500 | 1.050 | 1105 | 200 | 4.7 |
| 16.00 | 3 | 52 | 0.060 | 24.000 | 1.100 | 1035 | 185 | 4.9 |
| 18.00 | 3 | 52 | 0.070 | 27.000 | 1.250 | 920 | 195 | 6.5 |
| 20.00 | 3 | 52 | 0.080 | 30.000 | 1.400 | 830 | 200 | 8.3 |
| 22.00 | 3 | 52 | 0.085 | 33.000 | 1.550 | 750 | 190 | 9.8 |
| 25.00 | 3 | 52 | 0.100 | 37.500 | 1.750 | 660 | 200 | 13.0 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| | | | | | | | | |
|-------|---|----|-------|--------|-------|-----|-----|-----|
| 15.00 | 3 | 26 | 0.060 | 22.500 | 1.050 | 550 | 100 | 2.3 |
| 16.00 | 3 | 26 | 0.060 | 24.000 | 1.100 | 515 | 95 | 2.5 |
| 18.00 | 3 | 26 | 0.070 | 27.000 | 1.250 | 460 | 95 | 3.3 |
| 20.00 | 3 | 26 | 0.080 | 30.000 | 1.400 | 415 | 100 | 4.2 |
| 22.00 | 3 | 26 | 0.085 | 33.000 | 1.550 | 375 | 95 | 4.9 |
| 25.00 | 3 | 26 | 0.100 | 37.500 | 1.750 | 330 | 100 | 6.5 |

Ghisa
(griglia / sferoidale)



| | | | | | | | | |
|-------|---|----|-------|--------|-------|-----|-----|------|
| 15.00 | 3 | 45 | 0.060 | 22.500 | 1.050 | 955 | 170 | 4.1 |
| 16.00 | 3 | 45 | 0.060 | 24.000 | 1.100 | 895 | 160 | 4.3 |
| 18.00 | 3 | 45 | 0.070 | 27.000 | 1.250 | 795 | 165 | 5.6 |
| 20.00 | 3 | 45 | 0.080 | 30.000 | 1.400 | 715 | 170 | 7.2 |
| 22.00 | 3 | 45 | 0.085 | 33.000 | 1.550 | 650 | 165 | 8.5 |
| 25.00 | 3 | 45 | 0.100 | 37.500 | 1.750 | 575 | 170 | 11.3 |



Acciaio
< 850 N/mm²



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 15.00 | 3 | 60 | 0.060 | 7.500 | 15.000 | 1275 | 230 | 25.8 |
| 16.00 | 3 | 60 | 0.065 | 8.000 | 16.000 | 1195 | 235 | 29.8 |
| 18.00 | 3 | 60 | 0.070 | 9.000 | 18.000 | 1060 | 225 | 36.1 |
| 20.00 | 3 | 60 | 0.080 | 10.000 | 20.000 | 955 | 230 | 45.8 |
| 22.00 | 3 | 60 | 0.085 | 11.000 | 22.000 | 870 | 220 | 53.6 |
| 25.00 | 3 | 60 | 0.100 | 12.500 | 25.000 | 765 | 230 | 71.6 |

Acciaio
850 - 1100 N/mm²



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 15.00 | 3 | 50 | 0.060 | 7.500 | 15.000 | 1060 | 190 | 21.5 |
| 16.00 | 3 | 50 | 0.065 | 8.000 | 16.000 | 995 | 195 | 24.8 |
| 18.00 | 3 | 50 | 0.070 | 9.000 | 18.000 | 885 | 185 | 30.1 |
| 20.00 | 3 | 50 | 0.080 | 10.000 | 20.000 | 795 | 190 | 38.2 |
| 22.00 | 3 | 50 | 0.085 | 11.000 | 22.000 | 725 | 185 | 44.6 |
| 25.00 | 3 | 50 | 0.100 | 12.500 | 25.000 | 635 | 190 | 59.7 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| | | | | | | | | |
|-------|---|----|-------|--------|--------|-----|----|------|
| 15.00 | 3 | 23 | 0.060 | 7.500 | 15.000 | 490 | 90 | 9.9 |
| 16.00 | 3 | 23 | 0.065 | 8.000 | 16.000 | 460 | 90 | 11.4 |
| 18.00 | 3 | 23 | 0.070 | 9.000 | 18.000 | 405 | 85 | 13.8 |
| 20.00 | 3 | 23 | 0.080 | 10.000 | 20.000 | 365 | 90 | 17.6 |
| 22.00 | 3 | 23 | 0.085 | 11.000 | 22.000 | 335 | 85 | 20.5 |
| 25.00 | 3 | 23 | 0.100 | 12.500 | 25.000 | 295 | 90 | 27.5 |

Ghisa
(griglia / sferoidale)



| | | | | | | | | |
|-------|---|----|-------|--------|--------|-----|-----|------|
| 15.00 | 3 | 40 | 0.060 | 7.500 | 15.000 | 850 | 155 | 17.2 |
| 16.00 | 3 | 40 | 0.065 | 8.000 | 16.000 | 795 | 155 | 19.9 |
| 18.00 | 3 | 40 | 0.070 | 9.000 | 18.000 | 705 | 150 | 24.1 |
| 20.00 | 3 | 40 | 0.080 | 10.000 | 20.000 | 635 | 155 | 30.6 |
| 22.00 | 3 | 40 | 0.085 | 11.000 | 22.000 | 580 | 150 | 35.7 |
| 25.00 | 3 | 40 | 0.100 | 12.500 | 25.000 | 510 | 155 | 47.7 |

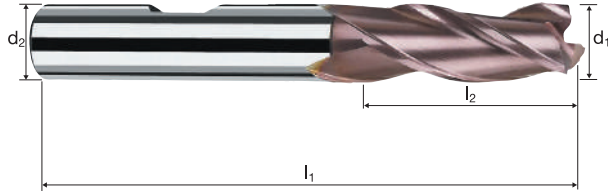
Frese cilindriche

A taglienti lisci, esecuzione normale

HSS

HSS-E λ 30°
Co8 γ 15°

90°



Sgrossatura

Finitura



ReTool®

Rm
< 850

Rm
850-1100

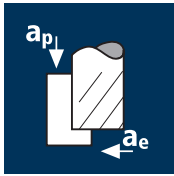
Rm
1100-1300

Inox
Stainless

GG(G)
Aluminium
Copper

| | | | | | | | | | UNICUT-4X |
|---|----------------------|----------------------|----------------|----------------|----------------|------|---|--|-----------|
| | | | | | | | | | U0780 |
| Esempio: N° Ordine Rivestimento U Articolo 0780 Codice-Ø 581 | | | | | | | | | EUR |
| Ø Code | d ₁ f8 | d ₂ h6 | l ₁ | l ₂ | l ₄ | α | z | | EUR |
| 581 | 15.00 | 12.00 | 83 | 26.00 | - | 0.0° | 3 | | 53.50 |
| 610 | 16.00 | 16.00 | 92 | 32.00 | - | 0.0° | 3 | | 53.50 |
| 640 | 18.00 | 16.00 | 92 | 32.00 | - | 0.0° | 3 | | 68.00 |
| 671 | 20.00 | 16.00 | 98 | 38.00 | - | 0.0° | 3 | | 68.00 |
| 682 | 20.00 | 20.00 | 104 | 38.00 | - | 0.0° | 3 | | 68.00 |
| 710 | 22.00 | 20.00 | 104 | 38.00 | - | 0.0° | 3 | | 114.00 |
| 772 | 25.00 | 25.00 | 121 | 45.00 | - | 0.0° | 3 | | 114.00 |
| | | | | | | | | | |
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| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

Applicazione



Materiale

Acciaio
850 - 1100 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 4.00 | 4 | 150 | 0.030 | 4.000 | 2.600 | 11935 | 1430 | 14.9 |
| 5.00 | 4 | 150 | 0.040 | 5.000 | 3.250 | 9550 | 1530 | 24.8 |
| 6.00 | 4 | 150 | 0.045 | 6.000 | 3.900 | 7960 | 1430 | 33.5 |
| 8.00 | 4 | 150 | 0.060 | 8.000 | 5.200 | 5970 | 1430 | 59.6 |
| 10.00 | 4 | 150 | 0.075 | 10.000 | 6.500 | 4775 | 1430 | 93.1 |
| 12.00 | 4 | 150 | 0.090 | 12.000 | 7.800 | 3980 | 1430 | 134.1 |
| 16.00 | 4 | 150 | 0.100 | 16.000 | 10.400 | 2985 | 1195 | 198.6 |
| 20.00 | 4 | 150 | 0.125 | 20.000 | 13.000 | 2385 | 1195 | 310.4 |

Acciaio
1100 - 1300 N/mm²



| | | | | | | | | |
|-------|---|-----|-------|--------|--------|------|------|-------|
| 4.00 | 4 | 115 | 0.025 | 4.000 | 2.600 | 9150 | 915 | 9.5 |
| 5.00 | 4 | 115 | 0.035 | 5.000 | 3.250 | 7320 | 1025 | 16.7 |
| 6.00 | 4 | 115 | 0.040 | 6.000 | 3.900 | 6100 | 975 | 22.8 |
| 8.00 | 4 | 115 | 0.055 | 8.000 | 5.200 | 4575 | 1005 | 41.9 |
| 10.00 | 4 | 115 | 0.065 | 10.000 | 6.500 | 3660 | 950 | 61.9 |
| 12.00 | 4 | 115 | 0.080 | 12.000 | 7.800 | 3050 | 975 | 91.4 |
| 16.00 | 4 | 115 | 0.090 | 16.000 | 10.400 | 2290 | 825 | 137.1 |
| 20.00 | 4 | 115 | 0.110 | 20.000 | 13.000 | 1830 | 805 | 209.4 |

Acciaio da
utensile temprato
52 - 56 HRC

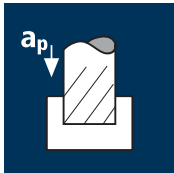


| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 4.00 | 4 | 50 | 0.015 | 4.000 | 2.600 | 3980 | 240 | 2.5 |
| 5.00 | 4 | 50 | 0.020 | 5.000 | 3.250 | 3185 | 255 | 4.1 |
| 6.00 | 4 | 50 | 0.020 | 6.000 | 3.900 | 2655 | 210 | 5.0 |
| 8.00 | 4 | 50 | 0.025 | 8.000 | 5.200 | 1990 | 200 | 8.3 |
| 10.00 | 4 | 50 | 0.035 | 10.000 | 6.500 | 1590 | 225 | 14.5 |
| 12.00 | 4 | 50 | 0.040 | 12.000 | 7.800 | 1325 | 210 | 19.9 |
| 16.00 | 4 | 50 | 0.050 | 16.000 | 10.400 | 995 | 200 | 33.1 |
| 20.00 | 4 | 50 | 0.060 | 20.000 | 13.000 | 795 | 190 | 49.7 |

Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 4.00 | 4 | 60 | 0.015 | 4.000 | 1.600 | 4775 | 285 | 1.8 |
| 5.00 | 4 | 60 | 0.020 | 5.000 | 2.000 | 3820 | 305 | 3.1 |
| 6.00 | 4 | 60 | 0.020 | 6.000 | 2.300 | 3185 | 255 | 3.5 |
| 8.00 | 4 | 60 | 0.025 | 8.000 | 3.100 | 2385 | 240 | 5.9 |
| 10.00 | 4 | 60 | 0.035 | 10.000 | 3.900 | 1910 | 265 | 10.4 |
| 12.00 | 4 | 60 | 0.040 | 12.000 | 4.700 | 1590 | 255 | 14.4 |
| 16.00 | 4 | 60 | 0.050 | 16.000 | 6.200 | 1195 | 240 | 23.7 |
| 20.00 | 4 | 60 | 0.060 | 20.000 | 7.800 | 955 | 230 | 35.8 |



Acciaio
850 - 1100 N/mm²



| | | | | | | | | |
|-------|---|-----|-------|--------|--------|------|-----|-------|
| 4.00 | 4 | 120 | 0.020 | 3.600 | 4.000 | 9550 | 765 | 11.0 |
| 5.00 | 4 | 120 | 0.025 | 4.500 | 5.000 | 7640 | 765 | 17.2 |
| 6.00 | 4 | 120 | 0.035 | 5.400 | 6.000 | 6365 | 890 | 28.9 |
| 8.00 | 4 | 120 | 0.045 | 7.200 | 8.000 | 4775 | 860 | 49.5 |
| 10.00 | 4 | 120 | 0.055 | 9.000 | 10.000 | 3820 | 840 | 75.6 |
| 12.00 | 4 | 120 | 0.065 | 10.800 | 12.000 | 3185 | 830 | 107.3 |
| 16.00 | 4 | 120 | 0.075 | 14.400 | 16.000 | 2385 | 715 | 165.0 |
| 20.00 | 4 | 120 | 0.095 | 18.000 | 20.000 | 1910 | 725 | 261.3 |

Acciaio
1100 - 1300 N/mm²



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|-------|
| 4.00 | 4 | 90 | 0.020 | 3.600 | 4.000 | 7160 | 575 | 8.3 |
| 5.00 | 4 | 90 | 0.025 | 4.500 | 5.000 | 5730 | 575 | 12.9 |
| 6.00 | 4 | 90 | 0.035 | 5.400 | 6.000 | 4775 | 670 | 21.7 |
| 8.00 | 4 | 90 | 0.045 | 7.200 | 8.000 | 3580 | 645 | 37.1 |
| 10.00 | 4 | 90 | 0.055 | 9.000 | 10.000 | 2865 | 630 | 56.7 |
| 12.00 | 4 | 90 | 0.065 | 10.800 | 12.000 | 2385 | 620 | 80.4 |
| 16.00 | 4 | 90 | 0.075 | 14.400 | 16.000 | 1790 | 535 | 123.8 |
| 20.00 | 4 | 90 | 0.095 | 18.000 | 20.000 | 1430 | 545 | 196.0 |

Acciaio da
utensile temprato
52 - 56 HRC



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 4.00 | 4 | 40 | 0.015 | 3.600 | 4.000 | 3185 | 190 | 2.8 |
| 5.00 | 4 | 40 | 0.020 | 4.500 | 5.000 | 2545 | 205 | 4.6 |
| 6.00 | 4 | 40 | 0.025 | 5.400 | 6.000 | 2120 | 210 | 6.9 |
| 8.00 | 4 | 40 | 0.030 | 7.200 | 8.000 | 1590 | 190 | 11.0 |
| 10.00 | 4 | 40 | 0.040 | 9.000 | 10.000 | 1275 | 205 | 18.3 |
| 12.00 | 4 | 40 | 0.045 | 10.800 | 12.000 | 1060 | 190 | 24.8 |
| 16.00 | 4 | 40 | 0.050 | 14.400 | 16.000 | 795 | 160 | 36.7 |
| 20.00 | 4 | 40 | 0.065 | 18.000 | 20.000 | 635 | 165 | 59.6 |

Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 4.00 | 4 | 50 | 0.020 | 3.600 | 4.000 | 3980 | 320 | 4.6 |
| 5.00 | 4 | 50 | 0.025 | 4.500 | 5.000 | 3185 | 320 | 7.2 |
| 6.00 | 4 | 50 | 0.030 | 5.400 | 6.000 | 2655 | 320 | 10.3 |
| 8.00 | 4 | 50 | 0.040 | 7.200 | 8.000 | 1990 | 320 | 18.3 |
| 10.00 | 4 | 50 | 0.050 | 9.000 | 10.000 | 1590 | 320 | 28.6 |
| 12.00 | 4 | 50 | 0.060 | 10.800 | 12.000 | 1325 | 320 | 41.3 |
| 16.00 | 4 | 50 | 0.070 | 14.400 | 16.000 | 995 | 280 | 64.2 |
| 20.00 | 4 | 50 | 0.085 | 18.000 | 20.000 | 795 | 270 | 97.4 |

Frese cilindriche NX (NX-VD)

A taglienti lisci, esecuzione normale con scarico

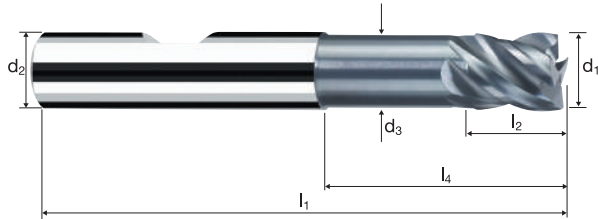


HM
MG10

λ 45°
 γ -20°

45°

Vario



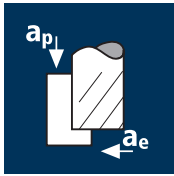
Sgrossatura Finitura



Rm 850-1100 **Rm** 1100-1300 **Rm** 1300-1500 **HRC** 48-56 **HRC** 56-60 **Ti** Titanium **GG(G) Tool Steel**

| | | | | | | | | | | | POLYCHROM | | | | | | | |
|-----------------------|----------------------|----------------------|----------------|----------------|----------------|----------------|----------------|------|------|---|--------------|--------|----------|--|----------|--|--|--|
| Esempio: N° Ordine | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | Rivestimento | | Articolo | | Codice-ø | | | |
| | | | | | | | | | | | P | | 15342 | | 220 | | | |
| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | 45° | α | z | | | | | | | | |
| 220 | 4.00 | 6.00 | 3.70 | 57 | 6.00 | 16.00 | 20.95 | 0.10 | 3.0° | 4 | EUR | 81.00 | | | | | | |
| 260 | 5.00 | 6.00 | 4.60 | 57 | 8.00 | 18.00 | 21.27 | 0.15 | 1.5° | 4 | EUR | 81.00 | | | | | | |
| 300 | 6.00 | 6.00 | 5.50 | 57 | 9.00 | 19.34 | 20.00 | 0.15 | 0.0° | 4 | EUR | 81.00 | | | | | | |
| 391 | 8.00 | 8.00 | 7.40 | 63 | 12.00 | 25.29 | 26.00 | 0.15 | 0.0° | 4 | EUR | 101.00 | | | | | | |
| 450 | 10.00 | 10.00 | 9.20 | 72 | 15.00 | 30.20 | 31.00 | 0.20 | 0.0° | 4 | EUR | 137.00 | | | | | | |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 18.00 | 36.13 | 37.00 | 0.20 | 0.0° | 4 | EUR | 169.00 | | | | | | |
| 610 | 16.00 | 16.00 | 15.00 | 92 | 24.00 | 42.13 | 43.00 | 0.20 | 0.0° | 4 | EUR | 265.00 | | | | | | |
| 682 | 20.00 | 20.00 | 19.00 | 104 | 30.00 | 52.13 | 53.00 | 0.20 | 0.0° | 4 | EUR | 386.00 | | | | | | |
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Applicazione



Materiale

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



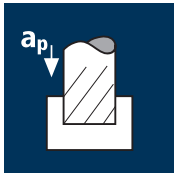
Inox medium
[Cr-Ni-Mo+/1.4539]
Acciaio duplex
[17-4 PH]



Inox difficile
[Cr-Ni-Mo+/1.4529]
Acciaio resistente al calore
[1.4841]



Leghe a base di nichel
indurite
Rm > 1000 N/mm²
[Inconel 718]



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Inox medium
[Cr-Ni-Mo+/1.4539]
Acciaio duplex
[17-4 PH]



Inox difficile
[Cr-Ni-Mo+/1.4529]
Acciaio resistente al calore
[1.4841]



Leghe a base di nichel
indurite
Rm > 1000 N/mm²
[Inconel 718]



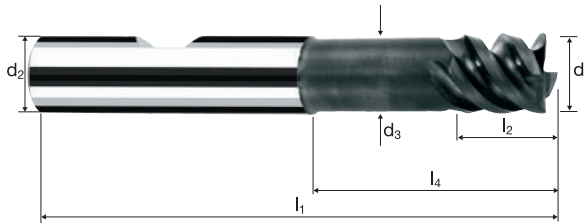
| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 3.00 | 4 | 80 | 0.010 | 3.000 | 1.200 | 8490 | 340 | 1.2 |
| 4.00 | 4 | 80 | 0.015 | 4.000 | 1.600 | 6365 | 380 | 2.4 |
| 5.00 | 4 | 80 | 0.020 | 5.000 | 2.000 | 5095 | 405 | 4.1 |
| 6.00 | 4 | 80 | 0.030 | 6.000 | 2.400 | 4245 | 510 | 7.3 |
| 8.00 | 4 | 80 | 0.040 | 8.000 | 3.200 | 3185 | 510 | 13.0 |
| 10.00 | 4 | 80 | 0.055 | 10.000 | 4.000 | 2545 | 560 | 22.4 |
| 12.00 | 4 | 80 | 0.065 | 12.000 | 4.800 | 2120 | 550 | 31.8 |
| 16.00 | 4 | 80 | 0.085 | 16.000 | 4.000 | 1590 | 540 | 34.6 |
| 20.00 | 4 | 80 | 0.090 | 20.000 | 5.000 | 1275 | 460 | 45.8 |
| 3.00 | 4 | 40 | 0.010 | 3.000 | 1.200 | 4245 | 170 | 0.6 |
| 4.00 | 4 | 40 | 0.015 | 4.000 | 1.600 | 3185 | 190 | 1.2 |
| 5.00 | 4 | 40 | 0.020 | 5.000 | 2.000 | 2545 | 205 | 2.0 |
| 6.00 | 4 | 40 | 0.030 | 6.000 | 2.400 | 2120 | 255 | 3.7 |
| 8.00 | 4 | 40 | 0.040 | 8.000 | 3.200 | 1590 | 255 | 6.5 |
| 10.00 | 4 | 40 | 0.055 | 10.000 | 4.000 | 1275 | 280 | 11.2 |
| 12.00 | 4 | 40 | 0.065 | 12.000 | 4.800 | 1060 | 275 | 15.9 |
| 16.00 | 4 | 40 | 0.085 | 16.000 | 4.000 | 795 | 270 | 17.3 |
| 20.00 | 4 | 40 | 0.090 | 20.000 | 5.000 | 635 | 230 | 22.9 |
| 3.00 | 4 | 25 | 0.015 | 3.000 | 1.200 | 2655 | 160 | 0.6 |
| 4.00 | 4 | 25 | 0.020 | 4.000 | 1.600 | 1990 | 160 | 1.0 |
| 5.00 | 4 | 25 | 0.025 | 5.000 | 2.000 | 1590 | 160 | 1.6 |
| 6.00 | 4 | 25 | 0.030 | 6.000 | 2.400 | 1325 | 160 | 2.3 |
| 8.00 | 4 | 25 | 0.035 | 8.000 | 3.200 | 995 | 140 | 3.6 |
| 10.00 | 4 | 25 | 0.045 | 10.000 | 4.000 | 795 | 145 | 5.7 |
| 12.00 | 4 | 25 | 0.050 | 12.000 | 4.800 | 665 | 135 | 7.6 |
| 16.00 | 4 | 25 | 0.065 | 16.000 | 4.000 | 495 | 130 | 8.3 |
| 20.00 | 4 | 25 | 0.085 | 20.000 | 5.000 | 400 | 135 | 13.5 |
| 3.00 | 4 | 15 | 0.015 | 3.000 | 1.200 | 1590 | 95 | 0.3 |
| 4.00 | 4 | 15 | 0.020 | 4.000 | 1.600 | 1195 | 95 | 0.6 |
| 5.00 | 4 | 15 | 0.025 | 5.000 | 2.000 | 955 | 95 | 1.0 |
| 6.00 | 4 | 15 | 0.030 | 6.000 | 2.400 | 795 | 95 | 1.4 |
| 8.00 | 4 | 15 | 0.035 | 8.000 | 3.200 | 595 | 85 | 2.1 |
| 10.00 | 4 | 15 | 0.045 | 10.000 | 4.000 | 475 | 85 | 3.4 |
| 12.00 | 4 | 15 | 0.050 | 12.000 | 4.800 | 400 | 80 | 4.6 |
| 16.00 | 4 | 15 | 0.065 | 16.000 | 4.000 | 300 | 80 | 5.0 |
| 20.00 | 4 | 15 | 0.085 | 20.000 | 5.000 | 240 | 80 | 8.1 |
| 3.00 | 4 | 60 | 0.010 | 2.250 | 3.000 | 6365 | 255 | 1.7 |
| 4.00 | 4 | 60 | 0.015 | 3.000 | 4.000 | 4775 | 285 | 3.4 |
| 5.00 | 4 | 60 | 0.020 | 3.750 | 5.000 | 3820 | 305 | 5.7 |
| 6.00 | 4 | 60 | 0.030 | 4.500 | 6.000 | 3185 | 380 | 10.3 |
| 8.00 | 4 | 60 | 0.040 | 6.000 | 8.000 | 2385 | 380 | 18.3 |
| 10.00 | 4 | 60 | 0.055 | 7.500 | 10.000 | 1910 | 420 | 31.5 |
| 12.00 | 4 | 60 | 0.055 | 9.000 | 12.000 | 1590 | 350 | 37.8 |
| 16.00 | 4 | 60 | 0.085 | 8.000 | 16.000 | 1195 | 405 | 51.9 |
| 20.00 | 4 | 60 | 0.105 | 10.000 | 20.000 | 955 | 400 | 80.2 |
| 3.00 | 4 | 30 | 0.010 | 2.250 | 3.000 | 3185 | 125 | 0.9 |
| 4.00 | 4 | 30 | 0.015 | 3.000 | 4.000 | 2385 | 145 | 1.7 |
| 5.00 | 4 | 30 | 0.020 | 3.750 | 5.000 | 1910 | 155 | 2.9 |
| 6.00 | 4 | 30 | 0.030 | 4.500 | 6.000 | 1590 | 190 | 5.2 |
| 8.00 | 4 | 30 | 0.040 | 6.000 | 8.000 | 1195 | 190 | 9.2 |
| 10.00 | 4 | 30 | 0.055 | 7.500 | 10.000 | 955 | 210 | 15.8 |
| 12.00 | 4 | 30 | 0.065 | 9.000 | 12.000 | 795 | 205 | 22.3 |
| 16.00 | 4 | 30 | 0.085 | 8.000 | 16.000 | 595 | 205 | 26.0 |
| 20.00 | 4 | 30 | 0.105 | 10.000 | 20.000 | 475 | 200 | 40.1 |
| 3.00 | 4 | 20 | 0.015 | 2.250 | 3.000 | 2120 | 125 | 0.9 |
| 4.00 | 4 | 20 | 0.020 | 3.000 | 4.000 | 1590 | 125 | 1.5 |
| 5.00 | 4 | 20 | 0.025 | 3.750 | 5.000 | 1275 | 125 | 2.4 |
| 6.00 | 4 | 20 | 0.030 | 4.500 | 6.000 | 1060 | 125 | 3.4 |
| 8.00 | 4 | 20 | 0.035 | 6.000 | 8.000 | 795 | 110 | 5.3 |
| 10.00 | 4 | 20 | 0.045 | 7.500 | 10.000 | 635 | 115 | 8.6 |
| 12.00 | 4 | 20 | 0.050 | 9.000 | 12.000 | 530 | 105 | 11.5 |
| 16.00 | 4 | 20 | 0.070 | 8.000 | 16.000 | 400 | 110 | 14.3 |
| 20.00 | 4 | 20 | 0.090 | 10.000 | 20.000 | 320 | 115 | 22.9 |
| 3.00 | 4 | 10 | 0.015 | 2.250 | 3.000 | 1060 | 65 | 0.4 |
| 4.00 | 4 | 10 | 0.020 | 3.000 | 4.000 | 795 | 65 | 0.8 |
| 5.00 | 4 | 10 | 0.025 | 3.750 | 5.000 | 635 | 65 | 1.2 |
| 6.00 | 4 | 10 | 0.030 | 4.500 | 6.000 | 530 | 65 | 1.7 |
| 8.00 | 4 | 10 | 0.035 | 6.000 | 8.000 | 400 | 55 | 2.7 |
| 10.00 | 4 | 10 | 0.045 | 7.500 | 10.000 | 320 | 55 | 4.3 |
| 12.00 | 4 | 10 | 0.050 | 9.000 | 12.000 | 265 | 55 | 5.7 |
| 16.00 | 4 | 10 | 0.070 | 8.000 | 16.000 | 200 | 55 | 7.1 |
| 20.00 | 4 | 10 | 0.090 | 10.000 | 20.000 | 160 | 55 | 11.5 |

Frese cilindriche SX

A taglienti lisci, esecuzione normale con scarico



HM λ 55°
MG10 γ 15°



Sgrossatura

Finitura



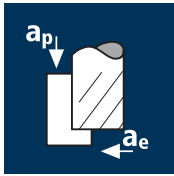
ToolSchool

ReTool®

| | | | | | | | | | | |
|-------------|----------------|--|--|--|--|--|--|-------------------|----------------|-----------------------------|
| Rm < 850 | Rm 850-1100 | | | | | | | Inox Stainless | Ti Titanium | Nickel-Alloys Tool Steel |
|-------------|----------------|--|--|--|--|--|--|-------------------|----------------|-----------------------------|

| Esempio: N° Ordine | | | | | | | | | | | POLYCHROM |
|--------------------------|-------------|-------------------------|-------|------------------------------|-------|-------|-------|------|----------|---|--------------|
| Rivestimento P | | Articolo 5318 | | Codice- ϕ 180 | | | | | | | |
| ϕ Code | d_1 e8 | d_2 h6 | d_3 | l_1 | l_2 | l_3 | l_4 | 45° | α | z | P5218 |
| | | | | | | | | | | | EUR |
| 180 | 3.00 | 6.00 | 2.80 | 57 | 4.00 | 14.00 | 20.63 | 0.10 | 4.5° | 4 | 82.00 |
| 220 | 4.00 | 6.00 | 3.70 | 57 | 5.00 | 16.00 | 20.95 | 0.10 | 3.0° | 4 | 82.00 |
| 260 | 5.00 | 6.00 | 4.60 | 57 | 6.00 | 18.00 | 21.27 | 0.15 | 1.5° | 4 | 82.00 |
| 300 | 6.00 | 6.00 | 5.50 | 57 | 7.00 | 19.34 | 20.00 | 0.15 | 0.0° | 4 | 82.00 |
| 391 | 8.00 | 8.00 | 7.40 | 63 | 9.00 | 25.29 | 26.00 | 0.15 | 0.0° | 4 | 102.00 |
| 450 | 10.00 | 10.00 | 9.20 | 72 | 11.00 | 30.20 | 31.00 | 0.20 | 0.0° | 4 | 139.00 |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 13.00 | 36.13 | 37.00 | 0.20 | 0.0° | 4 | 172.00 |
| 610 | 16.00 | 16.00 | 15.00 | 92 | 17.00 | 42.13 | 43.00 | 0.20 | 0.0° | 4 | 269.00 |
| 682 | 20.00 | 20.00 | 19.00 | 104 | 21.00 | 52.13 | 53.00 | 0.20 | 0.0° | 4 | 392.00 |
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Applicazione



Materiale

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 3.00 | 3 | 80 | 0.010 | 3.000 | 1.200 | 8490 | 255 | 0.9 |
| 4.00 | 3 | 80 | 0.015 | 4.000 | 1.600 | 6365 | 285 | 1.8 |
| 5.00 | 3 | 80 | 0.020 | 5.000 | 2.000 | 5095 | 305 | 3.1 |
| 6.00 | 3 | 80 | 0.030 | 6.000 | 2.400 | 4245 | 380 | 5.5 |
| 8.00 | 3 | 80 | 0.040 | 8.000 | 3.200 | 3185 | 380 | 9.8 |
| 10.00 | 3 | 80 | 0.055 | 10.000 | 4.000 | 2545 | 420 | 16.8 |
| 12.00 | 3 | 80 | 0.065 | 12.000 | 4.800 | 2120 | 415 | 23.8 |
| 16.00 | 3 | 80 | 0.085 | 16.000 | 4.000 | 1590 | 405 | 26.0 |

Inox medium
[Cr-Ni-Mo+/1.4539]
Acciaio duplex
[17-4 PH]



| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 3.00 | 3 | 40 | 0.010 | 3.000 | 1.200 | 4245 | 125 | 0.5 |
| 4.00 | 3 | 40 | 0.015 | 4.000 | 1.600 | 3185 | 145 | 0.9 |
| 5.00 | 3 | 40 | 0.020 | 5.000 | 2.000 | 2545 | 155 | 1.5 |
| 6.00 | 3 | 40 | 0.030 | 6.000 | 2.400 | 2120 | 190 | 2.8 |
| 8.00 | 3 | 40 | 0.040 | 8.000 | 3.200 | 1590 | 190 | 4.9 |
| 10.00 | 3 | 40 | 0.055 | 10.000 | 4.000 | 1275 | 210 | 8.4 |
| 12.00 | 3 | 40 | 0.065 | 12.000 | 4.800 | 1060 | 205 | 11.9 |
| 16.00 | 3 | 40 | 0.085 | 16.000 | 4.000 | 795 | 205 | 13.0 |

Inox difficile
[Cr-Ni-Mo+/1.4529]
Acciaio resistente al calore
[1.4841]

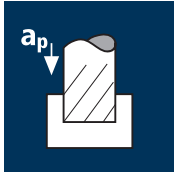


| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|-----|
| 3.00 | 3 | 25 | 0.015 | 3.000 | 1.200 | 2655 | 120 | 0.4 |
| 4.00 | 3 | 25 | 0.020 | 4.000 | 1.600 | 1990 | 120 | 0.8 |
| 5.00 | 3 | 25 | 0.025 | 5.000 | 2.000 | 1590 | 120 | 1.2 |
| 6.00 | 3 | 25 | 0.030 | 6.000 | 2.400 | 1325 | 120 | 1.7 |
| 8.00 | 3 | 25 | 0.035 | 8.000 | 3.200 | 995 | 105 | 2.7 |
| 10.00 | 3 | 25 | 0.045 | 10.000 | 4.000 | 795 | 105 | 4.3 |
| 12.00 | 3 | 25 | 0.050 | 12.000 | 4.800 | 665 | 100 | 5.7 |
| 16.00 | 3 | 25 | 0.060 | 16.000 | 4.000 | 495 | 90 | 5.7 |

Leghe a base di nichel
indurite
Rm > 1000 N/mm²
[Inconel 718]



| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|----|-----|
| 3.00 | 3 | 15 | 0.015 | 3.000 | 1.200 | 1590 | 70 | 0.3 |
| 4.00 | 3 | 15 | 0.020 | 4.000 | 1.600 | 1195 | 70 | 0.5 |
| 5.00 | 3 | 15 | 0.025 | 5.000 | 2.000 | 955 | 70 | 0.7 |
| 6.00 | 3 | 15 | 0.030 | 6.000 | 2.400 | 795 | 70 | 1.0 |
| 8.00 | 3 | 15 | 0.035 | 8.000 | 3.200 | 595 | 65 | 1.6 |
| 10.00 | 3 | 15 | 0.045 | 10.000 | 4.000 | 475 | 65 | 2.6 |
| 12.00 | 3 | 15 | 0.050 | 12.000 | 4.800 | 400 | 60 | 3.4 |
| 16.00 | 3 | 15 | 0.060 | 16.000 | 4.000 | 300 | 55 | 3.4 |



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| | | | | | | | | |
|-------|---|----|-------|-------|--------|------|-----|------|
| 3.00 | 3 | 60 | 0.010 | 1.500 | 3.000 | 6365 | 190 | 0.9 |
| 4.00 | 3 | 60 | 0.015 | 2.000 | 4.000 | 4775 | 215 | 1.7 |
| 5.00 | 3 | 60 | 0.020 | 2.500 | 5.000 | 3820 | 230 | 2.9 |
| 6.00 | 3 | 60 | 0.030 | 3.000 | 6.000 | 3185 | 285 | 5.2 |
| 8.00 | 3 | 60 | 0.040 | 4.000 | 8.000 | 2385 | 285 | 9.2 |
| 10.00 | 3 | 60 | 0.055 | 5.000 | 10.000 | 1910 | 315 | 15.8 |
| 12.00 | 3 | 60 | 0.065 | 6.000 | 12.000 | 1590 | 310 | 22.3 |
| 16.00 | 3 | 60 | 0.085 | 4.000 | 16.000 | 1195 | 305 | 19.5 |

Inox medium
[Cr-Ni-Mo+/1.4539]
Acciaio duplex
[17-4 PH]



| | | | | | | | | |
|-------|---|----|-------|-------|--------|------|-----|------|
| 3.00 | 3 | 30 | 0.010 | 1.500 | 3.000 | 3185 | 95 | 0.4 |
| 4.00 | 3 | 30 | 0.015 | 2.000 | 4.000 | 2385 | 105 | 0.9 |
| 5.00 | 3 | 30 | 0.020 | 2.500 | 5.000 | 1910 | 115 | 1.4 |
| 6.00 | 3 | 30 | 0.030 | 3.000 | 6.000 | 1590 | 145 | 2.6 |
| 8.00 | 3 | 30 | 0.040 | 4.000 | 8.000 | 1195 | 145 | 4.6 |
| 10.00 | 3 | 30 | 0.055 | 5.000 | 10.000 | 955 | 160 | 7.9 |
| 12.00 | 3 | 30 | 0.065 | 6.000 | 12.000 | 795 | 155 | 11.2 |
| 16.00 | 3 | 30 | 0.085 | 4.000 | 16.000 | 595 | 150 | 9.7 |

Inox difficile
[Cr-Ni-Mo+/1.4529]
Acciaio resistente al calore
[1.4841]



| | | | | | | | | |
|-------|---|----|-------|-------|--------|------|----|-----|
| 3.00 | 3 | 20 | 0.015 | 1.500 | 3.000 | 2120 | 95 | 0.4 |
| 4.00 | 3 | 20 | 0.020 | 2.000 | 4.000 | 1590 | 95 | 0.8 |
| 5.00 | 3 | 20 | 0.025 | 2.500 | 5.000 | 1275 | 95 | 1.2 |
| 6.00 | 3 | 20 | 0.030 | 3.000 | 6.000 | 1060 | 95 | 1.7 |
| 8.00 | 3 | 20 | 0.035 | 4.000 | 8.000 | 795 | 85 | 2.7 |
| 10.00 | 3 | 20 | 0.045 | 5.000 | 10.000 | 635 | 85 | 4.3 |
| 12.00 | 3 | 20 | 0.050 | 6.000 | 12.000 | 530 | 80 | 5.7 |
| 16.00 | 3 | 20 | 0.060 | 4.000 | 16.000 | 400 | 70 | 4.6 |

Leghe a base di nichel
indurite
Rm > 1000 N/mm²
[Inconel 718]



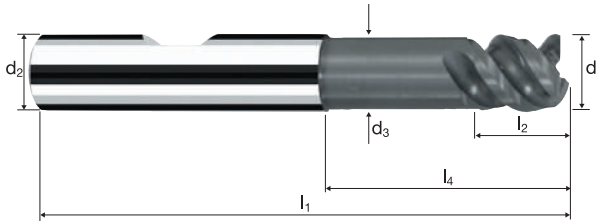
| | | | | | | | | |
|-------|---|----|-------|-------|--------|------|----|-----|
| 3.00 | 3 | 10 | 0.015 | 1.500 | 3.000 | 1060 | 50 | 0.2 |
| 4.00 | 3 | 10 | 0.020 | 2.000 | 4.000 | 795 | 50 | 0.4 |
| 5.00 | 3 | 10 | 0.025 | 2.500 | 5.000 | 635 | 50 | 0.6 |
| 6.00 | 3 | 10 | 0.030 | 3.000 | 6.000 | 530 | 50 | 0.9 |
| 8.00 | 3 | 10 | 0.035 | 4.000 | 8.000 | 400 | 40 | 1.3 |
| 10.00 | 3 | 10 | 0.045 | 5.000 | 10.000 | 320 | 45 | 2.1 |
| 12.00 | 3 | 10 | 0.050 | 6.000 | 12.000 | 265 | 40 | 2.9 |
| 16.00 | 3 | 10 | 0.060 | 4.000 | 16.000 | 200 | 35 | 2.3 |

Frese cilindriche SX (SX-3)

A taglienti lisci, esecuzione normale con scarico



HM λ 55°
MG10 γ 15°



Sgrossatura

Finitura



ToolSchool

ReTool®

Rm
< 850

Rm
850-1100

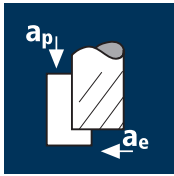
Inox
Stainless

Ti
Titanium

Nickel-Alloys
Tool Steel

| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | 45° | α | z | POLYCHROM |
|------------|----------------------|----------------------|----------------|----------------|----------------|----------------|----------------|------|------|---|-----------------------|
| | | | | | | | | | | | EUR |
| 180 | 3.00 | 6.00 | 2.80 | 57 | 4.00 | 14.00 | 20.63 | 0.10 | 4.5° | 3 | P5315 82.00 |
| 220 | 4.00 | 6.00 | 3.70 | 57 | 5.00 | 16.00 | 20.95 | 0.10 | 3.0° | 3 | P5215 82.00 |
| 260 | 5.00 | 6.00 | 4.60 | 57 | 6.00 | 18.00 | 21.27 | 0.15 | 1.5° | 3 | 82.00 |
| 300 | 6.00 | 6.00 | 5.50 | 57 | 7.00 | 19.34 | 20.00 | 0.15 | 0.0° | 3 | 82.00 |
| 391 | 8.00 | 8.00 | 7.40 | 63 | 9.00 | 25.29 | 26.00 | 0.15 | 0.0° | 3 | 102.00 |
| 450 | 10.00 | 10.00 | 9.20 | 72 | 11.00 | 30.20 | 31.00 | 0.20 | 0.0° | 3 | 139.00 |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 13.00 | 36.13 | 37.00 | 0.20 | 0.0° | 3 | 172.00 |
| 610 | 16.00 | 16.00 | 15.00 | 92 | 17.00 | 42.13 | 43.00 | 0.20 | 0.0° | 3 | 269.00 |
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Applicazione



Materiale

Acciaio
< 850 N/mm²



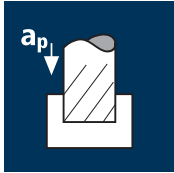
Acciaio
850 - 1100 N/mm²



Acciaio per lavorazione
a freddo (12% Cr)
fortemente legati
[1.2379]



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



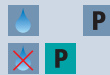
Acciaio
< 850 N/mm²



Acciaio
850 - 1100 N/mm²



Acciaio per lavorazione
a freddo (12% Cr)
fortemente legati
[1.2379]



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



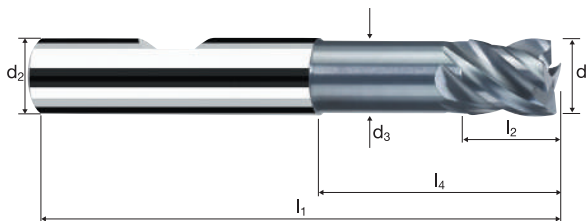
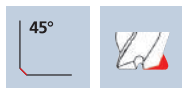
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 3.00 | 4 | 190 | 0.020 | 3.000 | 1.400 | 20160 | 1615 | 6.8 |
| 4.00 | 4 | 190 | 0.030 | 4.000 | 1.800 | 15120 | 1815 | 13.1 |
| 5.00 | 4 | 190 | 0.040 | 5.000 | 2.300 | 12095 | 1935 | 22.3 |
| 6.00 | 4 | 190 | 0.050 | 6.000 | 2.700 | 10080 | 2015 | 32.7 |
| 8.00 | 4 | 190 | 0.065 | 8.000 | 3.600 | 7560 | 1965 | 56.6 |
| 10.00 | 4 | 190 | 0.080 | 10.000 | 4.500 | 6050 | 1935 | 87.1 |
| 12.00 | 4 | 190 | 0.095 | 12.000 | 5.400 | 5040 | 1915 | 124.1 |
| 16.00 | 4 | 190 | 0.125 | 16.000 | 7.200 | 3780 | 1890 | 217.7 |
| 20.00 | 4 | 190 | 0.155 | 20.000 | 9.000 | 3025 | 1875 | 337.5 |
| 3.00 | 4 | 140 | 0.020 | 3.000 | 1.400 | 14855 | 1190 | 5.0 |
| 4.00 | 4 | 140 | 0.030 | 4.000 | 1.800 | 11140 | 1335 | 9.6 |
| 5.00 | 4 | 140 | 0.040 | 5.000 | 2.300 | 8915 | 1425 | 16.4 |
| 6.00 | 4 | 140 | 0.050 | 6.000 | 2.700 | 7425 | 1485 | 24.1 |
| 8.00 | 4 | 140 | 0.065 | 8.000 | 3.600 | 5570 | 1450 | 41.7 |
| 10.00 | 4 | 140 | 0.080 | 10.000 | 4.500 | 4455 | 1425 | 64.2 |
| 12.00 | 4 | 140 | 0.095 | 12.000 | 5.400 | 3715 | 1410 | 91.4 |
| 16.00 | 4 | 140 | 0.125 | 16.000 | 7.200 | 2785 | 1395 | 160.4 |
| 20.00 | 4 | 140 | 0.155 | 20.000 | 9.000 | 2230 | 1380 | 248.7 |
| 3.00 | 4 | 70 | 0.020 | 3.000 | 1.400 | 7425 | 595 | 2.5 |
| 4.00 | 4 | 70 | 0.030 | 4.000 | 1.800 | 5570 | 670 | 4.8 |
| 5.00 | 4 | 70 | 0.035 | 5.000 | 2.300 | 4455 | 625 | 7.2 |
| 6.00 | 4 | 70 | 0.045 | 6.000 | 2.700 | 3715 | 670 | 10.8 |
| 8.00 | 4 | 70 | 0.060 | 8.000 | 3.600 | 2785 | 670 | 19.3 |
| 10.00 | 4 | 70 | 0.070 | 10.000 | 4.500 | 2230 | 625 | 28.1 |
| 12.00 | 4 | 70 | 0.085 | 12.000 | 5.400 | 1855 | 630 | 40.9 |
| 16.00 | 4 | 70 | 0.110 | 16.000 | 7.200 | 1395 | 615 | 70.6 |
| 20.00 | 4 | 70 | 0.140 | 20.000 | 9.000 | 1115 | 625 | 112.3 |
| 3.00 | 4 | 90 | 0.015 | 3.000 | 1.400 | 9550 | 575 | 2.4 |
| 4.00 | 4 | 90 | 0.020 | 4.000 | 1.800 | 7160 | 575 | 4.1 |
| 5.00 | 4 | 90 | 0.025 | 5.000 | 2.300 | 5730 | 575 | 6.6 |
| 6.00 | 4 | 90 | 0.030 | 6.000 | 2.700 | 4775 | 575 | 9.3 |
| 8.00 | 4 | 90 | 0.040 | 8.000 | 3.600 | 3580 | 575 | 16.5 |
| 10.00 | 4 | 90 | 0.050 | 10.000 | 4.500 | 2865 | 575 | 25.8 |
| 12.00 | 4 | 90 | 0.060 | 12.000 | 5.400 | 2385 | 575 | 37.1 |
| 16.00 | 4 | 90 | 0.080 | 16.000 | 7.200 | 1790 | 575 | 66.0 |
| 20.00 | 4 | 90 | 0.100 | 20.000 | 9.000 | 1430 | 575 | 103.1 |
| 3.00 | 4 | 155 | 0.015 | 2.400 | 3.000 | 16445 | 985 | 7.1 |
| 4.00 | 4 | 155 | 0.020 | 3.200 | 4.000 | 12335 | 985 | 12.6 |
| 5.00 | 4 | 155 | 0.030 | 4.000 | 5.000 | 9870 | 1185 | 23.7 |
| 6.00 | 4 | 155 | 0.040 | 4.800 | 6.000 | 8225 | 1315 | 37.9 |
| 8.00 | 4 | 155 | 0.050 | 6.400 | 8.000 | 6165 | 1235 | 63.2 |
| 10.00 | 4 | 155 | 0.065 | 8.000 | 10.000 | 4935 | 1285 | 102.6 |
| 12.00 | 4 | 155 | 0.075 | 9.600 | 12.000 | 4110 | 1235 | 142.1 |
| 16.00 | 4 | 155 | 0.075 | 8.000 | 16.000 | 3085 | 925 | 118.4 |
| 20.00 | 4 | 155 | 0.095 | 10.000 | 20.000 | 2465 | 935 | 187.5 |
| 3.00 | 4 | 105 | 0.015 | 2.400 | 3.000 | 11140 | 670 | 4.8 |
| 4.00 | 4 | 105 | 0.020 | 3.200 | 4.000 | 8355 | 670 | 8.6 |
| 5.00 | 4 | 105 | 0.030 | 4.000 | 5.000 | 6685 | 800 | 16.0 |
| 6.00 | 4 | 105 | 0.040 | 4.800 | 6.000 | 5570 | 890 | 25.7 |
| 8.00 | 4 | 105 | 0.050 | 6.400 | 8.000 | 4180 | 835 | 42.8 |
| 10.00 | 4 | 105 | 0.065 | 8.000 | 10.000 | 3340 | 870 | 69.5 |
| 12.00 | 4 | 105 | 0.075 | 9.600 | 12.000 | 2785 | 835 | 96.3 |
| 16.00 | 4 | 105 | 0.075 | 8.000 | 16.000 | 2090 | 625 | 80.2 |
| 20.00 | 4 | 105 | 0.095 | 10.000 | 20.000 | 1670 | 635 | 127.0 |
| 3.00 | 4 | 55 | 0.015 | 2.400 | 3.000 | 5835 | 350 | 2.5 |
| 4.00 | 4 | 55 | 0.020 | 3.200 | 4.000 | 4375 | 350 | 4.5 |
| 5.00 | 4 | 55 | 0.030 | 4.000 | 5.000 | 3500 | 420 | 8.4 |
| 6.00 | 4 | 55 | 0.035 | 4.800 | 6.000 | 2920 | 410 | 11.8 |
| 8.00 | 4 | 55 | 0.045 | 6.400 | 8.000 | 2190 | 395 | 20.2 |
| 10.00 | 4 | 55 | 0.055 | 8.000 | 10.000 | 1750 | 385 | 30.8 |
| 12.00 | 4 | 55 | 0.060 | 9.600 | 12.000 | 1460 | 350 | 40.3 |
| 16.00 | 4 | 55 | 0.075 | 8.000 | 16.000 | 1095 | 330 | 42.0 |
| 20.00 | 4 | 55 | 0.095 | 10.000 | 20.000 | 875 | 335 | 66.5 |
| 3.00 | 4 | 75 | 0.015 | 2.400 | 3.000 | 7960 | 475 | 3.4 |
| 4.00 | 4 | 75 | 0.015 | 3.200 | 4.000 | 5970 | 360 | 4.6 |
| 5.00 | 4 | 75 | 0.025 | 4.000 | 5.000 | 4775 | 475 | 9.5 |
| 6.00 | 4 | 75 | 0.030 | 4.800 | 6.000 | 3980 | 475 | 13.8 |
| 8.00 | 4 | 75 | 0.040 | 6.400 | 8.000 | 2985 | 475 | 24.4 |
| 10.00 | 4 | 75 | 0.050 | 8.000 | 10.000 | 2385 | 475 | 38.2 |
| 12.00 | 4 | 75 | 0.050 | 9.600 | 12.000 | 1990 | 400 | 45.8 |
| 16.00 | 4 | 75 | 0.065 | 8.000 | 16.000 | 1490 | 390 | 49.7 |
| 20.00 | 4 | 75 | 0.080 | 10.000 | 20.000 | 1195 | 380 | 76.4 |

Frese cilindriche

A taglienti lisci, esecuzione normale con scarico



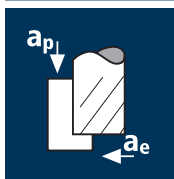
HM
MG10 λ 40°
 γ 0°



| | | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--|--|--|-------------------|----------------|--------------------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | | | | Inox Stainless | Ti Titanium | GG(G) Tool Steel Nickel-Alloys |
|-------------|----------------|-----------------|-----------------|--|--|--|-------------------|----------------|--------------------------------------|

| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | 45° | α | z | POLYCHROM | |
|--------------------------------------|----------------------|----------------------|----------------|----------------|----------------|----------------|----------------|------|------|---|-----------|--------|
| | | | | | | | | | | | | |
| Esempio: N° Ordine | | | | | | | | | | | | |
| Rivestimento Articolo Codice-Ø | | | | | | | | | | | | |
| P 5325 180 | | | | | | | | | | | | |
| | | | | | | | | | | | | P5325 |
| | | | | | | | | | | | | P5225 |
| | | | | | | | | | | | | EUR |
| 180 | 3.00 | 6.00 | 2.80 | 57 | 4.00 | 14.00 | 20.63 | 0.10 | 4.5° | 4 | | 78.00 |
| 220 | 4.00 | 6.00 | 3.70 | 57 | 5.00 | 16.00 | 20.95 | 0.10 | 3.0° | 4 | | 78.00 |
| 260 | 5.00 | 6.00 | 4.60 | 57 | 6.00 | 18.00 | 21.27 | 0.15 | 1.5° | 4 | | 78.00 |
| 300 | 6.00 | 6.00 | 5.50 | 57 | 7.00 | 19.34 | 20.00 | 0.15 | 0.0° | 4 | | 78.00 |
| 391 | 8.00 | 8.00 | 7.40 | 63 | 9.00 | 25.29 | 26.00 | 0.15 | 0.0° | 4 | | 97.00 |
| 450 | 10.00 | 10.00 | 9.20 | 72 | 11.00 | 30.20 | 31.00 | 0.20 | 0.0° | 4 | | 132.00 |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 13.00 | 36.13 | 37.00 | 0.20 | 0.0° | 4 | | 163.00 |
| 610 | 16.00 | 16.00 | 15.00 | 92 | 17.00 | 42.13 | 43.00 | 0.20 | 0.0° | 4 | | 255.00 |
| 682 | 20.00 | 20.00 | 19.00 | 104 | 21.00 | 52.13 | 53.00 | 0.20 | 0.0° | 4 | | 372.00 |

Applicazione

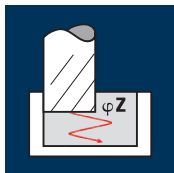


Materiale

Acciaio da
utensile temprato
52 - 56 HRC



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 3.00 | 4 | 60 | 0.009 | 3.000 | 1.800 | 6365 | 230 | 1.2 | 5° |
| 4.00 | 4 | 60 | 0.013 | 4.000 | 2.400 | 4775 | 250 | 2.4 | 5° |
| 5.00 | 4 | 60 | 0.017 | 5.000 | 3.000 | 3820 | 260 | 3.9 | 5° |
| 6.00 | 4 | 60 | 0.021 | 7.500 | 3.600 | 3185 | 265 | 7.2 | 5° |
| 8.00 | 4 | 60 | 0.028 | 10.000 | 4.800 | 2385 | 265 | 12.8 | 5° |
| 10.00 | 4 | 60 | 0.035 | 12.500 | 6.000 | 1910 | 265 | 20.1 | 5° |
| 12.00 | 4 | 60 | 0.042 | 15.000 | 7.200 | 1590 | 265 | 28.9 | 5° |
| 16.00 | 4 | 60 | 0.050 | 20.000 | 9.600 | 1195 | 240 | 45.8 | 5° |
| 20.00 | 4 | 60 | 0.060 | 25.000 | 12.000 | 955 | 230 | 68.8 | 5° |



Acciaio da
utensile temprato
> 60 HRC



| | | | | | | | | | |
|-------|---|----|-------|--------|--------|------|----|-----|----|
| 3.00 | 4 | 25 | 0.004 | 3.000 | 1.800 | 2655 | 40 | 0.2 | 3° |
| 4.00 | 4 | 25 | 0.006 | 4.000 | 2.400 | 1990 | 50 | 0.5 | 4° |
| 5.00 | 4 | 25 | 0.008 | 5.000 | 3.000 | 1590 | 50 | 0.8 | 5° |
| 6.00 | 4 | 25 | 0.009 | 6.000 | 3.600 | 1325 | 50 | 1.0 | 5° |
| 8.00 | 4 | 25 | 0.011 | 8.000 | 4.800 | 995 | 45 | 1.7 | 5° |
| 10.00 | 4 | 25 | 0.015 | 10.000 | 6.000 | 795 | 50 | 2.9 | 5° |
| 12.00 | 4 | 25 | 0.018 | 12.000 | 7.200 | 665 | 50 | 4.1 | 5° |
| 16.00 | 4 | 25 | 0.023 | 16.000 | 9.600 | 495 | 45 | 7.0 | 5° |
| 20.00 | 4 | 25 | 0.025 | 20.000 | 12.000 | 400 | 40 | 9.5 | 3° |

Acciaio rapido temprato
64 - 70 HRC



| | | | | | | | | | |
|-------|---|----|-------|--------|--------|------|----|-----|----|
| 3.00 | 4 | 15 | 0.005 | 2.250 | 0.450 | 1590 | 30 | 0.0 | 3° |
| 4.00 | 4 | 15 | 0.006 | 3.000 | 0.600 | 1195 | 30 | 0.1 | 4° |
| 5.00 | 4 | 15 | 0.008 | 3.750 | 0.750 | 955 | 30 | 0.1 | 5° |
| 6.00 | 4 | 15 | 0.006 | 4.500 | 3.600 | 795 | 20 | 0.3 | 5° |
| 8.00 | 4 | 15 | 0.008 | 6.000 | 4.800 | 595 | 20 | 0.6 | 5° |
| 10.00 | 4 | 15 | 0.010 | 7.500 | 6.000 | 475 | 20 | 0.9 | 5° |
| 12.00 | 4 | 15 | 0.012 | 9.000 | 7.200 | 400 | 20 | 1.2 | 5° |
| 16.00 | 4 | 15 | 0.016 | 12.000 | 9.600 | 300 | 20 | 2.2 | 5° |
| 20.00 | 4 | 15 | 0.020 | 15.000 | 12.000 | 240 | 20 | 3.4 | 3° |

Applicazione

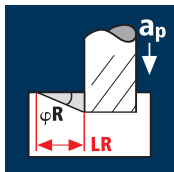


Materiale

Acciaio da
utensile temprato
52 - 56 HRC



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] | LR [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|---------|
| 3.00 | 4 | 50 | 0.010 | 3.000 | 3.000 | 5305 | 210 | 1.9 | 5° | 34.3 |
| 4.00 | 4 | 50 | 0.013 | 4.000 | 4.000 | 3980 | 205 | 3.3 | 5° | 45.7 |
| 5.00 | 4 | 50 | 0.017 | 5.000 | 5.000 | 3185 | 215 | 5.4 | 5° | 57.2 |
| 6.00 | 4 | 50 | 0.021 | 6.000 | 6.000 | 2655 | 225 | 8.0 | 5° | 68.6 |
| 8.00 | 4 | 50 | 0.028 | 8.000 | 8.000 | 1990 | 225 | 14.3 | 5° | 91.4 |
| 10.00 | 4 | 50 | 0.035 | 10.000 | 10.000 | 1590 | 225 | 22.3 | 5° | 114.3 |
| 12.00 | 4 | 50 | 0.042 | 12.000 | 12.000 | 1325 | 225 | 32.1 | 5° | 137.2 |
| 16.00 | 4 | 50 | 0.064 | 8.000 | 16.000 | 995 | 255 | 32.6 | 5° | 91.4 |
| 20.00 | 4 | 50 | 0.075 | 10.000 | 20.000 | 795 | 240 | 47.7 | 5° | 114.3 |



Acciaio da
utensile temprato
> 60 HRC



| | | | | | | | | | | |
|-------|---|----|-------|--------|--------|------|----|------|----|-------|
| 3.00 | 4 | 20 | 0.004 | 3.000 | 3.000 | 2120 | 35 | 0.3 | 3° | 57.2 |
| 4.00 | 4 | 20 | 0.006 | 4.000 | 4.000 | 1590 | 40 | 0.6 | 4° | 57.2 |
| 5.00 | 4 | 20 | 0.008 | 5.000 | 5.000 | 1275 | 40 | 1.0 | 5° | 57.2 |
| 6.00 | 4 | 20 | 0.009 | 6.000 | 6.000 | 1060 | 40 | 1.4 | 5° | 68.6 |
| 8.00 | 4 | 20 | 0.011 | 8.000 | 8.000 | 795 | 35 | 2.2 | 5° | 91.4 |
| 10.00 | 4 | 20 | 0.015 | 10.000 | 10.000 | 635 | 40 | 3.8 | 5° | 114.3 |
| 12.00 | 4 | 20 | 0.020 | 12.000 | 12.000 | 530 | 40 | 6.1 | 5° | 137.2 |
| 16.00 | 4 | 20 | 0.032 | 8.000 | 16.000 | 400 | 50 | 6.5 | 5° | 91.4 |
| 20.00 | 4 | 20 | 0.040 | 10.000 | 20.000 | 320 | 50 | 10.2 | 3° | 190.8 |

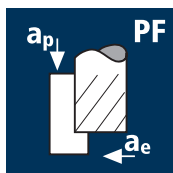
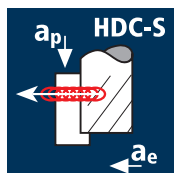
Acciaio rapido temprato
64 - 70 HRC



| | | | | | | | | | | |
|-------|---|----|-------|--------|--------|------|----|-----|----|-------|
| 3.00 | 4 | 10 | 0.003 | 1.500 | 3.000 | 1060 | 15 | 0.1 | 3° | 28.6 |
| 4.00 | 4 | 10 | 0.004 | 2.000 | 4.000 | 795 | 15 | 0.1 | 4° | 28.6 |
| 5.00 | 4 | 10 | 0.005 | 2.500 | 5.000 | 635 | 15 | 0.2 | 5° | 28.6 |
| 6.00 | 4 | 10 | 0.006 | 3.000 | 6.000 | 530 | 15 | 0.2 | 5° | 34.3 |
| 8.00 | 4 | 10 | 0.008 | 4.000 | 8.000 | 400 | 15 | 0.4 | 5° | 45.7 |
| 10.00 | 4 | 10 | 0.010 | 5.000 | 10.000 | 320 | 15 | 0.6 | 5° | 57.2 |
| 12.00 | 4 | 10 | 0.012 | 6.000 | 12.000 | 265 | 15 | 0.9 | 5° | 68.6 |
| 16.00 | 4 | 10 | 0.016 | 8.000 | 16.000 | 200 | 15 | 1.6 | 5° | 91.4 |
| 20.00 | 4 | 10 | 0.020 | 10.000 | 20.000 | 160 | 15 | 2.5 | 3° | 190.8 |



Dati di applicazione
precisi per ulteriori
applicazioni e materiali
si trovano nel
calcolatore dei
parametri di taglio
ToolExpert 2.0

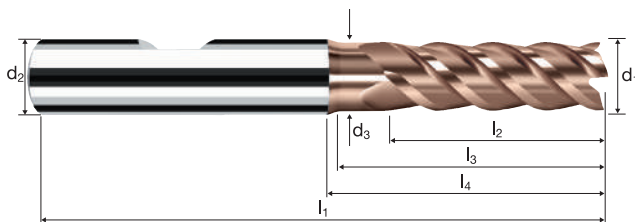
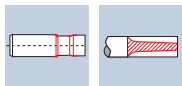


Frese cilindriche HX (HX-NVS)



A taglienti lisci, esecuzione medio-lunga con scarico corto
Geometria frontale per fresature in penetrazione ad alto rendimento

HM λ 45°
XA γ -10°



Sgrossatura HPC Sgrossatura HDC Finitura

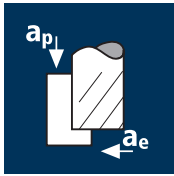


ReTool®

| | | | | | | | | | | |
|--|--|--|--|--------------|--------------|-------------|--|--|--|-----|
| | | | | HRC 48-56 | HRC 56-60 | HRC > 60 | | | | HSS |
|--|--|--|--|--------------|--------------|-------------|--|--|--|-----|

| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r | α | z | Esempio: N° Ordine | | DURO-Si |
|-----------|----------------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------|------|---|-----------------------|------------------|-----------------|
| | | | | | | | | | | | Rivestimento H | Articolo 8614 | Codice-Ø 180 |
| 180 | 3.00 | 6.00 | 2.80 | 63 | 11.00 | 18.00 | 24.37 | 0.100 | 4.5° | 4 | | | H8614 |
| 220 | 4.00 | 6.00 | 3.70 | 63 | 13.00 | 22.00 | 26.82 | 0.100 | 3.5° | 4 | | | H8514 |
| 260 | 5.00 | 6.00 | 4.60 | 63 | 16.00 | 24.00 | 27.27 | 0.100 | 1.5° | 4 | | | EUR |
| 300 | 6.00 | 6.00 | 5.50 | 63 | 21.00 | 25.34 | 26.00 | 0.150 | 0.0° | 4 | | | 110.00 |
| 391 | 8.00 | 8.00 | 7.40 | 72 | 31.00 | 34.79 | 35.50 | 0.150 | 0.0° | 4 | | | 110.00 |
| 450 | 10.00 | 10.00 | 9.20 | 84 | 37.00 | 42.20 | 43.00 | 0.200 | 0.0° | 4 | | | 137.00 |
| 501 | 12.00 | 12.00 | 11.00 | 97 | 44.00 | 50.13 | 51.00 | 0.200 | 0.0° | 4 | | | 187.00 |
| 610 | 16.00 | 16.00 | 15.00 | 108 | 53.00 | 58.13 | 59.00 | 0.200 | 0.0° | 4 | | | 231.00 |
| 682 | 20.00 | 20.00 | 19.00 | 122 | 62.00 | 70.13 | 71.00 | 0.200 | 0.0° | 4 | | | 361.00 |
| | | | | | | | | | | | | | 527.00 |
| | | | | | | | | | | | | | |
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Applicazione



Materiale

Acciaio
1100 - 1300 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 4.00 | 4 | 115 | 0.025 | 7.200 | 0.800 | 9150 | 915 | 5.3 |
| 5.00 | 4 | 115 | 0.035 | 9.000 | 1.000 | 7320 | 1025 | 9.2 |
| 6.00 | 4 | 115 | 0.040 | 10.800 | 1.200 | 6100 | 975 | 12.7 |
| 8.00 | 4 | 115 | 0.055 | 14.400 | 1.600 | 4575 | 1005 | 23.2 |
| 10.00 | 4 | 115 | 0.065 | 18.000 | 2.000 | 3660 | 950 | 34.3 |
| 12.00 | 4 | 115 | 0.080 | 21.600 | 2.400 | 3050 | 975 | 50.6 |
| 16.00 | 4 | 115 | 0.090 | 28.800 | 3.200 | 2290 | 825 | 75.9 |
| 20.00 | 4 | 115 | 0.110 | 36.000 | 4.000 | 1830 | 805 | 116.0 |

Acciaio
1300 - 1500 N/mm²



| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 4.00 | 4 | 80 | 0.025 | 7.200 | 0.800 | 6365 | 635 | 3.7 |
| 5.00 | 4 | 80 | 0.030 | 9.000 | 1.000 | 5095 | 610 | 5.5 |
| 6.00 | 4 | 80 | 0.035 | 10.800 | 1.200 | 4245 | 595 | 7.7 |
| 8.00 | 4 | 80 | 0.045 | 14.400 | 1.600 | 3185 | 575 | 13.2 |
| 10.00 | 4 | 80 | 0.060 | 18.000 | 2.000 | 2545 | 610 | 22.0 |
| 12.00 | 4 | 80 | 0.070 | 21.600 | 2.400 | 2120 | 595 | 30.8 |
| 16.00 | 4 | 80 | 0.080 | 28.800 | 3.200 | 1590 | 510 | 46.9 |
| 20.00 | 4 | 80 | 0.100 | 36.000 | 4.000 | 1275 | 510 | 73.3 |

Acciaio da
utensile temprato
52 - 56 HRC

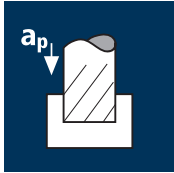


| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 4.00 | 4 | 50 | 0.015 | 7.200 | 0.800 | 3980 | 240 | 1.4 |
| 5.00 | 4 | 50 | 0.020 | 9.000 | 1.000 | 3185 | 255 | 2.3 |
| 6.00 | 4 | 50 | 0.020 | 10.800 | 1.200 | 2655 | 210 | 2.8 |
| 8.00 | 4 | 50 | 0.025 | 14.400 | 1.600 | 1990 | 200 | 4.6 |
| 10.00 | 4 | 50 | 0.035 | 18.000 | 2.000 | 1590 | 225 | 8.0 |
| 12.00 | 4 | 50 | 0.040 | 21.600 | 2.400 | 1325 | 210 | 11.0 |
| 16.00 | 4 | 50 | 0.050 | 28.800 | 3.200 | 995 | 200 | 18.3 |
| 20.00 | 4 | 50 | 0.060 | 36.000 | 4.000 | 795 | 190 | 27.5 |

Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 4.00 | 4 | 60 | 0.015 | 7.200 | 0.800 | 4775 | 285 | 1.7 |
| 5.00 | 4 | 60 | 0.020 | 9.000 | 1.000 | 3820 | 305 | 2.8 |
| 6.00 | 4 | 60 | 0.020 | 10.800 | 1.200 | 3185 | 255 | 3.3 |
| 8.00 | 4 | 60 | 0.025 | 14.400 | 1.600 | 2385 | 240 | 5.5 |
| 10.00 | 4 | 60 | 0.035 | 18.000 | 2.000 | 1910 | 265 | 9.6 |
| 12.00 | 4 | 60 | 0.040 | 21.600 | 2.400 | 1590 | 255 | 13.2 |
| 16.00 | 4 | 60 | 0.050 | 28.800 | 3.200 | 1195 | 240 | 22.0 |
| 20.00 | 4 | 60 | 0.060 | 36.000 | 4.000 | 955 | 230 | 33.0 |



Acciaio
1100 - 1300 N/mm²



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|-------|
| 4.00 | 4 | 90 | 0.015 | 6.000 | 4.000 | 7160 | 430 | 10.3 |
| 5.00 | 4 | 90 | 0.015 | 7.500 | 5.000 | 5730 | 345 | 12.9 |
| 6.00 | 4 | 90 | 0.020 | 9.000 | 6.000 | 4775 | 380 | 20.6 |
| 8.00 | 4 | 90 | 0.025 | 12.000 | 8.000 | 3580 | 360 | 34.4 |
| 10.00 | 4 | 90 | 0.035 | 15.000 | 10.000 | 2865 | 400 | 60.2 |
| 12.00 | 4 | 90 | 0.040 | 18.000 | 12.000 | 2385 | 380 | 82.5 |
| 16.00 | 4 | 90 | 0.050 | 24.000 | 16.000 | 1790 | 360 | 137.5 |
| 20.00 | 4 | 90 | 0.060 | 30.000 | 20.000 | 1430 | 345 | 206.3 |

Acciaio
1300 - 1500 N/mm²



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|-------|
| 4.00 | 4 | 65 | 0.010 | 6.000 | 4.000 | 5175 | 205 | 5.0 |
| 5.00 | 4 | 65 | 0.015 | 7.500 | 5.000 | 4140 | 250 | 9.3 |
| 6.00 | 4 | 65 | 0.020 | 9.000 | 6.000 | 3450 | 275 | 14.9 |
| 8.00 | 4 | 65 | 0.025 | 12.000 | 8.000 | 2585 | 260 | 24.8 |
| 10.00 | 4 | 65 | 0.030 | 15.000 | 10.000 | 2070 | 250 | 37.2 |
| 12.00 | 4 | 65 | 0.035 | 18.000 | 12.000 | 1725 | 240 | 52.1 |
| 16.00 | 4 | 65 | 0.045 | 24.000 | 16.000 | 1295 | 235 | 89.4 |
| 20.00 | 4 | 65 | 0.055 | 30.000 | 20.000 | 1035 | 230 | 136.6 |

Acciaio da
utensile temprato
52 - 56 HRC



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 4.00 | 4 | 40 | 0.010 | 4.000 | 4.000 | 3185 | 125 | 2.0 |
| 5.00 | 4 | 40 | 0.010 | 5.000 | 5.000 | 2545 | 100 | 2.5 |
| 6.00 | 4 | 40 | 0.015 | 6.000 | 6.000 | 2120 | 125 | 4.6 |
| 8.00 | 4 | 40 | 0.020 | 8.000 | 8.000 | 1590 | 125 | 8.1 |
| 10.00 | 4 | 40 | 0.025 | 10.000 | 10.000 | 1275 | 125 | 12.7 |
| 12.00 | 4 | 40 | 0.025 | 12.000 | 12.000 | 1060 | 105 | 15.3 |
| 16.00 | 4 | 40 | 0.030 | 16.000 | 16.000 | 795 | 95 | 24.4 |
| 20.00 | 4 | 40 | 0.040 | 20.000 | 20.000 | 635 | 100 | 40.7 |

Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|-------|
| 4.00 | 4 | 50 | 0.010 | 6.000 | 4.000 | 3980 | 160 | 3.8 |
| 5.00 | 4 | 50 | 0.015 | 7.500 | 5.000 | 3185 | 190 | 7.2 |
| 6.00 | 4 | 50 | 0.020 | 9.000 | 6.000 | 2655 | 210 | 11.5 |
| 8.00 | 4 | 50 | 0.025 | 12.000 | 8.000 | 1990 | 200 | 19.1 |
| 10.00 | 4 | 50 | 0.030 | 15.000 | 10.000 | 1590 | 190 | 28.6 |
| 12.00 | 4 | 50 | 0.035 | 18.000 | 12.000 | 1325 | 185 | 40.1 |
| 16.00 | 4 | 50 | 0.045 | 24.000 | 16.000 | 995 | 180 | 68.8 |
| 20.00 | 4 | 50 | 0.055 | 30.000 | 20.000 | 795 | 175 | 105.0 |

Frese cilindriche NX (NX-NVD)

A taglienti lisci, esecuzione medio-lunga



HM
MG10


λ

45°


γ


-20°

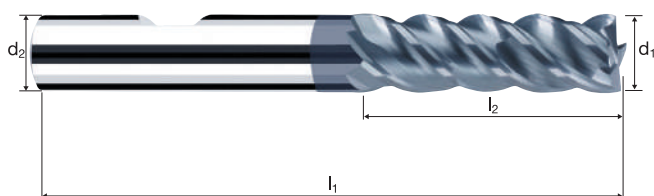
45°




Vario









Sgrossatura HPC



Sgrossatura HDC



Finitura

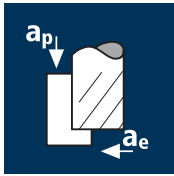




| | | | | | | | |
|-----------|-----------|-----------|------------|------------|--|-----------|--------------|
| Rm | Rm | Rm | HRC | HRC | | Ti | GG(G) |
| 850-1100 | 1100-1300 | 1300-1500 | 48-56 | 56-60 | | Titanium | Tool Steel |

| | | | | | | | | | | POLYCHROM |
|--|-------------------|-------------------|----------------|----------------|----------------|------|------|---|--|-----------|
| Esempio: Rivestimento Articolo Codice-ø | | | | | | | | | | |
| N° Ordine | | | | | | | | | | |
| P 15323 220 | | | | | | | | | | |
| Ø Code | d ₁ e8 | d ₂ h6 | l ₁ | l ₂ | l ₄ | 45° | α | z | | |
| 220 | 4.00 | 6.00 | 63 | 13.00 | 19.59 | 0.10 | 3.5° | 4 | | 89.00 |
| 260 | 5.00 | 6.00 | 63 | 16.00 | 20.72 | 0.15 | 1.5° | 4 | | 89.00 |
| 300 | 6.00 | 6.00 | 63 | 21.00 | - | 0.15 | 0.0° | 4 | | 89.00 |
| 391 | 8.00 | 8.00 | 72 | 31.00 | - | 0.15 | 0.0° | 4 | | 111.00 |
| 450 | 10.00 | 10.00 | 84 | 37.00 | - | 0.20 | 0.0° | 4 | | 151.00 |
| 501 | 12.00 | 12.00 | 97 | 44.00 | - | 0.20 | 0.0° | 4 | | 187.00 |
| 610 | 16.00 | 16.00 | 108 | 53.00 | - | 0.20 | 0.0° | 4 | | 292.00 |
| 682 | 20.00 | 20.00 | 122 | 62.00 | - | 0.20 | 0.0° | 4 | | 427.00 |
| | | | | | | | | | | |
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Applicazione



Materiale

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 3.00 | 4 | 86 | 0.013 | 3.750 | 1.200 | 9125 | 475 | 2.1 |
| 4.00 | 4 | 86 | 0.017 | 5.000 | 1.600 | 6845 | 465 | 3.7 |
| 5.00 | 4 | 72 | 0.020 | 6.250 | 3.250 | 4585 | 370 | 7.5 |
| 6.00 | 4 | 72 | 0.024 | 9.000 | 3.900 | 3820 | 370 | 13.0 |
| 8.00 | 4 | 72 | 0.032 | 12.000 | 5.200 | 2865 | 370 | 23.2 |
| 10.00 | 4 | 72 | 0.041 | 15.000 | 6.500 | 2290 | 370 | 36.2 |
| 12.00 | 4 | 72 | 0.049 | 18.000 | 7.800 | 1910 | 370 | 52.1 |
| 16.00 | 4 | 72 | 0.058 | 20.000 | 10.400 | 1430 | 330 | 68.6 |
| 20.00 | 4 | 72 | 0.072 | 25.000 | 13.000 | 1145 | 330 | 107.3 |

Inox medium
[Cr-Ni-Mo+/1.4539]
Acciaio duplex
[17-4 PH]



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 3.00 | 4 | 53 | 0.013 | 3.750 | 1.200 | 5625 | 290 | 1.3 |
| 4.00 | 4 | 53 | 0.017 | 5.000 | 1.600 | 4220 | 285 | 2.3 |
| 5.00 | 4 | 53 | 0.020 | 6.250 | 3.250 | 3375 | 275 | 5.6 |
| 6.00 | 4 | 53 | 0.024 | 9.000 | 3.900 | 2810 | 275 | 9.6 |
| 8.00 | 4 | 53 | 0.032 | 12.000 | 5.200 | 2110 | 275 | 17.1 |
| 10.00 | 4 | 53 | 0.041 | 15.000 | 6.500 | 1685 | 275 | 26.6 |
| 12.00 | 4 | 53 | 0.049 | 18.000 | 7.800 | 1405 | 275 | 38.4 |
| 16.00 | 4 | 53 | 0.058 | 20.000 | 10.400 | 1055 | 245 | 50.5 |
| 20.00 | 4 | 53 | 0.072 | 25.000 | 13.000 | 845 | 245 | 79.0 |

Inox difficile
[Cr-Ni-Mo+/1.4529]
Acciaio resistente al calore
[1.4841]

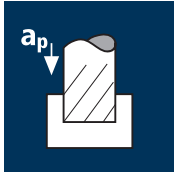


| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 3.00 | 4 | 44 | 0.012 | 3.750 | 1.200 | 4670 | 215 | 1.0 |
| 4.00 | 4 | 44 | 0.015 | 5.000 | 1.600 | 3500 | 210 | 1.7 |
| 5.00 | 4 | 40 | 0.018 | 6.250 | 3.250 | 2545 | 185 | 3.7 |
| 6.00 | 4 | 40 | 0.022 | 9.000 | 3.900 | 2120 | 180 | 6.4 |
| 8.00 | 4 | 40 | 0.029 | 12.000 | 5.200 | 1590 | 185 | 11.5 |
| 10.00 | 4 | 40 | 0.036 | 15.000 | 6.500 | 1275 | 185 | 17.9 |
| 12.00 | 4 | 40 | 0.043 | 18.000 | 7.800 | 1060 | 180 | 25.6 |
| 16.00 | 4 | 40 | 0.050 | 20.000 | 10.400 | 795 | 160 | 33.1 |
| 20.00 | 4 | 40 | 0.061 | 25.000 | 13.000 | 635 | 155 | 50.5 |

Inox martensitic
C < 0.3%
[Cr/1.4021]



| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|-----|-------|
| 3.00 | 4 | 110 | 0.017 | 3.750 | 1.200 | 11670 | 780 | 3.5 |
| 4.00 | 4 | 110 | 0.023 | 5.000 | 1.600 | 8755 | 790 | 6.3 |
| 5.00 | 4 | 92 | 0.027 | 6.250 | 3.250 | 5855 | 635 | 12.8 |
| 6.00 | 4 | 92 | 0.032 | 9.000 | 3.900 | 4880 | 635 | 22.3 |
| 8.00 | 4 | 92 | 0.043 | 12.000 | 5.200 | 3660 | 630 | 39.3 |
| 10.00 | 4 | 92 | 0.054 | 15.000 | 6.500 | 2930 | 635 | 61.7 |
| 12.00 | 4 | 92 | 0.065 | 18.000 | 7.800 | 2440 | 635 | 89.1 |
| 16.00 | 4 | 92 | 0.079 | 20.000 | 10.400 | 1830 | 580 | 120.3 |
| 20.00 | 4 | 92 | 0.097 | 25.000 | 13.000 | 1465 | 570 | 184.6 |



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|-------|
| 3.00 | 4 | 63 | 0.007 | 2.250 | 3.000 | 6685 | 175 | 1.2 |
| 4.00 | 4 | 63 | 0.009 | 3.000 | 4.000 | 5015 | 170 | 2.0 |
| 5.00 | 4 | 63 | 0.013 | 6.250 | 5.000 | 4010 | 210 | 6.6 |
| 6.00 | 4 | 63 | 0.019 | 9.000 | 6.000 | 3340 | 260 | 14.0 |
| 8.00 | 4 | 63 | 0.026 | 12.000 | 8.000 | 2505 | 260 | 24.9 |
| 10.00 | 4 | 63 | 0.032 | 15.000 | 10.000 | 2005 | 260 | 39.0 |
| 12.00 | 4 | 63 | 0.039 | 18.000 | 12.000 | 1670 | 260 | 56.1 |
| 16.00 | 4 | 63 | 0.046 | 20.000 | 16.000 | 1255 | 230 | 73.9 |
| 20.00 | 4 | 63 | 0.058 | 25.000 | 20.000 | 1005 | 230 | 115.5 |

Inox medium
[Cr-Ni-Mo+/1.4539]
Acciaio duplex
[17-4 PH]



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 3.00 | 4 | 42 | 0.007 | 2.250 | 3.000 | 4455 | 115 | 0.8 |
| 4.00 | 4 | 42 | 0.009 | 3.000 | 4.000 | 3340 | 115 | 1.4 |
| 5.00 | 4 | 46 | 0.013 | 6.250 | 5.000 | 2930 | 155 | 4.8 |
| 6.00 | 4 | 46 | 0.019 | 9.000 | 6.000 | 2440 | 190 | 10.2 |
| 8.00 | 4 | 46 | 0.026 | 12.000 | 8.000 | 1830 | 190 | 18.2 |
| 10.00 | 4 | 46 | 0.032 | 15.000 | 10.000 | 1465 | 190 | 28.5 |
| 12.00 | 4 | 46 | 0.039 | 18.000 | 12.000 | 1220 | 190 | 41.0 |
| 16.00 | 4 | 46 | 0.046 | 20.000 | 16.000 | 915 | 170 | 54.0 |
| 20.00 | 4 | 46 | 0.058 | 25.000 | 20.000 | 730 | 170 | 84.3 |

Inox difficile
[Cr-Ni-Mo+/1.4529]
Acciaio resistente al calore
[1.4841]



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 3.00 | 4 | 35 | 0.006 | 2.250 | 3.000 | 3715 | 85 | 0.6 |
| 4.00 | 4 | 35 | 0.007 | 3.000 | 4.000 | 2785 | 85 | 1.0 |
| 5.00 | 4 | 35 | 0.012 | 6.250 | 5.000 | 2230 | 105 | 3.3 |
| 6.00 | 4 | 35 | 0.017 | 9.000 | 6.000 | 1855 | 130 | 6.9 |
| 8.00 | 4 | 35 | 0.023 | 12.000 | 8.000 | 1395 | 130 | 12.4 |
| 10.00 | 4 | 35 | 0.029 | 15.000 | 10.000 | 1115 | 130 | 19.3 |
| 12.00 | 4 | 35 | 0.034 | 18.000 | 12.000 | 930 | 130 | 27.6 |
| 16.00 | 4 | 35 | 0.040 | 20.000 | 16.000 | 695 | 110 | 35.7 |
| 20.00 | 4 | 35 | 0.049 | 25.000 | 20.000 | 555 | 110 | 54.4 |

Inox martensitic
C < 0.3%
[Cr/1.4021]



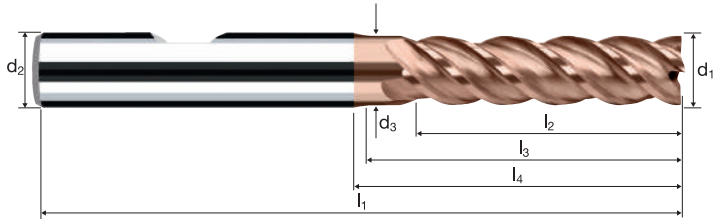
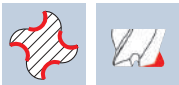
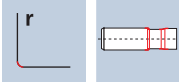
| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|-------|
| 3.00 | 4 | 81 | 0.007 | 2.250 | 3.000 | 8595 | 230 | 1.6 |
| 4.00 | 4 | 81 | 0.009 | 3.000 | 4.000 | 6445 | 230 | 2.8 |
| 5.00 | 4 | 81 | 0.014 | 5.000 | 5.000 | 5155 | 280 | 7.0 |
| 6.00 | 4 | 81 | 0.020 | 7.500 | 6.000 | 4295 | 335 | 15.1 |
| 8.00 | 4 | 81 | 0.026 | 10.000 | 8.000 | 3225 | 335 | 26.6 |
| 10.00 | 4 | 81 | 0.032 | 12.500 | 10.000 | 2580 | 335 | 41.8 |
| 12.00 | 4 | 81 | 0.039 | 15.000 | 12.000 | 2150 | 335 | 60.3 |
| 16.00 | 4 | 81 | 0.047 | 16.000 | 16.000 | 1610 | 305 | 78.2 |
| 20.00 | 4 | 81 | 0.058 | 20.000 | 20.000 | 1290 | 300 | 120.0 |

Frese cilindriche SX

A taglienti lisci, esecuzione medio-lunga con scarico corto



HM
MG10 λ 43°
 γ 3°



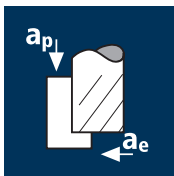
Sgrossatura HPC Sgrossatura HDC Finitura



| | | | | | | | | | | | |
|-------------|--|--|--|--|--|--|--|--|-------------------|----------------|--|
| Rm < 850 | | | | | | | | | Inox Stainless | Ti Titanium | Nickel-Alloys Mangan-Steels Tool Steel |
|-------------|--|--|--|--|--|--|--|--|-------------------|----------------|--|

| Esempio: N° Ordine | | | | | | | | | | | Rivestimento | | Articolo | | Codice-Ø | | | | | | DURO-Si |
|-----------------------|----------------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------|------|---|--------------|--|----------|--|----------|--|--|--|--|--|---------|
| | | | | | | | | | | | H | | 8616 | | 180 | | | | | | H8616 |
| | | | | | | | | | | | | | | | | | | | | | H8516 |
| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r | α | z | | | | | EUR | | | | | | |
| 180 | 3.00 | 6.00 | 2.80 | 63 | 11.00 | 18.00 | 24.37 | 0.050 | 4.5° | 4 | | | | | 93.00 | | | | | | |
| 220 | 4.00 | 6.00 | 3.70 | 63 | 13.00 | 22.00 | 26.82 | 0.100 | 3.5° | 4 | | | | | 93.00 | | | | | | |
| 260 | 5.00 | 6.00 | 4.60 | 63 | 16.00 | 24.00 | 27.27 | 0.100 | 1.5° | 4 | | | | | 93.00 | | | | | | |
| 300 | 6.00 | 6.00 | 5.50 | 63 | 21.00 | 25.34 | 26.00 | 0.150 | 0.0° | 4 | | | | | 93.00 | | | | | | |
| 391 | 8.00 | 8.00 | 7.40 | 72 | 31.00 | 34.79 | 35.50 | 0.150 | 0.0° | 4 | | | | | 116.00 | | | | | | |
| 450 | 10.00 | 10.00 | 9.20 | 84 | 37.00 | 42.20 | 43.00 | 0.200 | 0.0° | 4 | | | | | 157.00 | | | | | | |
| 501 | 12.00 | 12.00 | 11.00 | 97 | 44.00 | 50.13 | 51.00 | 0.200 | 0.0° | 4 | | | | | 194.00 | | | | | | |
| 610 | 16.00 | 16.00 | 15.00 | 108 | 53.00 | 58.13 | 59.00 | 0.200 | 0.0° | 4 | | | | | 304.00 | | | | | | |
| 682 | 20.00 | 20.00 | 19.00 | 122 | 62.00 | 70.13 | 71.00 | 0.250 | 0.0° | 4 | | | | | 444.00 | | | | | | |
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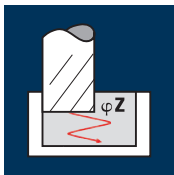
Applicazione



Materiale

Acciaio
850 - 1100 N/mm²

| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 4.00 | 4 | 135 | 0.026 | 8.000 | 1.200 | 10745 | 1115 | 10.7 | 12° |
| 5.00 | 4 | 135 | 0.030 | 10.000 | 1.500 | 8595 | 1030 | 15.5 | 12° |
| 6.00 | 4 | 135 | 0.034 | 12.000 | 1.800 | 7160 | 975 | 21.0 | 12° |
| 8.00 | 4 | 135 | 0.043 | 16.000 | 2.400 | 5370 | 925 | 35.5 | 12° |
| 10.00 | 4 | 135 | 0.055 | 20.000 | 3.000 | 4295 | 945 | 56.7 | 12° |
| 12.00 | 4 | 135 | 0.064 | 24.000 | 3.600 | 3580 | 915 | 79.2 | 12° |
| 16.00 | 4 | 135 | 0.072 | 25.600 | 4.800 | 2685 | 775 | 95.0 | 12° |
| 20.00 | 4 | 135 | 0.085 | 32.000 | 6.000 | 2150 | 730 | 140.3 | 12° |



Acciaio
1100 - 1300 N/mm²

| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 4.00 | 4 | 105 | 0.021 | 8.000 | 1.200 | 8355 | 700 | 6.7 | 12° |
| 5.00 | 4 | 105 | 0.026 | 10.000 | 1.500 | 6685 | 695 | 10.4 | 12° |
| 6.00 | 4 | 105 | 0.030 | 12.000 | 1.800 | 5570 | 670 | 14.4 | 12° |
| 8.00 | 4 | 105 | 0.038 | 16.000 | 2.400 | 4180 | 635 | 24.4 | 12° |
| 10.00 | 4 | 105 | 0.047 | 20.000 | 3.000 | 3340 | 630 | 37.7 | 12° |
| 12.00 | 4 | 105 | 0.055 | 24.000 | 3.600 | 2785 | 615 | 52.9 | 12° |
| 16.00 | 4 | 105 | 0.064 | 25.600 | 4.800 | 2090 | 535 | 65.7 | 12° |
| 20.00 | 4 | 105 | 0.077 | 32.000 | 6.000 | 1670 | 515 | 98.8 | 12° |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 4.00 | 4 | 80 | 0.017 | 8.000 | 1.200 | 6365 | 435 | 4.2 | 8° |
| 5.00 | 4 | 80 | 0.021 | 10.000 | 1.500 | 5095 | 430 | 6.4 | 8° |
| 6.00 | 4 | 80 | 0.026 | 12.000 | 1.800 | 4245 | 440 | 9.5 | 8° |
| 8.00 | 4 | 80 | 0.030 | 16.000 | 2.400 | 3185 | 380 | 14.7 | 8° |
| 10.00 | 4 | 80 | 0.038 | 20.000 | 3.000 | 2545 | 385 | 23.2 | 8° |
| 12.00 | 4 | 80 | 0.047 | 24.000 | 3.600 | 2120 | 400 | 34.5 | 8° |
| 16.00 | 4 | 80 | 0.055 | 25.600 | 4.800 | 1590 | 350 | 43.0 | 8° |
| 20.00 | 4 | 80 | 0.068 | 32.000 | 6.000 | 1275 | 345 | 66.5 | 8° |

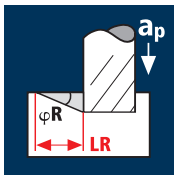
Applicazione



Materiale

Acciaio
850 - 1100 N/mm²

| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] | LR [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|---------|
| 4.00 | 4 | 110 | 0.017 | 6.000 | 4.000 | 8755 | 595 | 14.3 | 12° | 28.2 |
| 5.00 | 4 | 110 | 0.020 | 7.500 | 5.000 | 7005 | 560 | 21.0 | 12° | 35.3 |
| 6.00 | 4 | 110 | 0.022 | 9.000 | 6.000 | 5835 | 515 | 27.7 | 12° | 42.3 |
| 8.00 | 4 | 110 | 0.028 | 12.000 | 8.000 | 4375 | 490 | 47.1 | 12° | 56.5 |
| 10.00 | 4 | 110 | 0.036 | 15.000 | 10.000 | 3500 | 505 | 75.6 | 12° | 70.6 |
| 12.00 | 4 | 110 | 0.042 | 18.000 | 12.000 | 2920 | 490 | 105.9 | 12° | 84.7 |
| 16.00 | 4 | 110 | 0.047 | 24.000 | 16.000 | 2190 | 410 | 158.0 | 12° | 112.9 |
| 20.00 | 4 | 110 | 0.055 | 30.000 | 20.000 | 1750 | 385 | 231.1 | 12° | 141.1 |



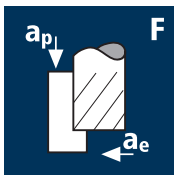
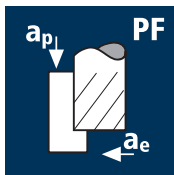
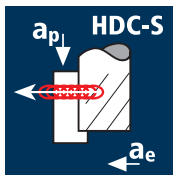
Acciaio
1100 - 1300 N/mm²

| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] | LR [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|---------|
| 4.00 | 4 | 85 | 0.014 | 6.000 | 4.000 | 6765 | 380 | 9.1 | 12° | 28.2 |
| 5.00 | 4 | 85 | 0.017 | 7.500 | 5.000 | 5410 | 370 | 13.8 | 12° | 35.3 |
| 6.00 | 4 | 85 | 0.020 | 9.000 | 6.000 | 4510 | 360 | 19.5 | 12° | 42.3 |
| 8.00 | 4 | 85 | 0.025 | 12.000 | 8.000 | 3380 | 340 | 32.5 | 12° | 56.5 |
| 10.00 | 4 | 85 | 0.031 | 15.000 | 10.000 | 2705 | 335 | 50.3 | 12° | 70.6 |
| 12.00 | 4 | 85 | 0.036 | 18.000 | 12.000 | 2255 | 325 | 70.1 | 12° | 84.7 |
| 16.00 | 4 | 85 | 0.042 | 24.000 | 16.000 | 1690 | 285 | 109.1 | 12° | 112.9 |
| 20.00 | 4 | 85 | 0.050 | 30.000 | 20.000 | 1355 | 270 | 162.3 | 12° | 141.1 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] | LR [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|---------|
| 4.00 | 4 | 65 | 0.011 | 6.000 | 4.000 | 5175 | 230 | 5.5 | 12° | 28.2 |
| 5.00 | 4 | 65 | 0.014 | 7.500 | 5.000 | 4140 | 230 | 8.7 | 12° | 35.3 |
| 6.00 | 4 | 65 | 0.017 | 9.000 | 6.000 | 3450 | 235 | 12.7 | 12° | 42.3 |
| 8.00 | 4 | 65 | 0.020 | 12.000 | 8.000 | 2585 | 205 | 19.9 | 12° | 56.5 |
| 10.00 | 4 | 65 | 0.025 | 15.000 | 10.000 | 2070 | 205 | 31.0 | 12° | 70.6 |
| 12.00 | 4 | 65 | 0.031 | 18.000 | 12.000 | 1725 | 215 | 46.2 | 12° | 84.7 |
| 16.00 | 4 | 65 | 0.036 | 24.000 | 16.000 | 1295 | 185 | 71.5 | 12° | 112.9 |
| 20.00 | 4 | 65 | 0.044 | 30.000 | 20.000 | 1035 | 180 | 109.2 | 12° | 141.1 |

Cliccare qui per accedere al **ToolExpert MFC**. Veloce, semplice, affidabile

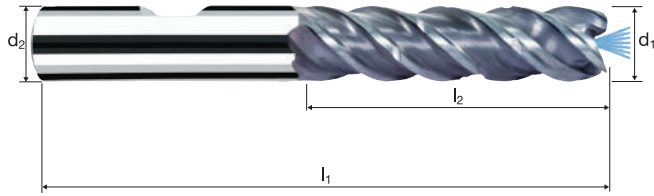
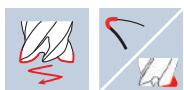
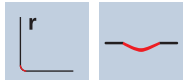


Frese cilindriche MFC



A taglienti lisci con rompitruciolo, esecuzione medio-lunga
Geometria frontale per fresature in penetrazione ad alto rendimento
con canale di raffreddamento/aria centrale

HM λ 45°
MG10 γ 10°



Sgrossatura HPC Sgrossatura HDC Finitura

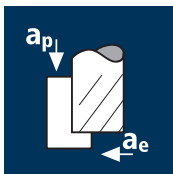


| | | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--------------|--|--|-------------------|----------------|---------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | | | Inox Stainless | Ti Titanium | GG(G) Tool Steel |
|-------------|----------------|-----------------|-----------------|--------------|--|--|-------------------|----------------|---------------------|

| Esempio: N° Ordine | Rivestimento | | Articolo | | Codice-ø | | | | | POLYCHROM |
|----------------------------|----------------------|----------------------|----------------|----------------|----------------|-------|------|---|--------|-----------|
| | P | 8211 | 220 | | | | | | | P8211 |
| Ø Code | d ₁ e8 | d ₂ h5 | l ₁ | l ₂ | l ₄ | r | α | z | EUR | |
| 220* | 4.00 | 6.00 | 63 | 13.00 | 19.59 | 0.100 | 3.5° | 4 | 89.00 | |
| 260* | 5.00 | 6.00 | 63 | 16.00 | 20.72 | 0.100 | 1.5° | 4 | 89.00 | |
| 300 | 6.00 | 6.00 | 63 | 21.00 | - | 0.100 | 0.0° | 4 | 94.00 | |
| 391 | 8.00 | 8.00 | 72 | 31.00 | - | 0.150 | 0.0° | 4 | 118.00 | |
| 450 | 10.00 | 10.00 | 84 | 37.00 | - | 0.200 | 0.0° | 4 | 160.00 | |
| 501 | 12.00 | 12.00 | 97 | 44.00 | - | 0.200 | 0.0° | 4 | 197.00 | |
| 610 | 16.00 | 16.00 | 108 | 53.00 | - | 0.200 | 0.0° | 4 | 309.00 | |
| 682 | 20.00 | 20.00 | 122 | 62.00 | - | 0.200 | 0.0° | 4 | 451.00 | |
| * solo senza rompitruciolo | | | | | | | | | | |

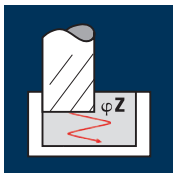
Applicazione

Materiale



Acciaio
850 - 1100 N/mm²

| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 4.00 | 4 | 135 | 0.026 | 8.000 | 1.200 | 10745 | 1115 | 10.7 | 12° |
| 5.00 | 4 | 135 | 0.030 | 10.000 | 1.500 | 8595 | 1030 | 15.5 | 12° |
| 6.00 | 4 | 135 | 0.034 | 12.000 | 1.800 | 7160 | 975 | 21.0 | 12° |
| 8.00 | 4 | 135 | 0.043 | 16.000 | 2.400 | 5370 | 925 | 35.5 | 12° |
| 10.00 | 4 | 135 | 0.055 | 20.000 | 3.000 | 4295 | 945 | 56.7 | 12° |
| 12.00 | 4 | 135 | 0.064 | 24.000 | 3.600 | 3580 | 915 | 79.2 | 12° |
| 16.00 | 4 | 135 | 0.072 | 25.600 | 4.800 | 2685 | 775 | 95.0 | 12° |
| 20.00 | 4 | 135 | 0.085 | 32.000 | 6.000 | 2150 | 730 | 140.3 | 12° |



Acciaio
1100 - 1300 N/mm²

| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 4.00 | 4 | 105 | 0.021 | 8.000 | 1.200 | 8355 | 700 | 6.7 | 12° |
| 5.00 | 4 | 105 | 0.026 | 10.000 | 1.500 | 6685 | 695 | 10.4 | 12° |
| 6.00 | 4 | 105 | 0.030 | 12.000 | 1.800 | 5570 | 670 | 14.4 | 12° |
| 8.00 | 4 | 105 | 0.038 | 16.000 | 2.400 | 4180 | 635 | 24.4 | 12° |
| 10.00 | 4 | 105 | 0.047 | 20.000 | 3.000 | 3340 | 630 | 37.7 | 12° |
| 12.00 | 4 | 105 | 0.055 | 24.000 | 3.600 | 2785 | 615 | 52.9 | 12° |
| 16.00 | 4 | 105 | 0.064 | 25.600 | 4.800 | 2090 | 535 | 65.7 | 12° |
| 20.00 | 4 | 105 | 0.077 | 32.000 | 6.000 | 1670 | 515 | 98.8 | 12° |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 4.00 | 4 | 80 | 0.017 | 8.000 | 1.200 | 6365 | 435 | 4.2 | 8° |
| 5.00 | 4 | 80 | 0.021 | 10.000 | 1.500 | 5095 | 430 | 6.4 | 8° |
| 6.00 | 4 | 80 | 0.026 | 12.000 | 1.800 | 4245 | 440 | 9.5 | 8° |
| 8.00 | 4 | 80 | 0.030 | 16.000 | 2.400 | 3185 | 380 | 14.7 | 8° |
| 10.00 | 4 | 80 | 0.038 | 20.000 | 3.000 | 2545 | 385 | 23.2 | 8° |
| 12.00 | 4 | 80 | 0.047 | 24.000 | 3.600 | 2120 | 400 | 34.5 | 8° |
| 16.00 | 4 | 80 | 0.055 | 25.600 | 4.800 | 1590 | 350 | 43.0 | 8° |
| 20.00 | 4 | 80 | 0.068 | 32.000 | 6.000 | 1275 | 345 | 66.5 | 8° |

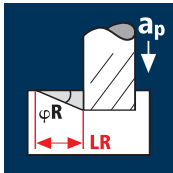
Applicazione

Materiale



Acciaio
850 - 1100 N/mm²

| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] | LR [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|---------|
| 4.00 | 4 | 110 | 0.017 | 6.000 | 4.000 | 8755 | 595 | 14.3 | 12° | 28.2 |
| 5.00 | 4 | 110 | 0.020 | 7.500 | 5.000 | 7005 | 560 | 21.0 | 12° | 35.3 |
| 6.00 | 4 | 110 | 0.022 | 9.000 | 6.000 | 5835 | 515 | 27.7 | 12° | 42.3 |
| 8.00 | 4 | 110 | 0.028 | 12.000 | 8.000 | 4375 | 490 | 47.1 | 12° | 56.5 |
| 10.00 | 4 | 110 | 0.036 | 15.000 | 10.000 | 3500 | 505 | 75.6 | 12° | 70.6 |
| 12.00 | 4 | 110 | 0.042 | 18.000 | 12.000 | 2920 | 490 | 105.9 | 12° | 84.7 |
| 16.00 | 4 | 110 | 0.047 | 24.000 | 16.000 | 2190 | 410 | 158.0 | 12° | 112.9 |
| 20.00 | 4 | 110 | 0.055 | 30.000 | 20.000 | 1750 | 385 | 231.1 | 12° | 141.1 |



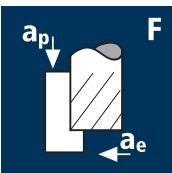
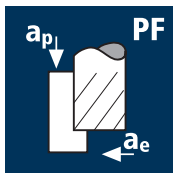
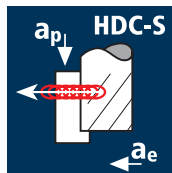
Acciaio
1100 - 1300 N/mm²

| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] | LR [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|---------|
| 4.00 | 4 | 85 | 0.014 | 6.000 | 4.000 | 6765 | 380 | 9.1 | 12° | 28.2 |
| 5.00 | 4 | 85 | 0.017 | 7.500 | 5.000 | 5410 | 370 | 13.8 | 12° | 35.3 |
| 6.00 | 4 | 85 | 0.020 | 9.000 | 6.000 | 4510 | 360 | 19.5 | 12° | 42.3 |
| 8.00 | 4 | 85 | 0.025 | 12.000 | 8.000 | 3380 | 340 | 32.5 | 12° | 56.5 |
| 10.00 | 4 | 85 | 0.031 | 15.000 | 10.000 | 2705 | 335 | 50.3 | 12° | 70.6 |
| 12.00 | 4 | 85 | 0.036 | 18.000 | 12.000 | 2255 | 325 | 70.1 | 12° | 84.7 |
| 16.00 | 4 | 85 | 0.042 | 24.000 | 16.000 | 1690 | 285 | 109.1 | 12° | 112.9 |
| 20.00 | 4 | 85 | 0.050 | 30.000 | 20.000 | 1355 | 270 | 162.3 | 12° | 141.1 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] | LR [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|---------|
| 4.00 | 4 | 65 | 0.011 | 6.000 | 4.000 | 5175 | 230 | 5.5 | 12° | 28.2 |
| 5.00 | 4 | 65 | 0.014 | 7.500 | 5.000 | 4140 | 230 | 8.7 | 12° | 35.3 |
| 6.00 | 4 | 65 | 0.017 | 9.000 | 6.000 | 3450 | 235 | 12.7 | 12° | 42.3 |
| 8.00 | 4 | 65 | 0.020 | 12.000 | 8.000 | 2585 | 205 | 19.9 | 12° | 56.5 |
| 10.00 | 4 | 65 | 0.025 | 15.000 | 10.000 | 2070 | 205 | 31.0 | 12° | 70.6 |
| 12.00 | 4 | 65 | 0.031 | 18.000 | 12.000 | 1725 | 215 | 46.2 | 12° | 84.7 |
| 16.00 | 4 | 65 | 0.036 | 24.000 | 16.000 | 1295 | 185 | 71.5 | 12° | 112.9 |
| 20.00 | 4 | 65 | 0.044 | 30.000 | 20.000 | 1035 | 180 | 109.2 | 12° | 141.1 |

Cliccare qui per accedere al **ToolExpert MFC**. Veloce, semplice, affidabile

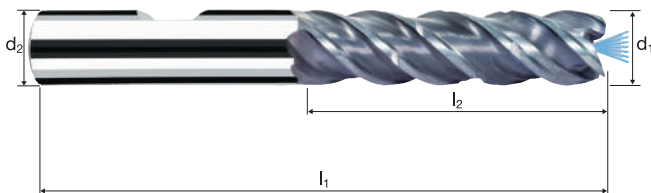
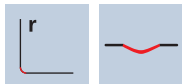


Frese cilindriche MFC



A taglienti lisci con rompitrucciolo, esecuzione medio-lunga
Geometria frontale per fresature in penetrazione ad alto rendimento
con canale di raffreddamento/aria centrale

HM λ 45°
MG10 γ 0°



Sgrossatura HPC Sgrossatura HDC Finitura

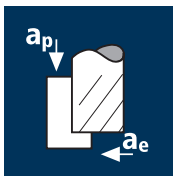


ReTool®

| | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--------------|--|-------------------|----------------|---------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | | Inox Stainless | Ti Titanium | GG(G) Tool Steel |
|-------------|----------------|-----------------|-----------------|--------------|--|-------------------|----------------|---------------------|

| Esempio: N° Ordine | Rivestimento | | Articolo | | Codice-Ø | | | | | POLYCHROM |
|-----------------------------|----------------------|----------------------|----------------|----------------|----------------|-------|------|---|--|-----------|
| | P | 8212 | 220 | | | | | | | P8212 |
| Ø Code | d ₁ e8 | d ₂ h5 | l ₁ | l ₂ | l ₄ | r | α | z | | EUR |
| 220* | 4.00 | 6.00 | 63 | 13.00 | 19.59 | 0.100 | 3.5° | 4 | | 89.00 |
| 260* | 5.00 | 6.00 | 63 | 16.00 | 20.72 | 0.100 | 1.5° | 4 | | 89.00 |
| 300 | 6.00 | 6.00 | 63 | 21.00 | - | 0.100 | 0.0° | 4 | | 94.00 |
| 391 | 8.00 | 8.00 | 72 | 31.00 | - | 0.150 | 0.0° | 4 | | 118.00 |
| 450 | 10.00 | 10.00 | 84 | 37.00 | - | 0.200 | 0.0° | 4 | | 160.00 |
| 501 | 12.00 | 12.00 | 97 | 44.00 | - | 0.200 | 0.0° | 4 | | 197.00 |
| 610 | 16.00 | 16.00 | 108 | 53.00 | - | 0.200 | 0.0° | 4 | | 309.00 |
| 682 | 20.00 | 20.00 | 122 | 62.00 | - | 0.200 | 0.0° | 4 | | 451.00 |
| * solo senza rompitrucciolo | | | | | | | | | | |

Applicazione

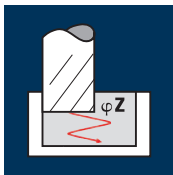


Materiale

Acciaio
850 - 1100 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 6.00 | 5 | 135 | 0.034 | 12.000 | 1.500 | 7160 | 1220 | 21.9 | 10° |
| 8.00 | 5 | 135 | 0.043 | 16.000 | 2.000 | 5370 | 1155 | 37.0 | 12° |
| 10.00 | 5 | 135 | 0.055 | 20.000 | 2.500 | 4295 | 1180 | 59.1 | 12° |
| 12.00 | 5 | 135 | 0.064 | 24.000 | 3.000 | 3580 | 1145 | 82.5 | 12° |
| 16.00 | 5 | 135 | 0.072 | 25.600 | 4.000 | 2685 | 965 | 99.0 | 12° |
| 20.00 | 5 | 135 | 0.085 | 32.000 | 5.000 | 2150 | 915 | 146.1 | 12° |



Acciaio
1100 - 1300 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 6.00 | 5 | 105 | 0.030 | 12.000 | 1.500 | 5570 | 835 | 15.0 | 10° |
| 8.00 | 5 | 105 | 0.038 | 16.000 | 2.000 | 4180 | 795 | 25.4 | 12° |
| 10.00 | 5 | 105 | 0.047 | 20.000 | 2.500 | 3340 | 785 | 39.3 | 12° |
| 12.00 | 5 | 105 | 0.055 | 24.000 | 3.000 | 2785 | 765 | 55.1 | 12° |
| 16.00 | 5 | 105 | 0.064 | 25.600 | 4.000 | 2090 | 670 | 68.4 | 12° |
| 20.00 | 5 | 105 | 0.077 | 32.000 | 5.000 | 1670 | 645 | 102.9 | 12° |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 6.00 | 5 | 80 | 0.026 | 12.000 | 1.500 | 4245 | 550 | 9.9 | 8° |
| 8.00 | 5 | 80 | 0.030 | 16.000 | 2.000 | 3185 | 475 | 15.3 | 8° |
| 10.00 | 5 | 80 | 0.038 | 20.000 | 2.500 | 2545 | 485 | 24.2 | 8° |
| 12.00 | 5 | 80 | 0.047 | 24.000 | 3.000 | 2120 | 500 | 35.9 | 8° |
| 16.00 | 5 | 80 | 0.055 | 25.600 | 4.000 | 1590 | 440 | 44.8 | 8° |
| 20.00 | 5 | 80 | 0.068 | 32.000 | 5.000 | 1275 | 435 | 69.3 | 8° |

Applicazione

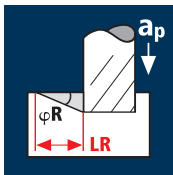


Materiale

Acciaio
850 - 1100 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] | LR [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|---------|
| 6.00 | 5 | 110 | 0.020 | 6.000 | 6.000 | 5835 | 585 | 21.0 | 10° | 34.0 |
| 8.00 | 5 | 110 | 0.026 | 8.000 | 8.000 | 4375 | 570 | 36.4 | 10° | 45.4 |
| 10.00 | 5 | 110 | 0.033 | 10.000 | 10.000 | 3500 | 580 | 57.8 | 10° | 56.7 |
| 12.00 | 5 | 110 | 0.038 | 12.000 | 12.000 | 2920 | 555 | 79.8 | 10° | 68.1 |
| 16.00 | 5 | 110 | 0.043 | 16.000 | 16.000 | 2190 | 470 | 120.4 | 10° | 90.7 |
| 20.00 | 5 | 110 | 0.051 | 20.000 | 20.000 | 1750 | 445 | 178.6 | 10° | 113.4 |



Acciaio
1100 - 1300 N/mm²



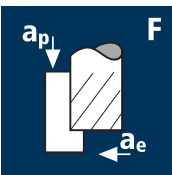
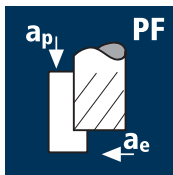
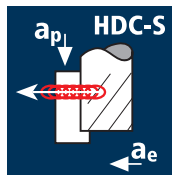
| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] | LR [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|---------|
| 6.00 | 5 | 85 | 0.018 | 6.000 | 6.000 | 4510 | 405 | 14.6 | 10° | 34.0 |
| 8.00 | 5 | 85 | 0.023 | 8.000 | 8.000 | 3380 | 390 | 24.9 | 10° | 45.4 |
| 10.00 | 5 | 85 | 0.028 | 10.000 | 10.000 | 2705 | 380 | 37.9 | 10° | 56.7 |
| 12.00 | 5 | 85 | 0.033 | 12.000 | 12.000 | 2255 | 370 | 53.6 | 10° | 68.1 |
| 16.00 | 5 | 85 | 0.038 | 16.000 | 16.000 | 1690 | 320 | 82.3 | 10° | 90.7 |
| 20.00 | 5 | 85 | 0.046 | 20.000 | 20.000 | 1355 | 310 | 124.5 | 10° | 113.4 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] | LR [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|---------|
| 6.00 | 5 | 65 | 0.016 | 6.000 | 6.000 | 3450 | 275 | 9.9 | 10° | 34.0 |
| 8.00 | 5 | 65 | 0.018 | 8.000 | 8.000 | 2585 | 235 | 14.9 | 10° | 45.4 |
| 10.00 | 5 | 65 | 0.023 | 10.000 | 10.000 | 2070 | 240 | 23.8 | 10° | 56.7 |
| 12.00 | 5 | 65 | 0.028 | 12.000 | 12.000 | 1725 | 240 | 34.8 | 10° | 68.1 |
| 16.00 | 5 | 65 | 0.033 | 16.000 | 16.000 | 1295 | 215 | 54.6 | 10° | 90.7 |
| 20.00 | 5 | 65 | 0.041 | 20.000 | 20.000 | 1035 | 210 | 84.8 | 10° | 113.4 |

Cliccare qui per accedere al **ToolExpert MFC**.
Veloce, semplice, affidabile

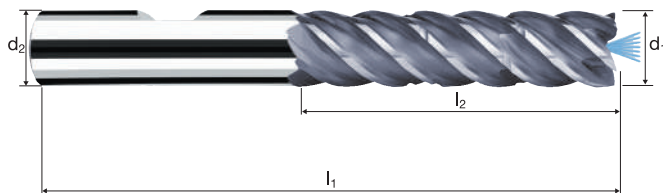
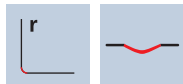


Frese cilindriche MFC



A taglienti lisci con rompitrucciolo, esecuzione medio-lunga
Geometria frontale per fresature in penetrazione ad alto rendimento
con canale di raffreddamento/aria centrale

HM λ 45°
MG10 γ 0°



Sgrossatura HPC Sgrossatura HDC Finitura

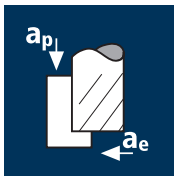


ReTool®

| | | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--------------|--|--|-------------------|----------------|---------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | | | Inox Stainless | Ti Titanium | GG(G) Tool Steel |
|-------------|----------------|-----------------|-----------------|--------------|--|--|-------------------|----------------|---------------------|

| Ø Code | d ₁ e8 | d ₂ h5 | l ₁ | l ₂ | r | z | Esempio: N° Ordine | | POLYCHROM | |
|-----------|----------------------|----------------------|----------------|----------------|-------|---|-----------------------|------------------|-----------------|--------|
| | | | | | | | Rivestimento P | Articolo 8215 | Codice-Ø 300 | |
| 300 | 6.00 | 6.00 | 63 | 21.00 | 0.100 | 5 | | | | 8215 |
| 391 | 8.00 | 8.00 | 72 | 31.00 | 0.150 | 5 | | | | 8115 |
| 450 | 10.00 | 10.00 | 84 | 37.00 | 0.200 | 5 | | | | EUR |
| 501 | 12.00 | 12.00 | 97 | 44.00 | 0.200 | 5 | | | | 94.00 |
| 610 | 16.00 | 16.00 | 108 | 53.00 | 0.200 | 5 | | | | 118.00 |
| 682 | 20.00 | 20.00 | 122 | 62.00 | 0.200 | 5 | | | | 160.00 |
| | | | | | | | | | | 197.00 |
| | | | | | | | | | | 309.00 |
| | | | | | | | | | | 451.00 |
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Applicazione



Materiale

Acciaio
< 850 N/mm²



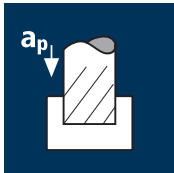
Acciaio
850 - 1100 N/mm²



Acciaio per lavorazione
a freddo (12% Cr)
fortemente legati
[1.2379]



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



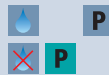
Acciaio
< 850 N/mm²



Acciaio
850 - 1100 N/mm²



Acciaio per lavorazione
a freddo (12% Cr)
fortemente legati
[1.2379]



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 6.00 | 4 | 180 | 0.040 | 10.800 | 1.200 | 9550 | 1530 | 19.8 |
| 8.00 | 4 | 180 | 0.050 | 14.400 | 1.600 | 7160 | 1430 | 33.0 |
| 10.00 | 4 | 180 | 0.065 | 18.000 | 2.000 | 5730 | 1490 | 53.6 |
| 12.00 | 4 | 180 | 0.075 | 21.600 | 2.400 | 4775 | 1430 | 74.3 |
| 16.00 | 4 | 180 | 0.085 | 28.800 | 3.200 | 3580 | 1220 | 112.2 |
| 20.00 | 4 | 180 | 0.105 | 36.000 | 4.000 | 2865 | 1205 | 173.3 |

| | | | | | | | | |
|-------|---|-----|-------|--------|-------|------|------|-------|
| 6.00 | 4 | 140 | 0.040 | 10.800 | 1.200 | 7425 | 1190 | 15.4 |
| 8.00 | 4 | 140 | 0.050 | 14.400 | 1.600 | 5570 | 1115 | 25.7 |
| 10.00 | 4 | 140 | 0.065 | 18.000 | 2.000 | 4455 | 1160 | 41.7 |
| 12.00 | 4 | 140 | 0.075 | 21.600 | 2.400 | 3715 | 1115 | 57.8 |
| 16.00 | 4 | 140 | 0.085 | 28.800 | 3.200 | 2785 | 945 | 87.3 |
| 20.00 | 4 | 140 | 0.105 | 36.000 | 4.000 | 2230 | 935 | 134.8 |

| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 6.00 | 4 | 70 | 0.035 | 10.800 | 1.200 | 3715 | 520 | 6.7 |
| 8.00 | 4 | 70 | 0.045 | 14.400 | 1.600 | 2785 | 500 | 11.6 |
| 10.00 | 4 | 70 | 0.060 | 18.000 | 2.000 | 2230 | 535 | 19.3 |
| 12.00 | 4 | 70 | 0.070 | 21.600 | 2.400 | 1855 | 520 | 27.0 |
| 16.00 | 4 | 70 | 0.080 | 28.800 | 3.200 | 1395 | 445 | 41.1 |
| 20.00 | 4 | 70 | 0.100 | 36.000 | 4.000 | 1115 | 445 | 64.2 |

| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 6.00 | 4 | 85 | 0.025 | 10.800 | 1.200 | 4510 | 450 | 5.8 |
| 8.00 | 4 | 85 | 0.030 | 14.400 | 1.600 | 3380 | 405 | 9.4 |
| 10.00 | 4 | 85 | 0.040 | 18.000 | 2.000 | 2705 | 435 | 15.6 |
| 12.00 | 4 | 85 | 0.050 | 21.600 | 2.400 | 2255 | 450 | 23.4 |
| 16.00 | 4 | 85 | 0.055 | 28.800 | 3.200 | 1690 | 370 | 34.3 |
| 20.00 | 4 | 85 | 0.070 | 36.000 | 4.000 | 1355 | 380 | 54.5 |

| | | | | | | | | |
|-------|---|-----|-------|--------|--------|------|-----|-------|
| 6.00 | 4 | 145 | 0.020 | 8.100 | 6.000 | 7690 | 615 | 29.9 |
| 8.00 | 4 | 145 | 0.025 | 10.800 | 8.000 | 5770 | 575 | 49.8 |
| 10.00 | 4 | 145 | 0.035 | 13.500 | 10.000 | 4615 | 645 | 87.2 |
| 12.00 | 4 | 145 | 0.040 | 16.200 | 12.000 | 3845 | 615 | 119.6 |
| 16.00 | 4 | 145 | 0.050 | 19.200 | 16.000 | 2885 | 575 | 177.2 |
| 20.00 | 4 | 145 | 0.060 | 24.000 | 20.000 | 2310 | 555 | 265.9 |

| | | | | | | | | |
|-------|---|-----|-------|--------|--------|------|-----|-------|
| 6.00 | 4 | 105 | 0.020 | 8.100 | 6.000 | 5570 | 445 | 21.7 |
| 8.00 | 4 | 105 | 0.025 | 10.800 | 8.000 | 4180 | 420 | 36.1 |
| 10.00 | 4 | 105 | 0.035 | 13.500 | 10.000 | 3340 | 470 | 63.2 |
| 12.00 | 4 | 105 | 0.040 | 16.200 | 12.000 | 2785 | 445 | 86.6 |
| 16.00 | 4 | 105 | 0.050 | 19.200 | 16.000 | 2090 | 420 | 128.3 |
| 20.00 | 4 | 105 | 0.060 | 24.000 | 20.000 | 1670 | 400 | 192.5 |

| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 6.00 | 4 | 55 | 0.020 | 8.100 | 6.000 | 2920 | 235 | 11.3 |
| 8.00 | 4 | 55 | 0.025 | 10.800 | 8.000 | 2190 | 220 | 18.9 |
| 10.00 | 4 | 55 | 0.030 | 13.500 | 10.000 | 1750 | 210 | 28.4 |
| 12.00 | 4 | 55 | 0.035 | 16.200 | 12.000 | 1460 | 205 | 39.7 |
| 16.00 | 4 | 55 | 0.045 | 19.200 | 16.000 | 1095 | 195 | 60.5 |
| 20.00 | 4 | 55 | 0.055 | 24.000 | 20.000 | 875 | 195 | 92.4 |

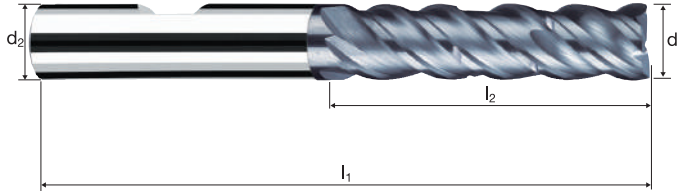
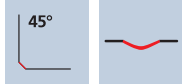
| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 6.00 | 4 | 65 | 0.015 | 8.100 | 6.000 | 3450 | 205 | 10.1 |
| 8.00 | 4 | 65 | 0.020 | 10.800 | 8.000 | 2585 | 205 | 17.9 |
| 10.00 | 4 | 65 | 0.025 | 13.500 | 10.000 | 2070 | 205 | 27.9 |
| 12.00 | 4 | 65 | 0.030 | 16.200 | 12.000 | 1725 | 205 | 40.2 |
| 16.00 | 4 | 65 | 0.035 | 19.200 | 16.000 | 1295 | 180 | 55.6 |
| 20.00 | 4 | 65 | 0.045 | 24.000 | 20.000 | 1035 | 185 | 89.4 |

Frese cilindriche NVD (NB-NVD)

A taglienti lisci con rompitrucciolo, esecuzione medio-lunga



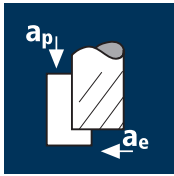
**HM
MG10** λ **45°**
 γ **0°**



| | | | | | | | | | |
|--------------------|-----------------------|------------------------|------------------------|--|--|--|--------------------------|-----------------------|---|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | | | | Inox Stainless | Ti Titanium | GG(G) Tool Steel Nickel-Alloys |
|--------------------|-----------------------|------------------------|------------------------|--|--|--|--------------------------|-----------------------|---|

| Ø Code | d ₁ e8 | d ₂ h6 | l ₁ | l ₂ | 45° | z | Esempio: N° Ordine | | POLYCHROM | |
|------------|----------------------|----------------------|----------------|----------------|------|---|-----------------------|--------------|------------|---------------|
| | | | | | | | Rivestimento | Articolo | Codice-Ø | |
| | | | | | | | P | 15310 | 300 | P15310 |
| | | | | | | | | | | P15210 |
| | | | | | | | | | | EUR |
| 300 | 6.00 | 6.00 | 63 | 21.00 | 0.15 | 4 | | | | 83.00 |
| 391 | 8.00 | 8.00 | 72 | 31.00 | 0.15 | 4 | | | | 103.00 |
| 450 | 10.00 | 10.00 | 84 | 37.00 | 0.20 | 4 | | | | 141.00 |
| 501 | 12.00 | 12.00 | 97 | 44.00 | 0.20 | 4 | | | | 174.00 |
| 610 | 16.00 | 16.00 | 108 | 53.00 | 0.20 | 4 | | | | 272.00 |
| 682 | 20.00 | 20.00 | 122 | 62.00 | 0.20 | 4 | | | | 396.00 |

Applicazione



Materiale

Acciaio
< 850 N/mm²



Acciaio
850 - 1100 N/mm²



Acciaio per lavorazione
a freddo (12% Cr)
fortemente legati
[1.2379]



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Acciaio
< 850 N/mm²



Acciaio
850 - 1100 N/mm²



Acciaio per lavorazione
a freddo (12% Cr)
fortemente legati
[1.2379]



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 4.00 | 4 | 180 | 0.025 | 7.200 | 0.800 | 14325 | 1430 | 8.3 |
| 5.00 | 4 | 180 | 0.030 | 9.000 | 1.000 | 11460 | 1375 | 12.4 |
| 6.00 | 4 | 180 | 0.040 | 10.800 | 1.200 | 9550 | 1530 | 19.8 |
| 8.00 | 4 | 180 | 0.050 | 14.400 | 1.600 | 7160 | 1430 | 33.0 |
| 10.00 | 4 | 180 | 0.065 | 18.000 | 2.000 | 5730 | 1490 | 53.6 |
| 12.00 | 4 | 180 | 0.075 | 21.600 | 2.400 | 4775 | 1430 | 74.3 |
| 16.00 | 4 | 180 | 0.085 | 28.800 | 3.200 | 3580 | 1220 | 112.2 |
| 20.00 | 4 | 180 | 0.105 | 36.000 | 4.000 | 2865 | 1205 | 173.3 |

| | | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|------|-------|
| 4.00 | 4 | 140 | 0.025 | 7.200 | 0.800 | 11140 | 1115 | 6.4 |
| 5.00 | 4 | 140 | 0.030 | 9.000 | 1.000 | 8915 | 1070 | 9.6 |
| 6.00 | 4 | 140 | 0.040 | 10.800 | 1.200 | 7425 | 1190 | 15.4 |
| 8.00 | 4 | 140 | 0.050 | 14.400 | 1.600 | 5570 | 1115 | 25.7 |
| 10.00 | 4 | 140 | 0.065 | 18.000 | 2.000 | 4455 | 1160 | 41.7 |
| 12.00 | 4 | 140 | 0.075 | 21.600 | 2.400 | 3715 | 1115 | 57.8 |
| 16.00 | 4 | 140 | 0.085 | 28.800 | 3.200 | 2785 | 945 | 87.3 |
| 20.00 | 4 | 140 | 0.105 | 36.000 | 4.000 | 2230 | 935 | 134.8 |

| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 4.00 | 4 | 70 | 0.025 | 7.200 | 0.800 | 5570 | 555 | 3.2 |
| 5.00 | 4 | 70 | 0.030 | 9.000 | 1.000 | 4455 | 535 | 4.8 |
| 6.00 | 4 | 70 | 0.035 | 10.800 | 1.200 | 3715 | 520 | 6.7 |
| 8.00 | 4 | 70 | 0.045 | 14.400 | 1.600 | 2785 | 500 | 11.6 |
| 10.00 | 4 | 70 | 0.060 | 18.000 | 2.000 | 2230 | 535 | 19.3 |
| 12.00 | 4 | 70 | 0.070 | 21.600 | 2.400 | 1855 | 520 | 27.0 |
| 16.00 | 4 | 70 | 0.080 | 28.800 | 3.200 | 1395 | 445 | 41.1 |
| 20.00 | 4 | 70 | 0.100 | 36.000 | 4.000 | 1115 | 445 | 64.2 |

| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 4.00 | 4 | 85 | 0.020 | 7.200 | 0.800 | 6765 | 540 | 3.1 |
| 5.00 | 4 | 85 | 0.020 | 9.000 | 1.000 | 5410 | 435 | 3.9 |
| 6.00 | 4 | 85 | 0.025 | 10.800 | 1.200 | 4510 | 450 | 5.8 |
| 8.00 | 4 | 85 | 0.030 | 14.400 | 1.600 | 3380 | 405 | 9.4 |
| 10.00 | 4 | 85 | 0.040 | 18.000 | 2.000 | 2705 | 435 | 15.6 |
| 12.00 | 4 | 85 | 0.050 | 21.600 | 2.400 | 2255 | 450 | 23.4 |
| 16.00 | 4 | 85 | 0.055 | 28.800 | 3.200 | 1690 | 370 | 34.3 |
| 20.00 | 4 | 85 | 0.070 | 36.000 | 4.000 | 1355 | 380 | 54.5 |

| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|-----|-------|
| 4.00 | 4 | 145 | 0.015 | 5.400 | 4.000 | 11540 | 690 | 15.0 |
| 5.00 | 4 | 145 | 0.015 | 6.750 | 5.000 | 9230 | 555 | 18.7 |
| 6.00 | 4 | 145 | 0.020 | 8.100 | 6.000 | 7690 | 615 | 29.9 |
| 8.00 | 4 | 145 | 0.025 | 10.800 | 8.000 | 5770 | 575 | 49.8 |
| 10.00 | 4 | 145 | 0.035 | 13.500 | 10.000 | 4615 | 645 | 87.2 |
| 12.00 | 4 | 145 | 0.040 | 16.200 | 12.000 | 3845 | 615 | 119.6 |
| 16.00 | 4 | 145 | 0.050 | 19.200 | 16.000 | 2885 | 575 | 177.2 |
| 20.00 | 4 | 145 | 0.060 | 24.000 | 20.000 | 2310 | 555 | 265.9 |

| | | | | | | | | |
|-------|---|-----|-------|--------|--------|------|-----|-------|
| 4.00 | 4 | 105 | 0.015 | 5.400 | 4.000 | 8355 | 500 | 10.8 |
| 5.00 | 4 | 105 | 0.015 | 6.750 | 5.000 | 6685 | 400 | 13.5 |
| 6.00 | 4 | 105 | 0.020 | 8.100 | 6.000 | 5570 | 445 | 21.7 |
| 8.00 | 4 | 105 | 0.025 | 10.800 | 8.000 | 4180 | 420 | 36.1 |
| 10.00 | 4 | 105 | 0.035 | 13.500 | 10.000 | 3340 | 470 | 63.2 |
| 12.00 | 4 | 105 | 0.040 | 16.200 | 12.000 | 2785 | 445 | 86.6 |
| 16.00 | 4 | 105 | 0.050 | 19.200 | 16.000 | 2090 | 420 | 128.3 |
| 20.00 | 4 | 105 | 0.060 | 24.000 | 20.000 | 1670 | 400 | 192.5 |

| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 4.00 | 4 | 55 | 0.010 | 5.400 | 4.000 | 4375 | 175 | 3.8 |
| 5.00 | 4 | 55 | 0.015 | 6.750 | 5.000 | 3500 | 210 | 7.1 |
| 6.00 | 4 | 55 | 0.020 | 8.100 | 6.000 | 2920 | 235 | 11.3 |
| 8.00 | 4 | 55 | 0.025 | 10.800 | 8.000 | 2190 | 220 | 18.9 |
| 10.00 | 4 | 55 | 0.030 | 13.500 | 10.000 | 1750 | 210 | 28.4 |
| 12.00 | 4 | 55 | 0.035 | 16.200 | 12.000 | 1460 | 205 | 39.7 |
| 16.00 | 4 | 55 | 0.045 | 19.200 | 16.000 | 1095 | 195 | 60.5 |
| 20.00 | 4 | 55 | 0.055 | 24.000 | 20.000 | 875 | 195 | 92.4 |

| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 4.00 | 4 | 65 | 0.010 | 5.400 | 4.000 | 5175 | 205 | 4.5 |
| 5.00 | 4 | 65 | 0.010 | 6.750 | 5.000 | 4140 | 165 | 5.6 |
| 6.00 | 4 | 65 | 0.015 | 8.100 | 6.000 | 3450 | 205 | 10.1 |
| 8.00 | 4 | 65 | 0.020 | 10.800 | 8.000 | 2585 | 205 | 17.9 |
| 10.00 | 4 | 65 | 0.025 | 13.500 | 10.000 | 2070 | 205 | 27.9 |
| 12.00 | 4 | 65 | 0.030 | 16.200 | 12.000 | 1725 | 205 | 40.2 |
| 16.00 | 4 | 65 | 0.035 | 19.200 | 16.000 | 1295 | 180 | 55.6 |
| 20.00 | 4 | 65 | 0.045 | 24.000 | 20.000 | 1035 | 185 | 89.4 |

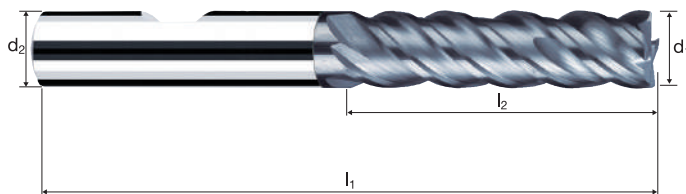
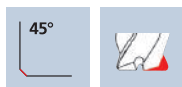
Frese cilindriche NVD (NB-NVD)

A taglienti lisci, esecuzione medio-lunga



HM
MG10

λ 45°
 γ 0°



Sgrossatura HPC Sgrossatura HDC Finitura

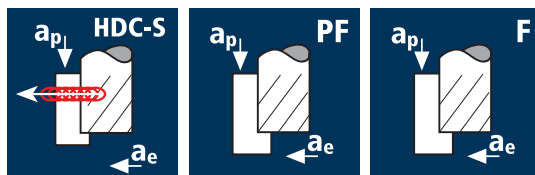


Rm < 850 Rm 850-1100 Rm 1100-1300 Rm 1300-1500 Inox Stainless Ti Titanium GG(G) Tool Steel Nickel-Alloys

| Esempio: N° Ordine | | Rivestimento | Articolo | Codice-Ø | | | | | | | POLYCHROM |
|-----------------------|-------|--------------|--------------|------------|-------|------|------|---|--------|--|---------------|
| | | P | 15308 | 220 | | | | | | | P15308 |
| | | | | | | | | | | | P15208 |
| Ø Code | d1 e8 | d2 h6 | l1 | l2 | l4 | 45° | α | z | EUR | | |
| 220 | 4.00 | 6.00 | 63 | 13.00 | 19.59 | 0.10 | 3.5° | 4 | 76.00 | | |
| 260 | 5.00 | 6.00 | 63 | 16.00 | 20.72 | 0.15 | 1.5° | 4 | 76.00 | | |
| 300 | 6.00 | 6.00 | 63 | 21.00 | - | 0.15 | 0.0° | 4 | 76.00 | | |
| 391 | 8.00 | 8.00 | 72 | 31.00 | - | 0.15 | 0.0° | 4 | 94.00 | | |
| 450 | 10.00 | 10.00 | 84 | 37.00 | - | 0.20 | 0.0° | 4 | 128.00 | | |
| 501 | 12.00 | 12.00 | 97 | 44.00 | - | 0.20 | 0.0° | 4 | 159.00 | | |
| 610 | 16.00 | 16.00 | 108 | 53.00 | - | 0.20 | 0.0° | 4 | 248.00 | | |
| 682 | 20.00 | 20.00 | 122 | 62.00 | - | 0.20 | 0.0° | 4 | 362.00 | | |
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| Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] |
|--------------|--|---------|--|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| | Acciaio < 850 N/mm ² | 3.00 | 4 | 130 | 0.020 | 3.750 | 1.200 | 13795 | 1105 | 5.0 | 1.5° |
| | | 4.00 | 4 | 130 | 0.030 | 5.000 | 1.600 | 10345 | 1240 | 9.9 | 1.5° |
| | | 5.00 | 4 | 130 | 0.037 | 6.250 | 2.000 | 8275 | 1225 | 15.3 | 1.5° |
| | | 6.00 | 4 | 130 | 0.039 | 9.000 | 2.400 | 6895 | 1075 | 23.2 | 1.5° |
| | | 8.00 | 4 | 130 | 0.052 | 12.000 | 3.200 | 5175 | 1075 | 41.3 | 1.5° |
| | | 10.00 | 4 | 130 | 0.065 | 15.000 | 4.000 | 4140 | 1075 | 64.6 | 1.5° |
| | | 12.00 | 4 | 130 | 0.072 | 18.000 | 4.800 | 3450 | 995 | 85.8 | 1.5° |
| | | 16.00 | 4 | 130 | 0.088 | 24.000 | 6.400 | 2585 | 910 | 139.8 | 1.5° |
| | | 20.00 | 4 | 130 | 0.099 | 30.000 | 8.000 | 2070 | 820 | 196.6 | 1.5° |
| | | | Acciaio 850 - 1100 N/mm ² | 3.00 | 4 | 120 | 0.019 | 3.750 | 1.200 | 12730 | 970 |
| 4.00 | 4 | | | 120 | 0.028 | 5.000 | 1.600 | 9550 | 1070 | 8.6 | 2° |
| 5.00 | 4 | | | 120 | 0.035 | 6.250 | 2.000 | 7640 | 1070 | 13.4 | 2° |
| 6.00 | 4 | | | 120 | 0.033 | 9.000 | 2.400 | 6365 | 840 | 18.2 | 2° |
| 8.00 | 4 | | | 120 | 0.044 | 12.000 | 3.200 | 4775 | 840 | 32.3 | 2° |
| 10.00 | 4 | | | 120 | 0.055 | 15.000 | 4.000 | 3820 | 840 | 50.4 | 2° |
| 12.00 | 4 | | | 120 | 0.066 | 18.000 | 4.800 | 3185 | 840 | 72.6 | 2° |
| 16.00 | 4 | | | 120 | 0.080 | 24.000 | 6.400 | 2385 | 765 | 117.3 | 2° |
| 20.00 | 4 | | | 120 | 0.090 | 30.000 | 8.000 | 1910 | 690 | 165.0 | 2° |
| | Inox normal [Cr-Ni/1.4301] [Cr-Ni-Mo/1.4571] | | | 3.00 | 4 | 75 | 0.013 | 3.750 | 1.200 | 7960 | 415 |
| | | 4.00 | 4 | 75 | 0.019 | 5.000 | 1.600 | 5970 | 455 | 3.6 | 1.5° |
| | | 5.00 | 4 | 75 | 0.024 | 6.250 | 2.000 | 4775 | 460 | 5.7 | 1.5° |
| | | 6.00 | 4 | 75 | 0.023 | 9.000 | 2.400 | 3980 | 365 | 7.9 | 1.5° |
| | | 8.00 | 4 | 75 | 0.030 | 12.000 | 3.200 | 2985 | 360 | 13.8 | 1.5° |
| | | 10.00 | 4 | 75 | 0.038 | 15.000 | 4.000 | 2385 | 365 | 21.8 | 1.5° |
| | | 12.00 | 4 | 75 | 0.046 | 18.000 | 4.800 | 1990 | 365 | 31.6 | 1.5° |
| | | 16.00 | 4 | 75 | 0.050 | 24.000 | 6.400 | 1490 | 300 | 45.8 | 1.5° |
| | | 20.00 | 4 | 75 | 0.063 | 30.000 | 8.000 | 1195 | 300 | 72.2 | 1.5° |
| | | | Acciaio < 850 N/mm ² | 3.00 | 4 | 105 | 0.009 | 2.250 | 3.000 | 11140 | 400 |
| 4.00 | 4 | | | 105 | 0.014 | 4.000 | 4.000 | 8355 | 470 | 7.5 | 1.5° |
| 5.00 | 4 | | | 105 | 0.017 | 5.000 | 5.000 | 6685 | 455 | 11.4 | 1.5° |
| 6.00 | 4 | | | 105 | 0.023 | 7.500 | 6.000 | 5570 | 510 | 23.1 | 1.5° |
| 8.00 | 4 | | | 105 | 0.031 | 10.000 | 8.000 | 4180 | 520 | 41.4 | 1.5° |
| 10.00 | 4 | | | 105 | 0.039 | 12.500 | 10.000 | 3340 | 520 | 65.2 | 1.5° |
| 12.00 | 4 | | | 105 | 0.043 | 15.000 | 12.000 | 2785 | 480 | 86.2 | 1.5° |
| 16.00 | 4 | | | 105 | 0.053 | 20.000 | 16.000 | 2090 | 445 | 141.7 | 1.5° |
| 20.00 | 4 | | | 105 | 0.059 | 25.000 | 20.000 | 1670 | 395 | 197.2 | 1.5° |
| | Acciaio 850 - 1100 N/mm ² | | | 3.00 | 4 | 95 | 0.009 | 2.250 | 3.000 | 10080 | 365 |
| | | 4.00 | 4 | 95 | 0.013 | 4.000 | 4.000 | 7560 | 395 | 6.3 | 2° |
| | | 5.00 | 4 | 95 | 0.016 | 5.000 | 5.000 | 6050 | 385 | 9.7 | 2° |
| | | 6.00 | 4 | 95 | 0.020 | 7.500 | 6.000 | 5040 | 405 | 18.1 | 2° |
| | | 8.00 | 4 | 95 | 0.026 | 10.000 | 8.000 | 3780 | 395 | 31.4 | 2° |
| | | 10.00 | 4 | 95 | 0.033 | 12.500 | 10.000 | 3025 | 400 | 49.9 | 2° |
| | | 12.00 | 4 | 95 | 0.040 | 15.000 | 12.000 | 2520 | 405 | 72.6 | 2° |
| | | 16.00 | 4 | 95 | 0.048 | 20.000 | 16.000 | 1890 | 365 | 116.1 | 2° |
| | | 20.00 | 4 | 95 | 0.054 | 25.000 | 20.000 | 1510 | 325 | 163.3 | 2° |
| | | | Inox normal [Cr-Ni/1.4301] [Cr-Ni-Mo/1.4571] | 3.00 | 4 | 60 | 0.006 | 2.250 | 3.000 | 6365 | 155 |
| 4.00 | 4 | | | 60 | 0.009 | 4.000 | 4.000 | 4775 | 170 | 2.8 | 1.5° |
| 5.00 | 4 | | | 60 | 0.011 | 5.000 | 5.000 | 3820 | 170 | 4.2 | 1.5° |
| 6.00 | 4 | | | 60 | 0.014 | 7.500 | 6.000 | 3185 | 180 | 8.0 | 1.5° |
| 8.00 | 4 | | | 60 | 0.018 | 10.000 | 8.000 | 2385 | 170 | 13.8 | 1.5° |
| 10.00 | 4 | | | 60 | 0.023 | 12.500 | 10.000 | 1910 | 175 | 22.0 | 1.5° |
| 12.00 | 4 | | | 60 | 0.028 | 15.000 | 12.000 | 1590 | 180 | 32.1 | 1.5° |
| 16.00 | 4 | | | 60 | 0.030 | 20.000 | 16.000 | 1195 | 145 | 45.8 | 1.5° |
| 20.00 | 4 | | | 60 | 0.038 | 25.000 | 20.000 | 955 | 145 | 72.6 | 1.5° |

I dati di taglio adatti per altre applicazioni e materiali si trovano nel calcolatore dei parametri di taglio **ToolExpert E-Cut**



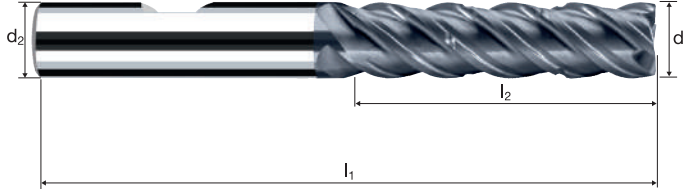
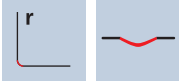
Frese cilindriche E-Cut

A taglienti lisci con rompitruciolo, esecuzione medio-lunga



HM
MG10

λ 45°
 γ 10°



Sgrossatura HPC Sgrossatura HDC Finitura



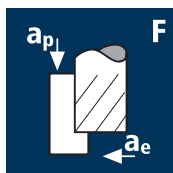
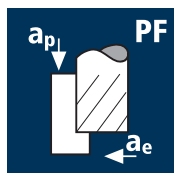
| | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--------------|--|-------------------|----------------|---------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | | Inox Stainless | Ti Titanium | GG(G) Tool Steel |
|-------------|----------------|-----------------|-----------------|--------------|--|-------------------|----------------|---------------------|

| | | | | | | | | | | POLYCHROM |
|----------------------------|----------------------|----------------------|-----------------|----------------|----------------|-------|------|---|--------|-----------|
| Esempio: N° Ordine | Rivestimento P | Articolo 8410 | Codice-ø 140 | | | | | | | |
| Ø Code | d ₁ e8 | d ₂ h6 | l ₁ | l ₂ | l ₄ | r | α | z | EUR | |
| 140* | 2.00 | 6.00 | 63 | 7.00 | 17.12 | 0.050 | 7.0° | 4 | 61.00 | |
| 180* | 3.00 | 6.00 | 63 | 11.00 | 20.26 | 0.050 | 4.5° | 4 | 61.00 | |
| 220* | 4.00 | 6.00 | 63 | 13.00 | 21.39 | 0.100 | 3.5° | 4 | 61.00 | |
| 260* | 5.00 | 6.00 | 63 | 16.00 | 23.52 | 0.100 | 1.5° | 4 | 61.00 | |
| 300 | 6.00 | 6.00 | 63 | 21.00 | - | 0.100 | 0.0° | 4 | 61.00 | |
| 391 | 8.00 | 8.00 | 72 | 31.00 | - | 0.150 | 0.0° | 4 | 76.00 | |
| 450 | 10.00 | 10.00 | 84 | 37.00 | - | 0.200 | 0.0° | 4 | 103.00 | |
| 501 | 12.00 | 12.00 | 97 | 44.00 | - | 0.200 | 0.0° | 4 | 128.00 | |
| 610 | 16.00 | 16.00 | 108 | 53.00 | - | 0.200 | 0.0° | 4 | 200.00 | |
| 682 | 20.00 | 20.00 | 122 | 62.00 | - | 0.250 | 0.0° | 4 | 292.00 | |
| * solo senza rompitruciolo | | | | | | | | | | |

| Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] | |
|--------------|--|---------|--|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|-------|
| | Acciaio < 850 N/mm ² | 4.00 | 5 | 140 | 0.034 | 6.000 | 1.200 | 11140 | 1895 | 13.6 | 1° | |
| | | 5.00 | 5 | 140 | 0.042 | 7.500 | 1.500 | 8915 | 1870 | 21.1 | 1° | |
| | | 6.00 | 5 | 140 | 0.045 | 9.000 | 1.800 | 7425 | 1670 | 27.1 | 1° | |
| | | 8.00 | 5 | 140 | 0.060 | 12.000 | 2.400 | 5570 | 1670 | 48.1 | 1° | |
| | | 10.00 | 5 | 140 | 0.075 | 15.000 | 3.000 | 4455 | 1670 | 75.2 | 1° | |
| | | 12.00 | 5 | 140 | 0.084 | 18.000 | 3.600 | 3715 | 1560 | 101.1 | 1° | |
| | | 16.00 | 5 | 140 | 0.102 | 24.000 | 4.800 | 2785 | 1420 | 163.6 | 1° | |
| 20.00 | 5 | 140 | 0.115 | 30.000 | 6.000 | 2230 | 1280 | 230.6 | 1° | | | |
| | Acciaio 850 - 1100 N/mm ² | 4.00 | 5 | 130 | 0.032 | 6.000 | 1.200 | 10345 | 1655 | 11.9 | 1.5° | |
| | | 5.00 | 5 | 130 | 0.038 | 7.500 | 1.500 | 8275 | 1570 | 17.7 | 1.5° | |
| | | 6.00 | 5 | 130 | 0.038 | 9.000 | 1.800 | 6895 | 1310 | 21.2 | 1.5° | |
| | | 8.00 | 5 | 130 | 0.051 | 12.000 | 2.400 | 5175 | 1320 | 38.0 | 1.5° | |
| | | 10.00 | 5 | 130 | 0.064 | 15.000 | 3.000 | 4140 | 1325 | 59.6 | 1.5° | |
| | | 12.00 | 5 | 130 | 0.076 | 18.000 | 3.600 | 3450 | 1310 | 84.9 | 1.5° | |
| | | 16.00 | 5 | 130 | 0.093 | 24.000 | 4.800 | 2585 | 1205 | 138.5 | 1.5° | |
| 20.00 | 5 | 130 | 0.104 | 30.000 | 6.000 | 2070 | 1075 | 193.7 | 1.5° | | | |
| | Inox normal [Cr-Ni/1.4301] [Cr-Ni-Mo/1.4571] | 4.00 | 5 | 80 | 0.022 | 6.000 | 1.200 | 6365 | 700 | 5.0 | 1° | |
| | | 5.00 | 5 | 80 | 0.027 | 7.500 | 1.500 | 5095 | 690 | 7.7 | 1° | |
| | | 6.00 | 5 | 80 | 0.027 | 9.000 | 1.800 | 4245 | 575 | 9.3 | 1° | |
| | | 8.00 | 5 | 80 | 0.035 | 12.000 | 2.400 | 3185 | 555 | 16.0 | 1° | |
| | | 10.00 | 5 | 80 | 0.043 | 15.000 | 3.000 | 2545 | 545 | 24.6 | 1° | |
| | | 12.00 | 5 | 80 | 0.053 | 18.000 | 3.600 | 2120 | 560 | 36.4 | 1° | |
| | | 16.00 | 5 | 80 | 0.058 | 24.000 | 4.800 | 1590 | 460 | 53.2 | 1° | |
| 20.00 | 5 | 80 | 0.073 | 30.000 | 6.000 | 1275 | 465 | 83.7 | 1° | | | |
| Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | | |
| | | | Acciaio < 850 N/mm ² | 4.00 | 5 | 230 | 0.036 | 13.000 | 0.400 | 18305 | 3255 | 16.9 |
| | | | | 5.00 | 5 | 230 | 0.044 | 16.000 | 0.500 | 14640 | 3240 | 25.9 |
| | | | | 6.00 | 5 | 230 | 0.054 | 21.000 | 0.600 | 12200 | 3285 | 41.4 |
| | | | | 8.00 | 5 | 230 | 0.072 | 31.000 | 0.800 | 9150 | 3300 | 81.8 |
| | | | | 10.00 | 5 | 230 | 0.089 | 37.000 | 1.000 | 7320 | 3275 | 121.1 |
| | | | | 12.00 | 5 | 230 | 0.107 | 44.000 | 1.200 | 6100 | 3255 | 171.9 |
| 16.00 | 5 | | | 230 | 0.117 | 53.000 | 1.600 | 4575 | 2685 | 227.6 | | |
| 20.00 | 5 | 230 | 0.148 | 62.000 | 2.000 | 3660 | 2710 | 336.1 | | | | |
| | Acciaio 850 - 1100 N/mm ² | 4.00 | 5 | 185 | 0.036 | 13.000 | 0.400 | 14720 | 2620 | 13.6 | | |
| | | 5.00 | 5 | 185 | 0.044 | 16.000 | 0.500 | 11775 | 2605 | 20.8 | | |
| | | 6.00 | 5 | 185 | 0.054 | 21.000 | 0.600 | 9815 | 2645 | 33.3 | | |
| | | 8.00 | 5 | 185 | 0.072 | 31.000 | 0.800 | 7360 | 2655 | 65.8 | | |
| | | 10.00 | 5 | 185 | 0.089 | 37.000 | 1.000 | 5890 | 2635 | 97.4 | | |
| | | 12.00 | 5 | 185 | 0.107 | 44.000 | 1.200 | 4905 | 2620 | 138.3 | | |
| | | 16.00 | 5 | 185 | 0.117 | 53.000 | 1.600 | 3680 | 2160 | 183.1 | | |
| 20.00 | 5 | 185 | 0.148 | 62.000 | 2.000 | 2945 | 2180 | 270.3 | | | | |
| | Inox normal [Cr-Ni/1.4301] [Cr-Ni-Mo/1.4571] | 4.00 | 5 | 142 | 0.034 | 13.000 | 0.200 | 11300 | 1930 | 5.0 | | |
| | | 5.00 | 5 | 142 | 0.042 | 16.000 | 0.250 | 9040 | 1895 | 7.6 | | |
| | | 6.00 | 5 | 142 | 0.050 | 21.000 | 0.300 | 7535 | 1875 | 11.8 | | |
| | | 8.00 | 5 | 142 | 0.067 | 31.000 | 0.400 | 5650 | 1890 | 23.4 | | |
| | | 10.00 | 5 | 142 | 0.084 | 37.000 | 0.500 | 4520 | 1895 | 35.1 | | |
| | | 12.00 | 5 | 142 | 0.101 | 44.000 | 0.600 | 3765 | 1905 | 50.2 | | |
| | | 16.00 | 5 | 142 | 0.110 | 53.000 | 0.800 | 2825 | 1560 | 66.1 | | |
| 20.00 | 5 | 142 | 0.141 | 62.000 | 1.000 | 2260 | 1600 | 99.1 | | | | |



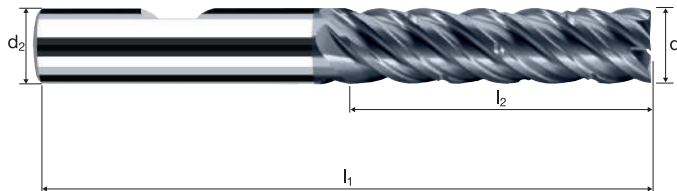
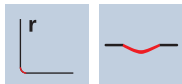
I dati di taglio adatti per altre applicazioni e materiali si trovano nel calcolatore dei parametri di taglio **ToolExpert E-Cut**



Frese cilindriche E-Cut

A taglienti lisci con rompitruciolo, esecuzione medio-lunga

HM λ **45°**
MG10 γ **10°**



Sgrossatura HPC Sgrossatura HDC Finitura

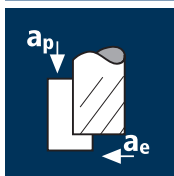


ReTool®

| | | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--------------|--|--|-------------------|----------------|---------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | | | Inox Stainless | Ti Titanium | GG(G) Tool Steel |
|-------------|----------------|-----------------|-----------------|--------------|--|--|-------------------|----------------|---------------------|

| Ø Code | d ₁ e8 | d ₂ h6 | l ₁ | l ₂ | l ₄ | r | α | z | | POLYCHROM | |
|----------------------------|----------------------|----------------------|----------------|----------------|----------------|-------|------|---|--|-----------|--------|
| | | | | | | | | | | P8415 | P8315 |
| | | | | | | | | | | | EUR |
| 220* | 4.00 | 6.00 | 63 | 13.00 | 21.39 | 0.100 | 3.0° | 5 | | | 65.00 |
| 260* | 5.00 | 6.00 | 63 | 16.00 | 23.52 | 0.100 | 1.5° | 5 | | | 65.00 |
| 300 | 6.00 | 6.00 | 63 | 21.00 | - | 0.100 | 0.0° | 5 | | | 65.00 |
| 391 | 8.00 | 8.00 | 72 | 31.00 | - | 0.150 | 0.0° | 5 | | | 81.00 |
| 450 | 10.00 | 10.00 | 84 | 37.00 | - | 0.200 | 0.0° | 5 | | | 110.00 |
| 501 | 12.00 | 12.00 | 97 | 44.00 | - | 0.200 | 0.0° | 5 | | | 136.00 |
| 610 | 16.00 | 16.00 | 108 | 53.00 | - | 0.200 | 0.0° | 5 | | | 212.00 |
| 682 | 20.00 | 20.00 | 122 | 62.00 | - | 0.250 | 0.0° | 5 | | | 310.00 |
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| | | | | | | | | | | | |
| * solo senza rompitruciolo | | | | | | | | | | | |

Applicazione

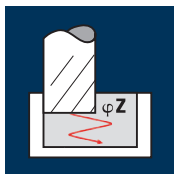


Materiale

Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _s [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 3.00 | 3 | 120 | 0.018 | 3.750 | 1.950 | 12730 | 690 | 5.0 | 2° |
| 4.00 | 3 | 120 | 0.027 | 5.000 | 2.600 | 9550 | 775 | 10.1 | 2° |
| 5.00 | 3 | 120 | 0.033 | 6.250 | 3.250 | 7640 | 755 | 15.4 | 2° |
| 6.00 | 3 | 120 | 0.035 | 9.000 | 3.900 | 6365 | 670 | 23.5 | 2° |
| 8.00 | 3 | 120 | 0.047 | 12.000 | 5.200 | 4775 | 675 | 42.0 | 2° |
| 10.00 | 3 | 120 | 0.059 | 15.000 | 6.500 | 3820 | 675 | 65.9 | 2° |
| 12.00 | 3 | 120 | 0.065 | 18.000 | 7.800 | 3185 | 620 | 87.1 | 2° |
| 16.00 | 3 | 120 | 0.079 | 24.000 | 10.400 | 2385 | 565 | 141.2 | 2° |
| 20.00 | 3 | 120 | 0.089 | 30.000 | 13.000 | 1910 | 510 | 198.9 | 2° |



Acciaio
850 - 1100 N/mm²



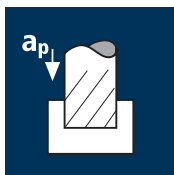
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _s [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 3.00 | 3 | 110 | 0.017 | 3.750 | 1.950 | 11670 | 595 | 4.4 | 3° |
| 4.00 | 3 | 110 | 0.025 | 5.000 | 2.600 | 8755 | 655 | 8.5 | 3° |
| 5.00 | 3 | 110 | 0.032 | 6.250 | 3.250 | 7005 | 670 | 13.7 | 3° |
| 6.00 | 3 | 110 | 0.030 | 9.000 | 3.900 | 5835 | 525 | 18.4 | 3° |
| 8.00 | 3 | 110 | 0.040 | 12.000 | 5.200 | 4375 | 525 | 32.8 | 3° |
| 10.00 | 3 | 110 | 0.050 | 15.000 | 6.500 | 3500 | 525 | 51.2 | 3° |
| 12.00 | 3 | 110 | 0.059 | 18.000 | 7.800 | 2920 | 515 | 72.5 | 3° |
| 16.00 | 3 | 110 | 0.072 | 24.000 | 10.400 | 2190 | 475 | 118.0 | 3° |
| 20.00 | 3 | 110 | 0.081 | 30.000 | 13.000 | 1750 | 425 | 165.9 | 3° |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _s [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 3.00 | 3 | 70 | 0.013 | 3.750 | 1.950 | 7425 | 290 | 2.1 | 2° |
| 4.00 | 3 | 70 | 0.019 | 5.000 | 2.600 | 5570 | 320 | 4.1 | 2° |
| 5.00 | 3 | 70 | 0.024 | 6.250 | 3.250 | 4455 | 320 | 6.5 | 2° |
| 6.00 | 3 | 70 | 0.023 | 9.000 | 3.900 | 3715 | 255 | 9.0 | 2° |
| 8.00 | 3 | 70 | 0.030 | 12.000 | 5.200 | 2785 | 250 | 15.6 | 2° |
| 10.00 | 3 | 70 | 0.038 | 15.000 | 6.500 | 2230 | 255 | 24.8 | 2° |
| 12.00 | 3 | 70 | 0.046 | 18.000 | 7.800 | 1855 | 255 | 36.0 | 2° |
| 16.00 | 3 | 70 | 0.050 | 24.000 | 10.400 | 1395 | 210 | 52.1 | 2° |
| 20.00 | 3 | 70 | 0.063 | 30.000 | 13.000 | 1115 | 210 | 82.1 | 2° |

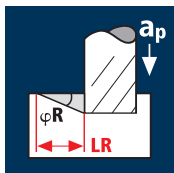
Applicazione



Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _s [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 3.00 | 3 | 105 | 0.013 | 3.000 | 3.000 | 11140 | 435 | 3.9 | 2° |
| 4.00 | 3 | 105 | 0.019 | 5.000 | 4.000 | 8355 | 475 | 9.5 | 2° |
| 5.00 | 3 | 105 | 0.023 | 6.250 | 5.000 | 6685 | 460 | 14.4 | 2° |
| 6.00 | 3 | 105 | 0.028 | 9.000 | 6.000 | 5570 | 470 | 25.3 | 2° |
| 8.00 | 3 | 105 | 0.038 | 12.000 | 8.000 | 4180 | 475 | 45.7 | 2° |
| 10.00 | 3 | 105 | 0.047 | 15.000 | 10.000 | 3340 | 470 | 70.7 | 2° |
| 12.00 | 3 | 105 | 0.052 | 18.000 | 12.000 | 2785 | 435 | 93.9 | 2° |
| 16.00 | 3 | 105 | 0.063 | 24.000 | 16.000 | 2090 | 395 | 151.6 | 2° |
| 20.00 | 3 | 105 | 0.071 | 30.000 | 20.000 | 1670 | 355 | 213.6 | 2° |



Acciaio
850 - 1100 N/mm²



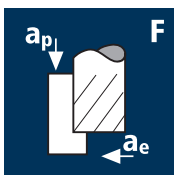
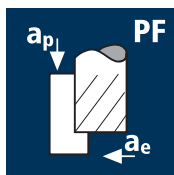
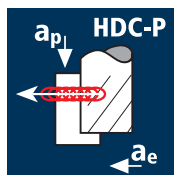
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _s [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 3.00 | 3 | 95 | 0.012 | 3.000 | 3.000 | 10080 | 365 | 3.3 | 2° |
| 4.00 | 3 | 95 | 0.018 | 5.000 | 4.000 | 7560 | 410 | 8.2 | 2° |
| 5.00 | 3 | 95 | 0.022 | 6.250 | 5.000 | 6050 | 400 | 12.5 | 2° |
| 6.00 | 3 | 95 | 0.024 | 9.000 | 6.000 | 5040 | 365 | 19.6 | 2° |
| 8.00 | 3 | 95 | 0.032 | 12.000 | 8.000 | 3780 | 365 | 34.8 | 2° |
| 10.00 | 3 | 95 | 0.040 | 15.000 | 10.000 | 3025 | 365 | 54.4 | 2° |
| 12.00 | 3 | 95 | 0.047 | 18.000 | 12.000 | 2520 | 355 | 76.7 | 2° |
| 16.00 | 3 | 95 | 0.058 | 24.000 | 16.000 | 1890 | 330 | 126.3 | 2° |
| 20.00 | 3 | 95 | 0.065 | 30.000 | 20.000 | 1510 | 295 | 176.9 | 2° |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _s [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 3.00 | 3 | 60 | 0.009 | 3.000 | 3.000 | 6365 | 170 | 1.5 | 2° |
| 4.00 | 3 | 60 | 0.013 | 5.000 | 4.000 | 4775 | 185 | 3.7 | 2° |
| 5.00 | 3 | 60 | 0.017 | 6.250 | 5.000 | 3820 | 195 | 6.1 | 2° |
| 6.00 | 3 | 60 | 0.018 | 9.000 | 6.000 | 3185 | 170 | 9.3 | 2° |
| 8.00 | 3 | 60 | 0.024 | 12.000 | 8.000 | 2385 | 170 | 16.5 | 2° |
| 10.00 | 3 | 60 | 0.030 | 15.000 | 10.000 | 1910 | 170 | 25.8 | 2° |
| 12.00 | 3 | 60 | 0.037 | 18.000 | 12.000 | 1590 | 175 | 38.2 | 2° |
| 16.00 | 3 | 60 | 0.040 | 24.000 | 16.000 | 1195 | 145 | 55.0 | 2° |
| 20.00 | 3 | 60 | 0.050 | 30.000 | 20.000 | 955 | 145 | 85.9 | 2° |

I dati di taglio adatti per altre applicazioni e materiali si trovano nel calcolatore dei parametri di taglio **ToolExpert E-Cut**

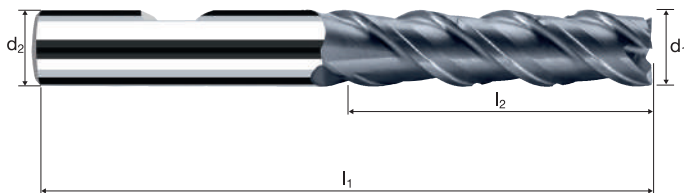
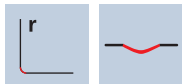


Frese cilindriche E-Cut

A taglienti lisci con rompitruciolo, esecuzione medio-lunga



HM
MG10 λ 45°
 γ 10°



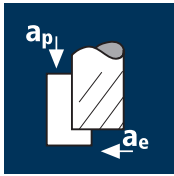
Sgrossatura HPC Sgrossatura HDC Finitura

ReTool®

| | | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--------------|--|--|-------------------|----------------|---------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | | | Inox Stainless | Ti Titanium | GG(G) Tool Steel |
|-------------|----------------|-----------------|-----------------|--------------|--|--|-------------------|----------------|---------------------|

| Esempio: N° Ordine | | | | | | | | | | POLYCHROM |
|----------------------------|----------------------|----------------------|----------------|----------------|----------------|-------|------|---|--|-----------|
| | | | | | | | | | | P8413 |
| | | | | | | | | | | P8313 |
| | | | | | | | | | | EUR |
| Ø Code | d ₁ e8 | d ₂ h6 | l ₁ | l ₂ | l ₄ | r | α | z | | |
| 140* | 2.00 | 6.00 | 63 | 7.00 | 17.12 | 0.050 | 7.0° | 3 | | 56.70 |
| 180* | 3.00 | 6.00 | 63 | 11.00 | 20.26 | 0.050 | 4.5° | 3 | | 56.70 |
| 220* | 4.00 | 6.00 | 63 | 13.00 | 21.39 | 0.100 | 3.0° | 3 | | 56.70 |
| 260* | 5.00 | 6.00 | 63 | 16.00 | 23.52 | 0.100 | 1.5° | 3 | | 56.70 |
| 300 | 6.00 | 6.00 | 63 | 21.00 | - | 0.100 | 0.0° | 3 | | 56.70 |
| 391 | 8.00 | 8.00 | 72 | 31.00 | - | 0.150 | 0.0° | 3 | | 71.00 |
| 450 | 10.00 | 10.00 | 84 | 37.00 | - | 0.200 | 0.0° | 3 | | 96.00 |
| 501 | 12.00 | 12.00 | 97 | 44.00 | - | 0.200 | 0.0° | 3 | | 119.00 |
| 610 | 16.00 | 16.00 | 108 | 53.00 | - | 0.200 | 0.0° | 3 | | 186.00 |
| 682 | 20.00 | 20.00 | 122 | 62.00 | - | 0.250 | 0.0° | 3 | | 272.00 |
| * solo senza rompitruciolo | | | | | | | | | | |

Applicazione



Materiale

Acciaio
< 850 N/mm²



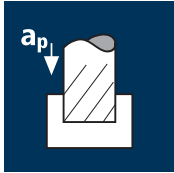
Acciaio
850 - 1100 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Ghisa
(griglia / sferoidale)



Acciaio
< 850 N/mm²



Acciaio
850 - 1100 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Ghisa
(griglia / sferoidale)



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 3.00 | 4 | 170 | 0.010 | 5.400 | 0.600 | 18040 | 720 | 2.3 |
| 4.00 | 4 | 170 | 0.015 | 7.200 | 0.800 | 13530 | 810 | 4.7 |
| 5.00 | 4 | 170 | 0.020 | 9.000 | 1.000 | 10825 | 865 | 7.8 |
| 6.00 | 4 | 170 | 0.025 | 10.800 | 1.200 | 9020 | 900 | 11.7 |
| 8.00 | 4 | 170 | 0.035 | 14.400 | 1.600 | 6765 | 945 | 21.8 |
| 10.00 | 4 | 170 | 0.045 | 18.000 | 2.000 | 5410 | 975 | 35.1 |
| 12.00 | 4 | 170 | 0.050 | 21.600 | 2.400 | 4510 | 900 | 46.8 |
| 16.00 | 4 | 170 | 0.065 | 28.800 | 3.200 | 3380 | 880 | 81.0 |
| 20.00 | 4 | 170 | 0.080 | 36.000 | 4.000 | 2705 | 865 | 124.7 |
| 3.00 | 4 | 120 | 0.010 | 5.400 | 0.600 | 12730 | 510 | 1.7 |
| 4.00 | 4 | 120 | 0.015 | 7.200 | 0.800 | 9550 | 575 | 3.3 |
| 5.00 | 4 | 120 | 0.020 | 9.000 | 1.000 | 7640 | 610 | 5.5 |
| 6.00 | 4 | 120 | 0.025 | 10.800 | 1.200 | 6365 | 635 | 8.3 |
| 8.00 | 4 | 120 | 0.035 | 14.400 | 1.600 | 4775 | 670 | 15.4 |
| 10.00 | 4 | 120 | 0.045 | 18.000 | 2.000 | 3820 | 690 | 24.8 |
| 12.00 | 4 | 120 | 0.050 | 21.600 | 2.400 | 3185 | 635 | 33.0 |
| 16.00 | 4 | 120 | 0.065 | 28.800 | 3.200 | 2385 | 620 | 57.2 |
| 20.00 | 4 | 120 | 0.080 | 36.000 | 4.000 | 1910 | 610 | 88.0 |
| 3.00 | 4 | 80 | 0.008 | 5.400 | 0.600 | 8490 | 270 | 0.9 |
| 4.00 | 4 | 80 | 0.010 | 7.200 | 0.800 | 6365 | 255 | 1.5 |
| 5.00 | 4 | 80 | 0.015 | 9.000 | 1.000 | 5095 | 305 | 2.8 |
| 6.00 | 4 | 80 | 0.020 | 10.800 | 1.200 | 4245 | 340 | 4.4 |
| 8.00 | 4 | 80 | 0.025 | 14.400 | 1.600 | 3185 | 320 | 7.3 |
| 10.00 | 4 | 80 | 0.030 | 18.000 | 2.000 | 2545 | 305 | 11.0 |
| 12.00 | 4 | 80 | 0.035 | 21.600 | 2.400 | 2120 | 295 | 15.4 |
| 16.00 | 4 | 80 | 0.045 | 28.800 | 3.200 | 1590 | 285 | 26.4 |
| 20.00 | 4 | 80 | 0.055 | 36.000 | 4.000 | 1275 | 280 | 40.3 |
| 3.00 | 4 | 135 | 0.012 | 5.400 | 0.600 | 14325 | 690 | 2.2 |
| 4.00 | 4 | 135 | 0.015 | 7.200 | 0.800 | 10745 | 645 | 3.7 |
| 5.00 | 4 | 135 | 0.020 | 9.000 | 1.000 | 8595 | 690 | 6.2 |
| 6.00 | 4 | 135 | 0.030 | 10.800 | 1.200 | 7160 | 860 | 11.1 |
| 8.00 | 4 | 135 | 0.040 | 14.400 | 1.600 | 5370 | 860 | 19.8 |
| 10.00 | 4 | 135 | 0.050 | 18.000 | 2.000 | 4295 | 860 | 30.9 |
| 12.00 | 4 | 135 | 0.055 | 21.600 | 2.400 | 3580 | 790 | 40.8 |
| 16.00 | 4 | 135 | 0.070 | 28.800 | 3.200 | 2685 | 750 | 69.3 |
| 20.00 | 4 | 135 | 0.090 | 36.000 | 4.000 | 2150 | 775 | 111.4 |
| 3.00 | 4 | 135 | 0.008 | 1.800 | 3.000 | 14325 | 460 | 2.5 |
| 4.00 | 4 | 135 | 0.010 | 2.800 | 4.000 | 10745 | 430 | 4.8 |
| 5.00 | 4 | 135 | 0.015 | 4.000 | 5.000 | 8595 | 515 | 10.3 |
| 6.00 | 4 | 135 | 0.020 | 6.000 | 6.000 | 7160 | 575 | 20.6 |
| 8.00 | 4 | 135 | 0.025 | 8.000 | 8.000 | 5370 | 535 | 34.4 |
| 10.00 | 4 | 135 | 0.035 | 10.000 | 10.000 | 4295 | 600 | 60.2 |
| 12.00 | 4 | 135 | 0.040 | 12.000 | 12.000 | 3580 | 575 | 82.5 |
| 16.00 | 4 | 135 | 0.050 | 8.000 | 16.000 | 2685 | 535 | 68.8 |
| 20.00 | 4 | 135 | 0.060 | 10.000 | 20.000 | 2150 | 515 | 103.1 |
| 3.00 | 4 | 95 | 0.008 | 1.800 | 3.000 | 10080 | 325 | 1.7 |
| 4.00 | 4 | 95 | 0.010 | 2.800 | 4.000 | 7560 | 300 | 3.4 |
| 5.00 | 4 | 95 | 0.015 | 4.000 | 5.000 | 6050 | 365 | 7.3 |
| 6.00 | 4 | 95 | 0.020 | 6.000 | 6.000 | 5040 | 405 | 14.5 |
| 8.00 | 4 | 95 | 0.025 | 8.000 | 8.000 | 3780 | 380 | 24.2 |
| 10.00 | 4 | 95 | 0.035 | 10.000 | 10.000 | 3025 | 425 | 42.3 |
| 12.00 | 4 | 95 | 0.040 | 12.000 | 12.000 | 2520 | 405 | 58.1 |
| 16.00 | 4 | 95 | 0.050 | 8.000 | 16.000 | 1890 | 380 | 48.4 |
| 20.00 | 4 | 95 | 0.060 | 10.000 | 20.000 | 1510 | 365 | 72.6 |
| 3.00 | 4 | 65 | 0.006 | 1.800 | 3.000 | 6895 | 165 | 0.9 |
| 4.00 | 4 | 65 | 0.008 | 2.800 | 4.000 | 5175 | 165 | 1.9 |
| 5.00 | 4 | 65 | 0.012 | 4.000 | 5.000 | 4140 | 200 | 4.0 |
| 6.00 | 4 | 65 | 0.016 | 4.200 | 6.000 | 3450 | 220 | 5.6 |
| 8.00 | 4 | 65 | 0.018 | 8.000 | 8.000 | 2585 | 185 | 11.9 |
| 10.00 | 4 | 65 | 0.022 | 10.000 | 10.000 | 2070 | 180 | 18.2 |
| 12.00 | 4 | 65 | 0.025 | 12.000 | 12.000 | 1725 | 170 | 24.8 |
| 16.00 | 4 | 65 | 0.035 | 8.000 | 16.000 | 1295 | 180 | 23.2 |
| 20.00 | 4 | 65 | 0.040 | 10.000 | 20.000 | 1035 | 165 | 33.1 |
| 3.00 | 4 | 115 | 0.010 | 1.800 | 3.000 | 12200 | 490 | 2.6 |
| 4.00 | 4 | 115 | 0.010 | 2.800 | 4.000 | 9150 | 365 | 4.1 |
| 5.00 | 4 | 115 | 0.015 | 4.000 | 5.000 | 7320 | 440 | 8.8 |
| 6.00 | 4 | 115 | 0.025 | 6.000 | 6.000 | 6100 | 610 | 22.0 |
| 8.00 | 4 | 115 | 0.030 | 8.000 | 8.000 | 4575 | 550 | 35.1 |
| 10.00 | 4 | 115 | 0.040 | 10.000 | 10.000 | 3660 | 585 | 58.6 |
| 12.00 | 4 | 115 | 0.040 | 12.000 | 12.000 | 3050 | 490 | 70.3 |
| 16.00 | 4 | 115 | 0.055 | 8.000 | 16.000 | 2290 | 505 | 64.4 |
| 20.00 | 4 | 115 | 0.070 | 10.000 | 20.000 | 1830 | 510 | 102.5 |

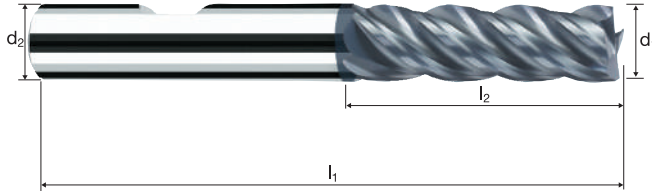
Frese cilindriche

A taglienti lisci, esecuzione medio-lunga



HM
MG10

λ 40°
 γ 6°



Sgrossatura

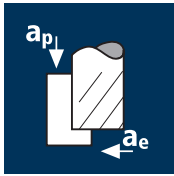
Finitura



| | | | | | | | | | |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|--------------------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | | | | | Inox Stainless | Ti Titanium | GG(G) Tool Steel Nickel-Alloys |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|--------------------------------------|

| | | | | | | | | | | POLYCHROM |
|--------------------|----------------------|----------------------|----------------|----------------|----------------|------|------|---|--|-----------|
| Esempio: N° Ordine | | | | | | | | | | P45322 |
| Rivestimento | | | | | | | | | | P |
| Articolo | | | | | | | | | | 45322 |
| Codice-Ø | | | | | | | | | | 140 |
| Ø Code | d ₁ e8 | d ₂ h6 | l ₁ | l ₂ | l ₄ | 45° | α | z | | EUR |
| 140 | 2.00 | 6.00 | 63 | 12.00 | 21.42 | 0.10 | 6.0° | 4 | | 48.70 |
| 160 | 2.50 | 6.00 | 63 | 12.00 | 20.49 | 0.10 | 5.0° | 4 | | 48.70 |
| 180 | 3.00 | 6.00 | 63 | 13.00 | 20.56 | 0.10 | 4.5° | 4 | | 48.70 |
| 220 | 4.00 | 6.00 | 63 | 13.00 | 18.89 | 0.10 | 3.5° | 4 | | 48.70 |
| 260 | 5.00 | 6.00 | 63 | 16.00 | 20.02 | 0.15 | 1.5° | 4 | | 48.70 |
| 300 | 6.00 | 6.00 | 63 | 21.00 | - | 0.15 | 0.0° | 4 | | 48.70 |
| 391 | 8.00 | 8.00 | 72 | 31.00 | - | 0.15 | 0.0° | 4 | | 61.00 |
| 450 | 10.00 | 10.00 | 84 | 37.00 | - | 0.20 | 0.0° | 4 | | 83.00 |
| 501 | 12.00 | 12.00 | 97 | 44.00 | - | 0.20 | 0.0° | 4 | | 102.00 |
| 570 | 14.00 | 14.00 | 102 | 48.00 | - | 0.20 | 0.0° | 4 | | 160.00 |
| 610 | 16.00 | 16.00 | 108 | 53.00 | - | 0.20 | 0.0° | 4 | | 160.00 |
| 682 | 20.00 | 20.00 | 122 | 62.00 | - | 0.20 | 0.0° | 4 | | 233.00 |
| 772 | 25.00 | 25.00 | 144 | 72.00 | - | 0.25 | 0.0° | 4 | | 442.00 |

Applicazione



Materiale

Acciaio
< 850 N/mm²



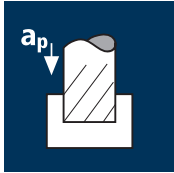
Acciaio
850 - 1100 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Ghisa
(grigia / sferoidale)



Acciaio
< 850 N/mm²



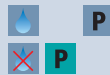
Acciaio
850 - 1100 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Ghisa
(grigia / sferoidale)



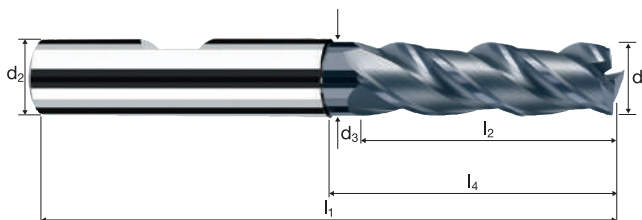
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 3.00 | 3 | 165 | 0.010 | 4.500 | 1.800 | 17505 | 525 | 4.3 |
| 4.00 | 3 | 165 | 0.015 | 6.000 | 2.400 | 13130 | 590 | 8.5 |
| 5.00 | 3 | 165 | 0.015 | 7.500 | 3.000 | 10505 | 475 | 10.6 |
| 6.00 | 3 | 165 | 0.020 | 9.000 | 3.600 | 8755 | 525 | 17.0 |
| 8.00 | 3 | 165 | 0.025 | 12.000 | 4.800 | 6565 | 490 | 28.4 |
| 10.00 | 3 | 165 | 0.030 | 15.000 | 6.000 | 5250 | 475 | 42.5 |
| 12.00 | 3 | 165 | 0.040 | 18.000 | 7.200 | 4375 | 525 | 68.1 |
| 16.00 | 3 | 165 | 0.050 | 24.000 | 8.400 | 3285 | 490 | 99.3 |
| 20.00 | 3 | 165 | 0.065 | 30.000 | 10.500 | 2625 | 510 | 161.3 |
| 3.00 | 3 | 110 | 0.010 | 4.500 | 1.800 | 11670 | 350 | 2.8 |
| 4.00 | 3 | 110 | 0.015 | 6.000 | 2.400 | 8755 | 395 | 5.7 |
| 5.00 | 3 | 110 | 0.015 | 7.500 | 3.000 | 7005 | 315 | 7.1 |
| 6.00 | 3 | 110 | 0.020 | 9.000 | 3.600 | 5835 | 350 | 11.3 |
| 8.00 | 3 | 110 | 0.025 | 12.000 | 4.800 | 4375 | 330 | 18.9 |
| 10.00 | 3 | 110 | 0.030 | 15.000 | 6.000 | 3500 | 315 | 28.4 |
| 12.00 | 3 | 110 | 0.040 | 18.000 | 7.200 | 2920 | 350 | 45.4 |
| 16.00 | 3 | 110 | 0.050 | 24.000 | 8.400 | 2190 | 330 | 66.2 |
| 20.00 | 3 | 110 | 0.065 | 30.000 | 10.500 | 1750 | 340 | 107.5 |
| 3.00 | 3 | 80 | 0.005 | 4.500 | 1.800 | 8490 | 125 | 1.0 |
| 4.00 | 3 | 80 | 0.010 | 6.000 | 2.400 | 6365 | 190 | 2.8 |
| 5.00 | 3 | 80 | 0.010 | 7.500 | 3.000 | 5095 | 155 | 3.4 |
| 6.00 | 3 | 80 | 0.015 | 9.000 | 3.600 | 4245 | 190 | 6.2 |
| 8.00 | 3 | 80 | 0.020 | 12.000 | 4.800 | 3185 | 190 | 11.0 |
| 10.00 | 3 | 80 | 0.025 | 15.000 | 6.000 | 2545 | 190 | 17.2 |
| 12.00 | 3 | 80 | 0.030 | 18.000 | 7.200 | 2120 | 190 | 24.8 |
| 16.00 | 3 | 80 | 0.040 | 24.000 | 8.400 | 1590 | 190 | 38.5 |
| 20.00 | 3 | 80 | 0.045 | 30.000 | 10.500 | 1275 | 170 | 54.1 |
| 3.00 | 3 | 130 | 0.010 | 4.500 | 1.800 | 13795 | 415 | 3.4 |
| 4.00 | 3 | 130 | 0.015 | 6.000 | 2.400 | 10345 | 465 | 6.7 |
| 5.00 | 3 | 130 | 0.015 | 7.500 | 3.000 | 8275 | 370 | 8.4 |
| 6.00 | 3 | 130 | 0.020 | 9.000 | 3.600 | 6895 | 415 | 13.4 |
| 8.00 | 3 | 130 | 0.025 | 12.000 | 4.800 | 5175 | 390 | 22.3 |
| 10.00 | 3 | 130 | 0.030 | 15.000 | 6.000 | 4140 | 370 | 33.5 |
| 12.00 | 3 | 130 | 0.040 | 18.000 | 7.200 | 3450 | 415 | 53.6 |
| 16.00 | 3 | 130 | 0.050 | 24.000 | 8.400 | 2585 | 390 | 78.2 |
| 20.00 | 3 | 130 | 0.065 | 30.000 | 10.500 | 2070 | 405 | 127.1 |
| 3.00 | 3 | 130 | 0.010 | 2.000 | 3.000 | 13795 | 415 | 2.5 |
| 4.00 | 3 | 130 | 0.015 | 3.100 | 4.000 | 10345 | 465 | 5.8 |
| 5.00 | 3 | 130 | 0.015 | 4.400 | 5.000 | 8275 | 370 | 8.2 |
| 6.00 | 3 | 130 | 0.020 | 7.800 | 6.000 | 6895 | 415 | 19.4 |
| 8.00 | 3 | 130 | 0.025 | 10.400 | 8.000 | 5175 | 390 | 32.3 |
| 10.00 | 3 | 130 | 0.025 | 13.000 | 10.000 | 4140 | 310 | 40.3 |
| 12.00 | 3 | 130 | 0.035 | 15.600 | 12.000 | 3450 | 360 | 67.8 |
| 16.00 | 3 | 130 | 0.045 | 17.600 | 16.000 | 2585 | 350 | 98.3 |
| 20.00 | 3 | 130 | 0.060 | 22.000 | 20.000 | 2070 | 370 | 163.9 |
| 3.00 | 3 | 85 | 0.010 | 2.000 | 3.000 | 9020 | 270 | 1.6 |
| 4.00 | 3 | 85 | 0.015 | 3.100 | 4.000 | 6765 | 305 | 3.8 |
| 5.00 | 3 | 85 | 0.015 | 4.400 | 5.000 | 5410 | 245 | 5.4 |
| 6.00 | 3 | 85 | 0.020 | 7.800 | 6.000 | 4510 | 270 | 12.7 |
| 8.00 | 3 | 85 | 0.025 | 10.400 | 8.000 | 3380 | 255 | 21.1 |
| 10.00 | 3 | 85 | 0.025 | 13.000 | 10.000 | 2705 | 205 | 26.4 |
| 12.00 | 3 | 85 | 0.035 | 15.600 | 12.000 | 2255 | 235 | 44.3 |
| 16.00 | 3 | 85 | 0.045 | 17.600 | 16.000 | 1690 | 230 | 64.3 |
| 20.00 | 3 | 85 | 0.060 | 22.000 | 20.000 | 1355 | 245 | 107.1 |
| 3.00 | 3 | 65 | 0.005 | 2.000 | 3.000 | 6895 | 105 | 0.6 |
| 4.00 | 3 | 65 | 0.010 | 3.100 | 4.000 | 5175 | 155 | 1.9 |
| 5.00 | 3 | 65 | 0.010 | 4.400 | 5.000 | 4140 | 125 | 2.7 |
| 6.00 | 3 | 65 | 0.015 | 7.800 | 6.000 | 3450 | 155 | 7.3 |
| 8.00 | 3 | 65 | 0.020 | 10.400 | 8.000 | 2585 | 155 | 12.9 |
| 10.00 | 3 | 65 | 0.025 | 13.000 | 10.000 | 2070 | 155 | 20.2 |
| 12.00 | 3 | 65 | 0.025 | 15.600 | 12.000 | 1725 | 130 | 24.2 |
| 16.00 | 3 | 65 | 0.035 | 17.600 | 16.000 | 1295 | 135 | 38.2 |
| 20.00 | 3 | 65 | 0.040 | 22.000 | 20.000 | 1035 | 125 | 54.6 |
| 3.00 | 3 | 110 | 0.010 | 2.000 | 3.000 | 11670 | 350 | 2.1 |
| 4.00 | 3 | 110 | 0.015 | 3.100 | 4.000 | 8755 | 395 | 4.9 |
| 5.00 | 3 | 110 | 0.015 | 4.400 | 5.000 | 7005 | 315 | 6.9 |
| 6.00 | 3 | 110 | 0.020 | 7.800 | 6.000 | 5835 | 350 | 16.4 |
| 8.00 | 3 | 110 | 0.025 | 10.400 | 8.000 | 4375 | 330 | 27.3 |
| 10.00 | 3 | 110 | 0.025 | 13.000 | 10.000 | 3500 | 265 | 34.1 |
| 12.00 | 3 | 110 | 0.035 | 15.600 | 12.000 | 2920 | 305 | 57.4 |
| 16.00 | 3 | 110 | 0.045 | 17.600 | 16.000 | 2190 | 295 | 83.2 |
| 20.00 | 3 | 110 | 0.060 | 22.000 | 20.000 | 1750 | 315 | 138.7 |

Frese cilindriche

A taglienti lisci, esecuzione medio-lunga con scarico corto



HM λ **40°**
MG10 γ **6°**



Sgrossatura Finitura

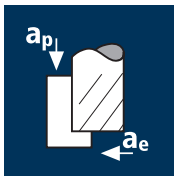


ReTool®

| | | | | | | | | | | |
|-------------|----------------|-----------------|--|--|--|--|--|-------------------|----------------|--------------------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | | | | | | Inox Stainless | Ti Titanium | GG(G) Tool Steel Nickel-Alloys |
|-------------|----------------|-----------------|--|--|--|--|--|-------------------|----------------|--------------------------------------|

| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | 45° | α | z | POLYCHROM |
|-----------------------|----------------------|----------------------|--------------------------|--------------------------|------------------------|----------------|----------------|------|------|---|---------------|
| | | | | | | | | | | | EUR |
| Esempio: N° Ordine | | | Rivestimento P | Articolo 45334 | Codice-Ø 180 | | | | | | P45334 |
| | | | | | | | | | | | P45234 |
| 180 | 3.00 | 6.00 | 2.80 | 63 | 14.00 | 20.00 | 26.63 | 0.10 | 3.5° | 3 | 49.50 |
| 220 | 4.00 | 6.00 | 3.70 | 63 | 17.00 | 22.00 | 26.95 | 0.10 | 2.5° | 3 | 49.50 |
| 260 | 5.00 | 6.00 | 4.60 | 63 | 19.00 | 24.00 | 27.27 | 0.15 | 1.5° | 3 | 49.50 |
| 300 | 6.00 | 6.00 | 5.50 | 63 | 19.00 | 25.34 | 26.00 | 0.15 | 0.0° | 3 | 49.50 |
| 391 | 8.00 | 8.00 | 7.40 | 72 | 28.00 | 34.29 | 35.00 | 0.15 | 0.0° | 3 | 62.00 |
| 450 | 10.00 | 10.00 | 9.20 | 84 | 34.00 | 42.20 | 43.00 | 0.20 | 0.0° | 3 | 84.00 |
| 501 | 12.00 | 12.00 | 11.00 | 97 | 40.00 | 50.13 | 51.00 | 0.20 | 0.0° | 3 | 104.00 |
| 610 | 16.00 | 16.00 | 15.00 | 108 | 48.00 | 58.13 | 59.00 | 0.20 | 0.0° | 3 | 163.00 |
| 682 | 20.00 | 20.00 | 19.00 | 122 | 56.00 | 70.13 | 71.00 | 0.20 | 0.0° | 3 | 237.00 |

Applicazione



Materiale

Acciaio
850 - 1100 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 4.00 | 4 | 150 | 0.025 | 4.000 | 1.800 | 11935 | 1195 | 8.6 |
| 5.00 | 4 | 150 | 0.035 | 5.000 | 2.250 | 9550 | 1335 | 15.0 |
| 6.00 | 4 | 150 | 0.040 | 6.000 | 2.700 | 7960 | 1275 | 20.6 |
| 8.00 | 4 | 150 | 0.055 | 8.000 | 3.600 | 5970 | 1315 | 37.8 |
| 10.00 | 4 | 150 | 0.065 | 10.000 | 4.500 | 4775 | 1240 | 55.9 |
| 12.00 | 4 | 150 | 0.080 | 12.000 | 5.400 | 3980 | 1275 | 82.5 |
| 16.00 | 4 | 150 | 0.090 | 16.000 | 7.200 | 2985 | 1075 | 123.8 |

Acciaio
1100 - 1300 N/mm²



| | | | | | | | | |
|-------|---|-----|-------|--------|-------|------|------|------|
| 4.00 | 4 | 115 | 0.025 | 4.000 | 1.800 | 9150 | 915 | 6.6 |
| 5.00 | 4 | 115 | 0.035 | 5.000 | 2.250 | 7320 | 1025 | 11.5 |
| 6.00 | 4 | 115 | 0.040 | 6.000 | 2.700 | 6100 | 975 | 15.8 |
| 8.00 | 4 | 115 | 0.055 | 8.000 | 3.600 | 4575 | 1005 | 29.0 |
| 10.00 | 4 | 115 | 0.065 | 10.000 | 4.500 | 3660 | 950 | 42.8 |
| 12.00 | 4 | 115 | 0.080 | 12.000 | 5.400 | 3050 | 975 | 63.3 |
| 16.00 | 4 | 115 | 0.090 | 16.000 | 7.200 | 2290 | 825 | 94.9 |

Acciaio
1300 - 1500 N/mm²

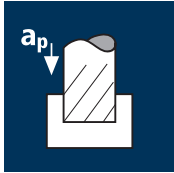


| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 4.00 | 4 | 80 | 0.025 | 4.000 | 1.800 | 6365 | 635 | 4.6 |
| 5.00 | 4 | 80 | 0.030 | 5.000 | 2.250 | 5095 | 610 | 6.9 |
| 6.00 | 4 | 80 | 0.035 | 6.000 | 2.700 | 4245 | 595 | 9.6 |
| 8.00 | 4 | 80 | 0.045 | 8.000 | 3.600 | 3185 | 575 | 16.5 |
| 10.00 | 4 | 80 | 0.060 | 10.000 | 4.500 | 2545 | 610 | 27.5 |
| 12.00 | 4 | 80 | 0.070 | 12.000 | 5.400 | 2120 | 595 | 38.5 |
| 16.00 | 4 | 80 | 0.080 | 16.000 | 7.200 | 1590 | 510 | 58.7 |

Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 4.00 | 4 | 50 | 0.015 | 4.000 | 1.800 | 3980 | 240 | 1.7 |
| 5.00 | 4 | 50 | 0.020 | 5.000 | 2.250 | 3185 | 255 | 2.9 |
| 6.00 | 4 | 50 | 0.020 | 6.000 | 2.700 | 2655 | 210 | 3.4 |
| 8.00 | 4 | 50 | 0.025 | 8.000 | 3.600 | 1990 | 200 | 5.7 |
| 10.00 | 4 | 50 | 0.035 | 10.000 | 4.500 | 1590 | 225 | 10.0 |
| 12.00 | 4 | 50 | 0.040 | 12.000 | 5.400 | 1325 | 210 | 13.8 |
| 16.00 | 4 | 50 | 0.050 | 16.000 | 7.200 | 995 | 200 | 22.9 |



Acciaio
850 - 1100 N/mm²



| | | | | | | | | |
|-------|---|-----|-------|--------|--------|------|-----|-------|
| 4.00 | 4 | 115 | 0.020 | 3.200 | 4.000 | 9150 | 730 | 9.4 |
| 5.00 | 4 | 115 | 0.025 | 4.000 | 5.000 | 7320 | 730 | 14.6 |
| 6.00 | 4 | 115 | 0.035 | 4.800 | 6.000 | 6100 | 855 | 24.6 |
| 8.00 | 4 | 115 | 0.045 | 6.400 | 8.000 | 4575 | 825 | 42.2 |
| 10.00 | 4 | 115 | 0.055 | 8.000 | 10.000 | 3660 | 805 | 64.4 |
| 12.00 | 4 | 115 | 0.065 | 9.600 | 12.000 | 3050 | 795 | 91.4 |
| 16.00 | 4 | 115 | 0.075 | 11.200 | 16.000 | 2290 | 685 | 123.0 |

Acciaio
1100 - 1300 N/mm²



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 4.00 | 4 | 90 | 0.020 | 3.200 | 4.000 | 7160 | 575 | 7.3 |
| 5.00 | 4 | 90 | 0.025 | 4.000 | 5.000 | 5730 | 575 | 11.5 |
| 6.00 | 4 | 90 | 0.035 | 4.800 | 6.000 | 4775 | 670 | 19.3 |
| 8.00 | 4 | 90 | 0.045 | 6.400 | 8.000 | 3580 | 645 | 33.0 |
| 10.00 | 4 | 90 | 0.055 | 8.000 | 10.000 | 2865 | 630 | 50.4 |
| 12.00 | 4 | 90 | 0.065 | 9.600 | 12.000 | 2385 | 620 | 71.5 |
| 16.00 | 4 | 90 | 0.075 | 11.200 | 16.000 | 1790 | 535 | 96.3 |

Acciaio
1300 - 1500 N/mm²



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 4.00 | 4 | 65 | 0.020 | 3.200 | 4.000 | 5175 | 415 | 5.3 |
| 5.00 | 4 | 65 | 0.025 | 4.000 | 5.000 | 4140 | 415 | 8.3 |
| 6.00 | 4 | 65 | 0.030 | 4.800 | 6.000 | 3450 | 415 | 11.9 |
| 8.00 | 4 | 65 | 0.040 | 6.400 | 8.000 | 2585 | 415 | 21.2 |
| 10.00 | 4 | 65 | 0.050 | 8.000 | 10.000 | 2070 | 415 | 33.1 |
| 12.00 | 4 | 65 | 0.060 | 9.600 | 12.000 | 1725 | 415 | 47.7 |
| 16.00 | 4 | 65 | 0.070 | 11.200 | 16.000 | 1295 | 360 | 64.9 |

Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 4.00 | 4 | 40 | 0.015 | 3.200 | 4.000 | 3185 | 190 | 2.4 |
| 5.00 | 4 | 40 | 0.015 | 4.000 | 5.000 | 2545 | 155 | 3.1 |
| 6.00 | 4 | 40 | 0.020 | 4.800 | 6.000 | 2120 | 170 | 4.9 |
| 8.00 | 4 | 40 | 0.025 | 6.400 | 8.000 | 1590 | 160 | 8.1 |
| 10.00 | 4 | 40 | 0.035 | 8.000 | 10.000 | 1275 | 180 | 14.3 |
| 12.00 | 4 | 40 | 0.040 | 9.600 | 12.000 | 1060 | 170 | 19.6 |
| 16.00 | 4 | 40 | 0.045 | 11.200 | 16.000 | 795 | 145 | 25.7 |

Frese cilindriche NX (NX-VD)

A taglienti lisci, esecuzione medio-lunga con scarico

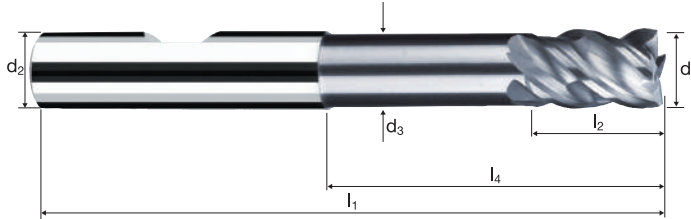


HM
MG10

λ 45°
 γ -20°

45°

Vario



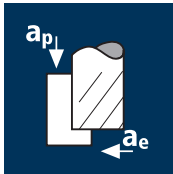
Sgrossatura Finitura



| | | | | | | | |
|----------------|-----------------|-----------------|--------------|--------------|--|----------------|---------------------|
| Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | | Ti Titanium | GG(G) Tool Steel |
|----------------|-----------------|-----------------|--------------|--------------|--|----------------|---------------------|

| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | 45° | α | z | POLYCHROM |
|---|----------------------|----------------------|----------------|----------------|----------------|----------------|----------------|------|------|---|-----------|
| | | | | | | | | | | | EUR |
| Esempio: Rivestimento P Articolo 15359 Codice-ø 220 | | | | | | | | | | | P15359 |
| N° Ordine | | | | | | | | | | | P15259 |
| 220 | 4.00 | 6.00 | 3.70 | 63 | 6.00 | 22.00 | 26.95 | 0.10 | 2.5° | 4 | 90.00 |
| 260 | 5.00 | 6.00 | 4.60 | 63 | 8.00 | 24.00 | 27.27 | 0.15 | 1.5° | 4 | 90.00 |
| 300 | 6.00 | 6.00 | 5.50 | 63 | 9.00 | 25.34 | 26.00 | 0.15 | 0.0° | 4 | 90.00 |
| 391 | 8.00 | 8.00 | 7.40 | 72 | 12.00 | 34.29 | 35.00 | 0.15 | 0.0° | 4 | 112.00 |
| 450 | 10.00 | 10.00 | 9.20 | 84 | 15.00 | 42.20 | 43.00 | 0.20 | 0.0° | 4 | 153.00 |
| 501 | 12.00 | 12.00 | 11.00 | 97 | 18.00 | 50.13 | 51.00 | 0.20 | 0.0° | 4 | 189.00 |
| 610 | 16.00 | 16.00 | 15.00 | 108 | 24.00 | 58.13 | 59.00 | 0.20 | 0.0° | 4 | 295.00 |

Applicazione



Materiale

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 6.00 | 4 | 80 | 0.030 | 6.000 | 1.800 | 4245 | 510 | 5.5 |
| 8.00 | 4 | 80 | 0.040 | 8.000 | 2.400 | 3185 | 510 | 9.8 |
| 10.00 | 4 | 80 | 0.055 | 10.000 | 3.000 | 2545 | 560 | 16.8 |
| 12.00 | 4 | 80 | 0.060 | 12.000 | 3.600 | 2120 | 510 | 22.0 |
| 16.00 | 4 | 80 | 0.085 | 16.000 | 2.400 | 1590 | 540 | 20.8 |

Inox medium
[Cr-Ni-Mo+/1.4539]
Acciaio duplex
[17-4 PH]



| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 6.00 | 4 | 40 | 0.030 | 6.000 | 1.800 | 2120 | 255 | 2.8 |
| 8.00 | 4 | 40 | 0.040 | 8.000 | 2.400 | 1590 | 255 | 4.9 |
| 10.00 | 4 | 40 | 0.055 | 10.000 | 3.000 | 1275 | 280 | 8.4 |
| 12.00 | 4 | 40 | 0.060 | 12.000 | 3.600 | 1060 | 255 | 11.0 |
| 16.00 | 4 | 40 | 0.085 | 16.000 | 2.400 | 795 | 270 | 10.4 |

Inox difficile
[Cr-Ni-Mo+//1.4529]
Acciaio resistente al calore
[1.4841]



| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|-----|
| 6.00 | 4 | 25 | 0.030 | 6.000 | 1.800 | 1325 | 160 | 1.7 |
| 8.00 | 4 | 25 | 0.035 | 8.000 | 2.400 | 995 | 140 | 2.7 |
| 10.00 | 4 | 25 | 0.045 | 10.000 | 3.000 | 795 | 145 | 4.3 |
| 12.00 | 4 | 25 | 0.050 | 12.000 | 3.600 | 665 | 135 | 5.7 |
| 16.00 | 4 | 25 | 0.060 | 16.000 | 2.400 | 495 | 120 | 4.6 |

Leghe a base di nichel
indurite
Rm > 1000 N/mm²
[Inconel 718]



| | | | | | | | | |
|-------|---|----|-------|--------|-------|-----|----|-----|
| 6.00 | 4 | 15 | 0.030 | 6.000 | 1.800 | 795 | 95 | 1.0 |
| 8.00 | 4 | 15 | 0.035 | 8.000 | 2.400 | 595 | 85 | 1.6 |
| 10.00 | 4 | 15 | 0.045 | 10.000 | 3.000 | 475 | 85 | 2.6 |
| 12.00 | 4 | 15 | 0.050 | 12.000 | 3.600 | 400 | 80 | 3.4 |
| 16.00 | 4 | 15 | 0.060 | 16.000 | 2.400 | 300 | 70 | 2.8 |



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| | | | | | | | | |
|-------|---|----|-------|-------|--------|------|-----|------|
| 6.00 | 4 | 60 | 0.030 | 1.500 | 6.000 | 3185 | 380 | 3.4 |
| 8.00 | 4 | 60 | 0.040 | 2.000 | 8.000 | 2385 | 380 | 6.1 |
| 10.00 | 4 | 60 | 0.055 | 2.500 | 10.000 | 1910 | 420 | 10.5 |
| 12.00 | 4 | 60 | 0.065 | 3.000 | 12.000 | 1590 | 415 | 14.9 |
| 16.00 | 4 | 60 | 0.085 | 2.400 | 16.000 | 1195 | 405 | 15.6 |

Inox medium
[Cr-Ni-Mo+/1.4539]
Acciaio duplex
[17-4 PH]



| | | | | | | | | |
|-------|---|----|-------|-------|--------|------|-----|-----|
| 6.00 | 4 | 30 | 0.030 | 1.500 | 6.000 | 1590 | 190 | 1.7 |
| 8.00 | 4 | 30 | 0.040 | 2.000 | 8.000 | 1195 | 190 | 3.1 |
| 10.00 | 4 | 30 | 0.055 | 2.500 | 10.000 | 955 | 210 | 5.3 |
| 12.00 | 4 | 30 | 0.065 | 3.000 | 12.000 | 795 | 205 | 7.4 |
| 16.00 | 4 | 30 | 0.085 | 2.400 | 16.000 | 595 | 205 | 7.8 |

Inox difficile
[Cr-Ni-Mo+//1.4529]
Acciaio resistente al calore
[1.4841]



| | | | | | | | | |
|-------|---|----|-------|-------|--------|------|-----|-----|
| 6.00 | 4 | 20 | 0.030 | 1.500 | 6.000 | 1060 | 125 | 1.1 |
| 8.00 | 4 | 20 | 0.035 | 2.000 | 8.000 | 795 | 110 | 1.8 |
| 10.00 | 4 | 20 | 0.045 | 2.500 | 10.000 | 635 | 115 | 2.9 |
| 12.00 | 4 | 20 | 0.050 | 3.000 | 12.000 | 530 | 105 | 3.8 |
| 16.00 | 4 | 20 | 0.060 | 2.400 | 16.000 | 400 | 95 | 3.7 |

Leghe a base di nichel
indurite
Rm > 1000 N/mm²
[Inconel 718]



| | | | | | | | | |
|-------|---|----|-------|-------|--------|-----|----|-----|
| 6.00 | 4 | 10 | 0.030 | 1.500 | 6.000 | 530 | 65 | 0.6 |
| 8.00 | 4 | 10 | 0.035 | 2.000 | 8.000 | 400 | 55 | 0.9 |
| 10.00 | 4 | 10 | 0.045 | 2.500 | 10.000 | 320 | 55 | 1.4 |
| 12.00 | 4 | 10 | 0.050 | 3.000 | 12.000 | 265 | 55 | 1.9 |
| 16.00 | 4 | 10 | 0.060 | 2.400 | 16.000 | 200 | 50 | 1.8 |

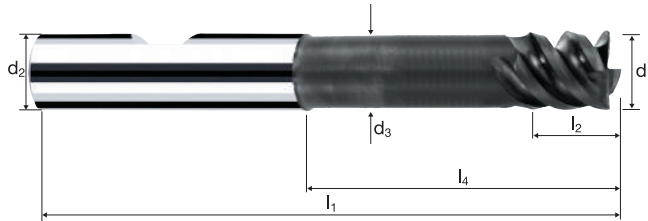
Frese cilindriche SX

A taglienti lisci, esecuzione medio-lunga con scarico



HM
MG10

λ 55°
 γ 15°



Sgrossatura

Finitura



ToolSchool

ReTool®

Rm
< 850

Rm
850-1100

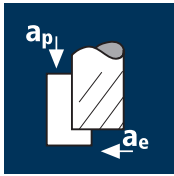
Inox
Stainless

Ti
Titanium

Nickel-Alloys
Tool Steel

| | | | | | | | | | | POLYCHROM | |
|-----------|----------------------|----------------------|----------------|----------------|----------------|----------------|----------------|------|---|-----------|--------|
| | | | | | | | | | | P5319 | |
| | | | | | | | | | | P5219 | |
| | | | | | | | | | | EUR | |
| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | 45° | z | | |
| 300 | 6.00 | 6.00 | 5.50 | 70 | 7.00 | 32.34 | 33.00 | 0.15 | 4 | | 91.00 |
| 391 | 8.00 | 8.00 | 7.40 | 80 | 9.00 | 42.29 | 43.00 | 0.15 | 4 | | 114.00 |
| 450 | 10.00 | 10.00 | 9.20 | 84 | 11.00 | 42.20 | 43.00 | 0.20 | 4 | | 155.00 |
| 501 | 12.00 | 12.00 | 11.00 | 97 | 13.00 | 50.13 | 51.00 | 0.20 | 4 | | 191.00 |
| 610 | 16.00 | 16.00 | 15.00 | 115 | 17.00 | 65.13 | 66.00 | 0.20 | 4 | | 299.00 |
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Applicazione



Materiale

Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 6.00 | 4 | 190 | 0.050 | 6.000 | 2.400 | 10080 | 2015 | 29.0 |
| 8.00 | 4 | 190 | 0.065 | 8.000 | 3.200 | 7560 | 1965 | 50.3 |
| 10.00 | 4 | 190 | 0.080 | 10.000 | 4.000 | 6050 | 1935 | 77.4 |
| 12.00 | 4 | 190 | 0.095 | 12.000 | 4.800 | 5040 | 1915 | 110.3 |
| 16.00 | 4 | 190 | 0.125 | 16.000 | 3.200 | 3780 | 1890 | 96.8 |

Acciaio
850 - 1100 N/mm²



| | | | | | | | | |
|-------|---|-----|-------|--------|-------|------|------|------|
| 6.00 | 4 | 140 | 0.050 | 6.000 | 2.400 | 7425 | 1485 | 21.4 |
| 8.00 | 4 | 140 | 0.065 | 8.000 | 3.200 | 5570 | 1450 | 37.1 |
| 10.00 | 4 | 140 | 0.080 | 10.000 | 4.000 | 4455 | 1425 | 57.0 |
| 12.00 | 4 | 140 | 0.095 | 12.000 | 4.800 | 3715 | 1410 | 81.3 |
| 16.00 | 4 | 140 | 0.125 | 16.000 | 3.200 | 2785 | 1395 | 71.3 |

Acciaio per lavorazione
a freddo (12% Cr)
fortemente legati
[1.2379]



| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 6.00 | 4 | 70 | 0.045 | 6.000 | 2.400 | 3715 | 670 | 9.6 |
| 8.00 | 4 | 70 | 0.060 | 8.000 | 3.200 | 2785 | 670 | 17.1 |
| 10.00 | 4 | 70 | 0.070 | 10.000 | 4.000 | 2230 | 625 | 25.0 |
| 12.00 | 4 | 70 | 0.085 | 12.000 | 4.800 | 1855 | 630 | 36.4 |
| 16.00 | 4 | 70 | 0.110 | 16.000 | 3.200 | 1395 | 615 | 31.4 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 6.00 | 4 | 90 | 0.030 | 6.000 | 2.400 | 4775 | 575 | 8.3 |
| 8.00 | 4 | 90 | 0.040 | 8.000 | 3.200 | 3580 | 575 | 14.7 |
| 10.00 | 4 | 90 | 0.050 | 10.000 | 4.000 | 2865 | 575 | 22.9 |
| 12.00 | 4 | 90 | 0.060 | 12.000 | 4.800 | 2385 | 575 | 33.0 |
| 16.00 | 4 | 90 | 0.080 | 16.000 | 3.200 | 1790 | 575 | 29.3 |



Acciaio
< 850 N/mm²



| | | | | | | | | |
|-------|---|-----|-------|-------|--------|------|------|-------|
| 6.00 | 4 | 155 | 0.040 | 4.200 | 6.000 | 8225 | 1315 | 33.2 |
| 8.00 | 4 | 155 | 0.050 | 5.600 | 8.000 | 6165 | 1235 | 55.3 |
| 10.00 | 4 | 155 | 0.065 | 7.000 | 10.000 | 4935 | 1285 | 89.8 |
| 12.00 | 4 | 155 | 0.075 | 8.400 | 12.000 | 4110 | 1235 | 124.3 |
| 16.00 | 4 | 155 | 0.075 | 6.400 | 16.000 | 3085 | 925 | 94.7 |

Acciaio
850 - 1100 N/mm²



| | | | | | | | | |
|-------|---|-----|-------|-------|--------|------|-----|------|
| 6.00 | 4 | 105 | 0.040 | 4.200 | 6.000 | 5570 | 890 | 22.5 |
| 8.00 | 4 | 105 | 0.050 | 5.600 | 8.000 | 4180 | 835 | 37.4 |
| 10.00 | 4 | 105 | 0.065 | 7.000 | 10.000 | 3340 | 870 | 60.8 |
| 12.00 | 4 | 105 | 0.075 | 8.400 | 12.000 | 2785 | 835 | 84.2 |
| 16.00 | 4 | 105 | 0.075 | 6.400 | 16.000 | 2090 | 625 | 64.2 |

Acciaio per lavorazione
a freddo (12% Cr)
fortemente legati
[1.2379]



| | | | | | | | | |
|-------|---|----|-------|-------|--------|------|-----|------|
| 6.00 | 4 | 55 | 0.035 | 4.200 | 6.000 | 2920 | 410 | 10.3 |
| 8.00 | 4 | 55 | 0.045 | 5.600 | 8.000 | 2190 | 395 | 17.6 |
| 10.00 | 4 | 55 | 0.055 | 7.000 | 10.000 | 1750 | 385 | 27.0 |
| 12.00 | 4 | 55 | 0.060 | 8.400 | 12.000 | 1460 | 350 | 35.3 |
| 16.00 | 4 | 55 | 0.075 | 6.400 | 16.000 | 1095 | 330 | 33.6 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



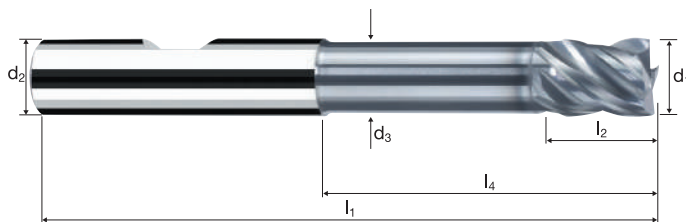
| | | | | | | | | |
|-------|---|----|-------|-------|--------|------|-----|------|
| 6.00 | 4 | 75 | 0.030 | 4.200 | 6.000 | 3980 | 475 | 12.0 |
| 8.00 | 4 | 75 | 0.040 | 5.600 | 8.000 | 2985 | 475 | 21.4 |
| 10.00 | 4 | 75 | 0.045 | 7.000 | 10.000 | 2385 | 430 | 30.1 |
| 12.00 | 4 | 75 | 0.050 | 8.400 | 12.000 | 1990 | 400 | 40.1 |
| 16.00 | 4 | 75 | 0.065 | 6.400 | 16.000 | 1490 | 390 | 39.7 |

Frese cilindriche

A taglienti lisci, esecuzione medio-lunga con scarico



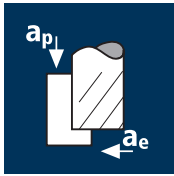
HM
MG10 λ 40°
 γ 0°



| | | | | | | | | | |
|----------|-------------|--------------|--------------|--|--|--|----------------|-------------|------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | | | | Inox Stainless | Ti Titanium | GG(G) Tool Steel |
|----------|-------------|--------------|--------------|--|--|--|----------------|-------------|------------------|

| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | 45° | z | ESEMPIO | POLYCHROM |
|--------|-------------------|-------------------|----------------|----------------|----------------|----------------|----------------|------|---|---------|-----------|
| | | | | | | | | | | | EUR |
| 300 | 6.00 | 6.00 | 5.50 | 70 | 7.00 | 32.34 | 33.00 | 0.15 | 4 | | P15325 |
| 391 | 8.00 | 8.00 | 7.40 | 80 | 9.00 | 42.29 | 43.00 | 0.15 | 4 | | P15225 |
| 450 | 10.00 | 10.00 | 9.20 | 84 | 11.00 | 42.20 | 43.00 | 0.20 | 4 | | EUR |
| 501 | 12.00 | 12.00 | 11.00 | 97 | 13.00 | 50.13 | 51.00 | 0.20 | 4 | | 87.00 |
| 610 | 16.00 | 16.00 | 15.00 | 115 | 17.00 | 65.13 | 66.00 | 0.20 | 4 | | 109.00 |
| | | | | | | | | | | | 148.00 |
| | | | | | | | | | | | 182.00 |
| | | | | | | | | | | | 285.00 |
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Applicazione



Materiale

Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 3.00 | 3 | 190 | 0.015 | 4.500 | 1.200 | 20160 | 905 | 4.9 |
| 4.00 | 3 | 190 | 0.015 | 6.000 | 1.600 | 15120 | 680 | 6.5 |
| 5.00 | 3 | 190 | 0.020 | 7.500 | 2.000 | 12095 | 725 | 10.9 |
| 6.00 | 3 | 190 | 0.040 | 9.000 | 2.400 | 10080 | 1210 | 26.1 |
| 8.00 | 3 | 190 | 0.050 | 12.000 | 3.200 | 7560 | 1135 | 43.5 |
| 10.00 | 3 | 190 | 0.065 | 15.000 | 4.000 | 6050 | 1180 | 70.8 |
| 12.00 | 3 | 190 | 0.075 | 18.000 | 4.800 | 5040 | 1135 | 98.0 |
| 16.00 | 3 | 190 | 0.085 | 24.000 | 6.400 | 3780 | 965 | 148.1 |

Acciaio
850 - 1100 N/mm²



| | | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|-----|-------|
| 3.00 | 3 | 140 | 0.015 | 4.500 | 1.200 | 14855 | 670 | 3.6 |
| 4.00 | 3 | 140 | 0.015 | 6.000 | 1.600 | 11140 | 500 | 4.8 |
| 5.00 | 3 | 140 | 0.020 | 7.500 | 2.000 | 8915 | 535 | 8.0 |
| 6.00 | 3 | 140 | 0.040 | 9.000 | 2.400 | 7425 | 890 | 19.3 |
| 8.00 | 3 | 140 | 0.050 | 12.000 | 3.200 | 5570 | 835 | 32.1 |
| 10.00 | 3 | 140 | 0.065 | 15.000 | 4.000 | 4455 | 870 | 52.1 |
| 12.00 | 3 | 140 | 0.075 | 18.000 | 4.800 | 3715 | 835 | 72.2 |
| 16.00 | 3 | 140 | 0.085 | 24.000 | 6.400 | 2785 | 710 | 109.1 |

Acciaio per lavorazione
a freddo (12% Cr)
fortemente legati
[1.2379]

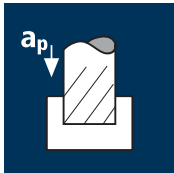


| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 3.00 | 3 | 70 | 0.010 | 4.500 | 1.200 | 7425 | 225 | 1.2 |
| 4.00 | 3 | 70 | 0.015 | 6.000 | 1.600 | 5570 | 250 | 2.4 |
| 5.00 | 3 | 70 | 0.015 | 7.500 | 2.000 | 4455 | 200 | 3.0 |
| 6.00 | 3 | 70 | 0.035 | 9.000 | 2.400 | 3715 | 390 | 8.4 |
| 8.00 | 3 | 70 | 0.045 | 12.000 | 3.200 | 2785 | 375 | 14.4 |
| 10.00 | 3 | 70 | 0.055 | 15.000 | 4.000 | 2230 | 370 | 22.1 |
| 12.00 | 3 | 70 | 0.065 | 18.000 | 4.800 | 1855 | 360 | 31.3 |
| 16.00 | 3 | 70 | 0.075 | 24.000 | 6.400 | 1395 | 315 | 48.1 |

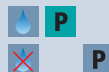
Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 3.00 | 3 | 90 | 0.010 | 4.500 | 1.200 | 9550 | 285 | 1.5 |
| 4.00 | 3 | 90 | 0.010 | 6.000 | 1.600 | 7160 | 215 | 2.1 |
| 5.00 | 3 | 90 | 0.010 | 7.500 | 2.000 | 5730 | 170 | 2.6 |
| 6.00 | 3 | 90 | 0.030 | 9.000 | 2.400 | 4775 | 430 | 9.3 |
| 8.00 | 3 | 90 | 0.035 | 12.000 | 3.200 | 3580 | 375 | 14.4 |
| 10.00 | 3 | 90 | 0.045 | 15.000 | 4.000 | 2865 | 385 | 23.2 |
| 12.00 | 3 | 90 | 0.050 | 18.000 | 4.800 | 2385 | 360 | 30.9 |
| 16.00 | 3 | 90 | 0.060 | 24.000 | 6.400 | 1790 | 320 | 49.5 |



Acciaio
< 850 N/mm²



| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|-----|-------|
| 3.00 | 3 | 155 | 0.015 | 4.200 | 3.000 | 16445 | 740 | 9.3 |
| 4.00 | 3 | 155 | 0.015 | 5.600 | 4.000 | 12335 | 555 | 12.4 |
| 5.00 | 3 | 155 | 0.025 | 7.000 | 5.000 | 9870 | 740 | 25.9 |
| 6.00 | 3 | 155 | 0.030 | 8.400 | 6.000 | 8225 | 740 | 37.3 |
| 8.00 | 3 | 155 | 0.040 | 11.200 | 8.000 | 6165 | 740 | 66.3 |
| 10.00 | 3 | 155 | 0.050 | 14.000 | 10.000 | 4935 | 740 | 103.6 |
| 12.00 | 3 | 155 | 0.060 | 16.800 | 12.000 | 4110 | 740 | 149.2 |
| 16.00 | 3 | 155 | 0.070 | 14.400 | 16.000 | 3085 | 650 | 149.2 |

Acciaio
850 - 1100 N/mm²



| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|-----|-------|
| 3.00 | 3 | 105 | 0.015 | 4.200 | 3.000 | 11140 | 500 | 6.3 |
| 4.00 | 3 | 105 | 0.015 | 5.600 | 4.000 | 8355 | 375 | 8.4 |
| 5.00 | 3 | 105 | 0.025 | 7.000 | 5.000 | 6685 | 500 | 17.5 |
| 6.00 | 3 | 105 | 0.030 | 8.400 | 6.000 | 5570 | 500 | 25.3 |
| 8.00 | 3 | 105 | 0.040 | 11.200 | 8.000 | 4180 | 500 | 44.9 |
| 10.00 | 3 | 105 | 0.050 | 14.000 | 10.000 | 3340 | 500 | 70.2 |
| 12.00 | 3 | 105 | 0.060 | 16.800 | 12.000 | 2785 | 500 | 101.1 |
| 16.00 | 3 | 105 | 0.070 | 14.400 | 16.000 | 2090 | 440 | 101.1 |

Acciaio per lavorazione
a freddo (12% Cr)
fortemente legati
[1.2379]



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 3.00 | 3 | 55 | 0.010 | 4.200 | 3.000 | 5835 | 175 | 2.2 |
| 4.00 | 3 | 55 | 0.015 | 5.600 | 4.000 | 4375 | 195 | 4.4 |
| 5.00 | 3 | 55 | 0.015 | 7.000 | 5.000 | 3500 | 160 | 5.5 |
| 6.00 | 3 | 55 | 0.030 | 8.400 | 6.000 | 2920 | 265 | 13.2 |
| 8.00 | 3 | 55 | 0.040 | 11.200 | 8.000 | 2190 | 265 | 23.5 |
| 10.00 | 3 | 55 | 0.050 | 14.000 | 10.000 | 1750 | 265 | 36.8 |
| 12.00 | 3 | 55 | 0.060 | 16.800 | 12.000 | 1460 | 265 | 52.9 |
| 16.00 | 3 | 55 | 0.070 | 14.400 | 16.000 | 1095 | 230 | 52.9 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

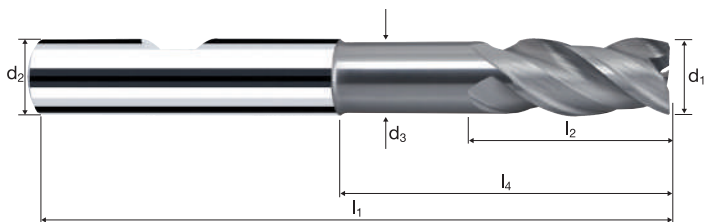


| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 3.00 | 3 | 70 | 0.010 | 4.200 | 3.000 | 7425 | 225 | 2.8 |
| 4.00 | 3 | 70 | 0.010 | 5.600 | 4.000 | 5570 | 165 | 3.7 |
| 5.00 | 3 | 70 | 0.010 | 7.000 | 5.000 | 4455 | 135 | 4.7 |
| 6.00 | 3 | 70 | 0.025 | 8.400 | 6.000 | 3715 | 280 | 14.0 |
| 8.00 | 3 | 70 | 0.030 | 11.200 | 8.000 | 2785 | 250 | 22.5 |
| 10.00 | 3 | 70 | 0.040 | 14.000 | 10.000 | 2230 | 265 | 37.4 |
| 12.00 | 3 | 70 | 0.050 | 16.800 | 12.000 | 1855 | 280 | 56.1 |
| 16.00 | 3 | 70 | 0.055 | 14.400 | 16.000 | 1395 | 230 | 52.9 |

Frese cilindriche

A taglienti lisci, esecuzione medio-lunga con scarico

HM
MG10 λ **40°**
 γ **0°**



Sgrossatura

Finitura

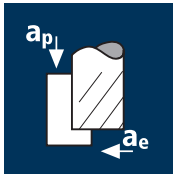


ReTool®

| | | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--|--|--|-------------------|----------------|---------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | | | | Inox Stainless | Ti Titanium | GG(G) Tool Steel |
|-------------|----------------|-----------------|-----------------|--|--|--|-------------------|----------------|---------------------|

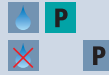
| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | 45° | α | z | POLYCHROM | | |
|-----------------------|----------------------|--------------------------|--------------------------|------------------------|----------------|----------------|----------------|------|------|---|-----------|---------------|--|
| | | | | | | | | | | | | | |
| Esempio: N° Ordine | | | | | | | | | | | | | |
| | | Rivestimento P | Articolo 15399 | Codice-Ø 180 | | | | | | | | | |
| | | | | | | | | | | | | P15399 | |
| | | | | | | | | | | | | P15299 | |
| | | | | | | | | | | | | EUR | |
| 180 | 3.00 | 6.00 | 2.80 | 63 | 8.00 | 20.00 | 26.63 | 0.10 | 3.5° | 3 | | 67.00 | |
| 220 | 4.00 | 6.00 | 3.70 | 63 | 11.00 | 22.00 | 26.95 | 0.10 | 2.5° | 3 | | 67.00 | |
| 260 | 5.00 | 6.00 | 4.60 | 63 | 13.00 | 24.00 | 27.27 | 0.15 | 1.5° | 3 | | 67.00 | |
| 300 | 6.00 | 6.00 | 5.50 | 63 | 13.00 | 25.34 | 26.00 | 0.15 | 0.0° | 3 | | 67.00 | |
| 391 | 8.00 | 8.00 | 7.40 | 72 | 19.00 | 34.29 | 35.00 | 0.15 | 0.0° | 3 | | 84.00 | |
| 450 | 10.00 | 10.00 | 9.20 | 84 | 22.00 | 42.20 | 43.00 | 0.20 | 0.0° | 3 | | 114.00 | |
| 501 | 12.00 | 12.00 | 11.00 | 97 | 26.00 | 50.13 | 51.00 | 0.20 | 0.0° | 3 | | 140.00 | |
| 610 | 16.00 | 16.00 | 15.00 | 108 | 32.00 | 58.13 | 59.00 | 0.20 | 0.0° | 3 | | 220.00 | |
| | | | | | | | | | | | | | |
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Applicazione



Materiale

Acciaio
< 850 N/mm²



Acciaio
850 - 1100 N/mm²



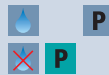
Acciaio
1100 - 1300 N/mm²



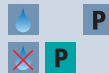
Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Ghisa
(grigia / sferoidale)



Acciaio per lavorazione
a freddo (12% Cr)
fortemente legati
[1.2379]



Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



Inox difficult
[Cr-Ni-Mo++/1.4529]
Acciaio resistente al calore
[1.4841]



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 6.00 | 4 | 130 | 0.045 | 15.000 | 0.600 | 6895 | 1240 | 11.2 |
| 8.00 | 4 | 130 | 0.060 | 20.000 | 0.800 | 5175 | 1240 | 19.9 |
| 10.00 | 4 | 130 | 0.075 | 25.000 | 1.000 | 4140 | 1240 | 31.0 |
| 12.00 | 4 | 130 | 0.090 | 30.000 | 1.200 | 3450 | 1240 | 44.7 |
| 16.00 | 4 | 130 | 0.115 | 40.000 | 1.600 | 2585 | 1190 | 76.1 |
| 20.00 | 4 | 130 | 0.145 | 50.000 | 2.000 | 2070 | 1200 | 120.0 |

| | | | | | | | | |
|-------|---|-----|-------|--------|-------|------|------|------|
| 6.00 | 4 | 120 | 0.040 | 15.000 | 0.600 | 6365 | 1020 | 9.2 |
| 8.00 | 4 | 120 | 0.050 | 20.000 | 0.800 | 4775 | 955 | 15.3 |
| 10.00 | 4 | 120 | 0.065 | 25.000 | 1.000 | 3820 | 995 | 24.8 |
| 12.00 | 4 | 120 | 0.080 | 30.000 | 1.200 | 3185 | 1020 | 36.7 |
| 16.00 | 4 | 120 | 0.100 | 40.000 | 1.600 | 2385 | 955 | 61.1 |
| 20.00 | 4 | 120 | 0.125 | 50.000 | 2.000 | 1910 | 955 | 95.5 |

| | | | | | | | | |
|-------|---|-----|-------|--------|-------|------|-----|------|
| 6.00 | 4 | 100 | 0.035 | 15.000 | 0.600 | 5305 | 745 | 6.7 |
| 8.00 | 4 | 100 | 0.045 | 20.000 | 0.800 | 3980 | 715 | 11.5 |
| 10.00 | 4 | 100 | 0.060 | 25.000 | 1.000 | 3185 | 765 | 19.1 |
| 12.00 | 4 | 100 | 0.070 | 30.000 | 1.200 | 2655 | 745 | 26.7 |
| 16.00 | 4 | 100 | 0.090 | 40.000 | 1.600 | 1990 | 715 | 45.8 |
| 20.00 | 4 | 100 | 0.110 | 50.000 | 2.000 | 1590 | 700 | 70.0 |

| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 6.00 | 4 | 80 | 0.025 | 15.000 | 0.450 | 4245 | 425 | 2.9 |
| 8.00 | 4 | 80 | 0.030 | 20.000 | 0.600 | 3185 | 380 | 4.6 |
| 10.00 | 4 | 80 | 0.040 | 25.000 | 0.750 | 2545 | 405 | 7.6 |
| 12.00 | 4 | 80 | 0.050 | 30.000 | 0.900 | 2120 | 425 | 11.5 |
| 16.00 | 4 | 80 | 0.060 | 40.000 | 1.200 | 1590 | 380 | 18.3 |
| 20.00 | 4 | 80 | 0.075 | 50.000 | 1.500 | 1275 | 380 | 28.6 |

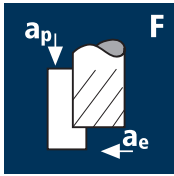
| | | | | | | | | |
|-------|---|-----|-------|--------|-------|------|------|-------|
| 6.00 | 4 | 120 | 0.045 | 15.000 | 0.600 | 6365 | 1145 | 10.3 |
| 8.00 | 4 | 120 | 0.060 | 20.000 | 0.800 | 4775 | 1145 | 18.3 |
| 10.00 | 4 | 120 | 0.070 | 25.000 | 1.000 | 3820 | 1070 | 26.7 |
| 12.00 | 4 | 120 | 0.085 | 30.000 | 1.200 | 3185 | 1080 | 39.0 |
| 16.00 | 4 | 120 | 0.110 | 40.000 | 1.600 | 2385 | 1050 | 67.2 |
| 20.00 | 4 | 120 | 0.135 | 50.000 | 2.000 | 1910 | 1030 | 103.1 |

| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 6.00 | 4 | 76 | 0.045 | 15.000 | 0.450 | 4030 | 725 | 4.9 |
| 8.00 | 4 | 76 | 0.060 | 20.000 | 0.600 | 3025 | 725 | 8.7 |
| 10.00 | 4 | 76 | 0.075 | 25.000 | 0.750 | 2420 | 725 | 13.6 |
| 12.00 | 4 | 76 | 0.090 | 30.000 | 0.900 | 2015 | 725 | 19.6 |
| 16.00 | 4 | 76 | 0.115 | 40.000 | 1.200 | 1510 | 695 | 33.4 |
| 20.00 | 4 | 76 | 0.145 | 50.000 | 1.500 | 1210 | 700 | 52.6 |

| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 6.00 | 4 | 50 | 0.030 | 15.000 | 0.600 | 2655 | 320 | 2.9 |
| 8.00 | 4 | 50 | 0.035 | 20.000 | 0.800 | 1990 | 280 | 4.5 |
| 10.00 | 4 | 50 | 0.045 | 25.000 | 1.000 | 1590 | 285 | 7.2 |
| 12.00 | 4 | 50 | 0.055 | 30.000 | 1.200 | 1325 | 290 | 10.5 |
| 16.00 | 4 | 50 | 0.065 | 40.000 | 1.600 | 995 | 260 | 16.6 |
| 20.00 | 4 | 50 | 0.085 | 50.000 | 2.000 | 795 | 270 | 27.1 |

| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 6.00 | 4 | 40 | 0.025 | 15.000 | 0.450 | 2120 | 210 | 1.4 |
| 8.00 | 4 | 40 | 0.030 | 20.000 | 0.600 | 1590 | 190 | 2.3 |
| 10.00 | 4 | 40 | 0.040 | 25.000 | 0.750 | 1275 | 205 | 3.8 |
| 12.00 | 4 | 40 | 0.050 | 30.000 | 0.900 | 1060 | 210 | 5.7 |
| 16.00 | 4 | 40 | 0.060 | 40.000 | 1.200 | 795 | 190 | 9.2 |
| 20.00 | 4 | 40 | 0.075 | 50.000 | 1.500 | 635 | 190 | 14.3 |

Applicazione



Materiale

Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|
| 4.00 | 4 | 32 | 0.005 | 11.200 | 0.050 | 2545 | 50 |
| 6.00 | 4 | 32 | 0.010 | 16.800 | 0.100 | 1700 | 70 |
| 8.00 | 4 | 32 | 0.015 | 22.400 | 0.100 | 1275 | 75 |
| 10.00 | 4 | 32 | 0.020 | 28.000 | 0.150 | 1020 | 80 |
| 12.00 | 4 | 32 | 0.020 | 33.600 | 0.200 | 850 | 70 |
| 16.00 | 4 | 32 | 0.030 | 44.800 | 0.250 | 635 | 75 |
| 20.00 | 4 | 32 | 0.035 | 56.000 | 0.300 | 510 | 70 |
| 30.00 | 6 | 32 | 0.055 | 84.000 | 0.450 | 340 | 110 |
| 40.00 | 6 | 32 | 0.075 | 112.000 | 0.600 | 255 | 115 |

Acciaio
850 - 1100 N/mm²



| | | | | | | | |
|-------|---|----|-------|---------|-------|------|----|
| 4.00 | 4 | 25 | 0.005 | 11.200 | 0.050 | 1990 | 40 |
| 6.00 | 4 | 25 | 0.010 | 16.800 | 0.100 | 1325 | 55 |
| 8.00 | 4 | 25 | 0.015 | 22.400 | 0.100 | 995 | 60 |
| 10.00 | 4 | 25 | 0.020 | 28.000 | 0.150 | 795 | 65 |
| 12.00 | 4 | 25 | 0.020 | 33.600 | 0.200 | 665 | 55 |
| 16.00 | 4 | 25 | 0.030 | 44.800 | 0.250 | 495 | 60 |
| 20.00 | 4 | 25 | 0.035 | 56.000 | 0.300 | 400 | 55 |
| 30.00 | 6 | 25 | 0.055 | 84.000 | 0.450 | 265 | 90 |
| 40.00 | 6 | 25 | 0.075 | 112.000 | 0.600 | 200 | 90 |

Acciaio
1100 - 1300 N/mm²



| | | | | | | | |
|-------|---|----|-------|---------|-------|------|----|
| 4.00 | 4 | 20 | 0.005 | 11.200 | 0.050 | 1590 | 30 |
| 6.00 | 4 | 20 | 0.010 | 16.800 | 0.100 | 1060 | 40 |
| 8.00 | 4 | 20 | 0.015 | 22.400 | 0.100 | 795 | 50 |
| 10.00 | 4 | 20 | 0.020 | 28.000 | 0.150 | 635 | 50 |
| 12.00 | 4 | 20 | 0.020 | 33.600 | 0.200 | 530 | 40 |
| 16.00 | 4 | 20 | 0.030 | 44.800 | 0.250 | 400 | 50 |
| 20.00 | 4 | 20 | 0.035 | 56.000 | 0.300 | 320 | 45 |
| 30.00 | 6 | 20 | 0.055 | 84.000 | 0.450 | 210 | 70 |
| 40.00 | 6 | 20 | 0.075 | 112.000 | 0.600 | 160 | 70 |

Acciaio per lavorazione
a freddo (12% Cr)
fortemente legati
[1.2379]



| | | | | | | | |
|-------|---|----|-------|---------|-------|------|----|
| 4.00 | 4 | 18 | 0.005 | 11.200 | 0.050 | 1430 | 30 |
| 6.00 | 4 | 18 | 0.010 | 16.800 | 0.100 | 955 | 40 |
| 8.00 | 4 | 18 | 0.015 | 22.400 | 0.100 | 715 | 45 |
| 10.00 | 4 | 18 | 0.020 | 28.000 | 0.150 | 575 | 45 |
| 12.00 | 4 | 18 | 0.020 | 33.600 | 0.200 | 475 | 40 |
| 16.00 | 4 | 18 | 0.030 | 44.800 | 0.250 | 360 | 45 |
| 20.00 | 4 | 18 | 0.035 | 56.000 | 0.300 | 285 | 40 |
| 30.00 | 6 | 18 | 0.055 | 84.000 | 0.450 | 190 | 65 |
| 40.00 | 6 | 18 | 0.075 | 112.000 | 0.600 | 145 | 65 |

Ghisa
(grigia / sferoidale)



| | | | | | | | |
|-------|---|----|-------|---------|-------|------|----|
| 4.00 | 4 | 24 | 0.005 | 11.200 | 0.050 | 1910 | 40 |
| 6.00 | 4 | 24 | 0.010 | 16.800 | 0.100 | 1275 | 50 |
| 8.00 | 4 | 24 | 0.015 | 22.400 | 0.100 | 955 | 55 |
| 10.00 | 4 | 24 | 0.020 | 28.000 | 0.150 | 765 | 60 |
| 12.00 | 4 | 24 | 0.020 | 33.600 | 0.200 | 635 | 50 |
| 16.00 | 4 | 24 | 0.030 | 44.800 | 0.250 | 475 | 55 |
| 20.00 | 4 | 24 | 0.035 | 56.000 | 0.300 | 380 | 55 |
| 30.00 | 6 | 24 | 0.055 | 84.000 | 0.450 | 255 | 85 |
| 40.00 | 6 | 24 | 0.075 | 112.000 | 0.600 | 190 | 85 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| | | | | | | | |
|-------|---|----|-------|---------|-------|------|----|
| 4.00 | 4 | 15 | 0.005 | 11.200 | 0.050 | 1195 | 25 |
| 6.00 | 4 | 15 | 0.010 | 16.800 | 0.100 | 795 | 30 |
| 8.00 | 4 | 15 | 0.015 | 22.400 | 0.100 | 595 | 35 |
| 10.00 | 4 | 15 | 0.020 | 28.000 | 0.150 | 475 | 40 |
| 12.00 | 4 | 15 | 0.020 | 33.600 | 0.200 | 400 | 30 |
| 16.00 | 4 | 15 | 0.030 | 44.800 | 0.250 | 300 | 35 |
| 20.00 | 4 | 15 | 0.035 | 56.000 | 0.300 | 240 | 35 |
| 30.00 | 6 | 15 | 0.055 | 84.000 | 0.450 | 160 | 55 |
| 40.00 | 6 | 15 | 0.075 | 112.000 | 0.600 | 120 | 55 |

Rame non legato



| | | | | | | | |
|-------|---|----|-------|---------|-------|------|-----|
| 4.00 | 4 | 40 | 0.005 | 11.200 | 0.050 | 3185 | 65 |
| 6.00 | 4 | 40 | 0.010 | 16.800 | 0.100 | 2120 | 85 |
| 8.00 | 4 | 40 | 0.015 | 22.400 | 0.100 | 1590 | 95 |
| 10.00 | 4 | 40 | 0.020 | 28.000 | 0.150 | 1275 | 100 |
| 12.00 | 4 | 40 | 0.020 | 33.600 | 0.200 | 1060 | 85 |
| 16.00 | 4 | 40 | 0.030 | 44.800 | 0.250 | 795 | 95 |
| 20.00 | 4 | 40 | 0.035 | 56.000 | 0.300 | 635 | 90 |
| 30.00 | 6 | 40 | 0.055 | 84.000 | 0.450 | 425 | 140 |
| 40.00 | 6 | 40 | 0.075 | 112.000 | 0.600 | 320 | 145 |

Alluminio malleabile
Costruzione integrale Al



| | | | | | | | |
|-------|---|----|-------|---------|-------|------|-----|
| 4.00 | 4 | 50 | 0.005 | 11.200 | 0.050 | 3980 | 80 |
| 6.00 | 4 | 50 | 0.010 | 16.800 | 0.100 | 2655 | 105 |
| 8.00 | 4 | 50 | 0.015 | 22.400 | 0.100 | 1990 | 120 |
| 10.00 | 4 | 50 | 0.020 | 28.000 | 0.150 | 1590 | 125 |
| 12.00 | 4 | 50 | 0.020 | 33.600 | 0.200 | 1325 | 105 |
| 16.00 | 4 | 50 | 0.030 | 44.800 | 0.250 | 995 | 120 |
| 20.00 | 4 | 50 | 0.035 | 56.000 | 0.300 | 795 | 110 |
| 30.00 | 6 | 50 | 0.055 | 84.000 | 0.450 | 530 | 175 |
| 40.00 | 6 | 50 | 0.075 | 112.000 | 0.600 | 400 | 180 |

Frese cilindriche

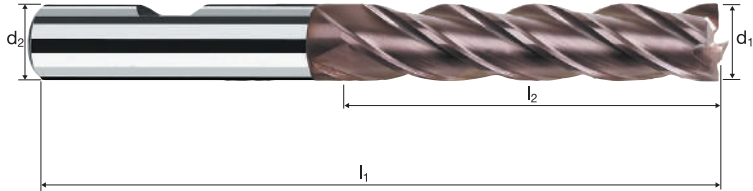
A taglienti lisci, esecuzione lunga

HSS

HSS
PM/F

λ 35°
 γ 15°

90°



Sgrossatura

Finitura



ReTool®

Rm
< 850

Rm
850-1100

Rm
1100-1300

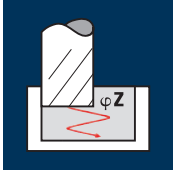
Inox
Stainless

Ti
Titanium

GG(G)
Copper

| Esempio: N° Ordine | | | | | | | | | UNICUT-4X |
|---|-------------|-------------|-------|--------|-------|----------|-----|--------|-----------|
| Rivestimento Articolo Codice- \emptyset | | | | | | | | | |
| U 0200 140 | | | | | | | | | U0200 |
| \emptyset Code | d_1 k8 | d_2 h6 | l_1 | l_2 | l_4 | α | z | EUR | |
| 140 | 2.00 | 6.00 | 54 | 10.00 | 16.81 | 7.0° | 4 | 29.40 | |
| 160 | 2.50 | 6.00 | 56 | 12.00 | 19.50 | 5.5° | 4 | 29.40 | |
| 180 | 3.00 | 6.00 | 56 | 12.00 | 19.50 | 4.5° | 4 | 29.40 | |
| 220 | 4.00 | 6.00 | 63 | 19.00 | 26.50 | 2.5° | 4 | 29.40 | |
| 260 | 5.00 | 6.00 | 68 | 24.00 | 31.50 | 1.0° | 4 | 29.40 | |
| 300 | 6.00 | 6.00 | 68 | 24.00 | - | 0.0° | 4 | 29.40 | |
| 391 | 8.00 | 8.00 | 82 | 38.00 | - | 0.0° | 4 | 41.10 | |
| 450 | 10.00 | 10.00 | 95 | 45.00 | - | 0.0° | 4 | 44.10 | |
| 501 | 12.00 | 12.00 | 110 | 53.00 | - | 0.0° | 4 | 50.00 | |
| 570 | 14.00 | 12.00 | 110 | 53.00 | - | 0.0° | 4 | 71.00 | |
| 610 | 16.00 | 16.00 | 123 | 63.00 | - | 0.0° | 4 | 71.00 | |
| 640 | 18.00 | 16.00 | 123 | 63.00 | - | 0.0° | 4 | 90.00 | |
| 682 | 20.00 | 20.00 | 141 | 75.00 | - | 0.0° | 4 | 90.00 | |
| 772 | 25.00 | 25.00 | 166 | 90.00 | - | 0.0° | 4 | 151.00 | |
| 810 | 30.00 | 25.00 | 166 | 90.00 | - | 0.0° | 6 | 269.00 | |
| 832 | 32.00 | 32.00 | 186 | 106.00 | - | 0.0° | 6 | 269.00 | |
| 860 | 36.00 | 32.00 | 186 | 106.00 | - | 0.0° | 6 | 483.00 | |
| 881 | 40.00 | 32.00 | 205 | 125.00 | - | 0.0° | 6 | 483.00 | |
| 892 | 40.00 | 40.00 | 217 | 125.00 | - | 0.0° | 6 | 483.00 | |

Applicazione



Materiale

Acciaio
850 - 1100 N/mm²



Acciaio
1100 - 1300 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

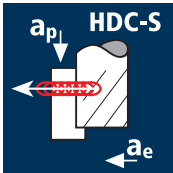


| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------|
| 6.00 | 4 | 120 | 0.034 | 32.000 | 5.400 | 6365 | 865 | 10° |
| 8.00 | 4 | 120 | 0.043 | 42.000 | 7.200 | 4775 | 820 | 10° |
| 10.00 | 4 | 120 | 0.055 | 53.000 | 9.000 | 3820 | 840 | 10° |
| 12.00 | 4 | 120 | 0.064 | 63.000 | 10.800 | 3185 | 815 | 10° |
| 16.00 | 4 | 120 | 0.072 | 84.000 | 14.400 | 2385 | 690 | 10° |
| 20.00 | 4 | 120 | 0.085 | 105.000 | 18.000 | 1910 | 650 | 10° |

| | | | | | | | | |
|-------|---|----|-------|---------|--------|------|-----|-----|
| 6.00 | 4 | 90 | 0.030 | 32.000 | 5.400 | 4775 | 575 | 10° |
| 8.00 | 4 | 90 | 0.038 | 42.000 | 7.200 | 3580 | 545 | 10° |
| 10.00 | 4 | 90 | 0.047 | 53.000 | 9.000 | 2865 | 540 | 10° |
| 12.00 | 4 | 90 | 0.055 | 63.000 | 10.800 | 2385 | 525 | 10° |
| 16.00 | 4 | 90 | 0.064 | 84.000 | 14.400 | 1790 | 460 | 10° |
| 20.00 | 4 | 90 | 0.077 | 105.000 | 18.000 | 1430 | 440 | 10° |

| | | | | | | | | |
|-------|---|----|-------|---------|--------|------|-----|----|
| 6.00 | 4 | 70 | 0.026 | 32.000 | 5.400 | 3715 | 385 | 7° |
| 8.00 | 4 | 70 | 0.030 | 42.000 | 7.200 | 2785 | 335 | 7° |
| 10.00 | 4 | 70 | 0.038 | 53.000 | 9.000 | 2230 | 340 | 7° |
| 12.00 | 4 | 70 | 0.047 | 63.000 | 10.800 | 1855 | 350 | 7° |
| 16.00 | 4 | 70 | 0.055 | 84.000 | 14.400 | 1395 | 305 | 7° |
| 20.00 | 4 | 70 | 0.068 | 105.000 | 18.000 | 1115 | 305 | 7° |

Applicazione



Materiale

Acciaio
850 - 1100 N/mm²



Acciaio
1100 - 1300 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



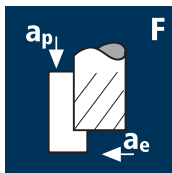
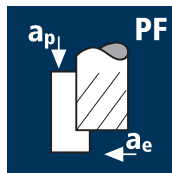
| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 6.00 | 4 | 250 | 0.124 | 32.000 | 0.300 | 13265 | 6580 | 63.2 |
| 8.00 | 4 | 250 | 0.165 | 42.000 | 0.400 | 9945 | 6565 | 110.3 |
| 10.00 | 4 | 250 | 0.207 | 53.000 | 0.500 | 7960 | 6590 | 174.6 |
| 12.00 | 4 | 250 | 0.241 | 63.000 | 0.600 | 6630 | 6390 | 241.5 |
| 16.00 | 4 | 250 | 0.268 | 84.000 | 0.800 | 4975 | 5335 | 358.5 |
| 20.00 | 4 | 250 | 0.330 | 105.000 | 1.000 | 3980 | 5255 | 551.8 |

| | | | | | | | | |
|-------|---|-----|-------|---------|-------|-------|------|-------|
| 6.00 | 4 | 194 | 0.103 | 32.000 | 0.300 | 10290 | 4240 | 40.7 |
| 8.00 | 4 | 194 | 0.145 | 42.000 | 0.400 | 7720 | 4480 | 75.3 |
| 10.00 | 4 | 194 | 0.172 | 53.000 | 0.500 | 6175 | 4250 | 112.6 |
| 12.00 | 4 | 194 | 0.213 | 63.000 | 0.600 | 5145 | 4385 | 165.8 |
| 16.00 | 4 | 194 | 0.241 | 84.000 | 0.800 | 3860 | 3720 | 250.0 |
| 20.00 | 4 | 194 | 0.296 | 105.000 | 1.000 | 3090 | 3660 | 384.3 |

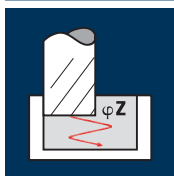
| | | | | | | | | |
|-------|---|-----|-------|---------|-------|------|------|-------|
| 6.00 | 4 | 167 | 0.062 | 32.000 | 0.300 | 8860 | 2195 | 21.1 |
| 8.00 | 4 | 167 | 0.086 | 42.000 | 0.400 | 6645 | 2285 | 38.4 |
| 10.00 | 4 | 167 | 0.107 | 53.000 | 0.500 | 5315 | 2275 | 60.3 |
| 12.00 | 4 | 167 | 0.124 | 63.000 | 0.600 | 4430 | 2195 | 83.0 |
| 16.00 | 4 | 167 | 0.141 | 84.000 | 0.800 | 3320 | 1870 | 125.7 |
| 20.00 | 4 | 167 | 0.179 | 105.000 | 1.000 | 2660 | 1905 | 200.0 |



Cliccare qui per accedere al
ToolExpert MFC.
Veloce, semplice,
affidabile



Applicazione



Materiale

Acciaio
< 850 N/mm²

| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------|
| 3.00 | 4 | 90 | 0.014 | 16.000 | 2.700 | 9550 | 535 | 1.5° |
| 4.00 | 4 | 90 | 0.020 | 21.000 | 3.600 | 7160 | 575 | 1.5° |
| 5.00 | 4 | 90 | 0.030 | 26.000 | 4.500 | 5730 | 690 | 1.5° |
| 6.00 | 4 | 90 | 0.037 | 32.000 | 5.400 | 4775 | 705 | 1.5° |
| 8.00 | 4 | 90 | 0.039 | 42.000 | 7.200 | 3580 | 560 | 1.5° |
| 10.00 | 4 | 90 | 0.052 | 53.000 | 9.000 | 2865 | 595 | 1.5° |
| 12.00 | 4 | 90 | 0.065 | 63.000 | 10.800 | 2385 | 620 | 1.5° |
| 16.00 | 4 | 90 | 0.072 | 84.000 | 14.400 | 1790 | 515 | 1.5° |
| 20.00 | 4 | 90 | 0.088 | 105.000 | 18.000 | 1430 | 505 | 1.5° |

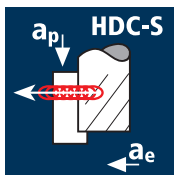
Acciaio
850 - 1100 N/mm²

| | | | | | | | | |
|-------|---|----|-------|---------|--------|------|-----|----|
| 3.00 | 4 | 85 | 0.012 | 16.000 | 2.700 | 9020 | 435 | 2° |
| 4.00 | 4 | 85 | 0.019 | 21.000 | 3.600 | 6765 | 515 | 2° |
| 5.00 | 4 | 85 | 0.028 | 26.000 | 4.500 | 5410 | 605 | 2° |
| 6.00 | 4 | 85 | 0.035 | 32.000 | 5.400 | 4510 | 630 | 2° |
| 8.00 | 4 | 85 | 0.033 | 42.000 | 7.200 | 3380 | 445 | 2° |
| 10.00 | 4 | 85 | 0.044 | 53.000 | 9.000 | 2705 | 475 | 2° |
| 12.00 | 4 | 85 | 0.055 | 63.000 | 10.800 | 2255 | 495 | 2° |
| 16.00 | 4 | 85 | 0.066 | 84.000 | 14.400 | 1690 | 445 | 2° |
| 20.00 | 4 | 85 | 0.080 | 105.000 | 18.000 | 1355 | 435 | 2° |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

| | | | | | | | | |
|-------|---|----|-------|---------|--------|------|-----|------|
| 3.00 | 4 | 55 | 0.008 | 16.000 | 2.700 | 5835 | 185 | 1.5° |
| 4.00 | 4 | 55 | 0.013 | 21.000 | 3.600 | 4375 | 230 | 1.5° |
| 5.00 | 4 | 55 | 0.019 | 26.000 | 4.500 | 3500 | 265 | 1.5° |
| 6.00 | 4 | 55 | 0.024 | 32.000 | 5.400 | 2920 | 280 | 1.5° |
| 8.00 | 4 | 55 | 0.023 | 42.000 | 7.200 | 2190 | 200 | 1.5° |
| 10.00 | 4 | 55 | 0.030 | 53.000 | 9.000 | 1750 | 210 | 1.5° |
| 12.00 | 4 | 55 | 0.038 | 63.000 | 10.800 | 1460 | 220 | 1.5° |
| 16.00 | 4 | 55 | 0.046 | 84.000 | 14.400 | 1095 | 200 | 1.5° |
| 20.00 | 4 | 55 | 0.050 | 105.000 | 18.000 | 875 | 175 | 1.5° |

Applicazione



Materiale

Acciaio
< 850 N/mm²

| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 3.00 | 4 | 260 | 0.064 | 16.000 | 0.075 | 27585 | 7100 | 8.5 |
| 4.00 | 4 | 260 | 0.086 | 21.000 | 0.100 | 20690 | 7155 | 15.0 |
| 5.00 | 4 | 260 | 0.109 | 26.000 | 0.125 | 16550 | 7190 | 23.4 |
| 6.00 | 4 | 260 | 0.133 | 32.000 | 0.150 | 13795 | 7320 | 35.1 |
| 8.00 | 4 | 260 | 0.177 | 42.000 | 0.200 | 10345 | 7320 | 61.5 |
| 10.00 | 4 | 260 | 0.219 | 53.000 | 0.250 | 8275 | 7255 | 96.1 |
| 12.00 | 4 | 260 | 0.263 | 63.000 | 0.300 | 6895 | 7265 | 137.3 |
| 16.00 | 4 | 260 | 0.290 | 84.000 | 0.400 | 5175 | 5990 | 201.3 |
| 20.00 | 4 | 260 | 0.364 | 105.000 | 0.500 | 4140 | 6025 | 316.2 |

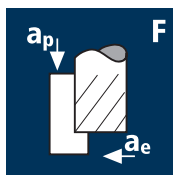
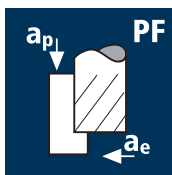
Acciaio
850 - 1100 N/mm²

| | | | | | | | | |
|-------|---|-----|-------|---------|-------|-------|------|-------|
| 3.00 | 4 | 266 | 0.072 | 16.000 | 0.075 | 28225 | 8170 | 9.8 |
| 4.00 | 4 | 266 | 0.097 | 21.000 | 0.100 | 21170 | 8235 | 17.3 |
| 5.00 | 4 | 266 | 0.122 | 26.000 | 0.125 | 16935 | 8275 | 26.9 |
| 6.00 | 4 | 266 | 0.149 | 32.000 | 0.150 | 14110 | 8425 | 40.4 |
| 8.00 | 4 | 266 | 0.199 | 42.000 | 0.200 | 10585 | 8425 | 70.8 |
| 10.00 | 4 | 266 | 0.247 | 53.000 | 0.250 | 8465 | 8350 | 110.6 |
| 12.00 | 4 | 266 | 0.296 | 63.000 | 0.300 | 7055 | 8365 | 158.1 |
| 16.00 | 4 | 266 | 0.326 | 84.000 | 0.400 | 5290 | 6895 | 231.7 |
| 20.00 | 4 | 266 | 0.409 | 105.000 | 0.500 | 4235 | 6935 | 364.0 |

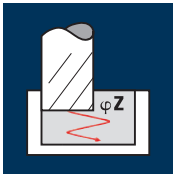
Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

| | | | | | | | | |
|-------|---|-----|-------|---------|-------|-------|------|-------|
| 3.00 | 4 | 184 | 0.045 | 16.000 | 0.075 | 19525 | 3535 | 4.2 |
| 4.00 | 4 | 184 | 0.065 | 21.000 | 0.100 | 14640 | 3825 | 8.0 |
| 5.00 | 4 | 184 | 0.080 | 26.000 | 0.125 | 11715 | 3770 | 12.2 |
| 6.00 | 4 | 184 | 0.095 | 32.000 | 0.150 | 9760 | 3730 | 17.9 |
| 8.00 | 4 | 184 | 0.128 | 42.000 | 0.200 | 7320 | 3755 | 31.5 |
| 10.00 | 4 | 184 | 0.161 | 53.000 | 0.250 | 5855 | 3770 | 49.9 |
| 12.00 | 4 | 184 | 0.194 | 63.000 | 0.300 | 4880 | 3780 | 71.4 |
| 16.00 | 4 | 184 | 0.209 | 84.000 | 0.400 | 3660 | 3055 | 102.6 |
| 20.00 | 4 | 184 | 0.269 | 105.000 | 0.500 | 2930 | 3150 | 165.4 |

I dati di taglio adatti per altre applicazioni e materiali si trovano nel calcolatore dei parametri di taglio **ToolExpert E-Cut**



Applicazione



Materiale

Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------|
| 3.00 | 3 | 85 | 0.012 | 16.000 | 2.700 | 9020 | 325 | 2° |
| 4.00 | 3 | 85 | 0.018 | 21.000 | 3.600 | 6765 | 365 | 2° |
| 5.00 | 3 | 85 | 0.027 | 26.000 | 4.500 | 5410 | 440 | 2° |
| 6.00 | 3 | 85 | 0.033 | 32.000 | 5.400 | 4510 | 445 | 2° |
| 8.00 | 3 | 85 | 0.035 | 42.000 | 7.200 | 3380 | 355 | 2° |
| 10.00 | 3 | 85 | 0.047 | 53.000 | 9.000 | 2705 | 380 | 2° |
| 12.00 | 3 | 85 | 0.059 | 63.000 | 10.800 | 2255 | 400 | 2° |
| 16.00 | 3 | 85 | 0.065 | 84.000 | 14.400 | 1690 | 330 | 2° |
| 20.00 | 3 | 85 | 0.079 | 105.000 | 18.000 | 1355 | 320 | 2° |

Acciaio
850 - 1100 N/mm²



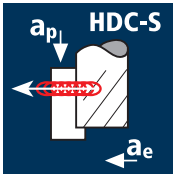
| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------|
| 3.00 | 3 | 75 | 0.011 | 16.000 | 2.700 | 7960 | 265 | 3° |
| 4.00 | 3 | 75 | 0.017 | 21.000 | 3.600 | 5970 | 305 | 3° |
| 5.00 | 3 | 75 | 0.025 | 26.000 | 4.500 | 4775 | 360 | 3° |
| 6.00 | 3 | 75 | 0.032 | 32.000 | 5.400 | 3980 | 380 | 3° |
| 8.00 | 3 | 75 | 0.030 | 42.000 | 7.200 | 2985 | 270 | 3° |
| 10.00 | 3 | 75 | 0.040 | 53.000 | 9.000 | 2385 | 285 | 3° |
| 12.00 | 3 | 75 | 0.050 | 63.000 | 10.800 | 1990 | 300 | 3° |
| 16.00 | 3 | 75 | 0.059 | 84.000 | 14.400 | 1490 | 265 | 3° |
| 20.00 | 3 | 75 | 0.072 | 105.000 | 18.000 | 1195 | 260 | 3° |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------|
| 3.00 | 3 | 50 | 0.008 | 16.000 | 2.700 | 5305 | 125 | 2° |
| 4.00 | 3 | 50 | 0.013 | 21.000 | 3.600 | 3980 | 155 | 2° |
| 5.00 | 3 | 50 | 0.019 | 26.000 | 4.500 | 3185 | 180 | 2° |
| 6.00 | 3 | 50 | 0.024 | 32.000 | 5.400 | 2655 | 190 | 2° |
| 8.00 | 3 | 50 | 0.023 | 42.000 | 7.200 | 1990 | 135 | 2° |
| 10.00 | 3 | 50 | 0.030 | 53.000 | 9.000 | 1590 | 145 | 2° |
| 12.00 | 3 | 50 | 0.038 | 63.000 | 10.800 | 1325 | 150 | 2° |
| 16.00 | 3 | 50 | 0.046 | 84.000 | 14.400 | 995 | 135 | 2° |
| 20.00 | 3 | 50 | 0.050 | 105.000 | 18.000 | 795 | 120 | 2° |

Applicazione



Materiale

Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 3.00 | 3 | 211 | 0.041 | 16.000 | 0.150 | 22390 | 2775 | 6.7 |
| 4.00 | 3 | 211 | 0.055 | 21.000 | 0.200 | 16790 | 2795 | 11.7 |
| 5.00 | 3 | 211 | 0.070 | 26.000 | 0.250 | 13435 | 2810 | 18.3 |
| 6.00 | 3 | 211 | 0.085 | 32.000 | 0.300 | 11195 | 2860 | 27.5 |
| 8.00 | 3 | 211 | 0.114 | 42.000 | 0.400 | 8395 | 2860 | 48.0 |
| 10.00 | 3 | 211 | 0.141 | 53.000 | 0.500 | 6715 | 2835 | 75.1 |
| 12.00 | 3 | 211 | 0.169 | 63.000 | 0.600 | 5595 | 2840 | 107.3 |
| 16.00 | 3 | 211 | 0.186 | 84.000 | 0.800 | 4200 | 2340 | 157.2 |
| 20.00 | 3 | 211 | 0.234 | 105.000 | 1.000 | 3360 | 2355 | 247.0 |

Acciaio
850 - 1100 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 3.00 | 3 | 216 | 0.050 | 16.000 | 0.150 | 22920 | 3420 | 8.2 |
| 4.00 | 3 | 216 | 0.067 | 21.000 | 0.200 | 17190 | 3445 | 14.5 |
| 5.00 | 3 | 216 | 0.084 | 26.000 | 0.250 | 13750 | 3465 | 22.5 |
| 6.00 | 3 | 216 | 0.103 | 32.000 | 0.300 | 11460 | 3525 | 33.9 |
| 8.00 | 3 | 216 | 0.137 | 42.000 | 0.400 | 8595 | 3525 | 59.3 |
| 10.00 | 3 | 216 | 0.169 | 53.000 | 0.500 | 6875 | 3495 | 92.6 |
| 12.00 | 3 | 216 | 0.204 | 63.000 | 0.600 | 5730 | 3500 | 132.3 |
| 16.00 | 3 | 216 | 0.224 | 84.000 | 0.800 | 4295 | 2885 | 193.9 |
| 20.00 | 3 | 216 | 0.281 | 105.000 | 1.000 | 3440 | 2900 | 304.7 |

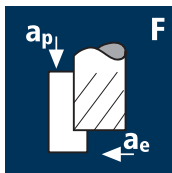
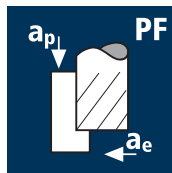
Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



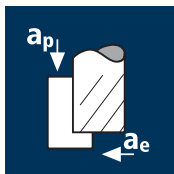
| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 3.00 | 3 | 149 | 0.028 | 16.000 | 0.150 | 15810 | 1325 | 3.2 |
| 4.00 | 3 | 149 | 0.040 | 21.000 | 0.200 | 11855 | 1440 | 6.0 |
| 5.00 | 3 | 149 | 0.050 | 26.000 | 0.250 | 9485 | 1415 | 9.2 |
| 6.00 | 3 | 149 | 0.059 | 32.000 | 0.300 | 7905 | 1400 | 13.4 |
| 8.00 | 3 | 149 | 0.079 | 42.000 | 0.400 | 5930 | 1410 | 23.7 |
| 10.00 | 3 | 149 | 0.099 | 53.000 | 0.500 | 4745 | 1415 | 37.5 |
| 12.00 | 3 | 149 | 0.120 | 63.000 | 0.600 | 3950 | 1420 | 53.6 |
| 16.00 | 3 | 149 | 0.129 | 84.000 | 0.800 | 2965 | 1145 | 77.1 |
| 20.00 | 3 | 149 | 0.166 | 105.000 | 1.000 | 2370 | 1185 | 124.3 |



I dati di taglio adatti per altre applicazioni e materiali si trovano nel calcolatore dei parametri di taglio **ToolExpert E-Cut**



Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC

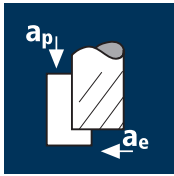


Acciaio da
utensile temprato
56 - 60 HRC



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 2.00 | 3 | 90 | 0.015 | 2.000 | 1.200 | 14325 | 645 | 1.5 |
| 3.00 | 4 | 90 | 0.025 | 3.000 | 1.800 | 9550 | 955 | 5.2 |
| 4.00 | 4 | 90 | 0.025 | 4.000 | 2.400 | 7160 | 715 | 6.9 |
| 5.00 | 4 | 90 | 0.035 | 5.000 | 3.000 | 5730 | 800 | 12.0 |
| 6.00 | 4 | 90 | 0.040 | 6.000 | 1.500 | 4775 | 765 | 6.9 |
| 8.00 | 4 | 90 | 0.055 | 8.000 | 4.800 | 3580 | 790 | 30.3 |
| 10.00 | 4 | 90 | 0.070 | 10.000 | 6.000 | 2865 | 800 | 48.1 |
| 12.00 | 4 | 90 | 0.085 | 12.000 | 7.200 | 2385 | 810 | 70.1 |
| 16.00 | 4 | 90 | 0.110 | 16.000 | 4.000 | 1790 | 790 | 50.4 |
| 2.00 | 3 | 70 | 0.010 | 2.000 | 1.200 | 11140 | 335 | 0.8 |
| 3.00 | 4 | 70 | 0.020 | 3.000 | 1.800 | 7425 | 595 | 3.2 |
| 4.00 | 4 | 70 | 0.025 | 4.000 | 2.400 | 5570 | 555 | 5.3 |
| 5.00 | 4 | 70 | 0.030 | 5.000 | 3.000 | 4455 | 535 | 8.0 |
| 6.00 | 4 | 70 | 0.035 | 6.000 | 1.500 | 3715 | 520 | 4.7 |
| 8.00 | 4 | 70 | 0.050 | 8.000 | 4.800 | 2785 | 555 | 21.4 |
| 10.00 | 4 | 70 | 0.060 | 10.000 | 6.000 | 2230 | 535 | 32.1 |
| 12.00 | 4 | 70 | 0.075 | 12.000 | 7.200 | 1855 | 555 | 48.1 |
| 16.00 | 4 | 70 | 0.100 | 16.000 | 4.000 | 1395 | 555 | 35.7 |
| 2.00 | 3 | 50 | 0.010 | 2.000 | 1.200 | 7960 | 240 | 0.6 |
| 3.00 | 4 | 50 | 0.015 | 3.000 | 1.800 | 5305 | 320 | 1.7 |
| 4.00 | 4 | 50 | 0.020 | 4.000 | 2.400 | 3980 | 320 | 3.1 |
| 5.00 | 4 | 50 | 0.025 | 5.000 | 3.000 | 3185 | 320 | 4.8 |
| 6.00 | 4 | 50 | 0.030 | 6.000 | 1.500 | 2655 | 320 | 2.9 |
| 8.00 | 4 | 50 | 0.040 | 8.000 | 4.800 | 1990 | 320 | 12.2 |
| 10.00 | 4 | 50 | 0.050 | 10.000 | 6.000 | 1590 | 320 | 19.1 |
| 12.00 | 4 | 50 | 0.060 | 12.000 | 7.200 | 1325 | 320 | 27.5 |
| 16.00 | 4 | 50 | 0.080 | 16.000 | 4.000 | 995 | 320 | 20.4 |
| 2.00 | 3 | 25 | 0.005 | 2.000 | 1.200 | 3980 | 60 | 0.1 |
| 3.00 | 4 | 25 | 0.010 | 3.000 | 1.800 | 2655 | 105 | 0.6 |
| 4.00 | 4 | 25 | 0.015 | 4.000 | 2.400 | 1990 | 120 | 1.1 |
| 5.00 | 4 | 25 | 0.020 | 5.000 | 3.000 | 1590 | 125 | 1.9 |
| 6.00 | 4 | 25 | 0.020 | 6.000 | 1.500 | 1325 | 105 | 1.0 |
| 8.00 | 4 | 25 | 0.030 | 8.000 | 4.800 | 995 | 120 | 4.6 |
| 10.00 | 4 | 25 | 0.035 | 10.000 | 6.000 | 795 | 110 | 6.7 |
| 12.00 | 4 | 25 | 0.045 | 12.000 | 7.200 | 665 | 120 | 10.3 |
| 16.00 | 4 | 25 | 0.060 | 16.000 | 4.000 | 495 | 120 | 7.6 |
| 2.00 | 3 | 75 | 0.010 | 1.000 | 2.000 | 11935 | 360 | 0.7 |
| 3.00 | 4 | 75 | 0.015 | 1.500 | 3.000 | 7960 | 475 | 2.1 |
| 4.00 | 4 | 75 | 0.025 | 2.000 | 4.000 | 5970 | 595 | 4.8 |
| 5.00 | 4 | 75 | 0.025 | 2.500 | 5.000 | 4775 | 475 | 6.0 |
| 6.00 | 4 | 75 | 0.035 | 3.000 | 6.000 | 3980 | 555 | 10.0 |
| 8.00 | 4 | 75 | 0.045 | 4.000 | 8.000 | 2985 | 535 | 17.2 |
| 10.00 | 4 | 75 | 0.055 | 5.000 | 10.000 | 2385 | 525 | 26.3 |
| 12.00 | 4 | 75 | 0.070 | 6.000 | 12.000 | 1990 | 555 | 40.1 |
| 16.00 | 4 | 75 | 0.085 | 4.000 | 16.000 | 1490 | 505 | 32.5 |
| 2.00 | 3 | 60 | 0.010 | 1.000 | 2.000 | 9550 | 285 | 0.6 |
| 3.00 | 4 | 60 | 0.015 | 1.500 | 3.000 | 6365 | 380 | 1.7 |
| 4.00 | 4 | 60 | 0.020 | 2.000 | 4.000 | 4775 | 380 | 3.1 |
| 5.00 | 4 | 60 | 0.030 | 2.500 | 5.000 | 3820 | 460 | 5.7 |
| 6.00 | 4 | 60 | 0.035 | 3.000 | 6.000 | 3185 | 445 | 8.0 |
| 8.00 | 4 | 60 | 0.045 | 4.000 | 8.000 | 2385 | 430 | 13.8 |
| 10.00 | 4 | 60 | 0.055 | 5.000 | 10.000 | 1910 | 420 | 21.0 |
| 12.00 | 4 | 60 | 0.065 | 6.000 | 12.000 | 1590 | 415 | 29.8 |
| 16.00 | 4 | 60 | 0.090 | 4.000 | 16.000 | 1195 | 430 | 27.5 |
| 2.00 | 3 | 40 | 0.010 | 1.000 | 2.000 | 6365 | 190 | 0.4 |
| 3.00 | 4 | 40 | 0.015 | 1.500 | 3.000 | 4245 | 255 | 1.1 |
| 4.00 | 4 | 40 | 0.020 | 2.000 | 4.000 | 3185 | 255 | 2.0 |
| 5.00 | 4 | 40 | 0.020 | 2.500 | 5.000 | 2545 | 205 | 2.5 |
| 6.00 | 4 | 40 | 0.025 | 3.000 | 6.000 | 2120 | 210 | 3.8 |
| 8.00 | 4 | 40 | 0.035 | 4.000 | 8.000 | 1590 | 225 | 7.1 |
| 10.00 | 4 | 40 | 0.045 | 5.000 | 10.000 | 1275 | 230 | 11.5 |
| 12.00 | 4 | 40 | 0.055 | 6.000 | 12.000 | 1060 | 235 | 16.8 |
| 16.00 | 4 | 40 | 0.070 | 4.000 | 16.000 | 795 | 225 | 14.3 |
| 2.00 | 3 | 20 | 0.006 | 1.000 | 2.000 | 3185 | 55 | 0.1 |
| 3.00 | 4 | 20 | 0.009 | 1.500 | 3.000 | 2120 | 75 | 0.3 |
| 4.00 | 4 | 20 | 0.013 | 2.000 | 4.000 | 1590 | 85 | 0.7 |
| 5.00 | 4 | 20 | 0.016 | 2.500 | 5.000 | 1275 | 80 | 1.0 |
| 6.00 | 4 | 20 | 0.019 | 3.000 | 6.000 | 1060 | 80 | 1.5 |
| 8.00 | 4 | 20 | 0.025 | 4.000 | 8.000 | 795 | 80 | 2.5 |
| 10.00 | 4 | 20 | 0.031 | 5.000 | 10.000 | 635 | 80 | 3.9 |
| 12.00 | 4 | 20 | 0.038 | 6.000 | 12.000 | 530 | 80 | 5.8 |
| 16.00 | 4 | 20 | 0.050 | 4.000 | 16.000 | 400 | 80 | 5.1 |

Applicazione



Materiale

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 3.00 | 4 | 80 | 0.015 | 3.000 | 1.800 | 8490 | 510 | 2.8 |
| 4.00 | 4 | 80 | 0.020 | 4.000 | 2.400 | 6365 | 510 | 4.9 |
| 5.00 | 4 | 80 | 0.025 | 5.000 | 3.000 | 5095 | 510 | 7.6 |
| 6.00 | 4 | 80 | 0.030 | 6.000 | 3.600 | 4245 | 510 | 11.0 |
| 8.00 | 4 | 80 | 0.040 | 8.000 | 4.800 | 3185 | 510 | 19.6 |
| 10.00 | 4 | 80 | 0.050 | 10.000 | 6.000 | 2545 | 510 | 30.6 |
| 12.00 | 4 | 80 | 0.060 | 12.000 | 7.200 | 2120 | 510 | 44.0 |
| 16.00 | 4 | 80 | 0.075 | 16.000 | 6.400 | 1590 | 475 | 48.9 |

Inox medium
[Cr-Ni-Mo+/1.4539]
Acciaio duplex
[17-4 PH]



| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 3.00 | 4 | 40 | 0.015 | 3.000 | 1.800 | 4245 | 255 | 1.4 |
| 4.00 | 4 | 40 | 0.020 | 4.000 | 2.400 | 3185 | 255 | 2.4 |
| 5.00 | 4 | 40 | 0.025 | 5.000 | 3.000 | 2545 | 255 | 3.8 |
| 6.00 | 4 | 40 | 0.030 | 6.000 | 3.600 | 2120 | 255 | 5.5 |
| 8.00 | 4 | 40 | 0.040 | 8.000 | 4.800 | 1590 | 255 | 9.8 |
| 10.00 | 4 | 40 | 0.050 | 10.000 | 6.000 | 1275 | 255 | 15.3 |
| 12.00 | 4 | 40 | 0.060 | 12.000 | 7.200 | 1060 | 255 | 22.0 |
| 16.00 | 4 | 40 | 0.075 | 16.000 | 6.400 | 795 | 240 | 24.4 |

Inox difficile
[Cr-Ni-Mo+/1.4529]
Acciaio resistente al calore
[1.4841]



| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 3.00 | 4 | 25 | 0.015 | 3.000 | 1.800 | 2655 | 160 | 0.9 |
| 4.00 | 4 | 25 | 0.020 | 4.000 | 2.400 | 1990 | 160 | 1.5 |
| 5.00 | 4 | 25 | 0.025 | 5.000 | 3.000 | 1590 | 160 | 2.4 |
| 6.00 | 4 | 25 | 0.030 | 6.000 | 3.600 | 1325 | 160 | 3.4 |
| 8.00 | 4 | 25 | 0.035 | 8.000 | 4.800 | 995 | 140 | 5.3 |
| 10.00 | 4 | 25 | 0.045 | 10.000 | 6.000 | 795 | 145 | 8.6 |
| 12.00 | 4 | 25 | 0.050 | 12.000 | 7.200 | 665 | 135 | 11.5 |
| 16.00 | 4 | 25 | 0.060 | 16.000 | 6.400 | 495 | 120 | 12.2 |

Leghe a base di nichel
indurite
Rm > 1000 N/mm²
[Inconel 718]



| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|----|-----|
| 3.00 | 4 | 15 | 0.015 | 3.000 | 1.800 | 1590 | 95 | 0.5 |
| 4.00 | 4 | 15 | 0.020 | 4.000 | 2.400 | 1195 | 95 | 0.9 |
| 5.00 | 4 | 15 | 0.025 | 5.000 | 3.000 | 955 | 95 | 1.4 |
| 6.00 | 4 | 15 | 0.030 | 6.000 | 3.600 | 795 | 95 | 2.1 |
| 8.00 | 4 | 15 | 0.035 | 8.000 | 4.800 | 595 | 85 | 3.2 |
| 10.00 | 4 | 15 | 0.045 | 10.000 | 6.000 | 475 | 85 | 5.2 |
| 12.00 | 4 | 15 | 0.050 | 12.000 | 7.200 | 400 | 80 | 6.9 |
| 16.00 | 4 | 15 | 0.060 | 16.000 | 6.400 | 300 | 70 | 7.3 |



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| | | | | | | | | |
|-------|---|----|-------|-------|--------|------|-----|------|
| 3.00 | 4 | 60 | 0.015 | 2.100 | 3.000 | 6365 | 380 | 2.4 |
| 4.00 | 4 | 60 | 0.020 | 2.800 | 4.000 | 4775 | 380 | 4.3 |
| 5.00 | 4 | 60 | 0.025 | 3.500 | 5.000 | 3820 | 380 | 6.7 |
| 6.00 | 4 | 60 | 0.030 | 4.200 | 6.000 | 3185 | 380 | 9.6 |
| 8.00 | 4 | 60 | 0.040 | 5.600 | 8.000 | 2385 | 380 | 17.1 |
| 10.00 | 4 | 60 | 0.045 | 7.000 | 10.000 | 1910 | 345 | 24.1 |
| 12.00 | 4 | 60 | 0.045 | 8.400 | 12.000 | 1590 | 285 | 28.9 |
| 16.00 | 4 | 60 | 0.065 | 6.400 | 16.000 | 1195 | 310 | 31.8 |

Inox medium
[Cr-Ni-Mo+/1.4539]
Acciaio duplex
[17-4 PH]



| | | | | | | | | |
|-------|---|----|-------|-------|--------|------|-----|------|
| 3.00 | 4 | 30 | 0.015 | 2.100 | 3.000 | 3185 | 190 | 1.2 |
| 4.00 | 4 | 30 | 0.020 | 2.800 | 4.000 | 2385 | 190 | 2.1 |
| 5.00 | 4 | 30 | 0.025 | 3.500 | 5.000 | 1910 | 190 | 3.3 |
| 6.00 | 4 | 30 | 0.030 | 4.200 | 6.000 | 1590 | 190 | 4.8 |
| 8.00 | 4 | 30 | 0.040 | 5.600 | 8.000 | 1195 | 190 | 8.6 |
| 10.00 | 4 | 30 | 0.045 | 7.000 | 10.000 | 955 | 170 | 12.0 |
| 12.00 | 4 | 30 | 0.045 | 8.400 | 12.000 | 795 | 145 | 14.4 |
| 16.00 | 4 | 30 | 0.065 | 6.400 | 16.000 | 595 | 155 | 15.9 |

Inox difficile
[Cr-Ni-Mo+/1.4529]
Acciaio resistente al calore
[1.4841]



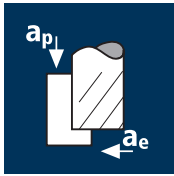
| | | | | | | | | |
|-------|---|----|-------|-------|--------|------|-----|-----|
| 3.00 | 4 | 20 | 0.015 | 2.100 | 3.000 | 2120 | 125 | 0.8 |
| 4.00 | 4 | 20 | 0.020 | 2.800 | 4.000 | 1590 | 125 | 1.4 |
| 5.00 | 4 | 20 | 0.025 | 3.500 | 5.000 | 1275 | 125 | 2.2 |
| 6.00 | 4 | 20 | 0.030 | 4.200 | 6.000 | 1060 | 125 | 3.2 |
| 8.00 | 4 | 20 | 0.035 | 5.600 | 8.000 | 795 | 110 | 5.0 |
| 10.00 | 4 | 20 | 0.045 | 7.000 | 10.000 | 635 | 115 | 8.0 |
| 12.00 | 4 | 20 | 0.045 | 8.400 | 12.000 | 530 | 95 | 9.6 |
| 16.00 | 4 | 20 | 0.060 | 6.400 | 16.000 | 400 | 95 | 9.8 |

Leghe a base di nichel
indurite
Rm > 1000 N/mm²
[Inconel 718]



| | | | | | | | | |
|-------|---|----|-------|-------|--------|------|----|-----|
| 3.00 | 4 | 10 | 0.015 | 2.100 | 3.000 | 1060 | 65 | 0.4 |
| 4.00 | 4 | 10 | 0.020 | 2.800 | 4.000 | 795 | 65 | 0.7 |
| 5.00 | 4 | 10 | 0.025 | 3.500 | 5.000 | 635 | 65 | 1.1 |
| 6.00 | 4 | 10 | 0.030 | 4.200 | 6.000 | 530 | 65 | 1.6 |
| 8.00 | 4 | 10 | 0.035 | 5.600 | 8.000 | 400 | 55 | 2.5 |
| 10.00 | 4 | 10 | 0.045 | 7.000 | 10.000 | 320 | 55 | 4.0 |
| 12.00 | 4 | 10 | 0.045 | 8.400 | 12.000 | 265 | 50 | 4.8 |
| 16.00 | 4 | 10 | 0.060 | 6.400 | 16.000 | 200 | 50 | 4.9 |

Applicazione



Materiale

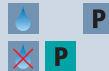
Acciaio
< 850 N/mm²



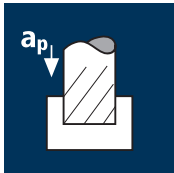
Acciaio
850 - 1100 N/mm²



Acciaio per lavorazione
a freddo (12% Cr)
fortemente legati
[1.2379]



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Acciaio
< 850 N/mm²



Acciaio
850 - 1100 N/mm²



Acciaio per lavorazione
a freddo (12% Cr)
fortemente legati
[1.2379]



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 3.00 | 4 | 190 | 0.020 | 3.000 | 1.400 | 20160 | 1615 | 6.8 |
| 4.00 | 4 | 190 | 0.025 | 4.000 | 1.800 | 15120 | 1510 | 10.9 |
| 5.00 | 4 | 190 | 0.035 | 5.000 | 2.300 | 12095 | 1695 | 19.5 |
| 6.00 | 4 | 190 | 0.040 | 6.000 | 2.700 | 10080 | 1615 | 26.1 |
| 8.00 | 4 | 190 | 0.055 | 8.000 | 3.600 | 7560 | 1665 | 47.9 |
| 10.00 | 4 | 190 | 0.070 | 10.000 | 4.500 | 6050 | 1695 | 76.2 |
| 12.00 | 4 | 190 | 0.075 | 12.000 | 5.400 | 5040 | 1510 | 98.0 |
| 16.00 | 4 | 190 | 0.100 | 16.000 | 4.000 | 3780 | 1510 | 96.8 |

| | | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|------|------|
| 3.00 | 4 | 140 | 0.020 | 3.000 | 1.400 | 14855 | 1190 | 5.0 |
| 4.00 | 4 | 140 | 0.025 | 4.000 | 1.800 | 11140 | 1115 | 8.0 |
| 5.00 | 4 | 140 | 0.035 | 5.000 | 2.300 | 8915 | 1250 | 14.3 |
| 6.00 | 4 | 140 | 0.040 | 6.000 | 2.700 | 7425 | 1190 | 19.3 |
| 8.00 | 4 | 140 | 0.055 | 8.000 | 3.600 | 5570 | 1225 | 35.3 |
| 10.00 | 4 | 140 | 0.070 | 10.000 | 4.500 | 4455 | 1250 | 56.1 |
| 12.00 | 4 | 140 | 0.075 | 12.000 | 5.400 | 3715 | 1115 | 72.2 |
| 16.00 | 4 | 140 | 0.100 | 16.000 | 4.000 | 2785 | 1115 | 71.3 |

| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 3.00 | 4 | 70 | 0.020 | 3.000 | 1.400 | 7425 | 595 | 2.5 |
| 4.00 | 4 | 70 | 0.025 | 4.000 | 1.800 | 5570 | 555 | 4.0 |
| 5.00 | 4 | 70 | 0.030 | 5.000 | 2.300 | 4455 | 535 | 6.1 |
| 6.00 | 4 | 70 | 0.040 | 6.000 | 2.700 | 3715 | 595 | 9.6 |
| 8.00 | 4 | 70 | 0.050 | 8.000 | 3.600 | 2785 | 555 | 16.0 |
| 10.00 | 4 | 70 | 0.065 | 10.000 | 4.500 | 2230 | 580 | 26.1 |
| 12.00 | 4 | 70 | 0.075 | 12.000 | 5.400 | 1855 | 555 | 36.1 |
| 16.00 | 4 | 70 | 0.095 | 16.000 | 4.000 | 1395 | 530 | 33.9 |

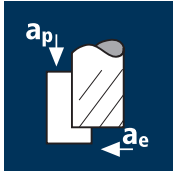
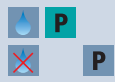
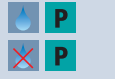

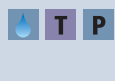
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|-------|---|----|-------|--------|-------|------|-----|------|
| 3.00 | 4 | 90 | 0.015 | 3.000 | 1.400 | 9550 | 575 | 2.4 |
| 4.00 | 4 | 90 | 0.020 | 4.000 | 1.800 | 7160 | 575 | 4.1 |
| 5.00 | 4 | 90 | 0.020 | 5.000 | 2.300 | 5730 | 460 | 5.3 |
| 6.00 | 4 | 90 | 0.030 | 6.000 | 2.700 | 4775 | 575 | 9.3 |
| 8.00 | 4 | 90 | 0.035 | 8.000 | 3.600 | 3580 | 500 | 14.4 |
| 10.00 | 4 | 90 | 0.045 | 10.000 | 4.500 | 2865 | 515 | 23.2 |
| 12.00 | 4 | 90 | 0.055 | 12.000 | 5.400 | 2385 | 525 | 34.0 |
| 16.00 | 4 | 90 | 0.065 | 16.000 | 4.000 | 1790 | 465 | 29.8 |


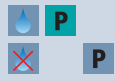
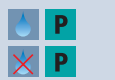


| | | | | | | | | |
|-------|---|-----|-------|-------|--------|-------|------|-------|
| 3.00 | 4 | 155 | 0.015 | 2.400 | 3.000 | 16445 | 985 | 7.1 |
| 4.00 | 4 | 155 | 0.020 | 3.200 | 4.000 | 12335 | 985 | 12.6 |
| 5.00 | 4 | 155 | 0.030 | 4.000 | 5.000 | 9870 | 1185 | 23.7 |
| 6.00 | 4 | 155 | 0.035 | 4.800 | 6.000 | 8225 | 1150 | 33.2 |
| 8.00 | 4 | 155 | 0.045 | 6.400 | 8.000 | 6165 | 1110 | 56.8 |
| 10.00 | 4 | 155 | 0.055 | 8.000 | 10.000 | 4935 | 1085 | 86.8 |
| 12.00 | 4 | 155 | 0.060 | 9.600 | 12.000 | 4110 | 985 | 113.7 |
| 16.00 | 4 | 155 | 0.075 | 6.400 | 16.000 | 3085 | 925 | 94.7 |

| | | | | | | | | |
|-------|---|-----|-------|-------|--------|-------|-----|------|
| 3.00 | 4 | 105 | 0.015 | 2.400 | 3.000 | 11140 | 670 | 4.8 |
| 4.00 | 4 | 105 | 0.020 | 3.200 | 4.000 | 8355 | 670 | 8.6 |
| 5.00 | 4 | 105 | 0.030 | 4.000 | 5.000 | 6685 | 800 | 16.0 |
| 6.00 | 4 | 105 | 0.035 | 4.800 | 6.000 | 5570 | 780 | 22.5 |
| 8.00 | 4 | 105 | 0.045 | 6.400 | 8.000 | 4180 | 750 | 38.5 |
| 10.00 | 4 | 105 | 0.055 | 8.000 | 10.000 | 3340 | 735 | 58.8 |
| 12.00 | 4 | 105 | 0.060 | 9.600 | 12.000 | 2785 | 670 | 77.0 |
| 16.00 | 4 | 105 | 0.075 | 6.400 | 16.000 | 2090 | 625 | 64.2 |

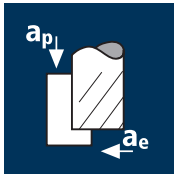
| | | | | | | | | |
|-------|---|----|-------|-------|--------|------|-----|------|
| 3.00 | 4 | 55 | 0.015 | 2.400 | 3.000 | 5835 | 350 | 2.5 |
| 4.00 | 4 | 55 | 0.020 | 3.200 | 4.000 | 4375 | 350 | 4.5 |
| 5.00 | 4 | 55 | 0.030 | 4.000 | 5.000 | 3500 | 420 | 8.4 |
| 6.00 | 4 | 55 | 0.035 | 4.800 | 6.000 | 2920 | 410 | 11.8 |
| 8.00 | 4 | 55 | 0.045 | 6.400 | 8.000 | 2190 | 395 | 20.2 |
| 10.00 | 4 | 55 | 0.055 | 8.000 | 10.000 | 1750 | 385 | 30.8 |
| 12.00 | 4 | 55 | 0.060 | 9.600 | 12.000 | 1460 | 350 | 40.3 |
| 16.00 | 4 | 55 | 0.075 | 6.400 | 16.000 | 1095 | 330 | 33.6 |

| | | | | | | | | |
|-------|---|----|-------|-------|--------|------|-----|------|
| 3.00 | 4 | 70 | 0.010 | 2.400 | 3.000 | 7425 | 295 | 2.1 |
| 4.00 | 4 | 70 | 0.015 | 3.200 | 4.000 | 5570 | 335 | 4.3 |
| 5.00 | 4 | 70 | 0.025 | 4.000 | 5.000 | 4455 | 445 | 8.9 |
| 6.00 | 4 | 70 | 0.030 | 4.800 | 6.000 | 3715 | 445 | 12.8 |
| 8.00 | 4 | 70 | 0.035 | 6.400 | 8.000 | 2785 | 390 | 20.0 |
| 10.00 | 4 | 70 | 0.045 | 8.000 | 10.000 | 2230 | 400 | 32.1 |
| 12.00 | 4 | 70 | 0.050 | 9.600 | 12.000 | 1855 | 370 | 42.8 |
| 16.00 | 4 | 70 | 0.060 | 6.400 | 16.000 | 1395 | 335 | 34.2 |

| Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|--|--|---------|--|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|
|  | Acciaio < 850 N/mm ²  | 1.50 | 3 | 190 | 0.010 | 1.800 | 0.200 | 40320 | 1210 |
| | | 2.00 | 3 | 190 | 0.015 | 2.400 | 0.200 | 30240 | 1360 |
| | | 2.50 | 3 | 190 | 0.015 | 3.000 | 0.300 | 24190 | 1090 |
| | | 3.00 | 3 | 190 | 0.020 | 3.600 | 0.300 | 20160 | 1210 |
| | | 4.00 | 3 | 190 | 0.025 | 4.800 | 0.400 | 15120 | 1135 |
| | | 5.00 | 3 | 190 | 0.035 | 6.000 | 0.500 | 12095 | 1270 |
| | | 6.00 | 3 | 190 | 0.040 | 7.200 | 0.600 | 10080 | 1210 |
| | | 8.00 | 3 | 190 | 0.055 | 9.600 | 0.800 | 7560 | 1245 |
| | | 10.00 | 3 | 190 | 0.065 | 12.000 | 1.000 | 6050 | 1180 |
| | | | Acciaio 850 - 1100 N/mm ²  | 1.50 | 3 | 130 | 0.010 | 1.800 | 0.200 |
| 2.00 | 3 | | | 130 | 0.015 | 2.400 | 0.200 | 20690 | 930 |
| 2.50 | 3 | | | 130 | 0.015 | 3.000 | 0.300 | 16550 | 745 |
| 3.00 | 3 | | | 130 | 0.020 | 3.600 | 0.300 | 13795 | 830 |
| 4.00 | 3 | | | 130 | 0.025 | 4.800 | 0.400 | 10345 | 775 |
| 5.00 | 3 | | | 130 | 0.035 | 6.000 | 0.500 | 8275 | 870 |
| 6.00 | 3 | | | 130 | 0.040 | 7.200 | 0.600 | 6895 | 830 |
| 8.00 | 3 | | | 130 | 0.050 | 9.600 | 0.800 | 5175 | 775 |
| 10.00 | 3 | | | 130 | 0.060 | 12.000 | 1.000 | 4140 | 745 |
| | Leghe di titanio indurite > 300 HB [Ti6Al4V]  | | | 1.50 | 3 | 50 | 0.005 | 1.800 | 0.200 |
| | | 2.00 | 3 | 50 | 0.010 | 2.400 | 0.200 | 7960 | 240 |
| | | 2.50 | 3 | 50 | 0.010 | 3.000 | 0.300 | 6365 | 190 |
| | | 3.00 | 3 | 50 | 0.010 | 3.600 | 0.300 | 5305 | 160 |
| | | 4.00 | 3 | 50 | 0.015 | 4.800 | 0.400 | 3980 | 180 |
| | | 5.00 | 3 | 50 | 0.020 | 6.000 | 0.500 | 3185 | 190 |
| | | 6.00 | 3 | 50 | 0.020 | 7.200 | 0.600 | 2655 | 160 |
| | | 8.00 | 3 | 50 | 0.030 | 9.600 | 0.800 | 1990 | 180 |
| | | 10.00 | 3 | 50 | 0.035 | 12.000 | 1.000 | 1590 | 165 |
| | | | Inox normal [Cr-Ni/1.4301] [Cr-Ni-Mo/1.4571]  | 1.50 | 3 | 80 | 0.005 | 1.800 | 0.200 |
| 2.00 | 3 | | | 80 | 0.010 | 2.400 | 0.200 | 12730 | 380 |
| 2.50 | 3 | | | 80 | 0.010 | 3.000 | 0.300 | 10185 | 305 |
| 3.00 | 3 | | | 80 | 0.015 | 3.600 | 0.300 | 8490 | 380 |
| 4.00 | 3 | | | 80 | 0.020 | 4.800 | 0.400 | 6365 | 380 |
| 5.00 | 3 | | | 80 | 0.025 | 6.000 | 0.500 | 5095 | 380 |
| 6.00 | 3 | | | 80 | 0.030 | 7.200 | 0.600 | 4245 | 380 |
| 8.00 | 3 | | | 80 | 0.040 | 9.600 | 0.800 | 3185 | 380 |
| 10.00 | 3 | | | 80 | 0.045 | 12.000 | 1.000 | 2545 | 345 |

| Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---|--|---------|--|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
|  | Acciaio < 850 N/mm ²  | 1.50 | 3 | 140 | 0.010 | 0.600 | 1.500 | 29710 | 890 | 0.8 |
| | | 2.00 | 3 | 140 | 0.010 | 0.800 | 2.000 | 22280 | 670 | 1.1 |
| | | 2.50 | 3 | 140 | 0.015 | 1.000 | 2.500 | 17825 | 800 | 2.0 |
| | | 3.00 | 3 | 140 | 0.015 | 1.200 | 3.000 | 14855 | 670 | 2.4 |
| | | 4.00 | 3 | 140 | 0.020 | 1.600 | 4.000 | 11140 | 670 | 4.3 |
| | | 5.00 | 3 | 140 | 0.030 | 2.000 | 5.000 | 8915 | 800 | 8.0 |
| | | 6.00 | 3 | 140 | 0.035 | 2.400 | 6.000 | 7425 | 780 | 11.2 |
| | | 8.00 | 3 | 140 | 0.045 | 3.200 | 8.000 | 5570 | 750 | 19.3 |
| | | 10.00 | 3 | 140 | 0.055 | 4.000 | 10.000 | 4455 | 735 | 29.4 |
| | | | Acciaio 850 - 1100 N/mm ²  | 1.50 | 3 | 85 | 0.010 | 0.600 | 1.500 | 18040 |
| 2.00 | 3 | | | 85 | 0.010 | 0.800 | 2.000 | 13530 | 405 | 0.6 |
| 2.50 | 3 | | | 85 | 0.015 | 1.000 | 2.500 | 10825 | 485 | 1.2 |
| 3.00 | 3 | | | 85 | 0.015 | 1.200 | 3.000 | 9020 | 405 | 1.5 |
| 4.00 | 3 | | | 85 | 0.020 | 1.600 | 4.000 | 6765 | 405 | 2.6 |
| 5.00 | 3 | | | 85 | 0.030 | 2.000 | 5.000 | 5410 | 485 | 4.9 |
| 6.00 | 3 | | | 85 | 0.035 | 2.400 | 6.000 | 4510 | 475 | 6.8 |
| 8.00 | 3 | | | 85 | 0.045 | 3.200 | 8.000 | 3380 | 455 | 11.7 |
| 10.00 | 3 | | | 85 | 0.050 | 4.000 | 10.000 | 2705 | 405 | 16.2 |
| | Leghe di titanio indurite > 300 HB [Ti6Al4V]  | | | 1.50 | 3 | 40 | 0.005 | 0.600 | 1.500 | 8490 |
| | | 2.00 | 3 | 40 | 0.005 | 0.800 | 2.000 | 6365 | 95 | 0.2 |
| | | 2.50 | 3 | 40 | 0.010 | 1.000 | 2.500 | 5095 | 155 | 0.4 |
| | | 3.00 | 3 | 40 | 0.010 | 1.200 | 3.000 | 4245 | 125 | 0.5 |
| | | 4.00 | 3 | 40 | 0.010 | 1.600 | 4.000 | 3185 | 95 | 0.6 |
| | | 5.00 | 3 | 40 | 0.015 | 2.000 | 5.000 | 2545 | 115 | 1.1 |
| | | 6.00 | 3 | 40 | 0.020 | 2.400 | 6.000 | 2120 | 125 | 1.8 |
| | | 8.00 | 3 | 40 | 0.025 | 3.200 | 8.000 | 1590 | 120 | 3.1 |
| | | 10.00 | 3 | 40 | 0.030 | 4.000 | 10.000 | 1275 | 115 | 4.6 |
| | | | Inox normal [Cr-Ni/1.4301] [Cr-Ni-Mo/1.4571]  | 1.50 | 3 | 55 | 0.005 | 0.600 | 1.500 | 11670 |
| 2.00 | 3 | | | 55 | 0.005 | 0.800 | 2.000 | 8755 | 130 | 0.2 |
| 2.50 | 3 | | | 55 | 0.010 | 1.000 | 2.500 | 7005 | 210 | 0.5 |
| 3.00 | 3 | | | 55 | 0.010 | 1.200 | 3.000 | 5835 | 175 | 0.6 |
| 4.00 | 3 | | | 55 | 0.015 | 1.600 | 4.000 | 4375 | 195 | 1.3 |
| 5.00 | 3 | | | 55 | 0.020 | 2.000 | 5.000 | 3500 | 210 | 2.1 |
| 6.00 | 3 | | | 55 | 0.025 | 2.400 | 6.000 | 2920 | 220 | 3.2 |
| 8.00 | 3 | | | 55 | 0.030 | 3.200 | 8.000 | 2190 | 195 | 5.0 |
| 10.00 | 3 | | | 55 | 0.040 | 4.000 | 10.000 | 1750 | 210 | 8.4 |

Applicazione



Materiale

Acciaio
< 850 N/mm²



Acciaio
850 - 1100 N/mm²



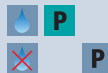
Ghisa
(griglia / sferoidale)



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Acciaio
< 850 N/mm²



Acciaio
850 - 1100 N/mm²



Ghisa
(griglia / sferoidale)



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|
| 1.00 | 2 | 115 | 0.005 | 1.000 | 0.500 | 36605 | 365 |
| 2.00 | 2 | 115 | 0.005 | 2.000 | 0.900 | 18305 | 185 |
| 2.50 | 2 | 115 | 0.005 | 2.000 | 1.100 | 14640 | 145 |
| 3.00 | 2 | 115 | 0.010 | 3.000 | 1.400 | 12200 | 245 |
| 4.00 | 2 | 115 | 0.015 | 4.000 | 1.800 | 9150 | 275 |
| 5.00 | 2 | 115 | 0.020 | 5.000 | 2.300 | 7320 | 295 |
| 6.00 | 2 | 115 | 0.025 | 6.000 | 2.700 | 6100 | 305 |

| | | | | | | | |
|------|---|----|-------|-------|-------|-------|-----|
| 1.00 | 2 | 75 | 0.005 | 1.000 | 0.500 | 23875 | 240 |
| 2.00 | 2 | 75 | 0.005 | 2.000 | 0.900 | 11935 | 120 |
| 2.50 | 2 | 75 | 0.005 | 2.000 | 1.100 | 9550 | 95 |
| 3.00 | 2 | 75 | 0.010 | 3.000 | 1.400 | 7960 | 160 |
| 4.00 | 2 | 75 | 0.015 | 4.000 | 1.800 | 5970 | 180 |
| 5.00 | 2 | 75 | 0.020 | 5.000 | 2.300 | 4775 | 190 |
| 6.00 | 2 | 75 | 0.020 | 6.000 | 2.700 | 3980 | 160 |

| | | | | | | | |
|------|---|-----|-------|-------|-------|-------|-----|
| 1.00 | 2 | 132 | 0.005 | 1.000 | 0.500 | 42015 | 420 |
| 2.00 | 2 | 150 | 0.005 | 2.000 | 0.900 | 23875 | 240 |
| 2.50 | 2 | 150 | 0.005 | 2.000 | 1.100 | 19100 | 190 |
| 3.00 | 2 | 150 | 0.015 | 3.000 | 1.400 | 15915 | 475 |
| 4.00 | 2 | 150 | 0.020 | 4.000 | 1.800 | 11935 | 475 |
| 5.00 | 2 | 150 | 0.020 | 5.000 | 2.300 | 9550 | 380 |
| 6.00 | 2 | 150 | 0.025 | 6.000 | 2.700 | 7960 | 400 |

| | | | | | | | |
|------|---|----|-------|-------|-------|-------|-----|
| 1.00 | 2 | 40 | 0.005 | 1.000 | 0.500 | 12730 | 125 |
| 2.00 | 2 | 40 | 0.005 | 2.000 | 0.900 | 6365 | 65 |
| 2.50 | 2 | 40 | 0.005 | 2.000 | 1.100 | 5095 | 50 |
| 3.00 | 2 | 40 | 0.010 | 3.000 | 1.400 | 4245 | 85 |
| 4.00 | 2 | 40 | 0.015 | 4.000 | 1.800 | 3185 | 95 |
| 5.00 | 2 | 40 | 0.020 | 5.000 | 2.300 | 2545 | 100 |
| 6.00 | 2 | 40 | 0.020 | 6.000 | 2.700 | 2120 | 85 |

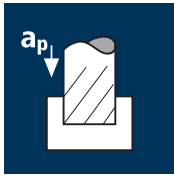
| | | | | | | | |
|------|---|----|-------|-------|-------|-------|-----|
| 1.00 | 2 | 85 | 0.005 | 0.500 | 1.000 | 27055 | 270 |
| 2.00 | 2 | 85 | 0.005 | 1.000 | 2.000 | 13530 | 135 |
| 2.50 | 2 | 85 | 0.005 | 1.000 | 2.500 | 10825 | 110 |
| 3.00 | 2 | 85 | 0.010 | 1.500 | 3.000 | 9020 | 180 |
| 4.00 | 2 | 85 | 0.010 | 2.000 | 4.000 | 6765 | 135 |
| 5.00 | 2 | 85 | 0.015 | 2.500 | 5.000 | 5410 | 160 |
| 6.00 | 2 | 85 | 0.015 | 3.000 | 6.000 | 4510 | 135 |

| | | | | | | | |
|------|---|----|-------|-------|-------|-------|-----|
| 1.00 | 2 | 60 | 0.005 | 0.500 | 1.000 | 19100 | 190 |
| 2.00 | 2 | 60 | 0.005 | 1.000 | 2.000 | 9550 | 95 |
| 2.50 | 2 | 60 | 0.005 | 1.000 | 2.500 | 7640 | 75 |
| 3.00 | 2 | 60 | 0.010 | 1.500 | 3.000 | 6365 | 125 |
| 4.00 | 2 | 60 | 0.010 | 2.000 | 4.000 | 4775 | 95 |
| 5.00 | 2 | 60 | 0.015 | 2.500 | 5.000 | 3820 | 115 |
| 6.00 | 2 | 60 | 0.015 | 3.000 | 6.000 | 3185 | 95 |

| | | | | | | | |
|------|---|-----|-------|-------|-------|-------|-----|
| 1.00 | 2 | 105 | 0.005 | 0.500 | 1.000 | 33425 | 335 |
| 2.00 | 2 | 105 | 0.005 | 1.000 | 2.000 | 16710 | 165 |
| 2.50 | 2 | 105 | 0.005 | 1.000 | 2.500 | 13370 | 135 |
| 3.00 | 2 | 105 | 0.010 | 1.500 | 3.000 | 11140 | 225 |
| 4.00 | 2 | 105 | 0.010 | 2.000 | 4.000 | 8355 | 165 |
| 5.00 | 2 | 105 | 0.015 | 2.500 | 5.000 | 6685 | 200 |
| 6.00 | 2 | 105 | 0.020 | 3.000 | 6.000 | 5570 | 225 |

| | | | | | | | |
|------|---|----|-------|-------|-------|------|----|
| 1.00 | 2 | 30 | 0.005 | 0.500 | 1.000 | 9550 | 95 |
| 2.00 | 2 | 30 | 0.005 | 1.000 | 2.000 | 4775 | 50 |
| 2.50 | 2 | 30 | 0.005 | 1.000 | 2.500 | 3820 | 40 |
| 3.00 | 2 | 30 | 0.010 | 1.500 | 3.000 | 3185 | 65 |
| 4.00 | 2 | 30 | 0.010 | 2.000 | 4.000 | 2385 | 50 |
| 5.00 | 2 | 30 | 0.015 | 2.500 | 5.000 | 1910 | 55 |
| 6.00 | 2 | 30 | 0.015 | 3.000 | 6.000 | 1590 | 50 |

Applicazione



Materiale

Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|
| 1.00 | 2 | 44 | 0.002 | 0.500 | 1.000 | 14005 | 55 |
| 2.00 | 2 | 44 | 0.004 | 1.000 | 2.000 | 7005 | 55 |
| 3.00 | 2 | 44 | 0.006 | 1.500 | 3.000 | 4670 | 55 |
| 4.00 | 2 | 44 | 0.008 | 2.000 | 4.000 | 3500 | 55 |
| 5.00 | 2 | 44 | 0.012 | 2.500 | 5.000 | 2800 | 65 |
| 6.00 | 2 | 44 | 0.014 | 3.000 | 6.000 | 2335 | 65 |
| 8.00 | 2 | 44 | 0.018 | 4.000 | 8.000 | 1750 | 65 |
| 9.00 | 2 | 44 | 0.020 | 4.500 | 9.000 | 1555 | 60 |
| 10.00 | 2 | 44 | 0.022 | 5.000 | 10.000 | 1400 | 60 |

Acciaio
850 - 1100 N/mm²



| | | | | | | | |
|-------|---|----|-------|-------|--------|-------|----|
| 1.00 | 2 | 36 | 0.002 | 0.500 | 1.000 | 11460 | 45 |
| 2.00 | 2 | 36 | 0.004 | 1.000 | 2.000 | 5730 | 45 |
| 3.00 | 2 | 36 | 0.006 | 1.500 | 3.000 | 3820 | 45 |
| 4.00 | 2 | 36 | 0.008 | 2.000 | 4.000 | 2865 | 45 |
| 5.00 | 2 | 36 | 0.012 | 2.500 | 5.000 | 2290 | 55 |
| 6.00 | 2 | 36 | 0.014 | 3.000 | 6.000 | 1910 | 55 |
| 8.00 | 2 | 36 | 0.018 | 4.000 | 8.000 | 1430 | 50 |
| 9.00 | 2 | 36 | 0.020 | 4.500 | 9.000 | 1275 | 50 |
| 10.00 | 2 | 36 | 0.022 | 5.000 | 10.000 | 1145 | 50 |

Acciaio
1100 - 1300 N/mm²



| | | | | | | | |
|-------|---|----|-------|-------|--------|------|----|
| 1.00 | 2 | 28 | 0.002 | 0.500 | 1.000 | 8915 | 35 |
| 2.00 | 2 | 28 | 0.004 | 1.000 | 2.000 | 4455 | 35 |
| 3.00 | 2 | 28 | 0.006 | 1.500 | 3.000 | 2970 | 35 |
| 4.00 | 2 | 28 | 0.008 | 2.000 | 4.000 | 2230 | 35 |
| 5.00 | 2 | 28 | 0.012 | 2.500 | 5.000 | 1785 | 45 |
| 6.00 | 2 | 28 | 0.014 | 3.000 | 6.000 | 1485 | 40 |
| 8.00 | 2 | 28 | 0.018 | 4.000 | 8.000 | 1115 | 40 |
| 9.00 | 2 | 28 | 0.020 | 4.500 | 9.000 | 990 | 40 |
| 10.00 | 2 | 28 | 0.022 | 5.000 | 10.000 | 890 | 40 |

Acciaio per lavorazione
a freddo (12% Cr)
fortemente legati
[1.2379]



| | | | | | | | |
|-------|---|----|-------|-------|--------|------|----|
| 1.00 | 2 | 25 | 0.002 | 0.500 | 1.000 | 7960 | 30 |
| 2.00 | 2 | 25 | 0.004 | 1.000 | 2.000 | 3980 | 30 |
| 3.00 | 2 | 25 | 0.006 | 1.500 | 3.000 | 2655 | 30 |
| 4.00 | 2 | 25 | 0.008 | 2.000 | 4.000 | 1990 | 30 |
| 5.00 | 2 | 25 | 0.012 | 2.500 | 5.000 | 1590 | 40 |
| 6.00 | 2 | 25 | 0.014 | 3.000 | 6.000 | 1325 | 35 |
| 8.00 | 2 | 25 | 0.018 | 4.000 | 8.000 | 995 | 35 |
| 9.00 | 2 | 25 | 0.020 | 4.500 | 9.000 | 885 | 35 |
| 10.00 | 2 | 25 | 0.022 | 5.000 | 10.000 | 795 | 35 |

Ghisa
(grigia / sferoidale)



| | | | | | | | |
|-------|---|----|-------|-------|--------|-------|----|
| 1.00 | 2 | 34 | 0.002 | 0.500 | 1.000 | 10825 | 45 |
| 2.00 | 2 | 34 | 0.004 | 1.000 | 2.000 | 5410 | 45 |
| 3.00 | 2 | 34 | 0.006 | 1.500 | 3.000 | 3610 | 45 |
| 4.00 | 2 | 34 | 0.008 | 2.000 | 4.000 | 2705 | 45 |
| 5.00 | 2 | 34 | 0.012 | 2.500 | 5.000 | 2165 | 50 |
| 6.00 | 2 | 34 | 0.014 | 3.000 | 6.000 | 1805 | 50 |
| 8.00 | 2 | 34 | 0.018 | 4.000 | 8.000 | 1355 | 50 |
| 9.00 | 2 | 34 | 0.020 | 4.500 | 9.000 | 1205 | 50 |
| 10.00 | 2 | 34 | 0.022 | 5.000 | 10.000 | 1080 | 50 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| | | | | | | | |
|-------|---|----|-------|-------|--------|------|----|
| 1.00 | 2 | 18 | 0.002 | 0.500 | 1.000 | 5730 | 25 |
| 2.00 | 2 | 18 | 0.004 | 1.000 | 2.000 | 2865 | 25 |
| 3.00 | 2 | 18 | 0.006 | 1.500 | 3.000 | 1910 | 25 |
| 4.00 | 2 | 18 | 0.008 | 2.000 | 4.000 | 1430 | 25 |
| 5.00 | 2 | 18 | 0.012 | 2.500 | 5.000 | 1145 | 30 |
| 6.00 | 2 | 18 | 0.014 | 3.000 | 6.000 | 955 | 25 |
| 8.00 | 2 | 18 | 0.018 | 4.000 | 8.000 | 715 | 25 |
| 9.00 | 2 | 18 | 0.020 | 4.500 | 9.000 | 635 | 25 |
| 10.00 | 2 | 18 | 0.022 | 5.000 | 10.000 | 575 | 25 |

Rame non legato



| | | | | | | | |
|-------|---|----|-------|-------|--------|-------|-----|
| 1.00 | 2 | 80 | 0.002 | 0.500 | 1.000 | 25465 | 100 |
| 2.00 | 2 | 80 | 0.004 | 1.000 | 2.000 | 12730 | 100 |
| 3.00 | 2 | 80 | 0.006 | 1.500 | 3.000 | 8490 | 100 |
| 4.00 | 2 | 80 | 0.008 | 2.000 | 4.000 | 6365 | 100 |
| 5.00 | 2 | 80 | 0.012 | 2.500 | 5.000 | 5095 | 120 |
| 6.00 | 2 | 80 | 0.014 | 3.000 | 6.000 | 4245 | 120 |
| 8.00 | 2 | 80 | 0.018 | 4.000 | 8.000 | 3185 | 115 |
| 9.00 | 2 | 80 | 0.020 | 4.500 | 9.000 | 2830 | 115 |
| 10.00 | 2 | 80 | 0.022 | 5.000 | 10.000 | 2545 | 110 |

Alluminio malleabile
Costruzione integrale Al



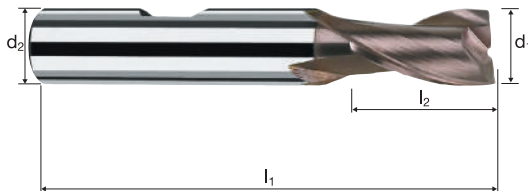
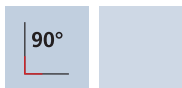
| | | | | | | | |
|-------|---|-----|-------|-------|--------|-------|-----|
| 1.00 | 2 | 100 | 0.002 | 0.500 | 1.000 | 31830 | 125 |
| 2.00 | 2 | 100 | 0.004 | 1.000 | 2.000 | 15915 | 125 |
| 3.00 | 2 | 100 | 0.006 | 1.500 | 3.000 | 10610 | 125 |
| 4.00 | 2 | 100 | 0.008 | 2.000 | 4.000 | 7960 | 125 |
| 5.00 | 2 | 100 | 0.012 | 2.500 | 5.000 | 6365 | 155 |
| 6.00 | 2 | 100 | 0.014 | 3.000 | 6.000 | 5305 | 150 |
| 8.00 | 2 | 100 | 0.018 | 4.000 | 8.000 | 3980 | 145 |
| 9.00 | 2 | 100 | 0.020 | 4.500 | 9.000 | 3535 | 140 |
| 10.00 | 2 | 100 | 0.022 | 5.000 | 10.000 | 3185 | 140 |

Frese cilindriche

A taglienti lisci, esecuzione corta

HSS

HSS
PM/F λ 30°
 γ 15°



Sgrossatura

Finitura



ReTool®

Rm

< 850

Rm

850-1100

Rm

1100-1300

Inox

Stainless

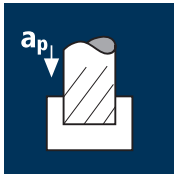
Ti

Titanium

GG(G)
Aluminium
Copper

| Esempio: N° Ordine | | | | | | | | | UNICUT-4X |
|--|----------------------------------|----------------------------------|----------------|----------------|----------------|-------|---|-------|-----------|
| Rivestimento Articolo Codice-ø | | | | | | | | | U0700 |
| U 0700 100 | | | | | | | | | EUR |
| Ø Code | d ₁ h ₈ | d ₂ h ₆ | l ₁ | l ₂ | l ₄ | α | z | | |
| 100 | 1.00 | 6.00 | 47 | 3.00 | 10.48 | 14.0° | 2 | 23.30 | |
| 120 | 1.50 | 6.00 | 47 | 3.00 | 9.99 | 13.0° | 2 | 23.30 | |
| 140* | 2.00 | 6.00 | 48 | 4.00 | 10.71 | 11.0° | 2 | 23.30 | |
| 160 | 2.50 | 6.00 | 49 | 5.00 | 12.50 | 8.0° | 2 | 23.30 | |
| 180* | 3.00 | 6.00 | 49 | 5.00 | 12.50 | 7.0° | 2 | 23.30 | |
| 200 | 3.50 | 6.00 | 50 | 6.00 | 13.50 | 5.5° | 2 | 23.30 | |
| 220* | 4.00 | 6.00 | 51 | 7.00 | 14.50 | 4.0° | 2 | 23.30 | |
| 240 | 4.50 | 6.00 | 51 | 7.00 | 14.50 | 3.0° | 2 | 23.30 | |
| 260* | 5.00 | 6.00 | 52 | 8.00 | 15.50 | 2.0° | 2 | 23.30 | |
| 280 | 5.50 | 6.00 | 52 | 8.00 | 15.50 | 1.0° | 2 | 23.30 | |
| 300* | 6.00 | 6.00 | 52 | 8.00 | - | 0.0° | 2 | 23.30 | |
| 322 | 6.50 | 10.00 | 60 | 10.00 | 19.50 | 5.5° | 2 | 32.60 | |
| 331 | 7.00 | 8.00 | 54 | 10.00 | 17.50 | 2.0° | 2 | 32.60 | |
| 362 | 7.50 | 10.00 | 60 | 10.00 | 19.50 | 4.0° | 2 | 32.60 | |
| 391* | 8.00 | 8.00 | 55 | 11.00 | - | 0.0° | 2 | 32.60 | |
| 410 | 8.50 | 10.00 | 61 | 11.00 | 20.50 | 2.5° | 2 | 35.00 | |
| 420 | 9.00 | 10.00 | 61 | 11.00 | 20.50 | 1.5° | 2 | 35.00 | |
| 440 | 9.70 | 10.00 | 63 | 13.00 | 22.50 | 0.0° | 2 | 35.00 | |
| 450* | 10.00 | 10.00 | 63 | 13.00 | - | 0.0° | 2 | 35.00 | |
| * Tolleranza d ₁ per la scanalatura della linguetta di aggiustamento P9 | | | | | | | | | |

Applicazione



Materiale

Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|
| 11.00 | 2 | 44 | 0.024 | 5.500 | 11.000 | 1275 | 60 |
| 12.00 | 2 | 44 | 0.026 | 6.000 | 12.000 | 1165 | 60 |
| 13.00 | 2 | 44 | 0.028 | 6.500 | 13.000 | 1075 | 60 |
| 14.00 | 2 | 44 | 0.032 | 7.000 | 14.000 | 1000 | 65 |
| 16.00 | 2 | 44 | 0.036 | 8.000 | 16.000 | 875 | 65 |
| 18.00 | 2 | 44 | 0.040 | 9.000 | 18.000 | 780 | 60 |
| 20.00 | 2 | 44 | 0.044 | 10.000 | 20.000 | 700 | 60 |
| 22.00 | 2 | 44 | 0.048 | 11.000 | 22.000 | 635 | 60 |
| 25.00 | 2 | 44 | 0.056 | 12.500 | 25.000 | 560 | 65 |

Acciaio
850 - 1100 N/mm²



| | | | | | | | |
|-------|---|----|-------|--------|--------|------|----|
| 11.00 | 2 | 36 | 0.024 | 5.500 | 11.000 | 1040 | 50 |
| 12.00 | 2 | 36 | 0.026 | 6.000 | 12.000 | 955 | 50 |
| 13.00 | 2 | 36 | 0.028 | 6.500 | 13.000 | 880 | 50 |
| 14.00 | 2 | 36 | 0.032 | 7.000 | 14.000 | 820 | 50 |
| 16.00 | 2 | 36 | 0.036 | 8.000 | 16.000 | 715 | 50 |
| 18.00 | 2 | 36 | 0.040 | 9.000 | 18.000 | 635 | 50 |
| 20.00 | 2 | 36 | 0.044 | 10.000 | 20.000 | 575 | 50 |
| 22.00 | 2 | 36 | 0.048 | 11.000 | 22.000 | 520 | 50 |
| 25.00 | 2 | 36 | 0.056 | 12.500 | 25.000 | 460 | 50 |

Acciaio
1100 - 1300 N/mm²



| | | | | | | | |
|-------|---|----|-------|--------|--------|-----|----|
| 11.00 | 2 | 28 | 0.024 | 5.500 | 11.000 | 810 | 40 |
| 12.00 | 2 | 28 | 0.026 | 6.000 | 12.000 | 745 | 40 |
| 13.00 | 2 | 28 | 0.028 | 6.500 | 13.000 | 685 | 40 |
| 14.00 | 2 | 28 | 0.032 | 7.000 | 14.000 | 635 | 40 |
| 16.00 | 2 | 28 | 0.036 | 8.000 | 16.000 | 555 | 40 |
| 18.00 | 2 | 28 | 0.040 | 9.000 | 18.000 | 495 | 40 |
| 20.00 | 2 | 28 | 0.044 | 10.000 | 20.000 | 445 | 40 |
| 22.00 | 2 | 28 | 0.048 | 11.000 | 22.000 | 405 | 40 |
| 25.00 | 2 | 28 | 0.056 | 12.500 | 25.000 | 355 | 40 |

Acciaio per lavorazione
a freddo (12% Cr)
fortemente legati
[1.2379]



| | | | | | | | |
|-------|---|----|-------|--------|--------|-----|----|
| 11.00 | 2 | 25 | 0.024 | 5.500 | 11.000 | 725 | 35 |
| 12.00 | 2 | 25 | 0.026 | 6.000 | 12.000 | 665 | 35 |
| 13.00 | 2 | 25 | 0.028 | 6.500 | 13.000 | 610 | 35 |
| 14.00 | 2 | 25 | 0.032 | 7.000 | 14.000 | 570 | 35 |
| 16.00 | 2 | 25 | 0.036 | 8.000 | 16.000 | 495 | 35 |
| 18.00 | 2 | 25 | 0.040 | 9.000 | 18.000 | 440 | 35 |
| 20.00 | 2 | 25 | 0.044 | 10.000 | 20.000 | 400 | 35 |
| 22.00 | 2 | 25 | 0.048 | 11.000 | 22.000 | 360 | 35 |
| 25.00 | 2 | 25 | 0.056 | 12.500 | 25.000 | 320 | 35 |

Ghisa
(grigia / sferoidale)



| | | | | | | | |
|-------|---|----|-------|--------|--------|-----|----|
| 11.00 | 2 | 34 | 0.024 | 5.500 | 11.000 | 985 | 45 |
| 12.00 | 2 | 34 | 0.026 | 6.000 | 12.000 | 900 | 45 |
| 13.00 | 2 | 34 | 0.028 | 6.500 | 13.000 | 835 | 45 |
| 14.00 | 2 | 34 | 0.032 | 7.000 | 14.000 | 775 | 50 |
| 16.00 | 2 | 34 | 0.036 | 8.000 | 16.000 | 675 | 50 |
| 18.00 | 2 | 34 | 0.040 | 9.000 | 18.000 | 600 | 50 |
| 20.00 | 2 | 34 | 0.044 | 10.000 | 20.000 | 540 | 50 |
| 22.00 | 2 | 34 | 0.048 | 11.000 | 22.000 | 490 | 45 |
| 25.00 | 2 | 34 | 0.056 | 12.500 | 25.000 | 435 | 50 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| | | | | | | | |
|-------|---|----|-------|--------|--------|-----|----|
| 11.00 | 2 | 18 | 0.024 | 5.500 | 11.000 | 520 | 25 |
| 12.00 | 2 | 18 | 0.026 | 6.000 | 12.000 | 475 | 25 |
| 13.00 | 2 | 18 | 0.028 | 6.500 | 13.000 | 440 | 25 |
| 14.00 | 2 | 18 | 0.032 | 7.000 | 14.000 | 410 | 25 |
| 16.00 | 2 | 18 | 0.036 | 8.000 | 16.000 | 360 | 25 |
| 18.00 | 2 | 18 | 0.040 | 9.000 | 18.000 | 320 | 25 |
| 20.00 | 2 | 18 | 0.044 | 10.000 | 20.000 | 285 | 25 |
| 22.00 | 2 | 18 | 0.048 | 11.000 | 22.000 | 260 | 25 |
| 25.00 | 2 | 18 | 0.056 | 12.500 | 25.000 | 230 | 25 |

Rame non legato



| | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|
| 11.00 | 2 | 80 | 0.024 | 5.500 | 11.000 | 2315 | 110 |
| 12.00 | 2 | 80 | 0.026 | 6.000 | 12.000 | 2120 | 110 |
| 13.00 | 2 | 80 | 0.028 | 6.500 | 13.000 | 1960 | 110 |
| 14.00 | 2 | 80 | 0.032 | 7.000 | 14.000 | 1820 | 115 |
| 16.00 | 2 | 80 | 0.036 | 8.000 | 16.000 | 1590 | 115 |
| 18.00 | 2 | 80 | 0.040 | 9.000 | 18.000 | 1415 | 115 |
| 20.00 | 2 | 80 | 0.044 | 10.000 | 20.000 | 1275 | 110 |
| 22.00 | 2 | 80 | 0.048 | 11.000 | 22.000 | 1155 | 110 |
| 25.00 | 2 | 80 | 0.056 | 12.500 | 25.000 | 1020 | 115 |

Alluminio malleabile
Costruzione integrale Al



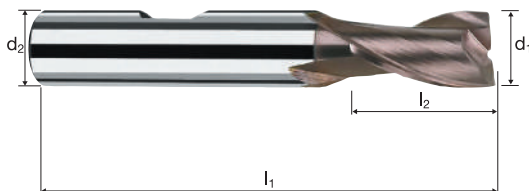
| | | | | | | | |
|-------|---|-----|-------|--------|--------|------|-----|
| 11.00 | 2 | 100 | 0.024 | 5.500 | 11.000 | 2895 | 140 |
| 12.00 | 2 | 100 | 0.026 | 6.000 | 12.000 | 2655 | 140 |
| 13.00 | 2 | 100 | 0.028 | 6.500 | 13.000 | 2450 | 135 |
| 14.00 | 2 | 100 | 0.032 | 7.000 | 14.000 | 2275 | 145 |
| 16.00 | 2 | 100 | 0.036 | 8.000 | 16.000 | 1990 | 145 |
| 18.00 | 2 | 100 | 0.040 | 9.000 | 18.000 | 1770 | 140 |
| 20.00 | 2 | 100 | 0.044 | 10.000 | 20.000 | 1590 | 140 |
| 22.00 | 2 | 100 | 0.048 | 11.000 | 22.000 | 1445 | 140 |
| 25.00 | 2 | 100 | 0.056 | 12.500 | 25.000 | 1275 | 145 |

Frese cilindriche

A taglienti lisci, esecuzione corta

HSS

HSS-E λ 30°
Co8 γ 15°



Sgrossatura

Finitura



ReTool®

Rm

< 850

Rm

850-1100

Rm

1100-1300

Inox

Stainless

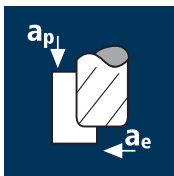
Ti

Titanium

GG(G)
Aluminium
Copper

| Esempio: N° Ordine | | | | | | | | | UNICUT-4X |
|--|----------------------|----------------------|----------------|----------------|----------------|------|---|--|-----------|
| Rivestimento Articolo Codice-ø | | | | | | | | | U0700 |
| Ø Code | d ₁ h8 | d ₂ h6 | l ₁ | l ₂ | l ₄ | α | z | | EUR |
| 460 | 10.50 | 12.00 | 70 | 13.00 | 24.50 | 2.0° | 2 | | 39.60 |
| 470 | 11.00 | 12.00 | 70 | 13.00 | 24.50 | 1.5° | 2 | | 39.60 |
| 501* | 12.00 | 12.00 | 73 | 16.00 | - | 0.0° | 2 | | 39.60 |
| 540 | 13.00 | 12.00 | 73 | 16.00 | - | 0.0° | 2 | | 55.90 |
| 570* | 14.00 | 12.00 | 73 | 16.00 | - | 0.0° | 2 | | 55.90 |
| 581 | 15.00 | 12.00 | 73 | 16.00 | - | 0.0° | 2 | | 55.90 |
| 610* | 16.00 | 16.00 | 79 | 19.00 | - | 0.0° | 2 | | 55.90 |
| 620 | 17.00 | 16.00 | 79 | 19.00 | - | 0.0° | 2 | | 55.90 |
| 640* | 18.00 | 16.00 | 79 | 19.00 | - | 0.0° | 2 | | 71.00 |
| 650 | 19.00 | 16.00 | 79 | 19.00 | - | 0.0° | 2 | | 71.00 |
| 682* | 20.00 | 20.00 | 88 | 22.00 | - | 0.0° | 2 | | 71.00 |
| 710* | 22.00 | 20.00 | 88 | 22.00 | - | 0.0° | 2 | | 120.00 |
| 772* | 25.00 | 25.00 | 102 | 26.00 | - | 0.0° | 2 | | 120.00 |
| * Tolleranza d ₁ per la scanalatura della linguetta di aggiustamento P9 | | | | | | | | | |

Applicazione

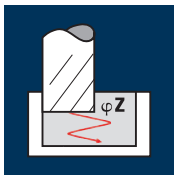


Materiale

Acciaio da utensile temprato 52 - 56 HRC

H

| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 3.00 | 4 | 60 | 0.012 | 4.500 | 1.800 | 6365 | 305 | 2.5 | 5° |
| 4.00 | 4 | 60 | 0.017 | 6.000 | 2.400 | 4775 | 325 | 4.7 | 5° |
| 5.00 | 4 | 60 | 0.022 | 7.500 | 3.000 | 3820 | 335 | 7.5 | 5° |
| 6.00 | 4 | 60 | 0.027 | 9.000 | 3.600 | 3185 | 345 | 11.2 | 5° |
| 8.00 | 4 | 60 | 0.035 | 12.000 | 4.800 | 2385 | 335 | 19.3 | 5° |
| 10.00 | 4 | 60 | 0.045 | 15.000 | 6.000 | 1910 | 345 | 31.1 | 5° |
| 12.00 | 4 | 60 | 0.055 | 18.000 | 7.200 | 1590 | 350 | 45.4 | 5° |
| 16.00 | 4 | 60 | 0.065 | 24.000 | 9.600 | 1195 | 310 | 71.4 | 5° |



Acciaio da utensile temprato > 60 HRC

H

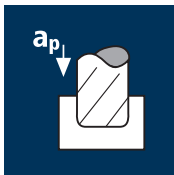
| | | | | | | | | | |
|-------|---|----|-------|--------|-------|------|----|------|----|
| 3.00 | 4 | 25 | 0.006 | 3.750 | 1.800 | 2655 | 65 | 0.4 | 3° |
| 4.00 | 4 | 25 | 0.008 | 5.000 | 2.400 | 1990 | 65 | 0.8 | 4° |
| 5.00 | 4 | 25 | 0.010 | 6.250 | 3.000 | 1590 | 65 | 1.2 | 5° |
| 6.00 | 4 | 25 | 0.012 | 7.500 | 3.600 | 1325 | 65 | 1.8 | 5° |
| 8.00 | 4 | 25 | 0.015 | 10.000 | 4.800 | 995 | 60 | 2.9 | 5° |
| 10.00 | 4 | 25 | 0.020 | 12.500 | 6.000 | 795 | 65 | 4.9 | 5° |
| 12.00 | 4 | 25 | 0.025 | 15.000 | 7.200 | 665 | 65 | 7.0 | 5° |
| 16.00 | 4 | 25 | 0.030 | 20.000 | 9.600 | 495 | 60 | 11.5 | 5° |

Acciaio rapido temprato 64 - 70 HRC

H

| | | | | | | | | | |
|-------|---|----|-------|--------|-------|------|----|-----|----|
| 3.00 | 4 | 15 | 0.005 | 3.000 | 0.750 | 1590 | 30 | 0.1 | 3° |
| 4.00 | 4 | 15 | 0.009 | 4.000 | 1.000 | 1195 | 45 | 0.2 | 4° |
| 5.00 | 4 | 15 | 0.012 | 5.000 | 1.250 | 955 | 45 | 0.3 | 5° |
| 6.00 | 4 | 15 | 0.009 | 6.000 | 3.600 | 795 | 30 | 0.6 | 5° |
| 8.00 | 4 | 15 | 0.012 | 8.000 | 4.800 | 595 | 30 | 1.2 | 5° |
| 10.00 | 4 | 15 | 0.015 | 10.000 | 6.000 | 475 | 30 | 1.8 | 5° |
| 12.00 | 4 | 15 | 0.018 | 12.000 | 7.200 | 400 | 30 | 2.6 | 5° |
| 16.00 | 4 | 15 | 0.023 | 16.000 | 9.600 | 300 | 30 | 4.6 | 5° |

Applicazione

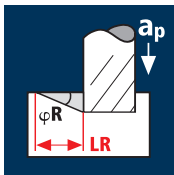


Materiale

Acciaio da utensile temprato 52 - 56 HRC

H

| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] | LR [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|---------|
| 3.00 | 4 | 50 | 0.013 | 3.000 | 3.000 | 5305 | 275 | 2.5 | 5° | 34.3 |
| 4.00 | 4 | 50 | 0.017 | 4.000 | 4.000 | 3980 | 270 | 4.3 | 5° | 45.7 |
| 5.00 | 4 | 50 | 0.022 | 5.000 | 5.000 | 3185 | 280 | 7.0 | 5° | 57.2 |
| 6.00 | 4 | 50 | 0.027 | 6.000 | 6.000 | 2655 | 285 | 10.3 | 5° | 68.6 |
| 8.00 | 4 | 50 | 0.035 | 8.000 | 8.000 | 1990 | 280 | 17.9 | 5° | 91.4 |
| 10.00 | 4 | 50 | 0.045 | 10.000 | 10.000 | 1590 | 285 | 28.5 | 5° | 114.3 |
| 12.00 | 4 | 50 | 0.055 | 12.000 | 12.000 | 1325 | 290 | 41.8 | 5° | 137.2 |
| 16.00 | 4 | 50 | 0.080 | 8.000 | 16.000 | 995 | 320 | 41.0 | 5° | 91.4 |



Acciaio da utensile temprato > 60 HRC

H

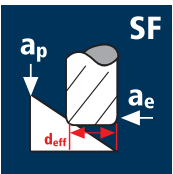
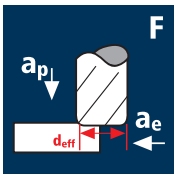
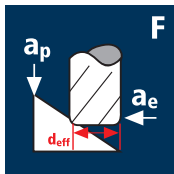
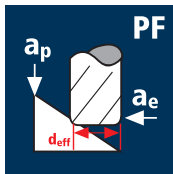
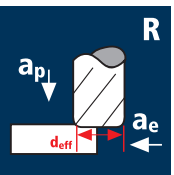
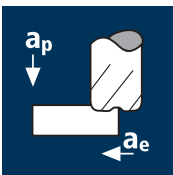
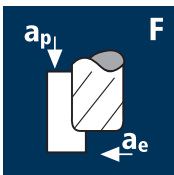
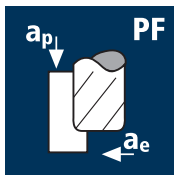
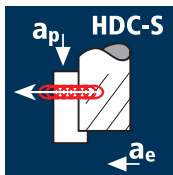
| | | | | | | | | | | |
|-------|---|----|-------|--------|--------|------|----|------|----|-------|
| 3.00 | 4 | 20 | 0.007 | 3.000 | 3.000 | 2120 | 60 | 0.5 | 3° | 57.2 |
| 4.00 | 4 | 20 | 0.010 | 4.000 | 4.000 | 1590 | 65 | 1.0 | 4° | 57.2 |
| 5.00 | 4 | 20 | 0.013 | 5.000 | 5.000 | 1275 | 65 | 1.6 | 5° | 57.2 |
| 6.00 | 4 | 20 | 0.016 | 6.000 | 6.000 | 1060 | 70 | 2.5 | 5° | 68.6 |
| 8.00 | 4 | 20 | 0.021 | 8.000 | 8.000 | 795 | 65 | 4.2 | 5° | 91.4 |
| 10.00 | 4 | 20 | 0.026 | 10.000 | 10.000 | 635 | 65 | 6.5 | 5° | 114.3 |
| 12.00 | 4 | 20 | 0.032 | 12.000 | 12.000 | 530 | 70 | 10.1 | 5° | 137.2 |
| 16.00 | 4 | 20 | 0.050 | 8.000 | 16.000 | 400 | 80 | 10.2 | 5° | 91.4 |

Acciaio rapido temprato 64 - 70 HRC

H

| | | | | | | | | | | |
|-------|---|----|-------|-------|--------|------|----|-----|----|-------|
| 3.00 | 4 | 10 | 0.004 | 1.500 | 3.000 | 1060 | 15 | 0.1 | 3° | 28.6 |
| 4.00 | 4 | 10 | 0.006 | 2.000 | 4.000 | 795 | 20 | 0.2 | 4° | 28.6 |
| 5.00 | 4 | 10 | 0.008 | 3.750 | 5.000 | 635 | 20 | 0.4 | 5° | 42.9 |
| 6.00 | 4 | 10 | 0.009 | 4.500 | 6.000 | 530 | 20 | 0.5 | 5° | 51.4 |
| 8.00 | 4 | 10 | 0.012 | 6.000 | 8.000 | 400 | 20 | 1.0 | 5° | 68.6 |
| 10.00 | 4 | 10 | 0.015 | 7.500 | 10.000 | 320 | 20 | 1.5 | 5° | 85.7 |
| 12.00 | 4 | 10 | 0.020 | 9.000 | 12.000 | 265 | 20 | 2.2 | 5° | 102.9 |
| 16.00 | 4 | 10 | 0.030 | 8.000 | 16.000 | 200 | 25 | 3.2 | 5° | 91.4 |

Dati di applicazione precisi per ulteriori applicazioni e materiali si trovano nel calcolatore dei parametri di taglio ToolExpert 2.0

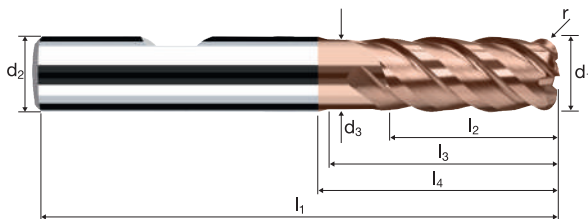
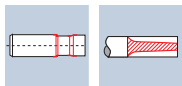
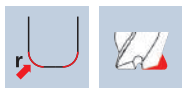


Frese toriche HX (HX-RNVS)

A taglienti lisci, esecuzione normale con scarico corto
Geometria frontale per fresature in penetrazione ad alto rendimento



HM
XA λ 45°
 γ -10°



Sgrossatura HPC Sgrossatura HDC Finitura

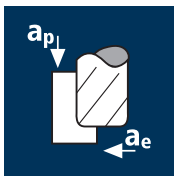


ReTool®

| | | | | | | | | | | |
|--|--|--|--|--------------|--------------|-------------|--|--|--|-----|
| | | | | HRC 48-56 | HRC 56-60 | HRC > 60 | | | | HSS |
|--|--|--|--|--------------|--------------|-------------|--|--|--|-----|

| Ø Code | d ₁ 0/-0.01 | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r 0/+0.015 | α | z | DURO-Si |
|--------------------|---------------------------|----------------------|----------------|----------------|----------------|----------------|----------------|---------------|------|---|---------|
| | | | | | | | | | | | EUR |
| Esempio: N° Ordine | | | | | | | | | | | |
| Rivestimento H | | | | | | | | | | | |
| Articolo 8607 | | | | | | | | | | | |
| Codice-ø 178 | | | | | | | | | | | |
| 178 | 3.00 | 6.00 | 2.80 | 57 | 8.00 | 14.00 | 20.37 | 0.200 | 4.5° | 4 | 109.00 |
| 218 | 4.00 | 6.00 | 3.70 | 57 | 11.00 | 16.00 | 20.82 | 0.200 | 3.0° | 4 | 109.00 |
| 258 | 5.00 | 6.00 | 4.60 | 57 | 13.00 | 18.00 | 21.27 | 0.200 | 1.5° | 4 | 109.00 |
| 297 | 6.00 | 6.00 | 5.50 | 57 | 13.00 | 18.15 | 20.00 | 0.200 | 0.0° | 4 | 109.00 |
| 385 | 8.00 | 8.00 | 7.40 | 63 | 19.00 | 23.63 | 26.00 | 0.200 | 0.0° | 4 | 136.00 |
| 445 | 10.00 | 10.00 | 9.20 | 72 | 22.00 | 27.99 | 31.00 | 0.200 | 0.0° | 4 | 186.00 |
| 496 | 12.00 | 12.00 | 11.00 | 83 | 26.00 | 33.29 | 37.00 | 0.200 | 0.0° | 4 | 229.00 |
| 605 | 16.00 | 16.00 | 15.00 | 92 | 32.00 | 38.73 | 43.00 | 0.200 | 0.0° | 4 | 359.00 |
| 180 | 3.00 | 6.00 | 2.80 | 57 | 8.00 | 14.00 | 20.37 | 0.500 | 4.5° | 4 | 109.00 |
| 220 | 4.00 | 6.00 | 3.70 | 57 | 11.00 | 16.00 | 20.82 | 0.500 | 3.0° | 4 | 109.00 |
| 260 | 5.00 | 6.00 | 4.60 | 57 | 13.00 | 18.00 | 21.27 | 0.500 | 1.5° | 4 | 109.00 |
| 300 | 6.00 | 6.00 | 5.50 | 57 | 13.00 | 18.15 | 20.00 | 0.500 | 0.0° | 4 | 109.00 |
| 388 | 8.00 | 8.00 | 7.40 | 63 | 19.00 | 23.63 | 26.00 | 0.500 | 0.0° | 4 | 136.00 |
| 448 | 10.00 | 10.00 | 9.20 | 72 | 22.00 | 27.99 | 31.00 | 0.500 | 0.0° | 4 | 186.00 |
| 498 | 12.00 | 12.00 | 11.00 | 83 | 26.00 | 33.29 | 37.00 | 0.500 | 0.0° | 4 | 229.00 |
| 606 | 16.00 | 16.00 | 15.00 | 92 | 32.00 | 38.73 | 43.00 | 0.500 | 0.0° | 4 | 359.00 |

Applicazione

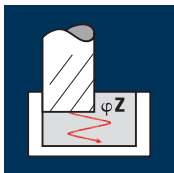


Materiale

Acciaio da
utensile temprato
52 - 56 HRC



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 6.00 | 4 | 60 | 0.027 | 9.000 | 3.600 | 3185 | 345 | 11.2 | 5° |
| 8.00 | 4 | 60 | 0.035 | 12.000 | 4.800 | 2385 | 335 | 19.3 | 5° |
| 10.00 | 4 | 60 | 0.045 | 15.000 | 6.000 | 1910 | 345 | 31.1 | 5° |
| 12.00 | 4 | 60 | 0.055 | 18.000 | 7.200 | 1590 | 350 | 45.4 | 5° |
| 16.00 | 4 | 60 | 0.065 | 24.000 | 9.600 | 1195 | 310 | 71.4 | 5° |



Acciaio da
utensile temprato
> 60 HRC



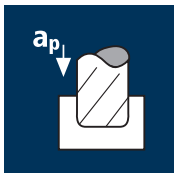
| | | | | | | | | | |
|-------|---|----|-------|--------|-------|------|----|------|----|
| 6.00 | 4 | 25 | 0.012 | 7.500 | 3.600 | 1325 | 65 | 1.8 | 5° |
| 8.00 | 4 | 25 | 0.015 | 10.000 | 4.800 | 995 | 60 | 2.9 | 5° |
| 10.00 | 4 | 25 | 0.020 | 12.500 | 6.000 | 795 | 65 | 4.9 | 5° |
| 12.00 | 4 | 25 | 0.025 | 15.000 | 7.200 | 665 | 65 | 7.0 | 5° |
| 16.00 | 4 | 25 | 0.030 | 20.000 | 9.600 | 495 | 60 | 11.5 | 5° |

Acciaio rapido temprato
64 - 70 HRC



| | | | | | | | | | |
|-------|---|----|-------|--------|-------|-----|----|-----|----|
| 6.00 | 4 | 15 | 0.009 | 6.000 | 3.600 | 795 | 30 | 0.6 | 5° |
| 8.00 | 4 | 15 | 0.012 | 8.000 | 4.800 | 595 | 30 | 1.2 | 5° |
| 10.00 | 4 | 15 | 0.015 | 10.000 | 6.000 | 475 | 30 | 1.8 | 5° |
| 12.00 | 4 | 15 | 0.018 | 12.000 | 7.200 | 400 | 30 | 2.6 | 5° |
| 16.00 | 4 | 15 | 0.023 | 16.000 | 9.600 | 300 | 30 | 4.6 | 5° |

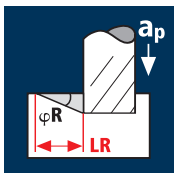
Applicazione



Acciaio da
utensile temprato
52 - 56 HRC



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] | LR [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|---------|
| 6.00 | 4 | 50 | 0.027 | 6.000 | 6.000 | 2655 | 285 | 10.3 | 5° | 68.6 |
| 8.00 | 4 | 50 | 0.035 | 8.000 | 8.000 | 1990 | 280 | 17.9 | 5° | 91.4 |
| 10.00 | 4 | 50 | 0.045 | 10.000 | 10.000 | 1590 | 285 | 28.5 | 5° | 114.3 |
| 12.00 | 4 | 50 | 0.055 | 12.000 | 12.000 | 1325 | 290 | 41.8 | 5° | 137.2 |
| 16.00 | 4 | 50 | 0.080 | 8.000 | 16.000 | 995 | 320 | 41.0 | 5° | 91.4 |



Acciaio da
utensile temprato
> 60 HRC



| | | | | | | | | | | |
|-------|---|----|-------|--------|--------|------|----|------|----|-------|
| 6.00 | 4 | 20 | 0.016 | 6.000 | 6.000 | 1060 | 70 | 2.5 | 5° | 68.6 |
| 8.00 | 4 | 20 | 0.021 | 8.000 | 8.000 | 795 | 65 | 4.2 | 5° | 91.4 |
| 10.00 | 4 | 20 | 0.026 | 10.000 | 10.000 | 635 | 65 | 6.5 | 5° | 114.3 |
| 12.00 | 4 | 20 | 0.032 | 12.000 | 12.000 | 530 | 70 | 10.1 | 5° | 137.2 |
| 16.00 | 4 | 20 | 0.050 | 8.000 | 16.000 | 400 | 80 | 10.2 | 5° | 91.4 |

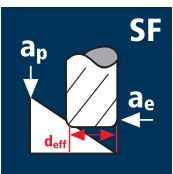
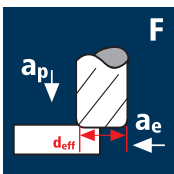
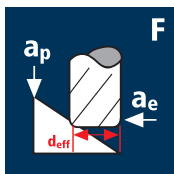
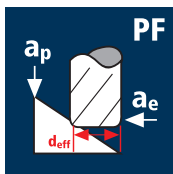
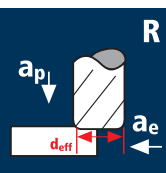
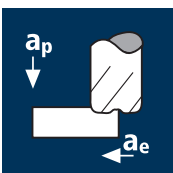
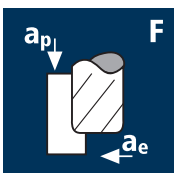
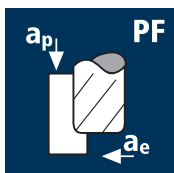
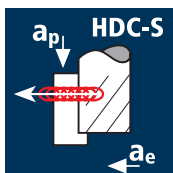
Acciaio rapido temprato
64 - 70 HRC



| | | | | | | | | | | |
|-------|---|----|-------|-------|--------|-----|----|-----|----|-------|
| 6.00 | 4 | 10 | 0.009 | 4.500 | 6.000 | 530 | 20 | 0.5 | 5° | 51.4 |
| 8.00 | 4 | 10 | 0.012 | 6.000 | 8.000 | 400 | 20 | 1.0 | 5° | 68.6 |
| 10.00 | 4 | 10 | 0.015 | 7.500 | 10.000 | 320 | 20 | 1.5 | 5° | 85.7 |
| 12.00 | 4 | 10 | 0.020 | 9.000 | 12.000 | 265 | 20 | 2.2 | 5° | 102.9 |
| 16.00 | 4 | 10 | 0.030 | 8.000 | 16.000 | 200 | 25 | 3.2 | 5° | 91.4 |



Dati di applicazione
precisi per ulteriori
applicazioni e materiali
si trovano nel
calcolatore dei
parametri di taglio
ToolExpert 2.0

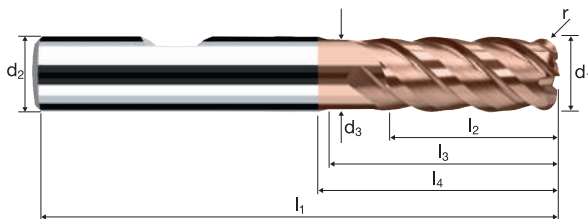
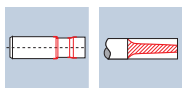
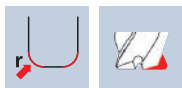


Frese toriche HX (HX-RNVS)

A taglienti lisci, esecuzione normale con scarico corto
Geometria frontale per fresature in penetrazione ad alto rendimento



HM
XA λ 45°
 γ -10°



Sgrossatura HPC Sgrossatura HDC Finitura

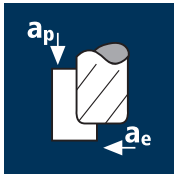


ReTool®

| | | | | | | | | | | |
|--|--|--|--|--------------|--------------|-------------|--|--|--|-----|
| | | | | HRC 48-56 | HRC 56-60 | HRC > 60 | | | | HSS |
|--|--|--|--|--------------|--------------|-------------|--|--|--|-----|

| Ø Code | d ₁ 0/-0.01 | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r 0/+0.015 | α | z | DURO-Si |
|-----------------------|---------------------------|----------------------|--------------------------|-------------------------|------------------------|----------------|----------------|---------------|------|---|--------------|
| | | | | | | | | | | | |
| Esempio: N° Ordine | | | Rivestimento H | Articolo 8607 | Codice-Ø 302 | | | | | | H8607 |
| | | | | | | | | | | | H8507 |
| 302 | 6.00 | 6.00 | 5.50 | 57 | 13.00 | 18.15 | 20.00 | 1.000 | 0.0° | 4 | 109.00 |
| 391 | 8.00 | 8.00 | 7.40 | 63 | 19.00 | 23.63 | 26.00 | 1.000 | 0.0° | 4 | 136.00 |
| 450 | 10.00 | 10.00 | 9.20 | 72 | 22.00 | 27.99 | 31.00 | 1.000 | 0.0° | 4 | 186.00 |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 26.00 | 33.29 | 37.00 | 1.000 | 0.0° | 4 | 229.00 |
| 608 | 16.00 | 16.00 | 15.00 | 92 | 32.00 | 38.73 | 43.00 | 1.000 | 0.0° | 4 | 359.00 |
| 304 | 6.00 | 6.00 | 5.50 | 57 | 13.00 | 18.15 | 20.00 | 1.500 | 0.0° | 4 | 109.00 |
| 395 | 8.00 | 8.00 | 7.40 | 63 | 19.00 | 23.63 | 26.00 | 2.000 | 0.0° | 4 | 136.00 |
| 457 | 10.00 | 10.00 | 9.20 | 72 | 22.00 | 27.99 | 31.00 | 2.500 | 0.0° | 4 | 186.00 |
| 507 | 12.00 | 12.00 | 11.00 | 83 | 26.00 | 33.29 | 37.00 | 3.000 | 0.0° | 4 | 229.00 |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Applicazione



Materiale

Acciaio
850 - 1100 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 4.00 | 4 | 150 | 0.025 | 6.000 | 1.600 | 11935 | 1195 | 11.5 |
| 5.00 | 4 | 150 | 0.035 | 7.500 | 2.000 | 9550 | 1335 | 20.1 |
| 6.00 | 4 | 150 | 0.040 | 9.000 | 2.400 | 7960 | 1275 | 27.5 |
| 8.00 | 4 | 150 | 0.055 | 12.000 | 3.200 | 5970 | 1315 | 50.4 |
| 10.00 | 4 | 150 | 0.065 | 15.000 | 4.000 | 4775 | 1240 | 74.5 |
| 12.00 | 4 | 150 | 0.080 | 18.000 | 4.800 | 3980 | 1275 | 110.0 |
| 16.00 | 4 | 150 | 0.090 | 24.000 | 6.400 | 2985 | 1075 | 165.0 |
| 20.00 | 4 | 150 | 0.110 | 30.000 | 8.000 | 2385 | 1050 | 252.1 |

Acciaio
1100 - 1300 N/mm²



| | | | | | | | | |
|-------|---|-----|-------|--------|-------|------|------|-------|
| 4.00 | 4 | 115 | 0.025 | 6.000 | 1.600 | 9150 | 915 | 8.8 |
| 5.00 | 4 | 115 | 0.035 | 7.500 | 2.000 | 7320 | 1025 | 15.4 |
| 6.00 | 4 | 115 | 0.040 | 9.000 | 2.400 | 6100 | 975 | 21.1 |
| 8.00 | 4 | 115 | 0.055 | 12.000 | 3.200 | 4575 | 1005 | 38.7 |
| 10.00 | 4 | 115 | 0.065 | 15.000 | 4.000 | 3660 | 950 | 57.1 |
| 12.00 | 4 | 115 | 0.080 | 18.000 | 4.800 | 3050 | 975 | 84.3 |
| 16.00 | 4 | 115 | 0.090 | 24.000 | 6.400 | 2290 | 825 | 126.5 |
| 20.00 | 4 | 115 | 0.110 | 30.000 | 8.000 | 1830 | 805 | 193.3 |

Acciaio da
utensile temprato
52 - 56 HRC

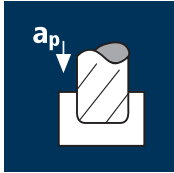


| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 4.00 | 4 | 55 | 0.015 | 6.000 | 1.200 | 4375 | 265 | 1.9 |
| 5.00 | 4 | 55 | 0.018 | 7.500 | 1.500 | 3500 | 250 | 2.8 |
| 6.00 | 4 | 55 | 0.021 | 9.000 | 1.800 | 2920 | 245 | 4.0 |
| 8.00 | 4 | 55 | 0.027 | 12.000 | 2.400 | 2190 | 235 | 6.8 |
| 10.00 | 4 | 55 | 0.036 | 15.000 | 3.000 | 1750 | 250 | 11.3 |
| 12.00 | 4 | 55 | 0.042 | 18.000 | 3.600 | 1460 | 245 | 15.9 |
| 16.00 | 4 | 55 | 0.048 | 24.000 | 4.800 | 1095 | 210 | 24.2 |
| 20.00 | 4 | 55 | 0.060 | 30.000 | 6.000 | 875 | 210 | 37.8 |

Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 4.00 | 4 | 50 | 0.015 | 6.000 | 1.600 | 3980 | 240 | 2.3 |
| 5.00 | 4 | 50 | 0.020 | 7.500 | 2.000 | 3185 | 255 | 3.8 |
| 6.00 | 4 | 50 | 0.020 | 9.000 | 2.400 | 2655 | 210 | 4.6 |
| 8.00 | 4 | 50 | 0.025 | 12.000 | 3.200 | 1990 | 200 | 7.6 |
| 10.00 | 4 | 50 | 0.035 | 15.000 | 4.000 | 1590 | 225 | 13.4 |
| 12.00 | 4 | 50 | 0.040 | 18.000 | 4.800 | 1325 | 210 | 18.3 |
| 16.00 | 4 | 50 | 0.050 | 24.000 | 6.400 | 995 | 200 | 30.6 |
| 20.00 | 4 | 50 | 0.060 | 30.000 | 8.000 | 795 | 190 | 45.8 |

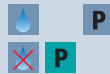


Acciaio
850 - 1100 N/mm²



| | | | | | | | | |
|-------|---|-----|-------|--------|--------|------|-----|-------|
| 4.00 | 4 | 115 | 0.020 | 5.000 | 4.000 | 9150 | 730 | 14.6 |
| 5.00 | 4 | 115 | 0.025 | 6.250 | 5.000 | 7320 | 730 | 22.9 |
| 6.00 | 4 | 115 | 0.025 | 7.500 | 6.000 | 6100 | 610 | 27.5 |
| 8.00 | 4 | 115 | 0.035 | 10.000 | 8.000 | 4575 | 640 | 51.2 |
| 10.00 | 4 | 115 | 0.045 | 12.500 | 10.000 | 3660 | 660 | 82.4 |
| 12.00 | 4 | 115 | 0.055 | 15.000 | 12.000 | 3050 | 670 | 120.8 |
| 16.00 | 4 | 115 | 0.065 | 20.000 | 16.000 | 2290 | 595 | 190.3 |
| 20.00 | 4 | 115 | 0.080 | 25.000 | 20.000 | 1830 | 585 | 292.8 |

Acciaio
1100 - 1300 N/mm²



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|-------|
| 4.00 | 4 | 90 | 0.020 | 5.000 | 4.000 | 7160 | 575 | 11.5 |
| 5.00 | 4 | 90 | 0.025 | 6.250 | 5.000 | 5730 | 575 | 17.9 |
| 6.00 | 4 | 90 | 0.025 | 7.500 | 6.000 | 4775 | 475 | 21.5 |
| 8.00 | 4 | 90 | 0.035 | 10.000 | 8.000 | 3580 | 500 | 40.1 |
| 10.00 | 4 | 90 | 0.045 | 12.500 | 10.000 | 2865 | 515 | 64.5 |
| 12.00 | 4 | 90 | 0.055 | 15.000 | 12.000 | 2385 | 525 | 94.5 |
| 16.00 | 4 | 90 | 0.065 | 20.000 | 16.000 | 1790 | 465 | 149.0 |
| 20.00 | 4 | 90 | 0.080 | 25.000 | 20.000 | 1430 | 460 | 229.2 |

Acciaio da
utensile temprato
52 - 56 HRC



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 4.00 | 4 | 50 | 0.009 | 4.000 | 4.000 | 3980 | 145 | 2.3 |
| 5.00 | 4 | 50 | 0.012 | 5.000 | 5.000 | 3185 | 155 | 3.8 |
| 6.00 | 4 | 50 | 0.015 | 6.000 | 6.000 | 2655 | 160 | 5.7 |
| 8.00 | 4 | 50 | 0.018 | 8.000 | 8.000 | 1990 | 145 | 9.2 |
| 10.00 | 4 | 50 | 0.024 | 10.000 | 10.000 | 1590 | 155 | 15.3 |
| 12.00 | 4 | 50 | 0.030 | 12.000 | 12.000 | 1325 | 160 | 22.9 |
| 16.00 | 4 | 50 | 0.033 | 16.000 | 16.000 | 995 | 130 | 33.6 |
| 20.00 | 4 | 50 | 0.042 | 20.000 | 20.000 | 795 | 135 | 53.5 |

Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 4.00 | 4 | 40 | 0.010 | 5.000 | 4.000 | 3185 | 125 | 2.5 |
| 5.00 | 4 | 40 | 0.015 | 6.250 | 5.000 | 2545 | 155 | 4.8 |
| 6.00 | 4 | 40 | 0.020 | 7.500 | 6.000 | 2120 | 170 | 7.6 |
| 8.00 | 4 | 40 | 0.025 | 10.000 | 8.000 | 1590 | 160 | 12.7 |
| 10.00 | 4 | 40 | 0.030 | 12.500 | 10.000 | 1275 | 155 | 19.1 |
| 12.00 | 4 | 40 | 0.040 | 15.000 | 12.000 | 1060 | 170 | 30.6 |
| 16.00 | 4 | 40 | 0.045 | 20.000 | 16.000 | 795 | 145 | 45.8 |
| 20.00 | 4 | 40 | 0.055 | 25.000 | 20.000 | 635 | 140 | 70.0 |

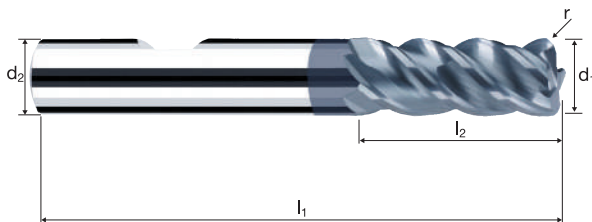
Frese toriche NX (NX-RNVD)

A taglienti lisci, esecuzione normale



HM
MG10

λ 45°
 γ -20°



Sgrossatura



Finitura



ReTool®

Rm
850-1100

Rm
1100-1300

Rm
1300-1500

HRC
48-56

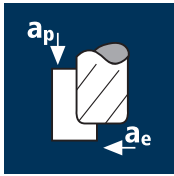
HRC
56-60

Ti
Titanium

GG(G)
Tool Steel

| | | | | | | | | | | POLYCHROM |
|-----------------------|----------------------|----------------------|----------------|----------------|----------------|--------------|------|---|--|-----------|
| Esempio: N° Ordine | | | | | | | | | | P15368 |
| Rivestimento | | | | | | | | | | P15268 |
| Articolo | | | | | | | | | | EUR |
| Codice-ø | | | | | | | | | | |
| Ø Code | d ₁ e8 | d ₂ h6 | l ₁ | l ₂ | l ₄ | r 0/+0.03 | α | z | | |
| 178 | 3.00 | 6.00 | 57 | 8.00 | 15.56 | 0.200 | 6.0° | 4 | | 88.00 |
| 180 | 3.00 | 6.00 | 57 | 8.00 | 15.56 | 0.500 | 6.0° | 4 | | 88.00 |
| 220 | 4.00 | 6.00 | 57 | 8.00 | 14.59 | 0.500 | 4.5° | 4 | | 88.00 |
| 260 | 5.00 | 6.00 | 57 | 10.00 | 14.72 | 0.500 | 2.5° | 4 | | 88.00 |
| 300 | 6.00 | 6.00 | 57 | 12.00 | - | 0.500 | 0.0° | 4 | | 88.00 |
| 388 | 8.00 | 8.00 | 63 | 19.00 | - | 0.500 | 0.0° | 4 | | 110.00 |
| 448 | 10.00 | 10.00 | 72 | 23.00 | - | 0.500 | 0.0° | 4 | | 150.00 |
| 498 | 12.00 | 12.00 | 83 | 27.00 | - | 0.500 | 0.0° | 4 | | 185.00 |
| 302 | 6.00 | 6.00 | 57 | 12.00 | - | 1.000 | 0.0° | 4 | | 88.00 |
| 391 | 8.00 | 8.00 | 63 | 19.00 | - | 1.000 | 0.0° | 4 | | 110.00 |
| 450 | 10.00 | 10.00 | 72 | 23.00 | - | 1.000 | 0.0° | 4 | | 150.00 |
| 501 | 12.00 | 12.00 | 83 | 27.00 | - | 1.000 | 0.0° | 4 | | 185.00 |
| 608 | 16.00 | 16.00 | 92 | 32.00 | - | 1.000 | 0.0° | 4 | | 290.00 |
| 680 | 20.00 | 20.00 | 104 | 39.00 | - | 1.000 | 0.0° | 4 | | 423.00 |
| 393 | 8.00 | 8.00 | 63 | 19.00 | - | 1.500 | 0.0° | 4 | | 110.00 |
| 453 | 10.00 | 10.00 | 72 | 23.00 | - | 1.500 | 0.0° | 4 | | 150.00 |
| 503 | 12.00 | 12.00 | 83 | 27.00 | - | 1.500 | 0.0° | 4 | | 185.00 |
| 610 | 16.00 | 16.00 | 92 | 32.00 | - | 1.500 | 0.0° | 4 | | 290.00 |

Applicazione



Materiale

Acciaio
850 - 1100 N/mm²



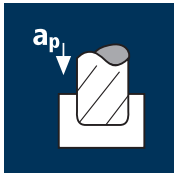
Acciaio
1100 - 1300 N/mm²



Acciaio da
utensile temprato
52 - 56 HRC



Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



Acciaio
850 - 1100 N/mm²



Acciaio
1100 - 1300 N/mm²



Acciaio da
utensile temprato
52 - 56 HRC

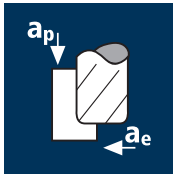


Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 10.00 | 4 | 150 | 0.065 | 15.000 | 4.000 | 4775 | 1240 | 74.5 |
| 12.00 | 4 | 150 | 0.080 | 18.000 | 4.800 | 3980 | 1275 | 110.0 |
| 16.00 | 4 | 150 | 0.090 | 24.000 | 6.400 | 2985 | 1075 | 165.0 |
| 20.00 | 4 | 150 | 0.110 | 30.000 | 8.000 | 2385 | 1050 | 252.1 |
| 10.00 | 4 | 115 | 0.065 | 15.000 | 4.000 | 3660 | 950 | 57.1 |
| 12.00 | 4 | 115 | 0.080 | 18.000 | 4.800 | 3050 | 975 | 84.3 |
| 16.00 | 4 | 115 | 0.090 | 24.000 | 6.400 | 2290 | 825 | 126.5 |
| 20.00 | 4 | 115 | 0.110 | 30.000 | 8.000 | 1830 | 805 | 193.3 |
| 10.00 | 4 | 55 | 0.036 | 15.000 | 3.000 | 1750 | 250 | 11.3 |
| 12.00 | 4 | 55 | 0.042 | 18.000 | 3.600 | 1460 | 245 | 15.9 |
| 16.00 | 4 | 55 | 0.048 | 24.000 | 4.800 | 1095 | 210 | 24.2 |
| 20.00 | 4 | 55 | 0.060 | 30.000 | 6.000 | 875 | 210 | 37.8 |
| 10.00 | 4 | 50 | 0.035 | 15.000 | 4.000 | 1590 | 225 | 13.4 |
| 12.00 | 4 | 50 | 0.040 | 18.000 | 4.800 | 1325 | 210 | 18.3 |
| 16.00 | 4 | 50 | 0.050 | 24.000 | 6.400 | 995 | 200 | 30.6 |
| 20.00 | 4 | 50 | 0.060 | 30.000 | 8.000 | 795 | 190 | 45.8 |
| 10.00 | 4 | 115 | 0.045 | 12.500 | 10.000 | 3660 | 660 | 82.4 |
| 12.00 | 4 | 115 | 0.055 | 15.000 | 12.000 | 3050 | 670 | 120.8 |
| 16.00 | 4 | 115 | 0.065 | 20.000 | 16.000 | 2290 | 595 | 190.3 |
| 20.00 | 4 | 115 | 0.080 | 25.000 | 20.000 | 1830 | 585 | 292.8 |
| 10.00 | 4 | 90 | 0.045 | 12.500 | 10.000 | 2865 | 515 | 64.5 |
| 12.00 | 4 | 90 | 0.055 | 15.000 | 12.000 | 2385 | 525 | 94.5 |
| 16.00 | 4 | 90 | 0.065 | 20.000 | 16.000 | 1790 | 465 | 149.0 |
| 20.00 | 4 | 90 | 0.080 | 25.000 | 20.000 | 1430 | 460 | 229.2 |
| 10.00 | 4 | 50 | 0.024 | 10.000 | 10.000 | 1590 | 155 | 15.3 |
| 12.00 | 4 | 50 | 0.030 | 12.000 | 12.000 | 1325 | 160 | 22.9 |
| 16.00 | 4 | 50 | 0.033 | 16.000 | 16.000 | 995 | 130 | 33.6 |
| 20.00 | 4 | 50 | 0.042 | 20.000 | 20.000 | 795 | 135 | 53.5 |
| 10.00 | 4 | 40 | 0.030 | 12.500 | 10.000 | 1275 | 155 | 19.1 |
| 12.00 | 4 | 40 | 0.040 | 15.000 | 12.000 | 1060 | 170 | 30.6 |
| 16.00 | 4 | 40 | 0.045 | 20.000 | 16.000 | 795 | 145 | 45.8 |
| 20.00 | 4 | 40 | 0.055 | 25.000 | 20.000 | 635 | 140 | 70.0 |

Applicazione



Materiale

Leghe a base di nichel
ricotto
Rm <1000 N/mm²
[Inconel 718]



| d1 [mm] | z | v _c [m/min] | f _e [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 3.00 | 4 | 35 | 0.010 | 5.400 | 1.350 | 3715 | 150 | 1.1 |
| 4.00 | 4 | 35 | 0.015 | 7.200 | 1.800 | 2785 | 165 | 2.2 |
| 5.00 | 4 | 35 | 0.020 | 9.000 | 2.250 | 2230 | 180 | 3.6 |
| 6.00 | 4 | 35 | 0.020 | 10.800 | 2.700 | 1855 | 150 | 4.3 |
| 8.00 | 4 | 35 | 0.030 | 14.400 | 3.600 | 1395 | 165 | 8.7 |
| 10.00 | 4 | 35 | 0.035 | 18.000 | 4.500 | 1115 | 155 | 12.6 |
| 12.00 | 4 | 35 | 0.045 | 21.600 | 5.400 | 930 | 165 | 19.5 |
| 16.00 | 4 | 35 | 0.050 | 28.800 | 7.200 | 695 | 140 | 28.9 |

Leghe a base di nichel
indurite
Rm > 1000 N/mm²
[Inconel 718]



| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 3.00 | 4 | 25 | 0.010 | 5.400 | 1.350 | 2655 | 105 | 0.8 |
| 4.00 | 4 | 25 | 0.010 | 7.200 | 1.800 | 1990 | 80 | 1.0 |
| 5.00 | 4 | 25 | 0.015 | 9.000 | 2.250 | 1590 | 95 | 1.9 |
| 6.00 | 4 | 25 | 0.015 | 10.800 | 2.700 | 1325 | 80 | 2.3 |
| 8.00 | 4 | 25 | 0.025 | 14.400 | 3.600 | 995 | 100 | 5.2 |
| 10.00 | 4 | 25 | 0.030 | 18.000 | 4.500 | 795 | 95 | 7.7 |
| 12.00 | 4 | 25 | 0.035 | 21.600 | 5.400 | 665 | 95 | 10.8 |
| 16.00 | 4 | 25 | 0.040 | 28.800 | 7.200 | 495 | 80 | 16.5 |

Acciaio al manganese
Mn >5%
[1.3964 / Nitronic]
[1.3401 / X120Mn12]



| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 3.00 | 4 | 40 | 0.010 | 5.400 | 1.350 | 4245 | 170 | 1.2 |
| 4.00 | 4 | 40 | 0.015 | 7.200 | 1.800 | 3185 | 190 | 2.5 |
| 5.00 | 4 | 40 | 0.020 | 9.000 | 2.250 | 2545 | 205 | 4.1 |
| 6.00 | 4 | 40 | 0.020 | 10.800 | 2.700 | 2120 | 170 | 5.0 |
| 8.00 | 4 | 40 | 0.030 | 14.400 | 3.600 | 1590 | 190 | 9.9 |
| 10.00 | 4 | 40 | 0.035 | 18.000 | 4.500 | 1275 | 180 | 14.4 |
| 12.00 | 4 | 40 | 0.045 | 21.600 | 5.400 | 1060 | 190 | 22.3 |
| 16.00 | 4 | 40 | 0.050 | 28.800 | 7.200 | 795 | 160 | 33.0 |

Inox difficult
[Cr-Ni-Mo++/1.4529]
Acciaio resistente al calore
[1.4841]



| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 3.00 | 4 | 50 | 0.015 | 5.400 | 1.350 | 5305 | 320 | 2.3 |
| 4.00 | 4 | 50 | 0.020 | 7.200 | 1.800 | 3980 | 320 | 4.1 |
| 5.00 | 4 | 50 | 0.030 | 9.000 | 2.250 | 3185 | 380 | 7.7 |
| 6.00 | 4 | 50 | 0.035 | 10.800 | 2.700 | 2655 | 370 | 10.8 |
| 8.00 | 4 | 50 | 0.045 | 14.400 | 3.600 | 1990 | 360 | 18.6 |
| 10.00 | 4 | 50 | 0.055 | 18.000 | 4.500 | 1590 | 350 | 28.4 |
| 12.00 | 4 | 50 | 0.065 | 21.600 | 5.400 | 1325 | 345 | 40.2 |
| 16.00 | 4 | 50 | 0.070 | 28.800 | 7.200 | 995 | 280 | 57.8 |

Acciaio rapido PM
ricotto
[Böhler S390]
[ASP 2023]

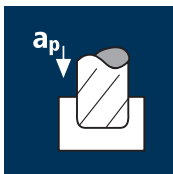


| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 3.00 | 4 | 80 | 0.010 | 5.400 | 1.350 | 8490 | 340 | 2.5 |
| 4.00 | 4 | 80 | 0.015 | 7.200 | 1.800 | 6365 | 380 | 5.0 |
| 5.00 | 4 | 80 | 0.020 | 9.000 | 2.250 | 5095 | 405 | 8.3 |
| 6.00 | 4 | 80 | 0.020 | 10.800 | 2.700 | 4245 | 340 | 9.9 |
| 8.00 | 4 | 80 | 0.030 | 14.400 | 3.600 | 3185 | 380 | 19.8 |
| 10.00 | 4 | 80 | 0.035 | 18.000 | 4.500 | 2545 | 355 | 28.9 |
| 12.00 | 4 | 80 | 0.045 | 21.600 | 5.400 | 2120 | 380 | 44.6 |
| 16.00 | 4 | 80 | 0.050 | 28.800 | 7.200 | 1590 | 320 | 66.0 |

Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 3.00 | 4 | 70 | 0.010 | 5.400 | 1.350 | 7425 | 295 | 2.2 |
| 4.00 | 4 | 70 | 0.015 | 7.200 | 1.800 | 5570 | 335 | 4.3 |
| 5.00 | 4 | 70 | 0.015 | 9.000 | 2.250 | 4455 | 265 | 5.4 |
| 6.00 | 4 | 70 | 0.020 | 10.800 | 2.700 | 3715 | 295 | 8.7 |
| 8.00 | 4 | 70 | 0.025 | 14.400 | 3.600 | 2785 | 280 | 14.4 |
| 10.00 | 4 | 70 | 0.035 | 18.000 | 4.500 | 2230 | 310 | 25.3 |
| 12.00 | 4 | 70 | 0.040 | 21.600 | 5.400 | 1855 | 295 | 34.7 |
| 16.00 | 4 | 70 | 0.045 | 28.800 | 7.200 | 1395 | 250 | 52.0 |



Leghe a base di nichel
ricotto
Rm <1000 N/mm²
[Inconel 718]



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 3.00 | 4 | 25 | 0.010 | 3.750 | 3.000 | 2655 | 105 | 1.2 |
| 4.00 | 4 | 25 | 0.010 | 5.000 | 4.000 | 1990 | 80 | 1.6 |
| 5.00 | 4 | 25 | 0.015 | 6.250 | 5.000 | 1590 | 95 | 3.0 |
| 6.00 | 4 | 25 | 0.015 | 7.500 | 6.000 | 1325 | 80 | 3.6 |
| 8.00 | 4 | 25 | 0.025 | 10.000 | 8.000 | 995 | 100 | 8.0 |
| 10.00 | 4 | 25 | 0.030 | 12.500 | 10.000 | 795 | 95 | 11.9 |
| 12.00 | 4 | 25 | 0.035 | 15.000 | 12.000 | 665 | 95 | 16.7 |
| 16.00 | 4 | 25 | 0.040 | 20.000 | 16.000 | 495 | 80 | 25.5 |

Leghe a base di nichel
indurite
Rm > 1000 N/mm²
[Inconel 718]



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|----|------|
| 3.00 | 4 | 20 | 0.005 | 3.750 | 3.000 | 2120 | 40 | 0.5 |
| 4.00 | 4 | 20 | 0.010 | 5.000 | 4.000 | 1590 | 65 | 1.3 |
| 5.00 | 4 | 20 | 0.010 | 6.250 | 5.000 | 1275 | 50 | 1.6 |
| 6.00 | 4 | 20 | 0.015 | 7.500 | 6.000 | 1060 | 65 | 2.9 |
| 8.00 | 4 | 20 | 0.020 | 10.000 | 8.000 | 795 | 65 | 5.1 |
| 10.00 | 4 | 20 | 0.020 | 12.500 | 10.000 | 635 | 50 | 6.4 |
| 12.00 | 4 | 20 | 0.025 | 15.000 | 12.000 | 530 | 55 | 9.5 |
| 16.00 | 4 | 20 | 0.030 | 20.000 | 16.000 | 400 | 50 | 15.3 |

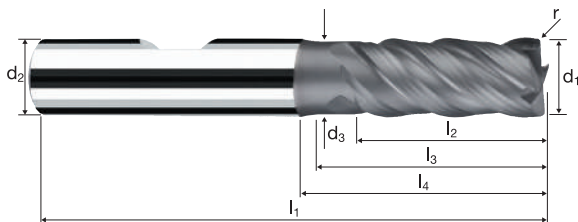
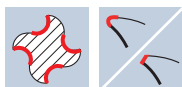
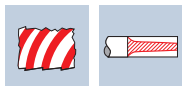
Frese toriche ZX (ZX-RNV)

A taglienti lisci, esecuzione normale con scarico corto



HM
MG10

λ 40°
 γ 5°



Sgrossatura

Finitura

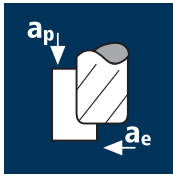


ReTool®



| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r | α | z | TICUT | POLYCHROM | |
|---|----------------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------|------|---|--------|-----------|-------|
| | | | | | | | | | | | EUR | EUR | |
| Esempio: N° Ordine | | | | | | | | | | | | 18820 | P8820 |
| Rivestimento P Articolo 8820 Codice-ø 299 | | | | | | | | | | | | 18720 | P8720 |
| 299 | 6.00 | 6.00 | 5.50 | 57 | 13.00 | 18.15 | 20.00 | 0.400 | 0.0° | 4 | 99.00 | 97.00 | |
| 387 | 8.00 | 8.00 | 7.40 | 63 | 19.00 | 23.63 | 26.00 | 0.400 | 0.0° | 4 | 124.00 | 121.00 | |
| 447 | 10.00 | 10.00 | 9.20 | 72 | 22.00 | 27.99 | 31.00 | 0.400 | 0.0° | 4 | 169.00 | 165.00 | |
| 497 | 12.00 | 12.00 | 11.00 | 83 | 26.00 | 33.29 | 37.00 | 0.400 | 0.0° | 4 | 208.00 | 204.00 | |
| 180 | 3.00 | 6.00 | 2.80 | 57 | 8.00 | 14.00 | 20.37 | 0.500 | 4.5° | 4 | 99.00 | 97.00 | |
| 220 | 4.00 | 6.00 | 3.70 | 57 | 11.00 | 16.00 | 20.82 | 0.500 | 3.0° | 4 | 99.00 | 97.00 | |
| 260 | 5.00 | 6.00 | 4.60 | 57 | 13.00 | 18.00 | 21.27 | 0.500 | 1.5° | 4 | 99.00 | 97.00 | |
| 300 | 6.00 | 6.00 | 5.50 | 57 | 13.00 | 18.15 | 20.00 | 0.500 | 0.0° | 4 | 99.00 | 97.00 | |
| 388 | 8.00 | 8.00 | 7.40 | 63 | 19.00 | 23.63 | 26.00 | 0.500 | 0.0° | 4 | 124.00 | 121.00 | |
| 448 | 10.00 | 10.00 | 9.20 | 72 | 22.00 | 27.99 | 31.00 | 0.500 | 0.0° | 4 | 169.00 | 165.00 | |
| 498 | 12.00 | 12.00 | 11.00 | 83 | 26.00 | 33.29 | 37.00 | 0.500 | 0.0° | 4 | 208.00 | 204.00 | |
| 301 | 6.00 | 6.00 | 5.50 | 57 | 13.00 | 18.15 | 20.00 | 0.800 | 0.0° | 4 | 99.00 | 97.00 | |
| 389 | 8.00 | 8.00 | 7.40 | 63 | 19.00 | 23.63 | 26.00 | 0.800 | 0.0° | 4 | 124.00 | 121.00 | |
| 449 | 10.00 | 10.00 | 9.20 | 72 | 22.00 | 27.99 | 31.00 | 0.800 | 0.0° | 4 | 169.00 | 165.00 | |
| 499 | 12.00 | 12.00 | 11.00 | 83 | 26.00 | 33.29 | 37.00 | 0.800 | 0.0° | 4 | 208.00 | 204.00 | |
| 607 | 16.00 | 16.00 | 15.00 | 92 | 32.00 | 38.73 | 43.00 | 0.800 | 0.0° | 4 | 326.00 | 319.00 | |
| I Disponibilità e date di consegna su richiesta | | | | | | | | | | | | | |

Applicazione



Materiale

Leghe a base di nichel
ricotto
Rm <1000 N/mm²
[Inconel 718]



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 6.00 | 4 | 35 | 0.020 | 10.800 | 2.400 | 1855 | 150 | 3.9 |
| 8.00 | 4 | 35 | 0.025 | 14.400 | 3.200 | 1395 | 140 | 6.4 |
| 10.00 | 4 | 35 | 0.030 | 18.000 | 4.000 | 1115 | 135 | 9.6 |
| 12.00 | 4 | 35 | 0.040 | 21.600 | 4.800 | 930 | 150 | 15.4 |
| 16.00 | 4 | 35 | 0.045 | 28.800 | 6.400 | 695 | 125 | 23.1 |
| 20.00 | 4 | 35 | 0.055 | 36.000 | 8.000 | 555 | 125 | 35.3 |

Leghe a base di nichel
indurite
Rm > 1000 N/mm²
[Inconel 718]



| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|----|------|
| 6.00 | 4 | 25 | 0.015 | 10.800 | 2.400 | 1325 | 80 | 2.1 |
| 8.00 | 4 | 25 | 0.020 | 14.400 | 3.200 | 995 | 80 | 3.7 |
| 10.00 | 4 | 25 | 0.025 | 18.000 | 4.000 | 795 | 80 | 5.7 |
| 12.00 | 4 | 25 | 0.030 | 21.600 | 4.800 | 665 | 80 | 8.3 |
| 16.00 | 4 | 25 | 0.035 | 28.800 | 6.400 | 495 | 70 | 12.8 |
| 20.00 | 4 | 25 | 0.045 | 36.000 | 8.000 | 400 | 70 | 20.6 |

Acciaio al manganese
Mn >5%
[1.3964 / Nitronic]
[1.3401 / X120Mn12]



| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 6.00 | 4 | 40 | 0.020 | 10.800 | 2.400 | 2120 | 170 | 4.4 |
| 8.00 | 4 | 40 | 0.025 | 14.400 | 3.200 | 1590 | 160 | 7.3 |
| 10.00 | 4 | 40 | 0.030 | 18.000 | 4.000 | 1275 | 155 | 11.0 |
| 12.00 | 4 | 40 | 0.040 | 21.600 | 4.800 | 1060 | 170 | 17.6 |
| 16.00 | 4 | 40 | 0.045 | 28.800 | 6.400 | 795 | 145 | 26.4 |
| 20.00 | 4 | 40 | 0.055 | 36.000 | 8.000 | 635 | 140 | 40.3 |

Inox difficult
[Cr-Ni-Mo+/1.4529]
Acciaio resistente al calore
[1.4841]



| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 6.00 | 4 | 50 | 0.030 | 10.800 | 2.400 | 2655 | 320 | 8.3 |
| 8.00 | 4 | 50 | 0.040 | 14.400 | 3.200 | 1990 | 320 | 14.7 |
| 10.00 | 4 | 50 | 0.050 | 18.000 | 4.000 | 1590 | 320 | 22.9 |
| 12.00 | 4 | 50 | 0.060 | 21.600 | 4.800 | 1325 | 320 | 33.0 |
| 16.00 | 4 | 50 | 0.065 | 28.800 | 6.400 | 995 | 260 | 47.7 |
| 20.00 | 4 | 50 | 0.080 | 36.000 | 8.000 | 795 | 255 | 73.3 |

Acciaio rapido PM
ricotto
[Böhler S390]
[ASP 2023]

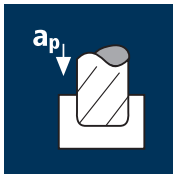


| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 6.00 | 4 | 80 | 0.020 | 10.800 | 2.400 | 4245 | 340 | 8.8 |
| 8.00 | 4 | 80 | 0.025 | 14.400 | 3.200 | 3185 | 320 | 14.7 |
| 10.00 | 4 | 80 | 0.030 | 18.000 | 4.000 | 2545 | 305 | 22.0 |
| 12.00 | 4 | 80 | 0.040 | 21.600 | 4.800 | 2120 | 340 | 35.2 |
| 16.00 | 4 | 80 | 0.045 | 28.800 | 6.400 | 1590 | 285 | 52.8 |
| 20.00 | 4 | 80 | 0.055 | 36.000 | 8.000 | 1275 | 280 | 80.7 |

Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 6.00 | 4 | 70 | 0.020 | 10.800 | 2.400 | 3715 | 295 | 7.7 |
| 8.00 | 4 | 70 | 0.025 | 14.400 | 3.200 | 2785 | 280 | 12.8 |
| 10.00 | 4 | 70 | 0.030 | 18.000 | 4.000 | 2230 | 265 | 19.3 |
| 12.00 | 4 | 70 | 0.035 | 21.600 | 4.800 | 1855 | 260 | 27.0 |
| 16.00 | 4 | 70 | 0.040 | 28.800 | 6.400 | 1395 | 225 | 41.1 |
| 20.00 | 4 | 70 | 0.050 | 36.000 | 8.000 | 1115 | 225 | 64.2 |



Leghe a base di nichel
ricotto
Rm <1000 N/mm²
[Inconel 718]



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|----|------|
| 6.00 | 4 | 25 | 0.015 | 7.200 | 6.000 | 1325 | 80 | 3.4 |
| 8.00 | 4 | 25 | 0.020 | 9.600 | 8.000 | 995 | 80 | 6.1 |
| 10.00 | 4 | 25 | 0.025 | 12.000 | 10.000 | 795 | 80 | 9.5 |
| 12.00 | 4 | 25 | 0.030 | 14.400 | 12.000 | 665 | 80 | 13.8 |
| 16.00 | 4 | 25 | 0.035 | 19.200 | 16.000 | 495 | 70 | 21.4 |
| 20.00 | 4 | 25 | 0.045 | 24.000 | 20.000 | 400 | 70 | 34.4 |

Leghe a base di nichel
indurite
Rm > 1000 N/mm²
[Inconel 718]



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|----|------|
| 6.00 | 4 | 20 | 0.010 | 7.200 | 6.000 | 1060 | 40 | 1.8 |
| 8.00 | 4 | 20 | 0.015 | 9.600 | 8.000 | 795 | 50 | 3.7 |
| 10.00 | 4 | 20 | 0.020 | 12.000 | 10.000 | 635 | 50 | 6.1 |
| 12.00 | 4 | 20 | 0.025 | 14.400 | 12.000 | 530 | 55 | 9.2 |
| 16.00 | 4 | 20 | 0.030 | 19.200 | 16.000 | 400 | 50 | 14.7 |
| 20.00 | 4 | 20 | 0.035 | 24.000 | 20.000 | 320 | 45 | 21.4 |

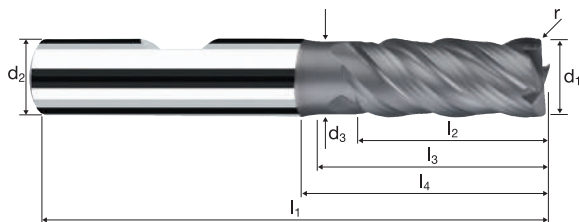
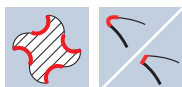
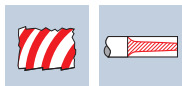
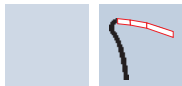
Frese toriche ZX (ZX-RNV)

A taglienti lisci, esecuzione normale con scarico corto



HM
MG10

λ 40°
 γ 5°



Sgrossatura



Finitura

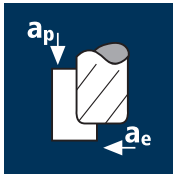


ReTool®



| Esempio: N° Ordine | Rivestimento | | Articolo | | Codice-Ø | | | | | | TICUT | POLYCHROM |
|--|----------------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------|------|---|--------|-----------|
| | P | 8820 | 302 | | | | | | | | 18820 | P8820 |
| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r | α | z | EUR | EUR |
| 302 | 6.00 | 6.00 | 5.50 | 57 | 13.00 | 18.15 | 20.00 | 1.000 | 0.0° | 4 | 99.00 | 97.00 |
| 391 | 8.00 | 8.00 | 7.40 | 63 | 19.00 | 23.63 | 26.00 | 1.000 | 0.0° | 4 | 124.00 | 121.00 |
| 450 | 10.00 | 10.00 | 9.20 | 72 | 22.00 | 27.99 | 31.00 | 1.000 | 0.0° | 4 | 169.00 | 165.00 |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 26.00 | 33.29 | 37.00 | 1.000 | 0.0° | 4 | 208.00 | 204.00 |
| 608 | 16.00 | 16.00 | 15.00 | 92 | 32.00 | 38.73 | 43.00 | 1.000 | 0.0° | 4 | 326.00 | 319.00 |
| 680 | 20.00 | 20.00 | 19.00 | 104 | 38.00 | 48.23 | 53.00 | 1.000 | 0.0° | 4 | 475.00 | 465.00 |
| 453 | 10.00 | 10.00 | 9.20 | 72 | 22.00 | 27.99 | 31.00 | 1.500 | 0.0° | 4 | 169.00 | 165.00 |
| 503 | 12.00 | 12.00 | 11.00 | 83 | 26.00 | 33.29 | 37.00 | 1.500 | 0.0° | 4 | 208.00 | 204.00 |
| 610 | 16.00 | 16.00 | 15.00 | 92 | 32.00 | 38.73 | 43.00 | 1.500 | 0.0° | 4 | 326.00 | 319.00 |
| 505 | 12.00 | 12.00 | 11.00 | 83 | 26.00 | 33.29 | 37.00 | 2.000 | 0.0° | 4 | 208.00 | 204.00 |
| 611 | 16.00 | 16.00 | 15.00 | 92 | 32.00 | 38.73 | 43.00 | 2.000 | 0.0° | 4 | 326.00 | 319.00 |
| 683 | 20.00 | 20.00 | 19.00 | 104 | 38.00 | 48.23 | 53.00 | 2.000 | 0.0° | 4 | 475.00 | 465.00 |
| <p>■ Disponibilità e date di consegna su richiesta</p> | | | | | | | | | | | | |

Applicazione



Materiale

Leghe a base di nichel
ricotto
Rm <1000 N/mm²
[Inconel 718]



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 10.00 | 4 | 35 | 0.030 | 18.000 | 4.000 | 1115 | 135 | 9.6 |
| 12.00 | 4 | 35 | 0.040 | 21.600 | 4.800 | 930 | 150 | 15.4 |
| 16.00 | 4 | 35 | 0.045 | 28.800 | 6.400 | 695 | 125 | 23.1 |
| 20.00 | 4 | 35 | 0.055 | 36.000 | 8.000 | 555 | 125 | 35.3 |
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Leghe a base di nichel
indurite
Rm > 1000 N/mm²
[Inconel 718]



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|-------|---|----|-------|--------|-------|-----|----|------|
| 10.00 | 4 | 25 | 0.025 | 18.000 | 4.000 | 795 | 80 | 5.7 |
| 12.00 | 4 | 25 | 0.030 | 21.600 | 4.800 | 665 | 80 | 8.3 |
| 16.00 | 4 | 25 | 0.035 | 28.800 | 6.400 | 495 | 70 | 12.8 |
| 20.00 | 4 | 25 | 0.045 | 36.000 | 8.000 | 400 | 70 | 20.6 |
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Acciaio al manganese
Mn >5%
[1.3964 / Nitronic]
[1.3401 / X120Mn12]



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|-------|---|----|-------|--------|-------|------|-----|------|
| 10.00 | 4 | 40 | 0.030 | 18.000 | 4.000 | 1275 | 155 | 11.0 |
| 12.00 | 4 | 40 | 0.040 | 21.600 | 4.800 | 1060 | 170 | 17.6 |
| 16.00 | 4 | 40 | 0.045 | 28.800 | 6.400 | 795 | 145 | 26.4 |
| 20.00 | 4 | 40 | 0.055 | 36.000 | 8.000 | 635 | 140 | 40.3 |
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Inox difficult
[Cr-Ni-Mo+/1.4529]
Acciaio resistente al calore
[1.4841]



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|-------|---|----|-------|--------|-------|------|-----|------|
| 10.00 | 4 | 50 | 0.050 | 18.000 | 4.000 | 1590 | 320 | 22.9 |
| 12.00 | 4 | 50 | 0.060 | 21.600 | 4.800 | 1325 | 320 | 33.0 |
| 16.00 | 4 | 50 | 0.065 | 28.800 | 6.400 | 995 | 260 | 47.7 |
| 20.00 | 4 | 50 | 0.080 | 36.000 | 8.000 | 795 | 255 | 73.3 |
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Acciaio rapido PM
ricotto
[Böhler S390]
[ASP 2023]

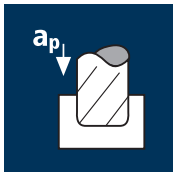


| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 10.00 | 4 | 80 | 0.030 | 18.000 | 4.000 | 2545 | 305 | 22.0 |
| 12.00 | 4 | 80 | 0.040 | 21.600 | 4.800 | 2120 | 340 | 35.2 |
| 16.00 | 4 | 80 | 0.045 | 28.800 | 6.400 | 1590 | 285 | 52.8 |
| 20.00 | 4 | 80 | 0.055 | 36.000 | 8.000 | 1275 | 280 | 80.7 |
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Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 10.00 | 4 | 70 | 0.030 | 18.000 | 4.000 | 2230 | 265 | 19.3 |
| 12.00 | 4 | 70 | 0.035 | 21.600 | 4.800 | 1855 | 260 | 27.0 |
| 16.00 | 4 | 70 | 0.040 | 28.800 | 6.400 | 1395 | 225 | 41.1 |
| 20.00 | 4 | 70 | 0.050 | 36.000 | 8.000 | 1115 | 225 | 64.2 |
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Leghe a base di nichel
ricotto
Rm <1000 N/mm²
[Inconel 718]



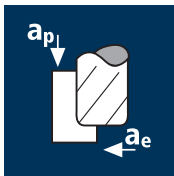
| | | | | | | | | |
|-------|---|----|-------|--------|--------|-----|----|------|
| 10.00 | 4 | 25 | 0.025 | 12.000 | 10.000 | 795 | 80 | 9.5 |
| 12.00 | 4 | 25 | 0.030 | 14.400 | 12.000 | 665 | 80 | 13.8 |
| 16.00 | 4 | 25 | 0.035 | 19.200 | 16.000 | 495 | 70 | 21.4 |
| 20.00 | 4 | 25 | 0.045 | 24.000 | 20.000 | 400 | 70 | 34.4 |
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Leghe a base di nichel
indurite
Rm > 1000 N/mm²
[Inconel 718]



| | | | | | | | | |
|-------|---|----|-------|--------|--------|-----|----|------|
| 10.00 | 4 | 20 | 0.020 | 12.000 | 10.000 | 635 | 50 | 6.1 |
| 12.00 | 4 | 20 | 0.025 | 14.400 | 12.000 | 530 | 55 | 9.2 |
| 16.00 | 4 | 20 | 0.030 | 19.200 | 16.000 | 400 | 50 | 14.7 |
| 20.00 | 4 | 20 | 0.035 | 24.000 | 20.000 | 320 | 45 | 21.4 |
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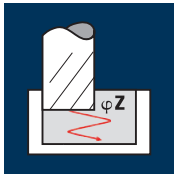
Applicazione



Materiale

Acciaio
850 - 1100 N/mm²

| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 4.00 | 4 | 150 | 0.030 | 7.200 | 1.600 | 11935 | 1430 | 16.5 | 16° |
| 5.00 | 4 | 150 | 0.035 | 9.000 | 2.000 | 9550 | 1335 | 24.1 | 16° |
| 6.00 | 4 | 150 | 0.040 | 10.800 | 2.400 | 7960 | 1275 | 33.0 | 16° |
| 8.00 | 4 | 150 | 0.050 | 14.400 | 3.200 | 5970 | 1195 | 55.0 | 16° |
| 10.00 | 4 | 150 | 0.065 | 18.000 | 4.000 | 4775 | 1240 | 89.4 | 16° |
| 12.00 | 4 | 150 | 0.075 | 21.600 | 4.800 | 3980 | 1195 | 123.8 | 16° |
| 16.00 | 4 | 150 | 0.085 | 24.000 | 6.400 | 2985 | 1015 | 155.9 | 16° |



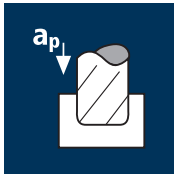
Acciaio
1100 - 1300 N/mm²

| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 4.00 | 4 | 115 | 0.025 | 7.200 | 1.600 | 9150 | 915 | 10.5 | 14° |
| 5.00 | 4 | 115 | 0.030 | 9.000 | 2.000 | 7320 | 880 | 15.8 | 14° |
| 6.00 | 4 | 115 | 0.035 | 10.800 | 2.400 | 6100 | 855 | 22.1 | 14° |
| 8.00 | 4 | 115 | 0.045 | 14.400 | 3.200 | 4575 | 825 | 38.0 | 14° |
| 10.00 | 4 | 115 | 0.055 | 18.000 | 4.000 | 3660 | 805 | 58.0 | 14° |
| 12.00 | 4 | 115 | 0.065 | 21.600 | 4.800 | 3050 | 795 | 82.2 | 14° |
| 16.00 | 4 | 115 | 0.075 | 24.000 | 6.400 | 2290 | 685 | 105.2 | 14° |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 4.00 | 4 | 90 | 0.020 | 7.200 | 1.600 | 7160 | 575 | 6.6 | 11° |
| 5.00 | 4 | 90 | 0.025 | 9.000 | 2.000 | 5730 | 575 | 10.3 | 11° |
| 6.00 | 4 | 90 | 0.030 | 10.800 | 2.400 | 4775 | 575 | 14.9 | 11° |
| 8.00 | 4 | 90 | 0.035 | 14.400 | 3.200 | 3580 | 500 | 23.1 | 11° |
| 10.00 | 4 | 90 | 0.045 | 18.000 | 4.000 | 2865 | 515 | 37.1 | 11° |
| 12.00 | 4 | 90 | 0.055 | 21.600 | 4.800 | 2385 | 525 | 54.5 | 11° |
| 16.00 | 4 | 90 | 0.065 | 24.000 | 6.400 | 1790 | 465 | 71.4 | 11° |

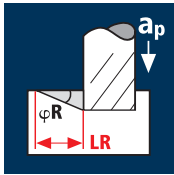
Applicazione



Materiale

Acciaio
850 - 1100 N/mm²

| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] | LR [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|---------|
| 4.00 | 4 | 120 | 0.020 | 6.000 | 4.000 | 9550 | 765 | 18.3 | 18° | 18.5 |
| 5.00 | 4 | 120 | 0.023 | 7.500 | 5.000 | 7640 | 705 | 26.4 | 18° | 23.1 |
| 6.00 | 4 | 120 | 0.026 | 9.000 | 6.000 | 6365 | 660 | 35.8 | 18° | 27.7 |
| 8.00 | 4 | 120 | 0.033 | 12.000 | 8.000 | 4775 | 630 | 60.5 | 18° | 36.9 |
| 10.00 | 4 | 120 | 0.042 | 15.000 | 10.000 | 3820 | 640 | 96.3 | 18° | 46.2 |
| 12.00 | 4 | 120 | 0.049 | 18.000 | 12.000 | 3185 | 625 | 134.8 | 18° | 55.4 |
| 16.00 | 4 | 120 | 0.055 | 24.000 | 16.000 | 2385 | 525 | 201.6 | 18° | 73.9 |



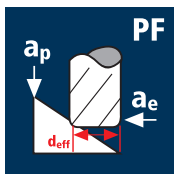
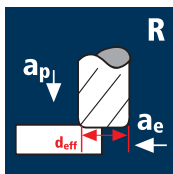
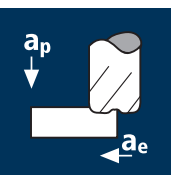
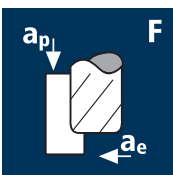
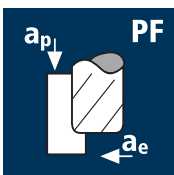
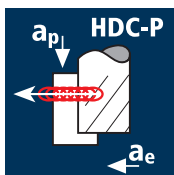
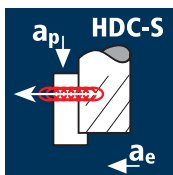
Acciaio
1100 - 1300 N/mm²

| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] | LR [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|---------|
| 4.00 | 4 | 90 | 0.016 | 6.000 | 4.000 | 7160 | 460 | 11.0 | 18° | 18.5 |
| 5.00 | 4 | 90 | 0.020 | 7.500 | 5.000 | 5730 | 460 | 17.2 | 18° | 23.1 |
| 6.00 | 4 | 90 | 0.023 | 9.000 | 6.000 | 4775 | 440 | 23.7 | 18° | 27.7 |
| 8.00 | 4 | 90 | 0.029 | 12.000 | 8.000 | 3580 | 415 | 39.9 | 18° | 36.9 |
| 10.00 | 4 | 90 | 0.036 | 15.000 | 10.000 | 2865 | 415 | 61.9 | 18° | 46.2 |
| 12.00 | 4 | 90 | 0.042 | 18.000 | 12.000 | 2385 | 400 | 86.6 | 18° | 55.4 |
| 16.00 | 4 | 90 | 0.049 | 24.000 | 16.000 | 1790 | 350 | 134.4 | 18° | 73.9 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] | LR [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|---------|
| 4.00 | 4 | 70 | 0.013 | 6.000 | 4.000 | 5570 | 290 | 7.0 | 13° | 26.0 |
| 5.00 | 4 | 70 | 0.016 | 7.500 | 5.000 | 4455 | 285 | 10.7 | 13° | 32.5 |
| 6.00 | 4 | 70 | 0.020 | 9.000 | 6.000 | 3715 | 295 | 16.0 | 13° | 39.0 |
| 8.00 | 4 | 70 | 0.023 | 12.000 | 8.000 | 2785 | 255 | 24.6 | 13° | 52.0 |
| 10.00 | 4 | 70 | 0.029 | 15.000 | 10.000 | 2230 | 260 | 38.8 | 13° | 65.0 |
| 12.00 | 4 | 70 | 0.036 | 18.000 | 12.000 | 1855 | 265 | 57.8 | 13° | 78.0 |
| 16.00 | 4 | 70 | 0.042 | 24.000 | 16.000 | 1395 | 235 | 90.2 | 13° | 104.0 |

Cliccare qui per accedere al ToolExpert MFC. Veloce, semplice, affidabile

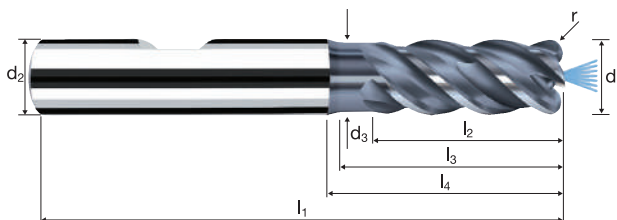
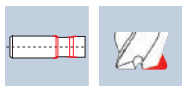


Frese toriche MFC (MFC-R)



A taglienti lisci, esecuzione normale con scarico corto
Geometria frontale per fresature in penetrazione ad alto rendimento
con canale di raffreddamento/aria centrale

HM
MG10 λ 45°
 γ 10°



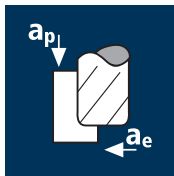
Sgrossatura HPC Sgrossatura HDC Finitura

ReTool®

| | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--------------|--|-------------------|----------------|---------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | | Inox Stainless | Ti Titanium | GG(G) Tool Steel |
|-------------|----------------|-----------------|-----------------|--------------|--|-------------------|----------------|---------------------|

| Ø Code | d ₁ e8 | d ₂ h5 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r 0/+0.03 | α | z | POLYCHROM | |
|--------------------|----------------------|----------------------|----------------|----------------|----------------|----------------|----------------|--------------|------|---|-----------|--------|
| | | | | | | | | | | | | |
| Esempio: N° Ordine | | | | | | | | | | | | |
| Rivestimento P | | | | | | | | | | | | |
| Articolo 8207 | | | | | | | | | | | | |
| Codice-ø 218 | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| 218 | 4.00 | 6.00 | 3.70 | 57 | 8.00 | 16.00 | 20.82 | 0.200 | 3.0° | 4 | | 85.00 |
| 258 | 5.00 | 6.00 | 4.60 | 57 | 10.00 | 18.00 | 21.27 | 0.200 | 1.5° | 4 | | 85.00 |
| 297 | 6.00 | 6.00 | 5.50 | 57 | 12.00 | 18.15 | 20.00 | 0.200 | 0.0° | 4 | | 85.00 |
| 385 | 8.00 | 8.00 | 7.40 | 63 | 19.00 | 23.63 | 26.00 | 0.200 | 0.0° | 4 | | 106.00 |
| 445 | 10.00 | 10.00 | 9.20 | 72 | 23.00 | 27.99 | 31.00 | 0.200 | 0.0° | 4 | | 144.00 |
| 496 | 12.00 | 12.00 | 11.00 | 83 | 27.00 | 33.29 | 37.00 | 0.200 | 0.0° | 4 | | 178.00 |
| 605 | 16.00 | 16.00 | 15.00 | 92 | 32.00 | 38.73 | 43.00 | 0.200 | 0.0° | 4 | | 279.00 |
| 220 | 4.00 | 6.00 | 3.70 | 57 | 8.00 | 16.00 | 20.82 | 0.500 | 3.0° | 4 | | 85.00 |
| 260 | 5.00 | 6.00 | 4.60 | 57 | 10.00 | 18.00 | 21.27 | 0.500 | 1.5° | 4 | | 85.00 |
| 300 | 6.00 | 6.00 | 5.50 | 57 | 12.00 | 18.15 | 20.00 | 0.500 | 0.0° | 4 | | 85.00 |
| 388 | 8.00 | 8.00 | 7.40 | 63 | 19.00 | 23.63 | 26.00 | 0.500 | 0.0° | 4 | | 106.00 |
| 448 | 10.00 | 10.00 | 9.20 | 72 | 23.00 | 27.99 | 31.00 | 0.500 | 0.0° | 4 | | 144.00 |
| 498 | 12.00 | 12.00 | 11.00 | 83 | 27.00 | 33.29 | 37.00 | 0.500 | 0.0° | 4 | | 178.00 |
| 606 | 16.00 | 16.00 | 15.00 | 92 | 32.00 | 38.73 | 43.00 | 0.500 | 0.0° | 4 | | 279.00 |
| 302 | 6.00 | 6.00 | 5.50 | 57 | 12.00 | 18.15 | 20.00 | 1.000 | 0.0° | 4 | | 85.00 |
| 391 | 8.00 | 8.00 | 7.40 | 63 | 19.00 | 23.63 | 26.00 | 1.000 | 0.0° | 4 | | 106.00 |
| 450 | 10.00 | 10.00 | 9.20 | 72 | 23.00 | 27.99 | 31.00 | 1.000 | 0.0° | 4 | | 144.00 |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 27.00 | 33.29 | 37.00 | 1.000 | 0.0° | 4 | | 178.00 |
| 608 | 16.00 | 16.00 | 15.00 | 92 | 32.00 | 38.73 | 43.00 | 1.000 | 0.0° | 4 | | 279.00 |

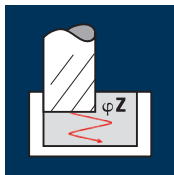
Applicazione



Materiale

Acciaio
850 - 1100 N/mm²

| d1 [mm] | z | v _c [m/min] | f _z [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 8.00 | 4 | 150 | 0.050 | 14.400 | 3.200 | 5970 | 1195 | 55.0 | 16° |
| 10.00 | 4 | 150 | 0.065 | 18.000 | 4.000 | 4775 | 1240 | 89.4 | 16° |
| 12.00 | 4 | 150 | 0.075 | 21.600 | 4.800 | 3980 | 1195 | 123.8 | 16° |
| 16.00 | 4 | 150 | 0.085 | 24.000 | 6.400 | 2985 | 1015 | 155.8 | 16° |



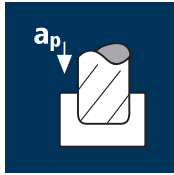
Acciaio
1100 - 1300 N/mm²

| | | | | | | | | | |
|-------|---|-----|-------|--------|-------|------|-----|-------|-----|
| 8.00 | 4 | 115 | 0.045 | 14.400 | 3.200 | 4575 | 825 | 38.0 | 14° |
| 10.00 | 4 | 115 | 0.055 | 18.000 | 4.000 | 3660 | 805 | 58.0 | 14° |
| 12.00 | 4 | 115 | 0.065 | 21.600 | 4.800 | 3050 | 795 | 82.2 | 14° |
| 16.00 | 4 | 115 | 0.075 | 24.000 | 6.400 | 2290 | 685 | 105.4 | 14° |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

| | | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|-----|
| 8.00 | 4 | 90 | 0.035 | 14.400 | 3.200 | 3580 | 500 | 23.1 | 11° |
| 10.00 | 4 | 90 | 0.045 | 18.000 | 4.000 | 2865 | 515 | 37.1 | 11° |
| 12.00 | 4 | 90 | 0.055 | 21.600 | 4.800 | 2385 | 525 | 54.5 | 11° |
| 16.00 | 4 | 90 | 0.065 | 24.000 | 6.400 | 1790 | 465 | 71.5 | 11° |

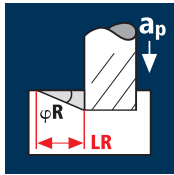
Applicazione



Materiale

Acciaio
850 - 1100 N/mm²

| d1 [mm] | z | v _c [m/min] | f _z [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] | LR [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|---------|
| 8.00 | 4 | 120 | 0.033 | 12.000 | 8.000 | 4775 | 630 | 60.5 | 18° | 36.9 |
| 10.00 | 4 | 120 | 0.042 | 15.000 | 10.000 | 3820 | 640 | 96.3 | 18° | 46.2 |
| 12.00 | 4 | 120 | 0.049 | 18.000 | 12.000 | 3185 | 625 | 134.8 | 18° | 55.4 |
| 16.00 | 4 | 120 | 0.055 | 24.000 | 16.000 | 2385 | 525 | 201.7 | 18° | 73.9 |



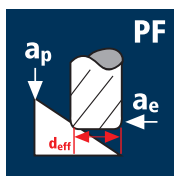
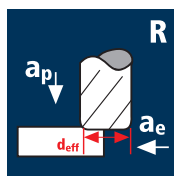
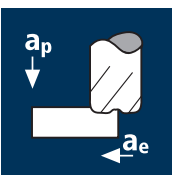
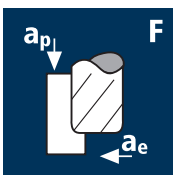
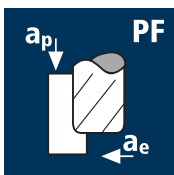
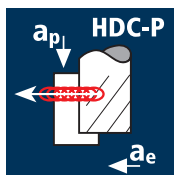
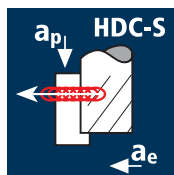
Acciaio
1100 - 1300 N/mm²

| | | | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|-------|-----|------|
| 8.00 | 4 | 90 | 0.029 | 12.000 | 8.000 | 3580 | 415 | 39.9 | 18° | 36.9 |
| 10.00 | 4 | 90 | 0.036 | 15.000 | 10.000 | 2865 | 415 | 61.9 | 18° | 46.2 |
| 12.00 | 4 | 90 | 0.042 | 18.000 | 12.000 | 2385 | 400 | 86.6 | 18° | 55.4 |
| 16.00 | 4 | 90 | 0.049 | 24.000 | 16.000 | 1790 | 350 | 134.8 | 18° | 73.9 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

| | | | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|-----|-------|
| 8.00 | 4 | 70 | 0.023 | 12.000 | 8.000 | 2785 | 255 | 24.6 | 13° | 52.0 |
| 10.00 | 4 | 70 | 0.029 | 15.000 | 10.000 | 2230 | 260 | 38.8 | 13° | 65.0 |
| 12.00 | 4 | 70 | 0.036 | 18.000 | 12.000 | 1855 | 265 | 57.8 | 13° | 78.0 |
| 16.00 | 4 | 70 | 0.042 | 24.000 | 16.000 | 1395 | 235 | 89.8 | 13° | 104.0 |

Cliccare qui per accedere al ToolExpert MFC. Veloce, semplice, affidabile

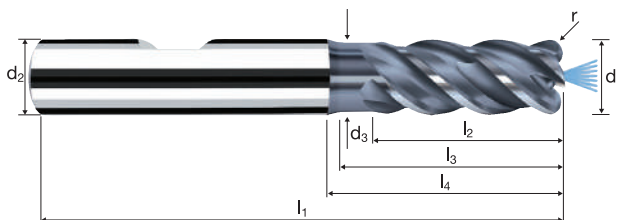
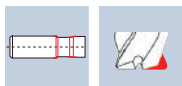


Frese toriche MFC (MFC-R)



A taglienti lisci, esecuzione normale con scarico corto
 Geometria frontale per fresature in penetrazione ad alto rendimento
 con canale di raffreddamento/aria centrale

HM λ 45°
 MG10 γ 10°



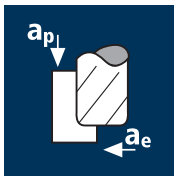
Sgrossatura HPC Sgrossatura HDC Finitura



| | | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--------------|--|--|-------------------|----------------|---------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | | | Inox Stainless | Ti Titanium | GG(G) Tool Steel |
|-------------|----------------|-----------------|-----------------|--------------|--|--|-------------------|----------------|---------------------|

| Ø Code | d ₁ e8 | d ₂ h5 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r 0/+0.03 | α | z | POLYCHROM | |
|-----------------------|----------------------|--------------------------|----------------|-------------------------|----------------|------------------------|----------------|--------------|------|---|--------------|--|
| | | | | | | | | | | | | |
| Esempio: N° Ordine | | Rivestimento P | | Articolo 8207 | | Codice-Ø 393 | | | | | | |
| | | | | | | | | | | | P8207 | |
| | | | | | | | | | | | P8107 | |
| | | | | | | | | | | | EUR | |
| 393 | 8.00 | 8.00 | 7.40 | 63 | 19.00 | 23.63 | 26.00 | 1.500 | 0.0° | 4 | 106.00 | |
| 453 | 10.00 | 10.00 | 9.20 | 72 | 23.00 | 27.99 | 31.00 | 1.500 | 0.0° | 4 | 144.00 | |
| 503 | 12.00 | 12.00 | 11.00 | 83 | 27.00 | 33.29 | 37.00 | 1.500 | 0.0° | 4 | 178.00 | |
| 610 | 16.00 | 16.00 | 15.00 | 92 | 32.00 | 38.73 | 43.00 | 1.500 | 0.0° | 4 | 279.00 | |
| 455 | 10.00 | 10.00 | 9.20 | 72 | 23.00 | 27.99 | 31.00 | 2.000 | 0.0° | 4 | 144.00 | |
| 505 | 12.00 | 12.00 | 11.00 | 83 | 27.00 | 33.29 | 37.00 | 2.000 | 0.0° | 4 | 178.00 | |
| 611 | 16.00 | 16.00 | 15.00 | 92 | 32.00 | 38.73 | 43.00 | 2.000 | 0.0° | 4 | 279.00 | |
| 506 | 12.00 | 12.00 | 11.00 | 83 | 27.00 | 33.29 | 37.00 | 2.500 | 0.0° | 4 | 178.00 | |

Applicazione



Materiale

Acciaio
< 850 N/mm²



Acciaio
850 - 1100 N/mm²



Acciaio per lavorazione
a freddo (12% Cr)
fortemente legati
[1.2379]



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



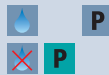
Acciaio
< 850 N/mm²



Acciaio
850 - 1100 N/mm²



Acciaio per lavorazione
a freddo (12% Cr)
fortemente legati
[1.2379]



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



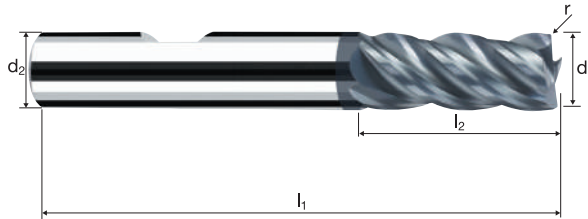
| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 3.00 | 4 | 190 | 0.020 | 4.500 | 1.200 | 20160 | 1615 | 8.7 |
| 4.00 | 4 | 190 | 0.025 | 6.000 | 1.600 | 15120 | 1510 | 14.5 |
| 5.00 | 4 | 190 | 0.035 | 7.500 | 2.000 | 12095 | 1695 | 25.4 |
| 6.00 | 4 | 190 | 0.040 | 9.000 | 2.400 | 10080 | 1615 | 34.8 |
| 8.00 | 4 | 190 | 0.055 | 12.000 | 3.200 | 7560 | 1665 | 63.9 |
| 10.00 | 4 | 190 | 0.070 | 15.000 | 4.000 | 6050 | 1695 | 101.6 |
| 12.00 | 4 | 190 | 0.075 | 18.000 | 4.800 | 5040 | 1510 | 130.6 |
| 16.00 | 4 | 190 | 0.100 | 24.000 | 6.400 | 3780 | 1510 | 232.2 |
| 20.00 | 4 | 190 | 0.130 | 30.000 | 8.000 | 3025 | 1570 | 377.4 |
| 3.00 | 4 | 140 | 0.020 | 4.500 | 1.200 | 14855 | 1190 | 6.4 |
| 4.00 | 4 | 140 | 0.025 | 6.000 | 1.600 | 11140 | 1115 | 10.7 |
| 5.00 | 4 | 140 | 0.035 | 7.500 | 2.000 | 8915 | 1250 | 18.7 |
| 6.00 | 4 | 140 | 0.040 | 9.000 | 2.400 | 7425 | 1190 | 25.7 |
| 8.00 | 4 | 140 | 0.055 | 12.000 | 3.200 | 5570 | 1225 | 47.1 |
| 10.00 | 4 | 140 | 0.070 | 15.000 | 4.000 | 4455 | 1250 | 74.9 |
| 12.00 | 4 | 140 | 0.075 | 18.000 | 4.800 | 3715 | 1115 | 96.3 |
| 16.00 | 4 | 140 | 0.100 | 24.000 | 6.400 | 2785 | 1115 | 171.1 |
| 20.00 | 4 | 140 | 0.130 | 30.000 | 8.000 | 2230 | 1160 | 278.1 |
| 3.00 | 4 | 70 | 0.020 | 4.500 | 1.200 | 7425 | 595 | 3.2 |
| 4.00 | 4 | 70 | 0.025 | 6.000 | 1.600 | 5570 | 555 | 5.3 |
| 5.00 | 4 | 70 | 0.030 | 7.500 | 2.000 | 4455 | 535 | 8.0 |
| 6.00 | 4 | 70 | 0.040 | 9.000 | 2.400 | 3715 | 595 | 12.8 |
| 8.00 | 4 | 70 | 0.050 | 12.000 | 3.200 | 2785 | 555 | 21.4 |
| 10.00 | 4 | 70 | 0.065 | 15.000 | 4.000 | 2230 | 580 | 34.8 |
| 12.00 | 4 | 70 | 0.075 | 18.000 | 4.800 | 1855 | 555 | 48.1 |
| 16.00 | 4 | 70 | 0.095 | 24.000 | 6.400 | 1395 | 530 | 81.3 |
| 20.00 | 4 | 70 | 0.120 | 30.000 | 8.000 | 1115 | 535 | 128.3 |
| 3.00 | 4 | 90 | 0.015 | 4.500 | 1.200 | 9550 | 575 | 3.1 |
| 4.00 | 4 | 90 | 0.020 | 6.000 | 1.600 | 7160 | 575 | 5.5 |
| 5.00 | 4 | 90 | 0.020 | 7.500 | 2.000 | 5730 | 460 | 6.9 |
| 6.00 | 4 | 90 | 0.030 | 9.000 | 2.400 | 4775 | 575 | 12.4 |
| 8.00 | 4 | 90 | 0.035 | 12.000 | 3.200 | 3580 | 500 | 19.3 |
| 10.00 | 4 | 90 | 0.045 | 15.000 | 4.000 | 2865 | 515 | 30.9 |
| 12.00 | 4 | 90 | 0.055 | 18.000 | 4.800 | 2385 | 525 | 45.4 |
| 16.00 | 4 | 90 | 0.065 | 24.000 | 6.400 | 1790 | 465 | 71.5 |
| 20.00 | 4 | 90 | 0.085 | 30.000 | 8.000 | 1430 | 485 | 116.9 |
| 3.00 | 4 | 155 | 0.015 | 3.000 | 3.000 | 16445 | 985 | 8.9 |
| 4.00 | 4 | 155 | 0.020 | 4.000 | 4.000 | 12335 | 985 | 15.8 |
| 5.00 | 4 | 155 | 0.030 | 5.000 | 5.000 | 9870 | 1185 | 29.6 |
| 6.00 | 4 | 155 | 0.035 | 6.000 | 6.000 | 8225 | 1150 | 41.4 |
| 8.00 | 4 | 155 | 0.045 | 8.000 | 8.000 | 6165 | 1110 | 71.0 |
| 10.00 | 4 | 155 | 0.055 | 10.000 | 10.000 | 4935 | 1085 | 108.5 |
| 12.00 | 4 | 155 | 0.060 | 12.000 | 12.000 | 4110 | 985 | 142.1 |
| 16.00 | 4 | 155 | 0.075 | 8.000 | 16.000 | 3085 | 925 | 118.4 |
| 20.00 | 4 | 155 | 0.095 | 10.000 | 20.000 | 2465 | 935 | 187.5 |
| 3.00 | 4 | 105 | 0.015 | 3.000 | 3.000 | 11140 | 670 | 6.0 |
| 4.00 | 4 | 105 | 0.020 | 4.000 | 4.000 | 8355 | 670 | 10.7 |
| 5.00 | 4 | 105 | 0.030 | 5.000 | 5.000 | 6685 | 800 | 20.1 |
| 6.00 | 4 | 105 | 0.035 | 6.000 | 6.000 | 5570 | 780 | 28.1 |
| 8.00 | 4 | 105 | 0.045 | 8.000 | 8.000 | 4180 | 750 | 48.1 |
| 10.00 | 4 | 105 | 0.055 | 10.000 | 10.000 | 3340 | 735 | 73.5 |
| 12.00 | 4 | 105 | 0.060 | 12.000 | 12.000 | 2785 | 670 | 96.3 |
| 16.00 | 4 | 105 | 0.075 | 8.000 | 16.000 | 2090 | 625 | 80.2 |
| 20.00 | 4 | 105 | 0.095 | 10.000 | 20.000 | 1670 | 635 | 127.0 |
| 3.00 | 4 | 55 | 0.015 | 3.000 | 3.000 | 5835 | 350 | 3.2 |
| 4.00 | 4 | 55 | 0.020 | 4.000 | 4.000 | 4375 | 350 | 5.6 |
| 5.00 | 4 | 55 | 0.030 | 5.000 | 5.000 | 3500 | 420 | 10.5 |
| 6.00 | 4 | 55 | 0.035 | 6.000 | 6.000 | 2920 | 410 | 14.7 |
| 8.00 | 4 | 55 | 0.045 | 8.000 | 8.000 | 2190 | 395 | 25.2 |
| 10.00 | 4 | 55 | 0.055 | 10.000 | 10.000 | 1750 | 385 | 38.5 |
| 12.00 | 4 | 55 | 0.060 | 12.000 | 12.000 | 1460 | 350 | 50.4 |
| 16.00 | 4 | 55 | 0.075 | 8.000 | 16.000 | 1095 | 330 | 42.0 |
| 20.00 | 4 | 55 | 0.095 | 10.000 | 20.000 | 875 | 335 | 66.5 |
| 3.00 | 4 | 70 | 0.010 | 3.000 | 3.000 | 7425 | 295 | 2.7 |
| 4.00 | 4 | 70 | 0.015 | 4.000 | 4.000 | 5570 | 335 | 5.3 |
| 5.00 | 4 | 70 | 0.025 | 5.000 | 5.000 | 4455 | 445 | 11.1 |
| 6.00 | 4 | 70 | 0.030 | 6.000 | 6.000 | 3715 | 445 | 16.0 |
| 8.00 | 4 | 70 | 0.035 | 8.000 | 8.000 | 2785 | 390 | 25.0 |
| 10.00 | 4 | 70 | 0.045 | 10.000 | 10.000 | 2230 | 400 | 40.1 |
| 12.00 | 4 | 70 | 0.050 | 12.000 | 12.000 | 1855 | 370 | 53.5 |
| 16.00 | 4 | 70 | 0.060 | 8.000 | 16.000 | 1395 | 335 | 42.8 |
| 20.00 | 4 | 70 | 0.075 | 10.000 | 20.000 | 1115 | 335 | 66.8 |

Frese toriche

A taglienti lisci, esecuzione normale



HM
MG10 λ 40°
 γ 0°



| | | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--|--|--|-------------------|----------------|--------------------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | | | | Inox Stainless | Ti Titanium | GG(G) Tool Steel Nickel-Alloys |
|-------------|----------------|-----------------|-----------------|--|--|--|-------------------|----------------|--------------------------------------|

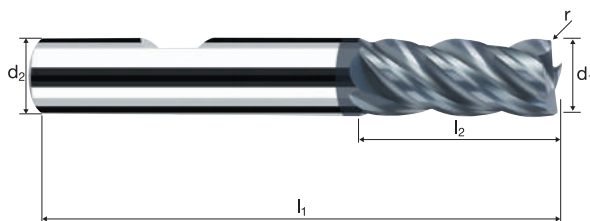
| Esempio: N° Ordine | | | | | | | | | | POLYCHROM |
|--------------------------------------|----------------------|----------------------|----------------|----------------|----------------|--------------|------|---|--|-----------|
| Rivestimento Articolo Codice-ø | | | | | | | | | | |
| P 15326 180 | | | | | | | | | | |
| Ø Code | d ₁ e8 | d ₂ h6 | l ₁ | l ₂ | l ₄ | r 0/+0.03 | α | z | | EUR |
| 180 | 3.00 | 6.00 | 57 | 8.00 | 15.56 | 0.500 | 6.0° | 4 | | 83.00 |
| 220 | 4.00 | 6.00 | 57 | 11.00 | 16.89 | 0.500 | 4.0° | 4 | | 83.00 |
| 260 | 5.00 | 6.00 | 57 | 13.00 | 17.22 | 0.500 | 2.0° | 4 | | 83.00 |
| 300 | 6.00 | 6.00 | 57 | 13.00 | - | 0.500 | 0.0° | 4 | | 83.00 |
| 388 | 8.00 | 8.00 | 63 | 19.00 | - | 0.500 | 0.0° | 4 | | 104.00 |
| 448 | 10.00 | 10.00 | 72 | 22.00 | - | 0.500 | 0.0° | 4 | | 141.00 |
| 498 | 12.00 | 12.00 | 83 | 26.00 | - | 0.500 | 0.0° | 4 | | 175.00 |
| 302 | 6.00 | 6.00 | 57 | 13.00 | - | 1.000 | 0.0° | 4 | | 83.00 |
| 391 | 8.00 | 8.00 | 63 | 19.00 | - | 1.000 | 0.0° | 4 | | 104.00 |
| 450 | 10.00 | 10.00 | 72 | 22.00 | - | 1.000 | 0.0° | 4 | | 141.00 |
| 501 | 12.00 | 12.00 | 83 | 26.00 | - | 1.000 | 0.0° | 4 | | 175.00 |
| 608 | 16.00 | 16.00 | 92 | 32.00 | - | 1.000 | 0.0° | 4 | | 273.00 |
| 680 | 20.00 | 20.00 | 104 | 38.00 | - | 1.000 | 0.0° | 4 | | 398.00 |
| 453 | 10.00 | 10.00 | 72 | 22.00 | - | 1.500 | 0.0° | 4 | | 141.00 |
| 503 | 12.00 | 12.00 | 83 | 26.00 | - | 1.500 | 0.0° | 4 | | 175.00 |
| 610 | 16.00 | 16.00 | 92 | 32.00 | - | 1.500 | 0.0° | 4 | | 273.00 |

Frese toriche

A taglienti lisci, esecuzione normale



HM λ **40°**
MG10 γ **0°**



Sgrossatura

Finitura

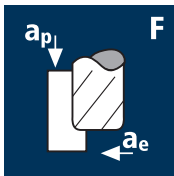


ReTool®

| | | | | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--|--|--|--|--|-------------------|----------------|--------------------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | | | | | | Inox Stainless | Ti Titanium | GG(G) Tool Steel Nickel-Alloys |
|-------------|----------------|-----------------|-----------------|--|--|--|--|--|-------------------|----------------|--------------------------------------|

| Ø Code | d ₁ e8 | d ₂ h6 | l ₁ | l ₂ | l ₄ | r 0/+0.03 | α | z | POLYCHROM | |
|------------------------|----------------------|----------------------|----------------|----------------|----------------|--------------|------|---|-----------|---------------|
| | | | | | | | | | | |
| Esempio: N° Ordine | | | | | | | | | | P15326 |
| Rivestimento: P | | | | | | | | | | P15226 |
| Articolo: 15326 | | | | | | | | | | |
| Codice-ø: 505 | | | | | | | | | | |
| | | | | | | | | | | EUR |
| 505 | 12.00 | 12.00 | 83 | 26.00 | - | 2.000 | 0.0° | 4 | | 175.00 |
| 611 | 16.00 | 16.00 | 92 | 32.00 | - | 2.000 | 0.0° | 4 | | 273.00 |
| 683 | 20.00 | 20.00 | 104 | 38.00 | - | 2.000 | 0.0° | 4 | | 398.00 |
| 457 | 10.00 | 10.00 | 72 | 22.00 | - | 2.500 | 0.0° | 4 | | 141.00 |
| 506 | 12.00 | 12.00 | 83 | 26.00 | - | 2.500 | 0.0° | 4 | | 175.00 |
| 612 | 16.00 | 16.00 | 92 | 32.00 | - | 2.500 | 0.0° | 4 | | 273.00 |
| 684 | 20.00 | 20.00 | 104 | 38.00 | - | 2.500 | 0.0° | 4 | | 398.00 |
| 508 | 12.00 | 12.00 | 83 | 26.00 | - | 4.000 | 0.0° | 4 | | 175.00 |
| 614 | 16.00 | 16.00 | 92 | 32.00 | - | 4.000 | 0.0° | 4 | | 273.00 |
| 686 | 20.00 | 20.00 | 104 | 38.00 | - | 4.000 | 0.0° | 4 | | 398.00 |

Applicazione



Materiale

Acciaio
< 850 N/mm²



Acciaio
850 - 1100 N/mm²



Ghisa
(griglia / sferoidale)



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Acciaio
< 850 N/mm²



Acciaio
850 - 1100 N/mm²



Ghisa
(griglia / sferoidale)



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 3.00 | 3 | 115 | 0.010 | 4.500 | 0.300 | 12200 | 365 | 0.5 |
| 4.00 | 3 | 115 | 0.015 | 6.000 | 0.400 | 9150 | 410 | 1.0 |
| 5.00 | 3 | 115 | 0.015 | 7.500 | 0.500 | 7320 | 330 | 1.2 |
| 6.00 | 3 | 115 | 0.020 | 9.000 | 0.600 | 6100 | 365 | 2.0 |
| 8.00 | 3 | 115 | 0.025 | 12.000 | 0.800 | 4575 | 345 | 3.3 |
| 10.00 | 3 | 115 | 0.035 | 15.000 | 1.000 | 3660 | 385 | 5.8 |
| 12.00 | 3 | 115 | 0.040 | 18.000 | 1.200 | 3050 | 365 | 7.9 |

| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|-----|
| 3.00 | 3 | 75 | 0.010 | 1.500 | 0.300 | 7960 | 240 | 0.1 |
| 4.00 | 3 | 75 | 0.015 | 6.000 | 0.400 | 5970 | 270 | 0.6 |
| 5.00 | 3 | 75 | 0.015 | 7.500 | 0.500 | 4775 | 215 | 0.8 |
| 6.00 | 3 | 75 | 0.020 | 9.000 | 0.600 | 3980 | 240 | 1.3 |
| 8.00 | 3 | 75 | 0.025 | 12.000 | 0.800 | 2985 | 225 | 2.1 |
| 10.00 | 3 | 75 | 0.035 | 15.000 | 1.000 | 2385 | 250 | 3.8 |
| 12.00 | 3 | 75 | 0.040 | 18.000 | 1.200 | 1990 | 240 | 5.2 |

| | | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|-----|------|
| 3.00 | 3 | 150 | 0.010 | 4.500 | 0.300 | 15915 | 475 | 0.6 |
| 4.00 | 3 | 150 | 0.015 | 6.000 | 0.400 | 11935 | 535 | 1.3 |
| 5.00 | 3 | 150 | 0.015 | 7.500 | 0.500 | 9550 | 430 | 1.6 |
| 6.00 | 3 | 150 | 0.020 | 9.000 | 0.600 | 7960 | 475 | 2.6 |
| 8.00 | 3 | 150 | 0.025 | 12.000 | 0.800 | 5970 | 450 | 4.3 |
| 10.00 | 3 | 150 | 0.035 | 15.000 | 1.000 | 4775 | 500 | 7.5 |
| 12.00 | 3 | 150 | 0.040 | 18.000 | 1.200 | 3980 | 475 | 10.3 |

| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|-----|
| 3.00 | 3 | 60 | 0.010 | 4.500 | 0.300 | 6365 | 190 | 0.3 |
| 4.00 | 3 | 60 | 0.015 | 6.000 | 0.400 | 4775 | 215 | 0.5 |
| 5.00 | 3 | 60 | 0.015 | 7.500 | 0.500 | 3820 | 170 | 0.6 |
| 6.00 | 3 | 60 | 0.020 | 9.000 | 0.600 | 3185 | 190 | 1.0 |
| 8.00 | 3 | 60 | 0.025 | 12.000 | 0.800 | 2385 | 180 | 1.7 |
| 10.00 | 3 | 60 | 0.035 | 15.000 | 1.000 | 1910 | 200 | 3.0 |
| 12.00 | 3 | 60 | 0.040 | 18.000 | 1.200 | 1590 | 190 | 4.1 |

| | | | | | | | | |
|-------|---|----|-------|-------|--------|------|-----|------|
| 3.00 | 3 | 85 | 0.010 | 1.500 | 3.000 | 9020 | 270 | 1.2 |
| 4.00 | 3 | 85 | 0.010 | 2.000 | 4.000 | 6765 | 205 | 1.6 |
| 5.00 | 3 | 85 | 0.015 | 2.500 | 5.000 | 5410 | 245 | 3.0 |
| 6.00 | 3 | 85 | 0.015 | 3.000 | 6.000 | 4510 | 205 | 3.7 |
| 8.00 | 3 | 85 | 0.020 | 4.000 | 8.000 | 3380 | 205 | 6.5 |
| 10.00 | 3 | 85 | 0.030 | 5.000 | 10.000 | 2705 | 245 | 12.2 |
| 12.00 | 3 | 85 | 0.035 | 6.000 | 12.000 | 2255 | 235 | 17.0 |

| | | | | | | | | |
|-------|---|----|-------|-------|--------|------|-----|------|
| 3.00 | 3 | 60 | 0.010 | 1.500 | 3.000 | 6365 | 190 | 0.9 |
| 4.00 | 3 | 60 | 0.010 | 2.000 | 4.000 | 4775 | 145 | 1.1 |
| 5.00 | 3 | 60 | 0.015 | 2.500 | 5.000 | 3820 | 170 | 2.1 |
| 6.00 | 3 | 60 | 0.015 | 3.000 | 6.000 | 3185 | 145 | 2.6 |
| 8.00 | 3 | 60 | 0.020 | 4.000 | 8.000 | 2385 | 145 | 4.6 |
| 10.00 | 3 | 60 | 0.025 | 5.000 | 10.000 | 1910 | 145 | 7.2 |
| 12.00 | 3 | 60 | 0.030 | 6.000 | 12.000 | 1590 | 145 | 10.3 |

| | | | | | | | | |
|-------|---|-----|-------|-------|--------|-------|-----|------|
| 3.00 | 3 | 105 | 0.010 | 1.500 | 3.000 | 11140 | 335 | 1.5 |
| 4.00 | 3 | 105 | 0.010 | 2.000 | 4.000 | 8355 | 250 | 2.0 |
| 5.00 | 3 | 105 | 0.015 | 2.500 | 5.000 | 6685 | 300 | 3.8 |
| 6.00 | 3 | 105 | 0.015 | 3.000 | 6.000 | 5570 | 250 | 4.5 |
| 8.00 | 3 | 105 | 0.020 | 4.000 | 8.000 | 4180 | 250 | 8.0 |
| 10.00 | 3 | 105 | 0.025 | 5.000 | 10.000 | 3340 | 250 | 12.5 |
| 12.00 | 3 | 105 | 0.030 | 6.000 | 12.000 | 2785 | 250 | 18.0 |

| | | | | | | | | |
|-------|---|----|-------|-------|--------|------|-----|-----|
| 3.00 | 3 | 40 | 0.010 | 1.500 | 3.000 | 4245 | 125 | 0.6 |
| 4.00 | 3 | 40 | 0.010 | 2.000 | 4.000 | 3185 | 95 | 0.8 |
| 5.00 | 3 | 40 | 0.015 | 2.500 | 5.000 | 2545 | 115 | 1.4 |
| 6.00 | 3 | 40 | 0.015 | 3.000 | 6.000 | 2120 | 95 | 1.7 |
| 8.00 | 3 | 40 | 0.020 | 4.000 | 8.000 | 1590 | 95 | 3.1 |
| 10.00 | 3 | 40 | 0.025 | 5.000 | 10.000 | 1275 | 95 | 4.8 |
| 12.00 | 3 | 40 | 0.030 | 6.000 | 12.000 | 1060 | 95 | 6.9 |

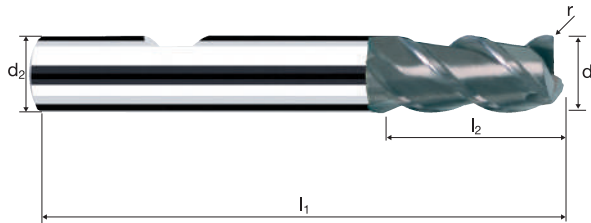
Frese toriche

A taglienti lisci, esecuzione normale



HM
MG10

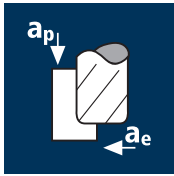
λ 45°
 γ 15°



| | | | | | | | | | |
|-------------|----------------|-----------------|--|--|--|--|-------------------|--|-----------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | | | | | Inox Stainless | | GG(G) Copper |
|-------------|----------------|-----------------|--|--|--|--|-------------------|--|-----------------|

| Esempio: N° Ordine | | | | | | | | | | POLYCHROM |
|-----------------------|----------------------|----------------------|----------------|----------------|----------------|--------------|------|---|--|-----------|
| | | | | | | | | | | P5334 |
| | | | | | | | | | | P5234 |
| | | | | | | | | | | EUR |
| Ø Code | d ₁ e8 | d ₂ h6 | l ₁ | l ₂ | l ₄ | r 0/+0.03 | α | z | | |
| 178 | 3.00 | 6.00 | 57 | 7.00 | 14.96 | 0.200 | 6.0° | 3 | | 58.60 |
| 218 | 4.00 | 6.00 | 57 | 8.00 | 14.59 | 0.200 | 4.5° | 3 | | 58.60 |
| 258 | 5.00 | 6.00 | 57 | 10.00 | 14.72 | 0.200 | 2.5° | 3 | | 58.60 |
| 297 | 6.00 | 6.00 | 57 | 10.00 | - | 0.200 | 0.0° | 3 | | 58.60 |
| 388 | 8.00 | 8.00 | 63 | 16.00 | - | 0.200 | 0.0° | 3 | | 73.00 |
| 445 | 10.00 | 10.00 | 72 | 19.00 | - | 0.200 | 0.0° | 3 | | 100.00 |
| 496 | 12.00 | 12.00 | 83 | 22.00 | - | 0.200 | 0.0° | 3 | | 123.00 |
| 180 | 3.00 | 6.00 | 57 | 7.00 | 14.96 | 0.500 | 6.0° | 3 | | 58.60 |
| 220 | 4.00 | 6.00 | 57 | 8.00 | 14.59 | 0.500 | 4.5° | 3 | | 58.60 |
| 260 | 5.00 | 6.00 | 57 | 10.00 | 14.72 | 0.500 | 2.5° | 3 | | 58.60 |
| 300 | 6.00 | 6.00 | 57 | 10.00 | - | 0.500 | 0.0° | 3 | | 58.60 |
| 391 | 8.00 | 8.00 | 63 | 16.00 | - | 0.500 | 0.0° | 3 | | 73.00 |
| 450 | 10.00 | 10.00 | 72 | 19.00 | - | 0.500 | 0.0° | 3 | | 100.00 |
| 501 | 12.00 | 12.00 | 83 | 22.00 | - | 0.500 | 0.0° | 3 | | 123.00 |

Applicazione



Materiale

Acciaio
< 850 N/mm²



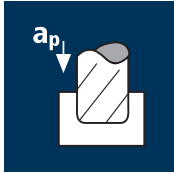
Acciaio
850 - 1100 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Ghisa
(griglia / sferoidale)



Acciaio
< 850 N/mm²



Acciaio
850 - 1100 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Ghisa
(griglia / sferoidale)



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 3.00 | 4 | 170 | 0.015 | 4.500 | 1.200 | 18040 | 1080 | 5.8 |
| 4.00 | 4 | 170 | 0.020 | 6.000 | 1.600 | 13530 | 1080 | 10.4 |
| 5.00 | 4 | 170 | 0.025 | 7.500 | 2.000 | 10825 | 1080 | 16.2 |
| 6.00 | 4 | 170 | 0.030 | 9.000 | 2.400 | 9020 | 1080 | 23.4 |
| 8.00 | 4 | 170 | 0.040 | 12.000 | 3.200 | 6765 | 1080 | 41.6 |
| 10.00 | 4 | 170 | 0.050 | 15.000 | 4.000 | 5410 | 1080 | 64.9 |
| 12.00 | 4 | 170 | 0.060 | 18.000 | 4.800 | 4510 | 1080 | 93.5 |
| 16.00 | 4 | 170 | 0.075 | 24.000 | 6.400 | 3380 | 1015 | 155.8 |
| 20.00 | 4 | 170 | 0.095 | 30.000 | 8.000 | 2705 | 1030 | 246.8 |
| 3.00 | 4 | 120 | 0.015 | 4.500 | 1.200 | 12730 | 765 | 4.1 |
| 4.00 | 4 | 120 | 0.020 | 6.000 | 1.600 | 9550 | 765 | 7.3 |
| 5.00 | 4 | 120 | 0.025 | 7.500 | 2.000 | 7640 | 765 | 11.5 |
| 6.00 | 4 | 120 | 0.030 | 9.000 | 2.400 | 6365 | 765 | 16.5 |
| 8.00 | 4 | 120 | 0.040 | 12.000 | 3.200 | 4775 | 765 | 29.3 |
| 10.00 | 4 | 120 | 0.050 | 15.000 | 4.000 | 3820 | 765 | 45.8 |
| 12.00 | 4 | 120 | 0.060 | 18.000 | 4.800 | 3185 | 765 | 66.0 |
| 16.00 | 4 | 120 | 0.075 | 24.000 | 6.400 | 2385 | 715 | 110.0 |
| 20.00 | 4 | 120 | 0.095 | 30.000 | 8.000 | 1910 | 725 | 174.2 |
| 3.00 | 4 | 80 | 0.010 | 4.500 | 1.200 | 8490 | 340 | 1.8 |
| 4.00 | 4 | 80 | 0.015 | 6.000 | 1.600 | 6365 | 380 | 3.7 |
| 5.00 | 4 | 80 | 0.020 | 7.500 | 2.000 | 5095 | 405 | 6.1 |
| 6.00 | 4 | 80 | 0.025 | 9.000 | 2.400 | 4245 | 425 | 9.2 |
| 8.00 | 4 | 80 | 0.030 | 12.000 | 3.200 | 3185 | 380 | 14.7 |
| 10.00 | 4 | 80 | 0.040 | 15.000 | 4.000 | 2545 | 405 | 24.4 |
| 12.00 | 4 | 80 | 0.050 | 18.000 | 4.800 | 2120 | 425 | 36.7 |
| 16.00 | 4 | 80 | 0.060 | 24.000 | 6.400 | 1590 | 380 | 58.7 |
| 20.00 | 4 | 80 | 0.075 | 30.000 | 8.000 | 1275 | 380 | 91.7 |
| 3.00 | 4 | 150 | 0.015 | 4.500 | 1.200 | 15915 | 955 | 5.2 |
| 4.00 | 4 | 150 | 0.020 | 6.000 | 1.600 | 11935 | 955 | 9.2 |
| 5.00 | 4 | 150 | 0.030 | 7.500 | 2.000 | 9550 | 1145 | 17.2 |
| 6.00 | 4 | 150 | 0.035 | 9.000 | 2.400 | 7960 | 1115 | 24.1 |
| 8.00 | 4 | 150 | 0.045 | 12.000 | 3.200 | 5970 | 1075 | 41.3 |
| 10.00 | 4 | 150 | 0.055 | 15.000 | 4.000 | 4775 | 1050 | 63.0 |
| 12.00 | 4 | 150 | 0.065 | 18.000 | 4.800 | 3980 | 1035 | 89.4 |
| 16.00 | 4 | 150 | 0.085 | 24.000 | 6.400 | 2985 | 1015 | 155.8 |
| 20.00 | 4 | 150 | 0.105 | 30.000 | 8.000 | 2385 | 1005 | 240.6 |
| 3.00 | 4 | 135 | 0.010 | 3.000 | 3.000 | 14325 | 575 | 5.2 |
| 4.00 | 4 | 135 | 0.015 | 4.000 | 4.000 | 10745 | 645 | 10.3 |
| 5.00 | 4 | 135 | 0.020 | 5.000 | 5.000 | 8595 | 690 | 17.2 |
| 6.00 | 4 | 135 | 0.025 | 6.000 | 6.000 | 7160 | 715 | 25.8 |
| 8.00 | 4 | 135 | 0.030 | 8.000 | 8.000 | 5370 | 645 | 41.3 |
| 10.00 | 4 | 135 | 0.040 | 10.000 | 10.000 | 4295 | 690 | 68.8 |
| 12.00 | 4 | 135 | 0.045 | 12.000 | 12.000 | 3580 | 645 | 92.8 |
| 16.00 | 4 | 135 | 0.055 | 8.000 | 16.000 | 2685 | 590 | 75.6 |
| 20.00 | 4 | 135 | 0.070 | 10.000 | 20.000 | 2150 | 600 | 120.3 |
| 3.00 | 4 | 95 | 0.010 | 3.000 | 3.000 | 10080 | 405 | 3.6 |
| 4.00 | 4 | 95 | 0.015 | 4.000 | 4.000 | 7560 | 455 | 7.3 |
| 5.00 | 4 | 95 | 0.020 | 5.000 | 5.000 | 6050 | 485 | 12.1 |
| 6.00 | 4 | 95 | 0.025 | 6.000 | 6.000 | 5040 | 505 | 18.1 |
| 8.00 | 4 | 95 | 0.030 | 8.000 | 8.000 | 3780 | 455 | 29.0 |
| 10.00 | 4 | 95 | 0.040 | 10.000 | 10.000 | 3025 | 485 | 48.4 |
| 12.00 | 4 | 95 | 0.045 | 12.000 | 12.000 | 2520 | 455 | 65.3 |
| 16.00 | 4 | 95 | 0.055 | 8.000 | 16.000 | 1890 | 415 | 53.2 |
| 20.00 | 4 | 95 | 0.070 | 10.000 | 20.000 | 1510 | 425 | 84.7 |
| 3.00 | 4 | 65 | 0.010 | 2.100 | 3.000 | 6895 | 275 | 1.7 |
| 4.00 | 4 | 65 | 0.010 | 2.800 | 4.000 | 5175 | 205 | 2.3 |
| 5.00 | 4 | 65 | 0.015 | 3.500 | 5.000 | 4140 | 250 | 4.3 |
| 6.00 | 4 | 65 | 0.020 | 4.200 | 6.000 | 3450 | 275 | 7.0 |
| 8.00 | 4 | 65 | 0.025 | 8.000 | 8.000 | 2585 | 260 | 16.6 |
| 10.00 | 4 | 65 | 0.030 | 10.000 | 10.000 | 2070 | 250 | 24.8 |
| 12.00 | 4 | 65 | 0.040 | 12.000 | 12.000 | 1725 | 275 | 39.7 |
| 16.00 | 4 | 65 | 0.045 | 8.000 | 16.000 | 1295 | 235 | 29.8 |
| 20.00 | 4 | 65 | 0.055 | 10.000 | 20.000 | 1035 | 230 | 45.5 |
| 3.00 | 4 | 125 | 0.010 | 3.000 | 3.000 | 13265 | 530 | 4.8 |
| 4.00 | 4 | 125 | 0.015 | 4.000 | 4.000 | 9945 | 595 | 9.5 |
| 5.00 | 4 | 125 | 0.025 | 5.000 | 5.000 | 7960 | 795 | 19.9 |
| 6.00 | 4 | 125 | 0.025 | 6.000 | 6.000 | 6630 | 665 | 23.9 |
| 8.00 | 4 | 125 | 0.035 | 8.000 | 8.000 | 4975 | 695 | 44.6 |
| 10.00 | 4 | 125 | 0.040 | 10.000 | 10.000 | 3980 | 635 | 63.7 |
| 12.00 | 4 | 125 | 0.050 | 12.000 | 12.000 | 3315 | 665 | 95.5 |
| 16.00 | 4 | 125 | 0.065 | 8.000 | 16.000 | 2485 | 645 | 82.8 |
| 20.00 | 4 | 125 | 0.080 | 10.000 | 20.000 | 1990 | 635 | 127.3 |

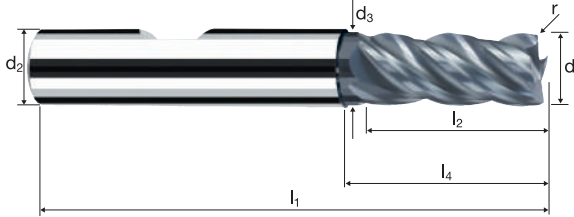
Frese toriche

A taglienti lisci, esecuzione normale con scarico corto



HM
MG10

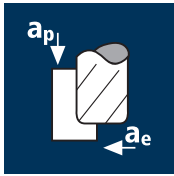
λ 40°
 γ 6°



| | | | | | | | | | |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | | | | | Inox Stainless | Ti Titanium | GG(G) Nickel-Alloys |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|------------------------|

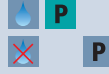
| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r 0/+0.03 | α | z | POLYCHROM |
|---|----------------------|----------------------|----------------|----------------|----------------|----------------|----------------|--------------|------|---|---------------|
| | | | | | | | | | | | |
| Esempio: N° Ordine P 45319 178 Rivestimento Articolo Codice-Ø | | | | | | | | | | | P45319 |
| | | | | | | | | | | | P45219 |
| | | | | | | | | | | | EUR |
| 178 | 3.00 | 6.00 | 2.80 | 57 | 8.00 | 14.00 | 20.63 | 0.200 | 4.5° | 4 | 47.20 |
| 218 | 4.00 | 6.00 | 3.70 | 57 | 11.00 | 16.00 | 20.95 | 0.200 | 3.0° | 4 | 47.20 |
| 258 | 5.00 | 6.00 | 4.60 | 57 | 13.00 | 18.00 | 21.27 | 0.200 | 1.5° | 4 | 47.20 |
| 297 | 6.00 | 6.00 | 5.50 | 57 | 13.00 | 19.34 | 20.00 | 0.200 | 0.0° | 4 | 47.20 |
| 385 | 8.00 | 8.00 | 7.40 | 63 | 19.00 | 25.29 | 26.00 | 0.200 | 0.0° | 4 | 58.90 |
| 445 | 10.00 | 10.00 | 9.20 | 72 | 22.00 | 30.20 | 31.00 | 0.200 | 0.0° | 4 | 80.00 |
| 496 | 12.00 | 12.00 | 11.00 | 83 | 26.00 | 36.13 | 37.00 | 0.200 | 0.0° | 4 | 99.00 |
| 605 | 16.00 | 16.00 | 15.00 | 92 | 32.00 | 42.13 | 43.00 | 0.200 | 0.0° | 4 | 155.00 |
| 180 | 3.00 | 6.00 | 2.80 | 57 | 8.00 | 14.00 | 20.63 | 0.500 | 4.5° | 4 | 47.20 |
| 220 | 4.00 | 6.00 | 3.70 | 57 | 11.00 | 16.00 | 20.95 | 0.500 | 3.0° | 4 | 47.20 |
| 260 | 5.00 | 6.00 | 4.60 | 57 | 13.00 | 18.00 | 21.27 | 0.500 | 1.5° | 4 | 47.20 |
| 300 | 6.00 | 6.00 | 5.50 | 57 | 13.00 | 19.34 | 20.00 | 0.500 | 0.0° | 4 | 47.20 |
| 388 | 8.00 | 8.00 | 7.40 | 63 | 19.00 | 25.29 | 26.00 | 0.500 | 0.0° | 4 | 58.90 |
| 448 | 10.00 | 10.00 | 9.20 | 72 | 22.00 | 30.20 | 31.00 | 0.500 | 0.0° | 4 | 80.00 |
| 498 | 12.00 | 12.00 | 11.00 | 83 | 26.00 | 36.13 | 37.00 | 0.500 | 0.0° | 4 | 99.00 |
| 606 | 16.00 | 16.00 | 15.00 | 92 | 32.00 | 42.13 | 43.00 | 0.500 | 0.0° | 4 | 155.00 |
| 678 | 20.00 | 20.00 | 19.00 | 104 | 38.00 | 52.13 | 53.00 | 0.500 | 0.0° | 4 | 226.00 |

Applicazione



Materiale

Acciaio
< 850 N/mm²



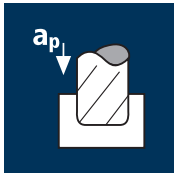
Acciaio
850 - 1100 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Ghisa
(griglia / sferoidale)



Acciaio
< 850 N/mm²



Acciaio
850 - 1100 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Ghisa
(griglia / sferoidale)



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 6.00 | 4 | 170 | 0.030 | 9.000 | 2.400 | 9020 | 1080 | 23.4 |
| 8.00 | 4 | 170 | 0.040 | 12.000 | 3.200 | 6765 | 1080 | 41.6 |
| 10.00 | 4 | 170 | 0.050 | 15.000 | 4.000 | 5410 | 1080 | 64.9 |
| 12.00 | 4 | 170 | 0.060 | 18.000 | 4.800 | 4510 | 1080 | 93.5 |
| 16.00 | 4 | 170 | 0.075 | 24.000 | 6.400 | 3380 | 1015 | 155.8 |
| 20.00 | 4 | 170 | 0.095 | 30.000 | 8.000 | 2705 | 1030 | 246.8 |

| | | | | | | | | |
|-------|---|-----|-------|--------|-------|------|-----|-------|
| 6.00 | 4 | 120 | 0.030 | 9.000 | 2.400 | 6365 | 765 | 16.5 |
| 8.00 | 4 | 120 | 0.040 | 12.000 | 3.200 | 4775 | 765 | 29.3 |
| 10.00 | 4 | 120 | 0.050 | 15.000 | 4.000 | 3820 | 765 | 45.8 |
| 12.00 | 4 | 120 | 0.060 | 18.000 | 4.800 | 3185 | 765 | 66.0 |
| 16.00 | 4 | 120 | 0.075 | 24.000 | 6.400 | 2385 | 715 | 110.0 |
| 20.00 | 4 | 120 | 0.095 | 30.000 | 8.000 | 1910 | 725 | 174.2 |

| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 6.00 | 4 | 80 | 0.025 | 9.000 | 2.400 | 4245 | 425 | 9.2 |
| 8.00 | 4 | 80 | 0.030 | 12.000 | 3.200 | 3185 | 380 | 14.7 |
| 10.00 | 4 | 80 | 0.040 | 15.000 | 4.000 | 2545 | 405 | 24.4 |
| 12.00 | 4 | 80 | 0.050 | 18.000 | 4.800 | 2120 | 425 | 36.7 |
| 16.00 | 4 | 80 | 0.060 | 24.000 | 6.400 | 1590 | 380 | 58.7 |
| 20.00 | 4 | 80 | 0.075 | 30.000 | 8.000 | 1275 | 380 | 91.7 |

| | | | | | | | | |
|-------|---|-----|-------|--------|-------|------|------|-------|
| 6.00 | 4 | 150 | 0.035 | 9.000 | 2.400 | 7960 | 1115 | 24.1 |
| 8.00 | 4 | 150 | 0.045 | 12.000 | 3.200 | 5970 | 1075 | 41.3 |
| 10.00 | 4 | 150 | 0.055 | 15.000 | 4.000 | 4775 | 1050 | 63.0 |
| 12.00 | 4 | 150 | 0.065 | 18.000 | 4.800 | 3980 | 1035 | 89.4 |
| 16.00 | 4 | 150 | 0.085 | 24.000 | 6.400 | 2985 | 1015 | 155.8 |
| 20.00 | 4 | 150 | 0.105 | 30.000 | 8.000 | 2385 | 1005 | 240.6 |

| | | | | | | | | |
|-------|---|-----|-------|--------|--------|------|-----|-------|
| 6.00 | 4 | 135 | 0.025 | 6.000 | 6.000 | 7160 | 715 | 25.8 |
| 8.00 | 4 | 135 | 0.030 | 8.000 | 8.000 | 5370 | 645 | 41.3 |
| 10.00 | 4 | 135 | 0.040 | 10.000 | 10.000 | 4295 | 690 | 68.8 |
| 12.00 | 4 | 135 | 0.045 | 12.000 | 12.000 | 3580 | 645 | 92.8 |
| 16.00 | 4 | 135 | 0.055 | 8.000 | 16.000 | 2685 | 590 | 75.6 |
| 20.00 | 4 | 135 | 0.070 | 10.000 | 20.000 | 2150 | 600 | 120.3 |

| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 6.00 | 4 | 95 | 0.025 | 6.000 | 6.000 | 5040 | 505 | 18.1 |
| 8.00 | 4 | 95 | 0.030 | 8.000 | 8.000 | 3780 | 455 | 29.0 |
| 10.00 | 4 | 95 | 0.040 | 10.000 | 10.000 | 3025 | 485 | 48.4 |
| 12.00 | 4 | 95 | 0.045 | 12.000 | 12.000 | 2520 | 455 | 65.3 |
| 16.00 | 4 | 95 | 0.055 | 8.000 | 16.000 | 1890 | 415 | 53.2 |
| 20.00 | 4 | 95 | 0.070 | 10.000 | 20.000 | 1510 | 425 | 84.7 |

| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 6.00 | 4 | 65 | 0.020 | 4.200 | 6.000 | 3450 | 275 | 7.0 |
| 8.00 | 4 | 65 | 0.025 | 8.000 | 8.000 | 2585 | 260 | 16.6 |
| 10.00 | 4 | 65 | 0.030 | 10.000 | 10.000 | 2070 | 250 | 24.8 |
| 12.00 | 4 | 65 | 0.040 | 12.000 | 12.000 | 1725 | 275 | 39.7 |
| 16.00 | 4 | 65 | 0.045 | 8.000 | 16.000 | 1295 | 235 | 29.8 |
| 20.00 | 4 | 65 | 0.055 | 10.000 | 20.000 | 1035 | 230 | 45.5 |

| | | | | | | | | |
|-------|---|-----|-------|--------|--------|------|-----|-------|
| 6.00 | 4 | 125 | 0.025 | 6.000 | 6.000 | 6630 | 665 | 23.9 |
| 8.00 | 4 | 125 | 0.035 | 8.000 | 8.000 | 4975 | 695 | 44.6 |
| 10.00 | 4 | 125 | 0.040 | 10.000 | 10.000 | 3980 | 635 | 63.7 |
| 12.00 | 4 | 125 | 0.050 | 12.000 | 12.000 | 3315 | 665 | 95.5 |
| 16.00 | 4 | 125 | 0.065 | 8.000 | 16.000 | 2485 | 645 | 82.8 |
| 20.00 | 4 | 125 | 0.080 | 10.000 | 20.000 | 1990 | 635 | 127.3 |

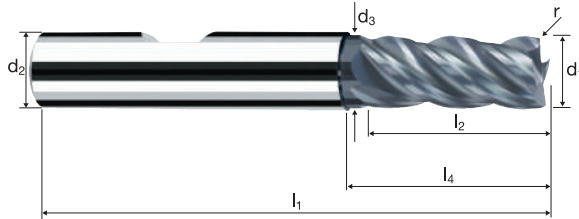
Frese toriche

A taglienti lisci, esecuzione normale con scarico corto



HM
MG10

λ 40°
 γ 6°



Sgrossatura

Finitura

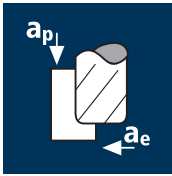


ReTool®

| | | | | | | | | | |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|--------------------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | | | | | Inox Stainless | Ti Titanium | GG(G) Tool Steel Nickel-Alloys |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|--------------------------------------|

| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r 0/+0.03 | α | z | POLYCHROM | |
|-----------------------|----------------------|----------------------|----------------|----------------|----------------|----------------|----------------|--------------|------|---|-----------|--|
| | | | | | | | | | | | | |
| Esempio: N° Ordine | | Rivestimento | | Articolo | | Codice-ø | | | | | | |
| | | P | | 45319 | | 301 | | | | | | |
| | | | | | | | | | | | P45319 | |
| | | | | | | | | | | | P45219 | |
| | | | | | | | | | | | EUR | |
| 301 | 6.00 | 6.00 | 5.50 | 57 | 13.00 | 19.34 | 20.00 | 0.800 | 0.0° | 4 | 47.20 | |
| 389 | 8.00 | 8.00 | 7.40 | 63 | 19.00 | 25.29 | 26.00 | 0.800 | 0.0° | 4 | 58.90 | |
| 449 | 10.00 | 10.00 | 9.20 | 72 | 22.00 | 30.20 | 31.00 | 0.800 | 0.0° | 4 | 80.00 | |
| 499 | 12.00 | 12.00 | 11.00 | 83 | 26.00 | 36.13 | 37.00 | 0.800 | 0.0° | 4 | 99.00 | |
| 302 | 6.00 | 6.00 | 5.50 | 57 | 13.00 | 19.34 | 20.00 | 1.000 | 0.0° | 4 | 47.20 | |
| 391 | 8.00 | 8.00 | 7.40 | 63 | 19.00 | 25.29 | 26.00 | 1.000 | 0.0° | 4 | 58.90 | |
| 450 | 10.00 | 10.00 | 9.20 | 72 | 22.00 | 30.20 | 31.00 | 1.000 | 0.0° | 4 | 80.00 | |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 26.00 | 36.13 | 37.00 | 1.000 | 0.0° | 4 | 99.00 | |
| 608 | 16.00 | 16.00 | 15.00 | 92 | 32.00 | 42.13 | 43.00 | 1.000 | 0.0° | 4 | 155.00 | |
| 680 | 20.00 | 20.00 | 19.00 | 104 | 38.00 | 52.13 | 53.00 | 1.000 | 0.0° | 4 | 226.00 | |
| 304 | 6.00 | 6.00 | 5.50 | 57 | 13.00 | 19.34 | 20.00 | 1.500 | 0.0° | 4 | 47.20 | |
| 393 | 8.00 | 8.00 | 7.40 | 63 | 19.00 | 25.29 | 26.00 | 1.500 | 0.0° | 4 | 58.90 | |
| 453 | 10.00 | 10.00 | 9.20 | 72 | 22.00 | 30.20 | 31.00 | 1.500 | 0.0° | 4 | 80.00 | |
| 503 | 12.00 | 12.00 | 11.00 | 83 | 26.00 | 36.13 | 37.00 | 1.500 | 0.0° | 4 | 99.00 | |
| 610 | 16.00 | 16.00 | 15.00 | 92 | 32.00 | 42.13 | 43.00 | 1.500 | 0.0° | 4 | 155.00 | |

Applicazione



Materiale

Acciaio
< 850 N/mm²



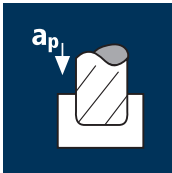
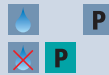
Acciaio
850 - 1100 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Ghisa
(griglia / sferoidale)



Acciaio
< 850 N/mm²



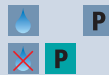
Acciaio
850 - 1100 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Ghisa
(griglia / sferoidale)



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 10.00 | 4 | 170 | 0.050 | 15.000 | 4.000 | 5410 | 1080 | 64.9 |
| 12.00 | 4 | 170 | 0.060 | 18.000 | 4.800 | 4510 | 1080 | 93.5 |
| 16.00 | 4 | 170 | 0.075 | 24.000 | 6.400 | 3380 | 1015 | 155.8 |
| 20.00 | 4 | 170 | 0.095 | 30.000 | 8.000 | 2705 | 1030 | 246.8 |
| | | | | | | | | |
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|-------|---|-----|-------|--------|-------|------|-----|-------|
| 10.00 | 4 | 120 | 0.050 | 15.000 | 4.000 | 3820 | 765 | 45.8 |
| 12.00 | 4 | 120 | 0.060 | 18.000 | 4.800 | 3185 | 765 | 66.0 |
| 16.00 | 4 | 120 | 0.075 | 24.000 | 6.400 | 2385 | 715 | 110.0 |
| 20.00 | 4 | 120 | 0.095 | 30.000 | 8.000 | 1910 | 725 | 174.2 |
| | | | | | | | | |
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|-------|---|----|-------|--------|-------|------|-----|------|
| 10.00 | 4 | 80 | 0.040 | 15.000 | 4.000 | 2545 | 405 | 24.4 |
| 12.00 | 4 | 80 | 0.050 | 18.000 | 4.800 | 2120 | 425 | 36.7 |
| 16.00 | 4 | 80 | 0.060 | 24.000 | 6.400 | 1590 | 380 | 58.7 |
| 20.00 | 4 | 80 | 0.075 | 30.000 | 8.000 | 1275 | 380 | 91.7 |
| | | | | | | | | |
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|-------|---|-----|-------|--------|-------|------|------|-------|
| 10.00 | 4 | 150 | 0.055 | 15.000 | 4.000 | 4775 | 1050 | 63.0 |
| 12.00 | 4 | 150 | 0.065 | 18.000 | 4.800 | 3980 | 1035 | 89.4 |
| 16.00 | 4 | 150 | 0.085 | 24.000 | 6.400 | 2985 | 1015 | 155.8 |
| 20.00 | 4 | 150 | 0.105 | 30.000 | 8.000 | 2385 | 1005 | 240.6 |
| | | | | | | | | |
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|-------|---|-----|-------|--------|--------|------|-----|-------|
| 10.00 | 4 | 135 | 0.040 | 10.000 | 10.000 | 4295 | 690 | 68.8 |
| 12.00 | 4 | 135 | 0.045 | 12.000 | 12.000 | 3580 | 645 | 92.8 |
| 16.00 | 4 | 135 | 0.055 | 8.000 | 16.000 | 2685 | 590 | 75.6 |
| 20.00 | 4 | 135 | 0.070 | 10.000 | 20.000 | 2150 | 600 | 120.3 |
| | | | | | | | | |
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|-------|---|----|-------|--------|--------|------|-----|------|
| 10.00 | 4 | 95 | 0.040 | 10.000 | 10.000 | 3025 | 485 | 48.4 |
| 12.00 | 4 | 95 | 0.045 | 12.000 | 12.000 | 2520 | 455 | 65.3 |
| 16.00 | 4 | 95 | 0.055 | 8.000 | 16.000 | 1890 | 415 | 53.2 |
| 20.00 | 4 | 95 | 0.070 | 10.000 | 20.000 | 1510 | 425 | 84.7 |
| | | | | | | | | |
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|-------|---|----|-------|--------|--------|------|-----|------|
| 10.00 | 4 | 65 | 0.030 | 10.000 | 10.000 | 2070 | 250 | 24.8 |
| 12.00 | 4 | 65 | 0.040 | 12.000 | 12.000 | 1725 | 275 | 39.7 |
| 16.00 | 4 | 65 | 0.045 | 8.000 | 16.000 | 1295 | 235 | 29.8 |
| 20.00 | 4 | 65 | 0.055 | 10.000 | 20.000 | 1035 | 230 | 45.5 |
| | | | | | | | | |
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|-------|---|-----|-------|--------|--------|------|-----|-------|
| 10.00 | 4 | 125 | 0.040 | 10.000 | 10.000 | 3980 | 635 | 63.7 |
| 12.00 | 4 | 125 | 0.050 | 12.000 | 12.000 | 3315 | 665 | 95.5 |
| 16.00 | 4 | 125 | 0.065 | 8.000 | 16.000 | 2485 | 645 | 82.8 |
| 20.00 | 4 | 125 | 0.080 | 10.000 | 20.000 | 1990 | 635 | 127.3 |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Frese toriche

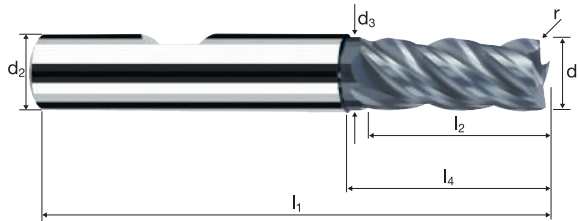
A taglienti lisci, esecuzione normale con scarico corto



HM
MG10 λ 40°
 γ 6°



Vario



Sgrossatura

Finitura



ReTool®

| | | | | | | | | | |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | | | | | Inox Stainless | Ti Titanium | GG(G) Nickel-Alloys |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|------------------------|

| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r 0/+0.03 | α | z | POLYCHROM | |
|---|----------------------|----------------------|----------------|----------------|----------------|----------------|----------------|--------------|------|---|-----------|--------|
| | | | | | | | | | | | | |
| Esempio: N° Ordine | | | | | | | | | | | | |
| Rivestimento: P Articolo: 45319 Codice-ø: 306 | | | | | | | | | | | | |
| | | | | | | | | | | | | P45319 |
| | | | | | | | | | | | | P45219 |
| | | | | | | | | | | | | EUR |
| 306 | 6.00 | 6.00 | 5.50 | 57 | 13.00 | 19.34 | 20.00 | 2.000 | 0.0° | 4 | | 47.20 |
| 395 | 8.00 | 8.00 | 7.40 | 63 | 19.00 | 25.29 | 26.00 | 2.000 | 0.0° | 4 | | 58.90 |
| 455 | 10.00 | 10.00 | 9.20 | 72 | 22.00 | 30.20 | 31.00 | 2.000 | 0.0° | 4 | | 80.00 |
| 505 | 12.00 | 12.00 | 11.00 | 83 | 26.00 | 36.13 | 37.00 | 2.000 | 0.0° | 4 | | 99.00 |
| 611 | 16.00 | 16.00 | 15.00 | 92 | 32.00 | 42.13 | 43.00 | 2.000 | 0.0° | 4 | | 155.00 |
| 683 | 20.00 | 20.00 | 19.00 | 104 | 38.00 | 52.13 | 53.00 | 2.000 | 0.0° | 4 | | 226.00 |
| 457 | 10.00 | 10.00 | 9.20 | 72 | 22.00 | 30.20 | 31.00 | 2.500 | 0.0° | 4 | | 80.00 |
| 506 | 12.00 | 12.00 | 11.00 | 83 | 26.00 | 36.13 | 37.00 | 2.500 | 0.0° | 4 | | 99.00 |
| 612 | 16.00 | 16.00 | 15.00 | 92 | 32.00 | 42.13 | 43.00 | 2.500 | 0.0° | 4 | | 155.00 |
| 684 | 20.00 | 20.00 | 19.00 | 104 | 38.00 | 52.13 | 53.00 | 2.500 | 0.0° | 4 | | 226.00 |
| 508 | 12.00 | 12.00 | 11.00 | 83 | 26.00 | 36.13 | 37.00 | 4.000 | 0.0° | 4 | | 99.00 |
| 614 | 16.00 | 16.00 | 15.00 | 92 | 32.00 | 42.13 | 43.00 | 4.000 | 0.0° | 4 | | 155.00 |
| 686 | 20.00 | 20.00 | 19.00 | 104 | 38.00 | 52.13 | 53.00 | 4.000 | 0.0° | 4 | | 226.00 |

| Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] | |
|---|--|---------|-------|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|---------|
| | Acciaio da utensile temprato 52 - 56 HRC | 3.00 | 4 | 60 | 0.009 | 3.000 | 1.800 | 6365 | 230 | 1.2 | 5° | |
| | | 4.00 | 4 | 60 | 0.013 | 4.000 | 2.400 | 4775 | 250 | 2.4 | 5° | |
| | | 5.00 | 4 | 60 | 0.017 | 5.000 | 3.000 | 3820 | 260 | 3.9 | 5° | |
| | | 6.00 | 4 | 60 | 0.021 | 7.500 | 3.600 | 3185 | 265 | 7.2 | 5° | |
| | | 8.00 | 4 | 60 | 0.028 | 10.000 | 4.800 | 2385 | 265 | 12.8 | 5° | |
| | | 10.00 | 4 | 60 | 0.035 | 12.500 | 6.000 | 1910 | 265 | 20.1 | 5° | |
| | | 12.00 | 4 | 60 | 0.042 | 15.000 | 7.200 | 1590 | 265 | 28.9 | 5° | |
| 16.00 | 4 | 60 | 0.050 | 20.000 | 9.600 | 1195 | 240 | 45.8 | 5° | | | |
| | Acciaio da utensile temprato > 60 HRC | 3.00 | 4 | 25 | 0.004 | 3.000 | 1.800 | 2655 | 40 | 0.2 | 3° | |
| | | 4.00 | 4 | 25 | 0.006 | 4.000 | 2.400 | 1990 | 50 | 0.5 | 4° | |
| | | 5.00 | 4 | 25 | 0.008 | 5.000 | 3.000 | 1590 | 50 | 0.8 | 5° | |
| | | 6.00 | 4 | 25 | 0.009 | 6.000 | 3.600 | 1325 | 50 | 1.0 | 5° | |
| | | 8.00 | 4 | 25 | 0.011 | 8.000 | 4.800 | 995 | 45 | 1.7 | 5° | |
| | | 10.00 | 4 | 25 | 0.015 | 10.000 | 6.000 | 795 | 50 | 2.9 | 5° | |
| | | 12.00 | 4 | 25 | 0.018 | 12.000 | 7.200 | 665 | 50 | 4.1 | 5° | |
| 16.00 | 4 | 25 | 0.023 | 16.000 | 9.600 | 495 | 45 | 7.0 | 5° | | | |
| Acciaio rapido temprato 64 - 70 HRC | | 3.00 | 4 | 15 | 0.005 | 2.250 | 0.450 | 1590 | 30 | 0.0 | 3° | |
| | | 4.00 | 4 | 15 | 0.006 | 3.000 | 0.600 | 1195 | 30 | 0.1 | 4° | |
| | | 5.00 | 4 | 15 | 0.008 | 3.750 | 0.750 | 955 | 30 | 0.1 | 5° | |
| | | 6.00 | 4 | 15 | 0.006 | 4.500 | 3.600 | 795 | 20 | 0.3 | 5° | |
| | | 8.00 | 4 | 15 | 0.008 | 6.000 | 4.800 | 595 | 20 | 0.6 | 5° | |
| | | 10.00 | 4 | 15 | 0.010 | 7.500 | 6.000 | 475 | 20 | 0.9 | 5° | |
| | | 12.00 | 4 | 15 | 0.012 | 9.000 | 7.200 | 400 | 20 | 1.2 | 5° | |
| 16.00 | 4 | 15 | 0.016 | 12.000 | 9.600 | 300 | 20 | 2.2 | 5° | | | |
| Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] | LR [mm] |
| | Acciaio da utensile temprato 52 - 56 HRC | 3.00 | 4 | 50 | 0.010 | 3.000 | 3.000 | 5305 | 210 | 1.9 | 5° | 34.3 |
| | | 4.00 | 4 | 50 | 0.013 | 4.000 | 4.000 | 3980 | 205 | 3.3 | 5° | 45.7 |
| | | 5.00 | 4 | 50 | 0.017 | 5.000 | 5.000 | 3185 | 215 | 5.4 | 5° | 57.2 |
| | | 6.00 | 4 | 50 | 0.021 | 6.000 | 6.000 | 2655 | 225 | 8.0 | 5° | 68.6 |
| | | 8.00 | 4 | 50 | 0.028 | 8.000 | 8.000 | 1990 | 225 | 14.3 | 5° | 91.4 |
| | | 10.00 | 4 | 50 | 0.035 | 10.000 | 10.000 | 1590 | 225 | 22.3 | 5° | 114.3 |
| | | 12.00 | 4 | 50 | 0.042 | 12.000 | 12.000 | 1325 | 225 | 32.1 | 5° | 137.2 |
| 16.00 | 4 | 50 | 0.064 | 8.000 | 16.000 | 995 | 255 | 32.6 | 5° | 91.4 | | |
| | Acciaio da utensile temprato > 60 HRC | 3.00 | 4 | 20 | 0.004 | 3.000 | 3.000 | 2120 | 35 | 0.3 | 3° | 57.2 |
| | | 4.00 | 4 | 20 | 0.006 | 4.000 | 4.000 | 1590 | 40 | 0.6 | 4° | 57.2 |
| | | 5.00 | 4 | 20 | 0.008 | 5.000 | 5.000 | 1275 | 40 | 1.0 | 5° | 57.2 |
| | | 6.00 | 4 | 20 | 0.009 | 6.000 | 6.000 | 1060 | 40 | 1.4 | 5° | 68.6 |
| | | 8.00 | 4 | 20 | 0.011 | 8.000 | 8.000 | 795 | 35 | 2.2 | 5° | 91.4 |
| | | 10.00 | 4 | 20 | 0.015 | 10.000 | 10.000 | 635 | 40 | 3.8 | 5° | 114.3 |
| | | 12.00 | 4 | 20 | 0.020 | 12.000 | 12.000 | 530 | 40 | 6.1 | 5° | 137.2 |
| 16.00 | 4 | 20 | 0.032 | 8.000 | 16.000 | 400 | 50 | 6.5 | 5° | 91.4 | | |
| Acciaio rapido temprato 64 - 70 HRC | | 3.00 | 4 | 10 | 0.003 | 1.500 | 3.000 | 1060 | 15 | 0.1 | 3° | 28.6 |
| | | 4.00 | 4 | 10 | 0.004 | 2.000 | 4.000 | 795 | 15 | 0.1 | 4° | 28.6 |
| | | 5.00 | 4 | 10 | 0.005 | 2.500 | 5.000 | 635 | 15 | 0.2 | 5° | 28.6 |
| | | 6.00 | 4 | 10 | 0.006 | 3.000 | 6.000 | 530 | 15 | 0.2 | 5° | 34.3 |
| | | 8.00 | 4 | 10 | 0.008 | 4.000 | 8.000 | 400 | 15 | 0.4 | 5° | 45.7 |
| | | 10.00 | 4 | 10 | 0.010 | 5.000 | 10.000 | 320 | 15 | 0.6 | 5° | 57.2 |
| | | 12.00 | 4 | 10 | 0.012 | 6.000 | 12.000 | 265 | 15 | 0.9 | 5° | 68.6 |
| 16.00 | 4 | 10 | 0.016 | 8.000 | 16.000 | 200 | 15 | 1.6 | 5° | 91.4 | | |

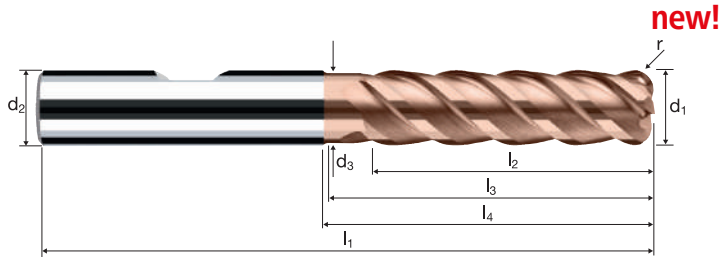
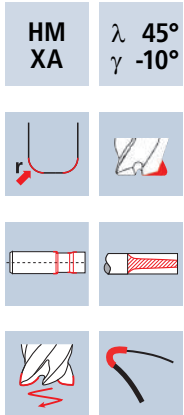
Dati di applicazione precisi per ulteriori applicazioni e materiali si trovano nel calcolatore dei parametri di taglio ToolExpert 2.0

| | | | | |
|--|--|--|--|--|
| | | | | |
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Frese toriche HX



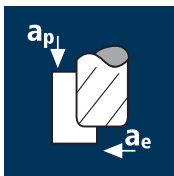
A taglienti lisci, esecuzione medio-lunga con scarico corto
Geometria frontale per fresature in penetrazione ad alto rendimento



| | | | | | | | | | | |
|--|--|--|--|--------------|--------------|-------------|--|--|--|-----|
| | | | | HRC 48-56 | HRC 56-60 | HRC > 60 | | | | HSS |
|--|--|--|--|--------------|--------------|-------------|--|--|--|-----|

| Ø Code | d ₁ 0/-0.01 | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r 0/+0.015 | α | z | Esempio: N° Ordine | | Rivestimento | | Articolo | | Codice-ø | | DURO-Si | EUR |
|-----------|---------------------------|----------------------|----------------|----------------|----------------|----------------|----------------|---------------|------|---|-----------------------|------|--------------|---|----------|-----|----------|------|---------|--------|
| | | | | | | | | | | | H | 8617 | 178 | H | 8617 | 178 | H | 8617 | | |
| 178 | 3.00 | 6.00 | 2.80 | 63 | 11.00 | 18.00 | 24.37 | 0.200 | 4.5° | 4 | | | | | | | | | H8617 | 118.00 |
| 218 | 4.00 | 6.00 | 3.70 | 63 | 13.00 | 22.00 | 26.82 | 0.200 | 3.5° | 4 | | | | | | | | | H8517 | 118.00 |
| 258 | 5.00 | 6.00 | 4.60 | 63 | 16.00 | 24.00 | 27.27 | 0.200 | 1.5° | 4 | | | | | | | | | | 118.00 |
| 297 | 6.00 | 6.00 | 5.50 | 63 | 21.00 | 25.34 | 26.00 | 0.200 | 0.0° | 4 | | | | | | | | | | 118.00 |
| 385 | 8.00 | 8.00 | 7.40 | 72 | 31.00 | 34.79 | 35.50 | 0.200 | 0.0° | 4 | | | | | | | | | | 148.00 |
| 445 | 10.00 | 10.00 | 9.20 | 84 | 37.00 | 42.20 | 43.00 | 0.200 | 0.0° | 4 | | | | | | | | | | 201.00 |
| 496 | 12.00 | 12.00 | 11.00 | 97 | 44.00 | 50.13 | 51.00 | 0.200 | 0.0° | 4 | | | | | | | | | | 249.00 |
| 605 | 16.00 | 16.00 | 15.00 | 108 | 53.00 | 58.13 | 59.00 | 0.200 | 0.0° | 4 | | | | | | | | | | 389.00 |
| 180 | 3.00 | 6.00 | 2.80 | 63 | 11.00 | 18.00 | 24.37 | 0.500 | 4.5° | 4 | | | | | | | | | | 118.00 |
| 220 | 4.00 | 6.00 | 3.70 | 63 | 13.00 | 22.00 | 26.82 | 0.500 | 3.5° | 4 | | | | | | | | | | 118.00 |
| 260 | 5.00 | 6.00 | 4.60 | 63 | 16.00 | 24.00 | 27.27 | 0.500 | 1.5° | 4 | | | | | | | | | | 118.00 |
| 300 | 6.00 | 6.00 | 5.50 | 63 | 21.00 | 25.34 | 26.00 | 0.500 | 0.0° | 4 | | | | | | | | | | 118.00 |
| 388 | 8.00 | 8.00 | 7.40 | 72 | 31.00 | 34.79 | 35.50 | 0.500 | 0.0° | 4 | | | | | | | | | | 148.00 |
| 448 | 10.00 | 10.00 | 9.20 | 84 | 37.00 | 42.20 | 43.00 | 0.500 | 0.0° | 4 | | | | | | | | | | 201.00 |
| 498 | 12.00 | 12.00 | 11.00 | 97 | 44.00 | 50.13 | 51.00 | 0.500 | 0.0° | 4 | | | | | | | | | | 249.00 |
| 606 | 16.00 | 16.00 | 15.00 | 108 | 53.00 | 58.13 | 59.00 | 0.500 | 0.0° | 4 | | | | | | | | | | 389.00 |

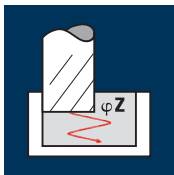
Applicazione



Materiale

Acciaio da utensile temprato 52 - 56 HRC

H



Acciaio da utensile temprato > 60 HRC

H

Acciaio rapido temprato 64 - 70 HRC

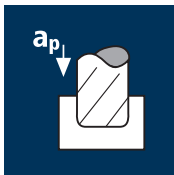
H

| d1 [mm] | z | v_c [m/min] | f_z [mm] | a_p [mm] | a_e [mm] | n [min ⁻¹] | v_f [mm/min] | Q [cm ³ /min] | phi_Z [°] |
|---------|---|-------------|----------|----------|----------|------------------------|--------------|--------------------------|-----------|
| 6.00 | 4 | 60 | 0.021 | 7.500 | 3.600 | 3185 | 265 | 7.2 | 5° |
| 8.00 | 4 | 60 | 0.028 | 10.000 | 4.800 | 2385 | 265 | 12.8 | 5° |
| 10.00 | 4 | 60 | 0.035 | 12.500 | 6.000 | 1910 | 265 | 20.1 | 5° |
| 12.00 | 4 | 60 | 0.042 | 15.000 | 7.200 | 1590 | 265 | 28.9 | 5° |
| 16.00 | 4 | 60 | 0.050 | 20.000 | 9.600 | 1195 | 240 | 45.8 | 5° |

| d1 [mm] | z | v_c [m/min] | f_z [mm] | a_p [mm] | a_e [mm] | n [min ⁻¹] | v_f [mm/min] | Q [cm ³ /min] | phi_Z [°] |
|---------|---|-------------|----------|----------|----------|------------------------|--------------|--------------------------|-----------|
| 6.00 | 4 | 25 | 0.009 | 6.000 | 3.600 | 1325 | 50 | 1.0 | 5° |
| 8.00 | 4 | 25 | 0.011 | 8.000 | 4.800 | 995 | 45 | 1.7 | 5° |
| 10.00 | 4 | 25 | 0.015 | 10.000 | 6.000 | 795 | 50 | 2.9 | 5° |
| 12.00 | 4 | 25 | 0.018 | 12.000 | 7.200 | 665 | 50 | 4.1 | 5° |
| 16.00 | 4 | 25 | 0.023 | 16.000 | 9.600 | 495 | 45 | 7.0 | 5° |

| d1 [mm] | z | v_c [m/min] | f_z [mm] | a_p [mm] | a_e [mm] | n [min ⁻¹] | v_f [mm/min] | Q [cm ³ /min] | phi_Z [°] |
|---------|---|-------------|----------|----------|----------|------------------------|--------------|--------------------------|-----------|
| 6.00 | 4 | 15 | 0.006 | 4.500 | 3.600 | 795 | 20 | 0.3 | 5° |
| 8.00 | 4 | 15 | 0.008 | 6.000 | 4.800 | 595 | 20 | 0.6 | 5° |
| 10.00 | 4 | 15 | 0.010 | 7.500 | 6.000 | 475 | 20 | 0.9 | 5° |
| 12.00 | 4 | 15 | 0.012 | 9.000 | 7.200 | 400 | 20 | 1.2 | 5° |
| 16.00 | 4 | 15 | 0.016 | 12.000 | 9.600 | 300 | 20 | 2.2 | 5° |

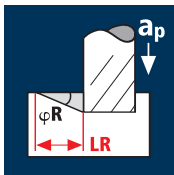
Applicazione



Materiale

Acciaio da utensile temprato 52 - 56 HRC

H



Acciaio da utensile temprato > 60 HRC

H

Acciaio rapido temprato 64 - 70 HRC

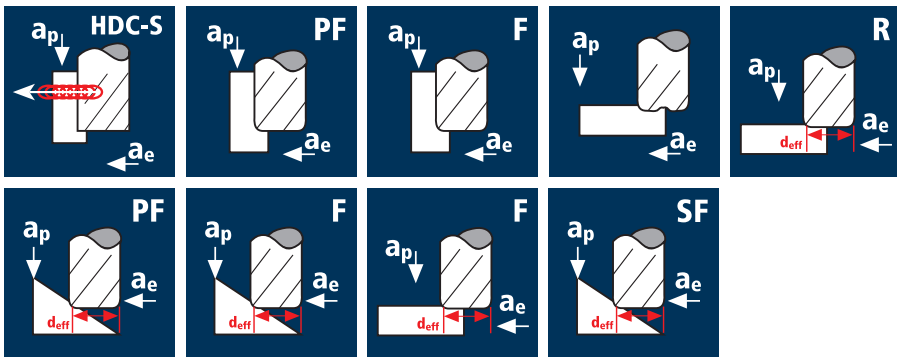
H

| d1 [mm] | z | v_c [m/min] | f_z [mm] | a_p [mm] | a_e [mm] | n [min ⁻¹] | v_f [mm/min] | Q [cm ³ /min] | phi_R [°] | LR [mm] |
|---------|---|-------------|----------|----------|----------|------------------------|--------------|--------------------------|-----------|---------|
| 6.00 | 4 | 50 | 0.021 | 6.000 | 6.000 | 2655 | 225 | 8.0 | 5° | 68.6 |
| 8.00 | 4 | 50 | 0.028 | 8.000 | 8.000 | 1990 | 225 | 14.3 | 5° | 91.4 |
| 10.00 | 4 | 50 | 0.035 | 10.000 | 10.000 | 1590 | 225 | 22.3 | 5° | 114.3 |
| 12.00 | 4 | 50 | 0.042 | 12.000 | 12.000 | 1325 | 225 | 32.1 | 5° | 137.2 |
| 16.00 | 4 | 50 | 0.064 | 8.000 | 16.000 | 995 | 255 | 32.6 | 5° | 91.4 |

| d1 [mm] | z | v_c [m/min] | f_z [mm] | a_p [mm] | a_e [mm] | n [min ⁻¹] | v_f [mm/min] | Q [cm ³ /min] | phi_R [°] | LR [mm] |
|---------|---|-------------|----------|----------|----------|------------------------|--------------|--------------------------|-----------|---------|
| 6.00 | 4 | 20 | 0.009 | 6.000 | 6.000 | 1060 | 40 | 1.4 | 5° | 68.6 |
| 8.00 | 4 | 20 | 0.011 | 8.000 | 8.000 | 795 | 35 | 2.2 | 5° | 91.4 |
| 10.00 | 4 | 20 | 0.015 | 10.000 | 10.000 | 635 | 40 | 3.8 | 5° | 114.3 |
| 12.00 | 4 | 20 | 0.020 | 12.000 | 12.000 | 530 | 40 | 6.1 | 5° | 137.2 |
| 16.00 | 4 | 20 | 0.032 | 8.000 | 16.000 | 400 | 50 | 6.5 | 5° | 91.4 |

| d1 [mm] | z | v_c [m/min] | f_z [mm] | a_p [mm] | a_e [mm] | n [min ⁻¹] | v_f [mm/min] | Q [cm ³ /min] | phi_R [°] | LR [mm] |
|---------|---|-------------|----------|----------|----------|------------------------|--------------|--------------------------|-----------|---------|
| 6.00 | 4 | 10 | 0.006 | 3.000 | 6.000 | 530 | 15 | 0.2 | 5° | 34.3 |
| 8.00 | 4 | 10 | 0.008 | 4.000 | 8.000 | 400 | 15 | 0.4 | 5° | 45.7 |
| 10.00 | 4 | 10 | 0.010 | 5.000 | 10.000 | 320 | 15 | 0.6 | 5° | 57.2 |
| 12.00 | 4 | 10 | 0.012 | 6.000 | 12.000 | 265 | 15 | 0.9 | 5° | 68.6 |
| 16.00 | 4 | 10 | 0.016 | 8.000 | 16.000 | 200 | 15 | 1.6 | 5° | 91.4 |

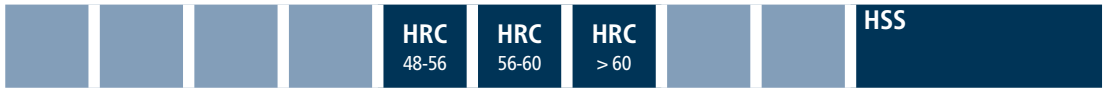
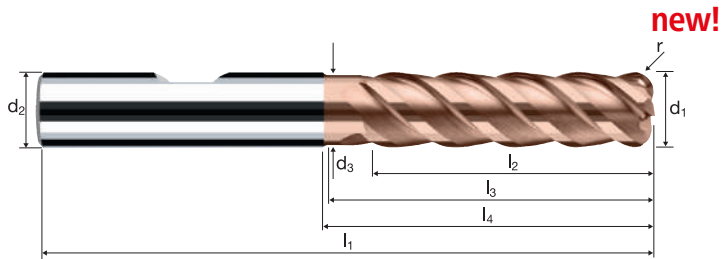
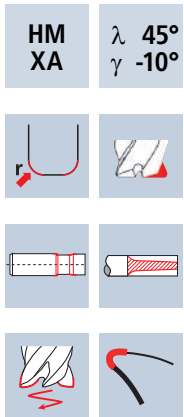
Dati di applicazione precisi per ulteriori applicazioni e materiali si trovano nel calcolatore dei parametri di taglio ToolExpert 2.0



Frese toriche HX

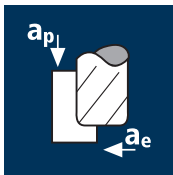


A taglienti lisci, esecuzione medio-lunga con scarico corto
Geometria frontale per fresature in penetrazione ad alto rendimento



| Esempio: N° Ordine | Rivestimento | | Articolo | | Codice-ø | | | | | | DURO-Si |
|-----------------------|---------------------------|----------------------|----------------|----------------|----------------|----------------|----------------|---------------|------|---|---------|
| | H | 8617 | 302 | | | | | | | | |
| Ø Code | d ₁ 0/-0.01 | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r 0/+0.015 | α | z | EUR |
| 302 | 6.00 | 6.00 | 5.50 | 63 | 21.00 | 25.34 | 26.00 | 1.000 | 0.0° | 4 | 118.00 |
| 391 | 8.00 | 8.00 | 7.40 | 72 | 31.00 | 34.79 | 35.50 | 1.000 | 0.0° | 4 | 148.00 |
| 450 | 10.00 | 10.00 | 9.20 | 84 | 37.00 | 42.20 | 43.00 | 1.000 | 0.0° | 4 | 201.00 |
| 501 | 12.00 | 12.00 | 11.00 | 97 | 44.00 | 50.13 | 51.00 | 1.000 | 0.0° | 4 | 249.00 |
| 608 | 16.00 | 16.00 | 15.00 | 108 | 53.00 | 58.13 | 59.00 | 1.000 | 0.0° | 4 | 389.00 |
| 304 | 6.00 | 6.00 | 5.50 | 63 | 21.00 | 25.34 | 26.00 | 1.500 | 0.0° | 4 | 118.00 |
| 395 | 8.00 | 8.00 | 7.40 | 72 | 31.00 | 34.79 | 35.50 | 2.000 | 0.0° | 4 | 148.00 |
| 457 | 10.00 | 10.00 | 9.20 | 84 | 37.00 | 42.20 | 43.00 | 2.500 | 0.0° | 4 | 201.00 |
| 507 | 12.00 | 12.00 | 11.00 | 97 | 44.00 | 50.13 | 51.00 | 3.000 | 0.0° | 4 | 249.00 |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
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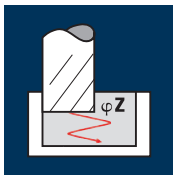
Applicazione



Materiale

Acciaio
850 - 1100 N/mm²

| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 4.00 | 4 | 135 | 0.026 | 8.000 | 1.200 | 10745 | 1115 | 10.7 | 12° |
| 5.00 | 4 | 135 | 0.030 | 10.000 | 1.500 | 8595 | 1030 | 15.5 | 12° |
| 6.00 | 4 | 135 | 0.034 | 12.000 | 1.800 | 7160 | 975 | 21.0 | 12° |
| 8.00 | 4 | 135 | 0.043 | 16.000 | 2.400 | 5370 | 925 | 35.5 | 12° |
| 10.00 | 4 | 135 | 0.055 | 20.000 | 3.000 | 4295 | 945 | 56.7 | 12° |
| 12.00 | 4 | 135 | 0.064 | 24.000 | 3.600 | 3580 | 915 | 79.2 | 12° |
| 16.00 | 4 | 135 | 0.072 | 25.600 | 4.800 | 2685 | 775 | 95.0 | 12° |



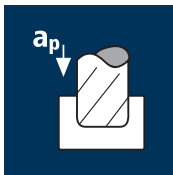
Acciaio
1100 - 1300 N/mm²

| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 4.00 | 4 | 105 | 0.021 | 8.000 | 1.200 | 8355 | 700 | 6.7 | 12° |
| 5.00 | 4 | 105 | 0.026 | 10.000 | 1.500 | 6685 | 695 | 10.4 | 12° |
| 6.00 | 4 | 105 | 0.030 | 12.000 | 1.800 | 5570 | 670 | 14.4 | 12° |
| 8.00 | 4 | 105 | 0.038 | 16.000 | 2.400 | 4180 | 635 | 24.4 | 12° |
| 10.00 | 4 | 105 | 0.047 | 20.000 | 3.000 | 3340 | 630 | 37.7 | 12° |
| 12.00 | 4 | 105 | 0.055 | 24.000 | 3.600 | 2785 | 615 | 52.9 | 12° |
| 16.00 | 4 | 105 | 0.064 | 25.600 | 4.800 | 2090 | 535 | 65.7 | 12° |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 4.00 | 4 | 80 | 0.017 | 8.000 | 1.200 | 6365 | 435 | 4.2 | 8° |
| 5.00 | 4 | 80 | 0.021 | 10.000 | 1.500 | 5095 | 430 | 6.4 | 8° |
| 6.00 | 4 | 80 | 0.026 | 12.000 | 1.800 | 4245 | 440 | 9.5 | 8° |
| 8.00 | 4 | 80 | 0.030 | 16.000 | 2.400 | 3185 | 380 | 14.7 | 8° |
| 10.00 | 4 | 80 | 0.038 | 20.000 | 3.000 | 2545 | 385 | 23.2 | 8° |
| 12.00 | 4 | 80 | 0.047 | 24.000 | 3.600 | 2120 | 400 | 34.5 | 8° |
| 16.00 | 4 | 80 | 0.055 | 25.600 | 4.800 | 1590 | 350 | 43.0 | 8° |

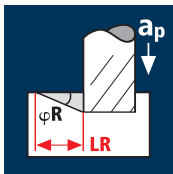
Applicazione



Materiale

Acciaio
850 - 1100 N/mm²

| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] | LR [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|---------|
| 4.00 | 4 | 110 | 0.017 | 6.000 | 4.000 | 8755 | 595 | 14.3 | 12° | 28.2 |
| 5.00 | 4 | 110 | 0.020 | 7.500 | 5.000 | 7005 | 560 | 21.0 | 12° | 35.3 |
| 6.00 | 4 | 110 | 0.022 | 9.000 | 6.000 | 5835 | 515 | 27.7 | 12° | 42.3 |
| 8.00 | 4 | 110 | 0.028 | 12.000 | 8.000 | 4375 | 490 | 47.1 | 12° | 56.5 |
| 10.00 | 4 | 110 | 0.036 | 15.000 | 10.000 | 3500 | 505 | 75.6 | 12° | 70.6 |
| 12.00 | 4 | 110 | 0.042 | 18.000 | 12.000 | 2920 | 490 | 105.9 | 12° | 84.7 |
| 16.00 | 4 | 110 | 0.047 | 24.000 | 16.000 | 2190 | 410 | 158.0 | 12° | 112.9 |



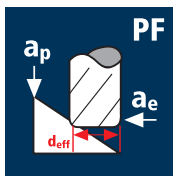
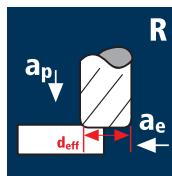
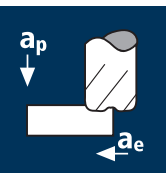
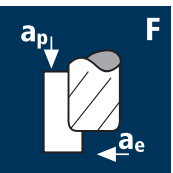
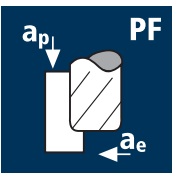
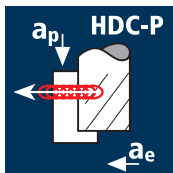
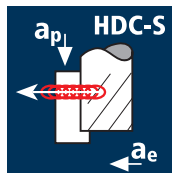
Acciaio
1100 - 1300 N/mm²

| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] | LR [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|---------|
| 4.00 | 4 | 85 | 0.014 | 6.000 | 4.000 | 6765 | 380 | 9.1 | 12° | 28.2 |
| 5.00 | 4 | 85 | 0.017 | 7.500 | 5.000 | 5410 | 370 | 13.8 | 12° | 35.3 |
| 6.00 | 4 | 85 | 0.020 | 9.000 | 6.000 | 4510 | 360 | 19.5 | 12° | 42.3 |
| 8.00 | 4 | 85 | 0.025 | 12.000 | 8.000 | 3380 | 340 | 32.5 | 12° | 56.5 |
| 10.00 | 4 | 85 | 0.031 | 15.000 | 10.000 | 2705 | 335 | 50.3 | 12° | 70.6 |
| 12.00 | 4 | 85 | 0.036 | 18.000 | 12.000 | 2255 | 325 | 70.1 | 12° | 84.7 |
| 16.00 | 4 | 85 | 0.042 | 24.000 | 16.000 | 1690 | 285 | 109.1 | 12° | 112.9 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] | LR [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|---------|
| 4.00 | 4 | 65 | 0.011 | 6.000 | 4.000 | 5175 | 230 | 5.5 | 12° | 28.2 |
| 5.00 | 4 | 65 | 0.014 | 7.500 | 5.000 | 4140 | 230 | 8.7 | 12° | 35.3 |
| 6.00 | 4 | 65 | 0.017 | 9.000 | 6.000 | 3450 | 235 | 12.7 | 12° | 42.3 |
| 8.00 | 4 | 65 | 0.020 | 12.000 | 8.000 | 2585 | 205 | 19.9 | 12° | 56.5 |
| 10.00 | 4 | 65 | 0.025 | 15.000 | 10.000 | 2070 | 205 | 31.0 | 12° | 70.6 |
| 12.00 | 4 | 65 | 0.031 | 18.000 | 12.000 | 1725 | 215 | 46.2 | 12° | 84.7 |
| 16.00 | 4 | 65 | 0.036 | 24.000 | 16.000 | 1295 | 185 | 71.5 | 12° | 112.9 |

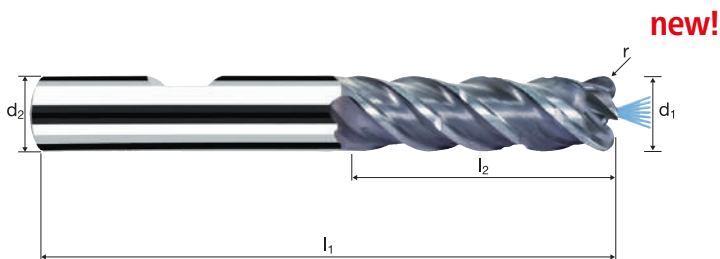
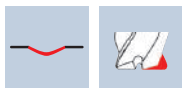
Cliccare qui per accedere al ToolExpert MFC. Veloce, semplice, affidabile



Frese toriche MFC

A taglienti lisci con rompitruciolo, esecuzione medio-lunga
Geometria frontale per fresature in penetrazione ad alto rendimento
con canale di raffreddamento/aria centrale

HM λ 45°
MG10 γ 10°



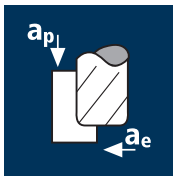
Sgrossatura HPC Sgrossatura HDC Finitura

ReTool®

| | | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--------------|--|--|-------------------|----------------|---------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | | | Inox Stainless | Ti Titanium | GG(G) Tool Steel |
|-------------|----------------|-----------------|-----------------|--------------|--|--|-------------------|----------------|---------------------|

| | | | | | | | | | | POLYCHROM |
|----------------------------|----------------------|----------------------|----------------|----------------|----------------|--------------|------|---|--|-----------|
| Esempio: N° Ordine | | | | | | | | | | |
| Rivestimento | | | | | | | | | | |
| Articolo | | | | | | | | | | |
| Codice-ø | | | | | | | | | | |
| Ø Code | d ₁ e8 | d ₂ h5 | l ₁ | l ₂ | l ₄ | r 0/+0.03 | α | z | | EUR |
| 218* | 4.00 | 6.00 | 63 | 13.00 | 19.59 | 0.200 | 3.5° | 4 | | 93.00 |
| 258* | 5.00 | 6.00 | 63 | 16.00 | 20.72 | 0.200 | 1.5° | 4 | | 93.00 |
| 297 | 6.00 | 6.00 | 63 | 21.00 | - | 0.200 | 0.0° | 4 | | 98.00 |
| 385 | 8.00 | 8.00 | 72 | 31.00 | - | 0.200 | 0.0° | 4 | | 123.00 |
| 445 | 10.00 | 10.00 | 84 | 37.00 | - | 0.200 | 0.0° | 4 | | 167.00 |
| 496 | 12.00 | 12.00 | 97 | 44.00 | - | 0.200 | 0.0° | 4 | | 206.00 |
| 605 | 16.00 | 16.00 | 108 | 53.00 | - | 0.200 | 0.0° | 4 | | 323.00 |
| 220* | 4.00 | 6.00 | 63 | 13.00 | 19.59 | 0.500 | 3.5° | 4 | | 93.00 |
| 260* | 5.00 | 6.00 | 63 | 16.00 | 20.72 | 0.500 | 1.5° | 4 | | 93.00 |
| 300 | 6.00 | 6.00 | 63 | 21.00 | - | 0.500 | 0.0° | 4 | | 98.00 |
| 388 | 8.00 | 8.00 | 72 | 31.00 | - | 0.500 | 0.0° | 4 | | 123.00 |
| 448 | 10.00 | 10.00 | 84 | 37.00 | - | 0.500 | 0.0° | 4 | | 167.00 |
| 498 | 12.00 | 12.00 | 97 | 44.00 | - | 0.500 | 0.0° | 4 | | 206.00 |
| 606 | 16.00 | 16.00 | 108 | 53.00 | - | 0.500 | 0.0° | 4 | | 323.00 |
| 302 | 6.00 | 6.00 | 63 | 21.00 | - | 1.000 | 0.0° | 4 | | 98.00 |
| 391 | 8.00 | 8.00 | 72 | 31.00 | - | 1.000 | 0.0° | 4 | | 123.00 |
| 450 | 10.00 | 10.00 | 84 | 37.00 | - | 1.000 | 0.0° | 4 | | 167.00 |
| 501 | 12.00 | 12.00 | 97 | 44.00 | - | 1.000 | 0.0° | 4 | | 206.00 |
| 608 | 16.00 | 16.00 | 108 | 53.00 | - | 1.000 | 0.0° | 4 | | 323.00 |
| * solo senza rompitruciolo | | | | | | | | | | |

Applicazione

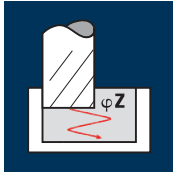


Materiale

Acciaio
850 - 1100 N/mm²



| d1 [mm] | z | v _c [m/min] | f _z [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 8.00 | 4 | 135 | 0.043 | 16.000 | 2.400 | 5370 | 925 | 35.5 | 12° |
| 10.00 | 4 | 135 | 0.055 | 20.000 | 3.000 | 4295 | 945 | 56.7 | 12° |
| 12.00 | 4 | 135 | 0.064 | 24.000 | 3.600 | 3580 | 915 | 79.2 | 12° |
| 16.00 | 4 | 135 | 0.072 | 25.600 | 4.800 | 2685 | 775 | 95.0 | 12° |



Acciaio
1100 - 1300 N/mm²



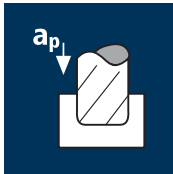
| | | | | | | | | | |
|-------|---|-----|-------|--------|-------|------|-----|------|-----|
| 8.00 | 4 | 105 | 0.038 | 16.000 | 2.400 | 4180 | 635 | 24.4 | 12° |
| 10.00 | 4 | 105 | 0.047 | 20.000 | 3.000 | 3340 | 630 | 37.7 | 12° |
| 12.00 | 4 | 105 | 0.055 | 24.000 | 3.600 | 2785 | 615 | 52.9 | 12° |
| 16.00 | 4 | 105 | 0.064 | 25.600 | 4.800 | 2090 | 535 | 65.7 | 12° |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| | | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|----|
| 8.00 | 4 | 80 | 0.030 | 16.000 | 2.400 | 3185 | 380 | 14.7 | 8° |
| 10.00 | 4 | 80 | 0.038 | 20.000 | 3.000 | 2545 | 385 | 23.2 | 8° |
| 12.00 | 4 | 80 | 0.047 | 24.000 | 3.600 | 2120 | 400 | 34.5 | 8° |
| 16.00 | 4 | 80 | 0.055 | 25.600 | 4.800 | 1590 | 350 | 43.0 | 8° |

Applicazione

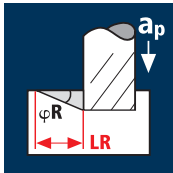


Materiale

Acciaio
850 - 1100 N/mm²



| d1 [mm] | z | v _c [m/min] | f _z [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] | LR [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|---------|
| 8.00 | 4 | 110 | 0.028 | 12.000 | 8.000 | 4375 | 490 | 47.1 | 12° | 56.5 |
| 10.00 | 4 | 110 | 0.036 | 15.000 | 10.000 | 3500 | 505 | 75.6 | 12° | 70.6 |
| 12.00 | 4 | 110 | 0.042 | 18.000 | 12.000 | 2920 | 490 | 105.9 | 12° | 84.7 |
| 16.00 | 4 | 110 | 0.047 | 24.000 | 16.000 | 2190 | 410 | 158.0 | 12° | 112.9 |



Acciaio
1100 - 1300 N/mm²



| | | | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|-------|-----|-------|
| 8.00 | 4 | 85 | 0.025 | 12.000 | 8.000 | 3380 | 340 | 32.5 | 12° | 56.5 |
| 10.00 | 4 | 85 | 0.031 | 15.000 | 10.000 | 2705 | 335 | 50.3 | 12° | 70.6 |
| 12.00 | 4 | 85 | 0.036 | 18.000 | 12.000 | 2255 | 325 | 70.1 | 12° | 84.7 |
| 16.00 | 4 | 85 | 0.042 | 24.000 | 16.000 | 1690 | 285 | 109.1 | 12° | 112.9 |

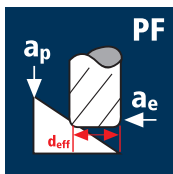
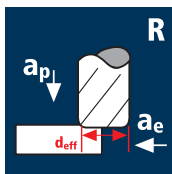
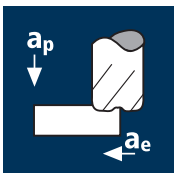
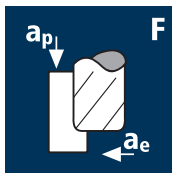
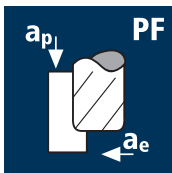
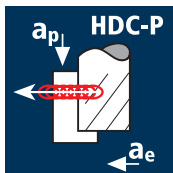
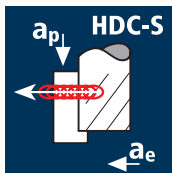
Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



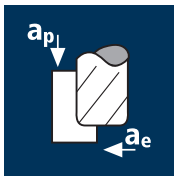
| | | | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|-----|-------|
| 8.00 | 4 | 65 | 0.020 | 12.000 | 8.000 | 2585 | 205 | 19.9 | 12° | 56.5 |
| 10.00 | 4 | 65 | 0.025 | 15.000 | 10.000 | 2070 | 205 | 31.0 | 12° | 70.6 |
| 12.00 | 4 | 65 | 0.031 | 18.000 | 12.000 | 1725 | 215 | 46.2 | 12° | 84.7 |
| 16.00 | 4 | 65 | 0.036 | 24.000 | 16.000 | 1295 | 185 | 71.5 | 12° | 112.9 |



Cliccare qui per accedere al
ToolExpert MFC.
Veloce, semplice,
affidabile



Applicazione



Materiale

Acciaio
1100 - 1300 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 6.00 | 4 | 120 | 0.050 | 6.000 | 2.400 | 6365 | 1275 | 18.3 |
| 8.00 | 4 | 120 | 0.065 | 8.000 | 3.200 | 4775 | 1240 | 31.8 |
| 10.00 | 4 | 120 | 0.085 | 10.000 | 4.000 | 3820 | 1300 | 51.9 |
| 12.00 | 4 | 120 | 0.100 | 12.000 | 4.800 | 3185 | 1275 | 73.3 |
| 16.00 | 4 | 120 | 0.135 | 16.000 | 3.200 | 2385 | 1290 | 66.0 |

Acciaio da
utensile temprato
42 - 48 HRC



| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 6.00 | 4 | 80 | 0.035 | 6.000 | 2.400 | 4245 | 595 | 8.6 |
| 8.00 | 4 | 80 | 0.045 | 8.000 | 3.200 | 3185 | 575 | 14.7 |
| 10.00 | 4 | 80 | 0.055 | 10.000 | 4.000 | 2545 | 560 | 22.4 |
| 12.00 | 4 | 80 | 0.065 | 12.000 | 4.800 | 2120 | 550 | 31.8 |
| 16.00 | 4 | 80 | 0.090 | 16.000 | 3.200 | 1590 | 575 | 29.3 |

Acciaio da
utensile temprato
48 - 52 HRC

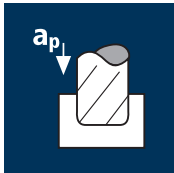


| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 6.00 | 4 | 60 | 0.025 | 6.000 | 2.400 | 3185 | 320 | 4.6 |
| 8.00 | 4 | 60 | 0.035 | 8.000 | 3.200 | 2385 | 335 | 8.6 |
| 10.00 | 4 | 60 | 0.045 | 10.000 | 4.000 | 1910 | 345 | 13.8 |
| 12.00 | 4 | 60 | 0.055 | 12.000 | 4.800 | 1590 | 350 | 20.2 |
| 16.00 | 4 | 60 | 0.075 | 16.000 | 3.200 | 1195 | 360 | 18.3 |

Acciaio da
utensile temprato
52 - 56 HRC



| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|-----|
| 6.00 | 4 | 30 | 0.020 | 6.000 | 2.400 | 1590 | 125 | 1.8 |
| 8.00 | 4 | 30 | 0.025 | 8.000 | 3.200 | 1195 | 120 | 3.1 |
| 10.00 | 4 | 30 | 0.035 | 10.000 | 4.000 | 955 | 135 | 5.3 |
| 12.00 | 4 | 30 | 0.040 | 12.000 | 4.800 | 795 | 125 | 7.3 |
| 16.00 | 4 | 30 | 0.055 | 16.000 | 3.200 | 595 | 130 | 6.7 |



Acciaio
1100 - 1300 N/mm²



| | | | | | | | | |
|-------|---|-----|-------|-------|--------|------|-----|------|
| 6.00 | 4 | 100 | 0.040 | 3.000 | 6.000 | 5305 | 850 | 15.3 |
| 8.00 | 4 | 100 | 0.050 | 4.000 | 8.000 | 3980 | 795 | 25.5 |
| 10.00 | 4 | 100 | 0.070 | 5.000 | 10.000 | 3185 | 890 | 44.6 |
| 12.00 | 4 | 100 | 0.080 | 6.000 | 12.000 | 2655 | 850 | 61.1 |
| 16.00 | 4 | 100 | 0.110 | 4.000 | 16.000 | 1990 | 875 | 56.0 |

Acciaio da
utensile temprato
42 - 48 HRC



| | | | | | | | | |
|-------|---|----|-------|-------|--------|------|-----|------|
| 6.00 | 4 | 60 | 0.030 | 3.000 | 6.000 | 3185 | 380 | 6.9 |
| 8.00 | 4 | 60 | 0.035 | 4.000 | 8.000 | 2385 | 335 | 10.7 |
| 10.00 | 4 | 60 | 0.045 | 5.000 | 10.000 | 1910 | 345 | 17.2 |
| 12.00 | 4 | 60 | 0.050 | 6.000 | 12.000 | 1590 | 320 | 22.9 |
| 16.00 | 4 | 60 | 0.070 | 4.000 | 16.000 | 1195 | 335 | 21.4 |

Acciaio da
utensile temprato
48 - 52 HRC



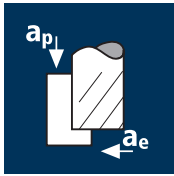
| | | | | | | | | |
|-------|---|----|-------|-------|--------|------|-----|------|
| 6.00 | 4 | 40 | 0.020 | 3.000 | 6.000 | 2120 | 170 | 3.1 |
| 8.00 | 4 | 40 | 0.030 | 4.000 | 8.000 | 1590 | 190 | 6.1 |
| 10.00 | 4 | 40 | 0.035 | 5.000 | 10.000 | 1275 | 180 | 8.9 |
| 12.00 | 4 | 40 | 0.045 | 6.000 | 12.000 | 1060 | 190 | 13.8 |
| 16.00 | 4 | 40 | 0.060 | 4.000 | 16.000 | 795 | 190 | 12.2 |

Acciaio da
utensile temprato
52 - 56 HRC



| | | | | | | | | |
|-------|---|----|-------|-------|--------|------|----|-----|
| 6.00 | 4 | 20 | 0.015 | 3.000 | 6.000 | 1060 | 65 | 1.1 |
| 8.00 | 4 | 20 | 0.020 | 4.000 | 8.000 | 795 | 65 | 2.0 |
| 10.00 | 4 | 20 | 0.030 | 5.000 | 10.000 | 635 | 75 | 3.8 |
| 12.00 | 4 | 20 | 0.030 | 6.000 | 12.000 | 530 | 65 | 4.6 |
| 16.00 | 4 | 20 | 0.045 | 4.000 | 16.000 | 400 | 70 | 4.6 |

Applicazione



Materiale

Acciaio
< 850 N/mm²



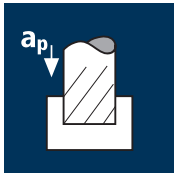
Acciaio
850 - 1100 N/mm²



Acciaio
1100 - 1300 N/mm²



Acciaio per lavorazione
a freddo (12% Cr)
fortemente legati
[1.2379]



Acciaio
< 850 N/mm²



Acciaio
850 - 1100 N/mm²



Acciaio
1100 - 1300 N/mm²



Acciaio per lavorazione
a freddo (12% Cr)
fortemente legati
[1.2379]



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 6.00 | 4 | 180 | 0.025 | 9.000 | 3.600 | 9550 | 955 | 30.9 |
| 8.00 | 4 | 180 | 0.030 | 12.000 | 4.800 | 7160 | 860 | 49.5 |
| 10.00 | 4 | 180 | 0.050 | 15.000 | 6.000 | 5730 | 1145 | 103.1 |
| 12.00 | 4 | 180 | 0.055 | 18.000 | 7.200 | 4775 | 1050 | 136.1 |
| 16.00 | 4 | 180 | 0.055 | 24.000 | 9.600 | 3580 | 790 | 181.5 |
| 20.00 | 4 | 180 | 0.060 | 30.000 | 12.000 | 2865 | 690 | 247.5 |

| | | | | | | | | |
|-------|---|-----|-------|--------|--------|------|-----|-------|
| 6.00 | 4 | 150 | 0.025 | 9.000 | 3.600 | 7960 | 795 | 25.8 |
| 8.00 | 4 | 150 | 0.030 | 12.000 | 4.800 | 5970 | 715 | 41.3 |
| 10.00 | 4 | 150 | 0.050 | 15.000 | 6.000 | 4775 | 955 | 85.9 |
| 12.00 | 4 | 150 | 0.055 | 18.000 | 7.200 | 3980 | 875 | 113.4 |
| 16.00 | 4 | 150 | 0.055 | 24.000 | 9.600 | 2985 | 655 | 151.3 |
| 20.00 | 4 | 150 | 0.060 | 30.000 | 12.000 | 2385 | 575 | 206.3 |

| | | | | | | | | |
|-------|---|-----|-------|--------|--------|------|-----|-------|
| 6.00 | 4 | 120 | 0.025 | 9.000 | 3.600 | 6365 | 635 | 20.6 |
| 8.00 | 4 | 120 | 0.030 | 12.000 | 4.800 | 4775 | 575 | 33.0 |
| 10.00 | 4 | 120 | 0.050 | 15.000 | 6.000 | 3820 | 765 | 68.8 |
| 12.00 | 4 | 120 | 0.055 | 18.000 | 7.200 | 3185 | 700 | 90.8 |
| 16.00 | 4 | 120 | 0.055 | 24.000 | 9.600 | 2385 | 525 | 121.0 |
| 20.00 | 4 | 120 | 0.060 | 30.000 | 12.000 | 1910 | 460 | 165.0 |

| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|-------|
| 6.00 | 4 | 80 | 0.025 | 9.000 | 3.600 | 4245 | 425 | 13.8 |
| 8.00 | 4 | 80 | 0.030 | 12.000 | 4.800 | 3185 | 380 | 22.0 |
| 10.00 | 4 | 80 | 0.050 | 15.000 | 6.000 | 2545 | 510 | 45.8 |
| 12.00 | 4 | 80 | 0.055 | 18.000 | 7.200 | 2120 | 465 | 60.5 |
| 16.00 | 4 | 80 | 0.055 | 24.000 | 9.600 | 1590 | 350 | 80.7 |
| 20.00 | 4 | 80 | 0.060 | 30.000 | 12.000 | 1275 | 305 | 110.0 |

| | | | | | | | | |
|-------|---|-----|-------|--------|--------|------|-----|-------|
| 6.00 | 4 | 150 | 0.025 | 9.000 | 6.000 | 7960 | 795 | 43.0 |
| 8.00 | 4 | 150 | 0.030 | 12.000 | 8.000 | 5970 | 715 | 68.8 |
| 10.00 | 4 | 150 | 0.050 | 15.000 | 10.000 | 4775 | 955 | 143.2 |
| 12.00 | 4 | 150 | 0.055 | 18.000 | 12.000 | 3980 | 875 | 189.1 |
| 16.00 | 4 | 150 | 0.055 | 24.000 | 16.000 | 2985 | 655 | 252.1 |
| 20.00 | 4 | 150 | 0.060 | 30.000 | 20.000 | 2385 | 575 | 343.8 |

| | | | | | | | | |
|-------|---|-----|-------|--------|--------|------|-----|-------|
| 6.00 | 4 | 100 | 0.020 | 9.000 | 6.000 | 5305 | 425 | 22.9 |
| 8.00 | 4 | 100 | 0.025 | 12.000 | 8.000 | 3980 | 400 | 38.2 |
| 10.00 | 4 | 100 | 0.030 | 15.000 | 10.000 | 3185 | 380 | 57.3 |
| 12.00 | 4 | 100 | 0.040 | 18.000 | 12.000 | 2655 | 425 | 91.7 |
| 16.00 | 4 | 100 | 0.050 | 24.000 | 16.000 | 1990 | 400 | 152.8 |
| 20.00 | 4 | 100 | 0.055 | 30.000 | 20.000 | 1590 | 350 | 210.1 |

| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|-------|
| 6.00 | 4 | 80 | 0.020 | 9.000 | 6.000 | 4245 | 340 | 18.3 |
| 8.00 | 4 | 80 | 0.025 | 12.000 | 8.000 | 3185 | 320 | 30.6 |
| 10.00 | 4 | 80 | 0.030 | 15.000 | 10.000 | 2545 | 305 | 45.8 |
| 12.00 | 4 | 80 | 0.040 | 18.000 | 12.000 | 2120 | 340 | 73.3 |
| 16.00 | 4 | 80 | 0.050 | 24.000 | 16.000 | 1590 | 320 | 122.2 |
| 20.00 | 4 | 80 | 0.055 | 30.000 | 20.000 | 1275 | 280 | 168.1 |

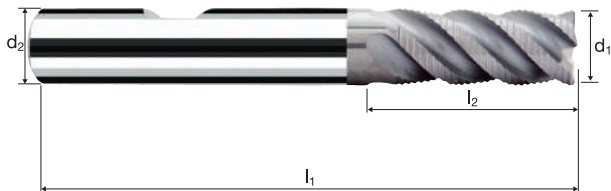
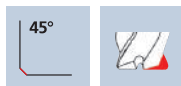
| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|-------|
| 6.00 | 4 | 60 | 0.020 | 9.000 | 6.000 | 3185 | 255 | 13.8 |
| 8.00 | 4 | 60 | 0.025 | 12.000 | 8.000 | 2385 | 240 | 22.9 |
| 10.00 | 4 | 60 | 0.030 | 15.000 | 10.000 | 1910 | 230 | 34.4 |
| 12.00 | 4 | 60 | 0.040 | 18.000 | 12.000 | 1590 | 255 | 55.0 |
| 16.00 | 4 | 60 | 0.050 | 24.000 | 16.000 | 1195 | 240 | 91.7 |
| 20.00 | 4 | 60 | 0.055 | 30.000 | 20.000 | 955 | 210 | 126.1 |

Frese cilindriche NX (NX-FP)

Profilata, esecuzione normale



| | |
|-----------|----------------------|
| HM | λ 45° |
| XT | γ 0° |

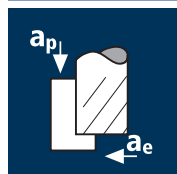


| | | | | | | | | | |
|--------------------|-----------------------|------------------------|------------------------|--|--|--|--------------------------|-----------------------|----------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | | | | Inox Stainless | Ti Titanium | GG(G) Tool Steel |
|--------------------|-----------------------|------------------------|------------------------|--|--|--|--------------------------|-----------------------|----------------------------|

| Ø Code | d ₁ e8 | d ₂ h6 | l ₁ | l ₂ | 45° | z | POLYCHROM |
|--------------------------------------|----------------------|----------------------|----------------|----------------|------|---|---------------|
| | | | | | | | |
| Esempio: N° Ordine P 5379 300 | | | | | | | P5379 |
| | | | | | | | P5279 |
| 300 | 6.00 | 6.00 | 57 | 13.00 | 0.35 | 4 | 110.00 |
| 391 | 8.00 | 8.00 | 63 | 19.00 | 0.45 | 4 | 135.00 |
| 450 | 10.00 | 10.00 | 72 | 22.00 | 0.60 | 4 | 153.00 |
| 501 | 12.00 | 12.00 | 83 | 26.00 | 0.60 | 4 | 197.00 |
| 608 | 16.00 | 16.00 | 92 | 32.00 | 0.70 | 4 | 344.00 |
| 610 | 16.00 | 16.00 | 92 | 32.00 | 0.70 | 6 | 344.00 |
| 680 | 20.00 | 20.00 | 104 | 38.00 | 0.70 | 4 | 497.00 |
| 682 | 20.00 | 20.00 | 104 | 38.00 | 0.70 | 6 | 497.00 |
| | | | | | | | |
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| | | | | | | | |

Applicazione

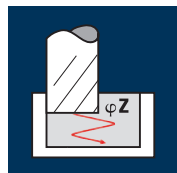
Materiale



Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 4.00 | 3 | 180 | 0.020 | 6.000 | 2.400 | 14325 | 860 | 12.4 | 20° |
| 5.00 | 4 | 180 | 0.025 | 7.500 | 3.000 | 11460 | 1145 | 25.8 | 20° |
| 6.00 | 4 | 180 | 0.030 | 9.000 | 3.600 | 9550 | 1145 | 37.1 | 20° |
| 8.00 | 4 | 180 | 0.040 | 12.000 | 4.800 | 7160 | 1145 | 66.0 | 20° |
| 10.00 | 4 | 180 | 0.050 | 15.000 | 6.000 | 5730 | 1145 | 103.1 | 20° |
| 12.00 | 4 | 180 | 0.055 | 18.000 | 7.200 | 4775 | 1050 | 136.1 | 20° |
| 16.00 | 4 | 180 | 0.055 | 24.000 | 9.600 | 3580 | 790 | 181.5 | 20° |
| 20.00 | 4 | 180 | 0.060 | 30.000 | 12.000 | 2865 | 690 | 247.5 | 20° |



Acciaio
850 - 1100 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 4.00 | 3 | 130 | 0.020 | 6.000 | 2.400 | 10345 | 620 | 8.9 | 18° |
| 5.00 | 4 | 130 | 0.025 | 7.500 | 3.000 | 8275 | 830 | 18.6 | 18° |
| 6.00 | 4 | 130 | 0.030 | 9.000 | 3.600 | 6895 | 830 | 26.8 | 18° |
| 8.00 | 4 | 130 | 0.040 | 12.000 | 4.800 | 5175 | 830 | 47.7 | 18° |
| 10.00 | 4 | 130 | 0.050 | 15.000 | 6.000 | 4140 | 830 | 74.5 | 18° |
| 12.00 | 4 | 130 | 0.055 | 18.000 | 7.200 | 3450 | 760 | 98.3 | 18° |
| 16.00 | 4 | 130 | 0.055 | 24.000 | 9.600 | 2585 | 570 | 131.1 | 18° |
| 20.00 | 4 | 130 | 0.060 | 30.000 | 12.000 | 2070 | 495 | 178.8 | 18° |

Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 4.00 | 3 | 45 | 0.015 | 6.000 | 2.400 | 3580 | 160 | 2.3 | 12° |
| 5.00 | 4 | 45 | 0.020 | 7.500 | 3.000 | 2865 | 230 | 5.2 | 12° |
| 6.00 | 4 | 45 | 0.025 | 9.000 | 3.600 | 2385 | 240 | 7.7 | 12° |
| 8.00 | 4 | 45 | 0.030 | 12.000 | 4.800 | 1790 | 215 | 12.4 | 12° |
| 10.00 | 4 | 45 | 0.040 | 15.000 | 6.000 | 1430 | 230 | 20.6 | 12° |
| 12.00 | 4 | 45 | 0.045 | 18.000 | 7.200 | 1195 | 215 | 27.8 | 12° |
| 16.00 | 4 | 45 | 0.045 | 24.000 | 9.600 | 895 | 160 | 37.1 | 12° |
| 20.00 | 4 | 45 | 0.050 | 30.000 | 12.000 | 715 | 145 | 51.6 | 12° |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 4.00 | 3 | 60 | 0.015 | 6.000 | 2.400 | 4775 | 215 | 3.1 | 12° |
| 5.00 | 4 | 60 | 0.020 | 7.500 | 3.000 | 3820 | 305 | 6.9 | 12° |
| 6.00 | 4 | 60 | 0.025 | 9.000 | 3.600 | 3185 | 320 | 10.3 | 12° |
| 8.00 | 4 | 60 | 0.030 | 12.000 | 4.800 | 2385 | 285 | 16.5 | 12° |
| 10.00 | 4 | 60 | 0.040 | 15.000 | 6.000 | 1910 | 305 | 27.5 | 12° |
| 12.00 | 4 | 60 | 0.045 | 18.000 | 7.200 | 1590 | 285 | 37.1 | 12° |
| 16.00 | 4 | 60 | 0.045 | 24.000 | 8.400 | 1195 | 215 | 43.3 | 12° |
| 20.00 | 4 | 60 | 0.050 | 30.000 | 12.000 | 955 | 190 | 68.8 | 12° |

Applicazione

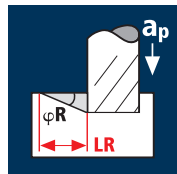
Materiale



Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] | LR [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|---------|
| 4.00 | 3 | 150 | 0.020 | 5.000 | 4.000 | 11935 | 715 | 14.3 | 20° | 13.7 |
| 5.00 | 4 | 150 | 0.025 | 6.300 | 5.000 | 9550 | 955 | 30.1 | 20° | 17.3 |
| 6.00 | 4 | 150 | 0.030 | 7.500 | 6.000 | 7960 | 955 | 43.0 | 20° | 20.6 |
| 8.00 | 4 | 150 | 0.040 | 10.000 | 8.000 | 5970 | 955 | 76.4 | 20° | 27.5 |
| 10.00 | 4 | 150 | 0.050 | 12.500 | 10.000 | 4775 | 955 | 119.4 | 20° | 34.3 |
| 12.00 | 4 | 150 | 0.055 | 15.000 | 12.000 | 3980 | 875 | 157.6 | 20° | 41.2 |
| 16.00 | 4 | 150 | 0.055 | 20.000 | 16.000 | 2985 | 655 | 210.1 | 20° | 54.9 |
| 20.00 | 4 | 150 | 0.060 | 25.000 | 20.000 | 2385 | 575 | 286.5 | 20° | 68.7 |



Acciaio
850 - 1100 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] | LR [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|---------|
| 4.00 | 3 | 80 | 0.020 | 5.000 | 4.000 | 6365 | 380 | 7.6 | 20° | 13.7 |
| 5.00 | 4 | 80 | 0.025 | 6.300 | 5.000 | 5095 | 510 | 16.0 | 20° | 17.3 |
| 6.00 | 4 | 80 | 0.030 | 7.500 | 6.000 | 4245 | 510 | 22.9 | 20° | 20.6 |
| 8.00 | 4 | 80 | 0.040 | 10.000 | 8.000 | 3185 | 510 | 40.7 | 20° | 27.5 |
| 10.00 | 4 | 80 | 0.050 | 12.500 | 10.000 | 2545 | 510 | 63.7 | 20° | 34.3 |
| 12.00 | 4 | 80 | 0.055 | 15.000 | 12.000 | 2120 | 465 | 84.0 | 20° | 41.2 |
| 16.00 | 4 | 80 | 0.055 | 20.000 | 16.000 | 1590 | 350 | 112.0 | 20° | 54.9 |
| 20.00 | 4 | 80 | 0.060 | 25.000 | 20.000 | 1275 | 305 | 152.8 | 20° | 68.7 |

Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] | LR [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|---------|
| 4.00 | 3 | 35 | 0.015 | 5.000 | 4.000 | 2785 | 125 | 2.5 | 14° | 20.1 |
| 5.00 | 4 | 35 | 0.020 | 6.300 | 5.000 | 2230 | 180 | 5.6 | 14° | 25.3 |
| 6.00 | 4 | 35 | 0.025 | 7.500 | 6.000 | 1855 | 185 | 8.4 | 14° | 30.1 |
| 8.00 | 4 | 35 | 0.030 | 10.000 | 8.000 | 1395 | 165 | 13.4 | 14° | 40.1 |
| 10.00 | 4 | 35 | 0.040 | 12.500 | 10.000 | 1115 | 180 | 22.3 | 14° | 50.1 |
| 12.00 | 4 | 35 | 0.045 | 15.000 | 12.000 | 930 | 165 | 30.1 | 14° | 60.2 |
| 16.00 | 4 | 35 | 0.045 | 20.000 | 16.000 | 695 | 125 | 40.1 | 14° | 80.2 |
| 20.00 | 4 | 35 | 0.050 | 25.000 | 20.000 | 555 | 110 | 55.7 | 14° | 100.3 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



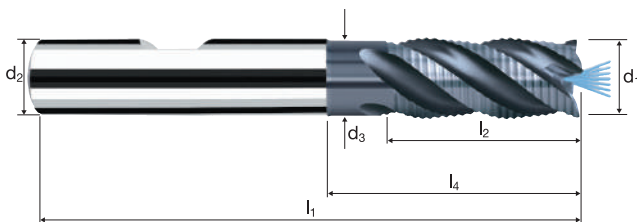
| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] | LR [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|---------|
| 4.00 | 3 | 50 | 0.015 | 5.000 | 4.000 | 3980 | 180 | 3.6 | 14° | 20.1 |
| 5.00 | 4 | 50 | 0.020 | 6.300 | 5.000 | 3185 | 255 | 8.0 | 14° | 25.3 |
| 6.00 | 4 | 50 | 0.025 | 7.500 | 6.000 | 2655 | 265 | 11.9 | 14° | 30.1 |
| 8.00 | 4 | 50 | 0.030 | 10.000 | 8.000 | 1990 | 240 | 19.1 | 14° | 40.1 |
| 10.00 | 4 | 50 | 0.040 | 12.500 | 10.000 | 1590 | 255 | 31.8 | 14° | 50.1 |
| 12.00 | 4 | 50 | 0.045 | 15.000 | 12.000 | 1325 | 240 | 43.0 | 14° | 60.2 |
| 16.00 | 4 | 50 | 0.045 | 20.000 | 16.000 | 995 | 180 | 57.3 | 14° | 80.2 |
| 20.00 | 4 | 50 | 0.050 | 25.000 | 20.000 | 795 | 160 | 79.6 | 14° | 100.3 |

Frese cilindriche SupraCarb®



Profilata, esecuzione normale con scarico corto
Geometria frontale per fresature in penetrazione ad alto rendimento
con canale di raffreddamento/aria centrale

HM λ 38°
MG10 γ 0°

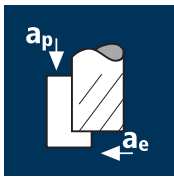


| | | | | | | | | | |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|---------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | | | | | Inox Stainless | Ti Titanium | GG(G) Tool Steel |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|---------------------|

| Ø Code | d ₁ e8 | d ₂ h5 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r | α | z | POLYCHROM | |
|--------------------|----------------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------|------|---|-----------|--------|
| | | | | | | | | | | | | |
| Esempio: N° Ordine | | | | | | | | | | | | |
| Rivestimento P | | | | | | | | | | | | |
| Articolo 8402 | | | | | | | | | | | | |
| Codice-ø 220 | | | | | | | | | | | | |
| 220 | 4.00 | 6.00 | 3.70 | 57 | 11.00 | 16.00 | 20.95 | 0.100 | 3.0° | 3 | | P8402 |
| 260 | 5.00 | 6.00 | 4.60 | 57 | 13.00 | 18.00 | 21.27 | 0.100 | 1.5° | 4 | | P8302 |
| 300 | 6.00 | 6.00 | 5.50 | 57 | 13.00 | 19.34 | 20.00 | 0.100 | 0.0° | 4 | | EUR |
| 391 | 8.00 | 8.00 | 7.40 | 63 | 19.00 | 25.29 | 26.00 | 0.150 | 0.0° | 4 | | 94.00 |
| 450 | 10.00 | 10.00 | 9.20 | 72 | 22.00 | 30.20 | 31.00 | 0.200 | 0.0° | 4 | | 94.00 |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 26.00 | 36.13 | 37.00 | 0.200 | 0.0° | 4 | | 94.00 |
| 610 | 16.00 | 16.00 | 15.00 | 92 | 32.00 | 42.13 | 43.00 | 0.200 | 0.0° | 4 | | 116.00 |
| 682 | 20.00 | 20.00 | 19.00 | 104 | 38.00 | 52.13 | 53.00 | 0.200 | 0.0° | 4 | | 131.00 |
| | | | | | | | | | | | | 170.00 |
| | | | | | | | | | | | | 295.00 |
| | | | | | | | | | | | | 427.00 |
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Applicazione

Materiale

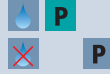


Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 3.00 | 3 | 180 | 0.015 | 3.600 | 1.800 | 19100 | 860 | 5.6 |
| 4.00 | 3 | 180 | 0.020 | 4.800 | 2.400 | 14325 | 860 | 9.9 |
| 5.00 | 4 | 180 | 0.025 | 6.000 | 3.000 | 11460 | 1145 | 20.6 |
| 6.00 | 4 | 180 | 0.030 | 7.200 | 3.600 | 9550 | 1145 | 29.7 |
| 8.00 | 4 | 180 | 0.040 | 9.600 | 4.800 | 7160 | 1145 | 52.8 |
| 10.00 | 4 | 180 | 0.050 | 12.000 | 6.000 | 5730 | 1145 | 82.5 |
| 12.00 | 4 | 180 | 0.055 | 14.400 | 7.200 | 4775 | 1050 | 108.9 |
| 16.00 | 4 | 180 | 0.055 | 19.200 | 9.600 | 3580 | 790 | 145.2 |
| 20.00 | 4 | 180 | 0.060 | 24.000 | 12.000 | 2865 | 690 | 198.0 |

Acciaio
850 - 1100 N/mm²



| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|-----|-------|
| 3.00 | 3 | 130 | 0.015 | 3.600 | 1.800 | 13795 | 620 | 4.0 |
| 4.00 | 3 | 130 | 0.020 | 4.800 | 2.400 | 10345 | 620 | 7.2 |
| 5.00 | 4 | 130 | 0.025 | 6.000 | 3.000 | 8275 | 830 | 14.9 |
| 6.00 | 4 | 130 | 0.030 | 7.200 | 3.600 | 6895 | 830 | 21.5 |
| 8.00 | 4 | 130 | 0.040 | 9.600 | 4.800 | 5175 | 830 | 38.1 |
| 10.00 | 4 | 130 | 0.050 | 12.000 | 6.000 | 4140 | 830 | 59.6 |
| 12.00 | 4 | 130 | 0.055 | 14.400 | 7.200 | 3450 | 760 | 78.7 |
| 16.00 | 4 | 130 | 0.055 | 19.200 | 9.600 | 2585 | 570 | 104.9 |
| 20.00 | 4 | 130 | 0.060 | 24.000 | 12.000 | 2070 | 495 | 143.0 |

Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 3.00 | 3 | 45 | 0.010 | 3.600 | 1.800 | 4775 | 145 | 0.9 |
| 4.00 | 3 | 45 | 0.015 | 4.800 | 2.400 | 3580 | 160 | 1.9 |
| 5.00 | 4 | 45 | 0.020 | 6.000 | 3.000 | 2865 | 230 | 4.1 |
| 6.00 | 4 | 45 | 0.025 | 7.200 | 3.600 | 2385 | 240 | 6.2 |
| 8.00 | 4 | 45 | 0.030 | 9.600 | 4.800 | 1790 | 215 | 9.9 |
| 10.00 | 4 | 45 | 0.040 | 12.000 | 6.000 | 1430 | 230 | 16.5 |
| 12.00 | 4 | 45 | 0.045 | 14.400 | 7.200 | 1195 | 215 | 22.3 |
| 16.00 | 4 | 45 | 0.045 | 19.200 | 9.600 | 895 | 160 | 29.7 |
| 20.00 | 4 | 45 | 0.050 | 24.000 | 12.000 | 715 | 145 | 41.3 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 3.00 | 3 | 60 | 0.010 | 3.600 | 1.800 | 6365 | 190 | 1.2 |
| 4.00 | 3 | 60 | 0.015 | 4.800 | 2.400 | 4775 | 215 | 2.5 |
| 5.00 | 4 | 60 | 0.020 | 6.000 | 3.000 | 3820 | 305 | 5.5 |
| 6.00 | 4 | 60 | 0.025 | 7.200 | 3.600 | 3185 | 320 | 8.3 |
| 8.00 | 4 | 60 | 0.030 | 9.600 | 4.800 | 2385 | 285 | 13.2 |
| 10.00 | 4 | 60 | 0.040 | 12.000 | 6.000 | 1910 | 305 | 22.0 |
| 12.00 | 4 | 60 | 0.045 | 14.400 | 7.200 | 1590 | 285 | 29.7 |
| 16.00 | 4 | 60 | 0.045 | 16.800 | 8.400 | 1195 | 215 | 30.3 |
| 20.00 | 4 | 60 | 0.050 | 24.000 | 12.000 | 955 | 190 | 55.0 |



Acciaio
< 850 N/mm²



| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|-----|-------|
| 3.00 | 3 | 150 | 0.015 | 3.000 | 3.000 | 15915 | 715 | 6.4 |
| 4.00 | 3 | 150 | 0.020 | 4.000 | 4.000 | 11935 | 715 | 11.5 |
| 5.00 | 4 | 150 | 0.025 | 5.000 | 5.000 | 9550 | 955 | 23.9 |
| 6.00 | 4 | 150 | 0.030 | 6.000 | 6.000 | 7960 | 955 | 34.4 |
| 8.00 | 4 | 150 | 0.040 | 8.000 | 8.000 | 5970 | 955 | 61.1 |
| 10.00 | 4 | 150 | 0.050 | 10.000 | 10.000 | 4775 | 955 | 95.5 |
| 12.00 | 4 | 150 | 0.055 | 12.000 | 12.000 | 3980 | 875 | 126.1 |
| 16.00 | 4 | 150 | 0.055 | 16.000 | 16.000 | 2985 | 655 | 168.1 |
| 20.00 | 4 | 150 | 0.060 | 20.000 | 20.000 | 2385 | 575 | 229.2 |

Acciaio
850 - 1100 N/mm²



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|-------|
| 3.00 | 3 | 80 | 0.015 | 3.000 | 3.000 | 8490 | 380 | 3.4 |
| 4.00 | 3 | 80 | 0.020 | 4.000 | 4.000 | 6365 | 380 | 6.1 |
| 5.00 | 4 | 80 | 0.025 | 5.000 | 5.000 | 5095 | 510 | 12.7 |
| 6.00 | 4 | 80 | 0.030 | 6.000 | 6.000 | 4245 | 510 | 18.3 |
| 8.00 | 4 | 80 | 0.040 | 8.000 | 8.000 | 3185 | 510 | 32.6 |
| 10.00 | 4 | 80 | 0.050 | 10.000 | 10.000 | 2545 | 510 | 50.9 |
| 12.00 | 4 | 80 | 0.055 | 12.000 | 12.000 | 2120 | 465 | 67.2 |
| 16.00 | 4 | 80 | 0.055 | 16.000 | 16.000 | 1590 | 350 | 89.6 |
| 20.00 | 4 | 80 | 0.060 | 20.000 | 20.000 | 1275 | 305 | 122.2 |

Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 3.00 | 3 | 35 | 0.010 | 3.000 | 3.000 | 3715 | 110 | 1.0 |
| 4.00 | 3 | 35 | 0.015 | 4.000 | 4.000 | 2785 | 125 | 2.0 |
| 5.00 | 4 | 35 | 0.020 | 5.000 | 5.000 | 2230 | 180 | 4.5 |
| 6.00 | 4 | 35 | 0.025 | 6.000 | 6.000 | 1855 | 185 | 6.7 |
| 8.00 | 4 | 35 | 0.030 | 8.000 | 8.000 | 1395 | 165 | 10.7 |
| 10.00 | 4 | 35 | 0.040 | 10.000 | 10.000 | 1115 | 180 | 17.8 |
| 12.00 | 4 | 35 | 0.045 | 12.000 | 12.000 | 930 | 165 | 24.1 |
| 16.00 | 4 | 35 | 0.045 | 16.000 | 16.000 | 695 | 125 | 32.1 |
| 20.00 | 4 | 35 | 0.050 | 20.000 | 20.000 | 555 | 110 | 44.6 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



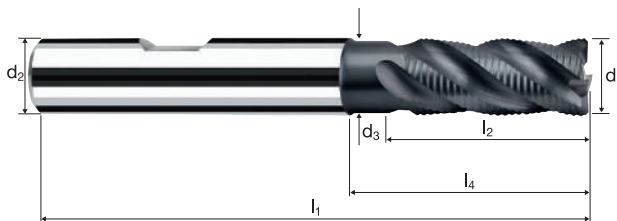
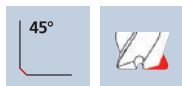
| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 3.00 | 3 | 50 | 0.010 | 3.000 | 3.000 | 5305 | 160 | 1.4 |
| 4.00 | 3 | 50 | 0.015 | 4.000 | 4.000 | 3980 | 180 | 2.9 |
| 5.00 | 4 | 50 | 0.020 | 5.000 | 5.000 | 3185 | 255 | 6.4 |
| 6.00 | 4 | 50 | 0.025 | 6.000 | 6.000 | 2655 | 265 | 9.5 |
| 8.00 | 4 | 50 | 0.030 | 8.000 | 8.000 | 1990 | 240 | 15.3 |
| 10.00 | 4 | 50 | 0.040 | 10.000 | 10.000 | 1590 | 255 | 25.5 |
| 12.00 | 4 | 50 | 0.045 | 12.000 | 12.000 | 1325 | 240 | 34.4 |
| 16.00 | 4 | 50 | 0.045 | 16.000 | 16.000 | 995 | 180 | 45.8 |
| 20.00 | 4 | 50 | 0.050 | 20.000 | 20.000 | 795 | 160 | 63.7 |

Frese cilindriche SupraCarb®

Profilata, esecuzione normale con scarico corto



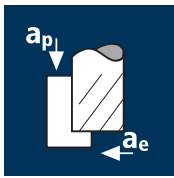
HM
MG10 λ 38°
 γ 0°



| | | | | | | | | | |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|---------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | | | | | Inox Stainless | Ti Titanium | GG(G) Tool Steel |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|---------------------|

| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | 45° | α | z | POLYCHROM | |
|------------|----------------------|----------------------|----------------|----------------|----------------|----------------|----------------|------|------|---|-----------|---------------|
| | | | | | | | | | | | | |
| | | | | | | | | | | | | P15336 |
| | | | | | | | | | | | | P15236 |
| | | | | | | | | | | | | EUR |
| 180 | 3.00 | 6.00 | 2.80 | 57 | 8.00 | 14.00 | 20.63 | 0.25 | 4.5° | 3 | | 78.00 |
| 220 | 4.00 | 6.00 | 3.70 | 57 | 11.00 | 16.00 | 20.95 | 0.30 | 3.0° | 3 | | 78.00 |
| 260 | 5.00 | 6.00 | 4.60 | 57 | 13.00 | 18.00 | 21.27 | 0.35 | 1.5° | 4 | | 78.00 |
| 300 | 6.00 | 6.00 | 5.50 | 57 | 13.00 | 19.34 | 20.00 | 0.35 | 0.0° | 4 | | 78.00 |
| 391 | 8.00 | 8.00 | 7.40 | 63 | 19.00 | 25.29 | 26.00 | 0.45 | 0.0° | 4 | | 95.00 |
| 450 | 10.00 | 10.00 | 9.20 | 72 | 22.00 | 30.20 | 31.00 | 0.60 | 0.0° | 4 | | 108.00 |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 26.00 | 36.13 | 37.00 | 0.60 | 0.0° | 4 | | 140.00 |
| 570 | 14.00 | 14.00 | 13.00 | 83 | 26.00 | 36.13 | 37.00 | 0.60 | 0.0° | 4 | | 243.00 |
| 610 | 16.00 | 16.00 | 15.00 | 92 | 32.00 | 42.13 | 43.00 | 0.70 | 0.0° | 4 | | 243.00 |
| 612 | 16.00 | 16.00 | 15.00 | 92 | 32.00 | 42.13 | 43.00 | 0.70 | 0.0° | 6 | | 243.00 |
| 640 | 18.00 | 18.00 | 17.00 | 92 | 32.00 | 42.13 | 43.00 | 0.70 | 0.0° | 4 | | 352.00 |
| 682 | 20.00 | 20.00 | 19.00 | 104 | 38.00 | 52.13 | 53.00 | 0.70 | 0.0° | 4 | | 352.00 |
| 684 | 20.00 | 20.00 | 19.00 | 104 | 38.00 | 52.13 | 53.00 | 0.70 | 0.0° | 6 | | 352.00 |

Applicazione



Materiale

Acciaio
< 850 N/mm²



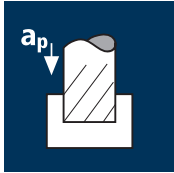
Acciaio
850 - 1100 N/mm²



Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Acciaio
< 850 N/mm²



Acciaio
850 - 1100 N/mm²



Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



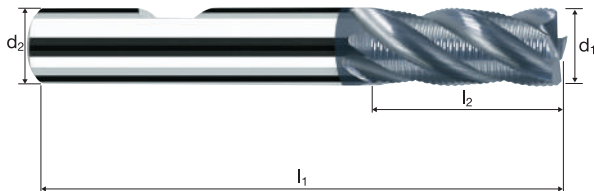
| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 3.00 | 3 | 180 | 0.015 | 3.600 | 1.800 | 19100 | 860 | 5.6 |
| 4.00 | 3 | 180 | 0.020 | 4.800 | 2.400 | 14325 | 860 | 9.9 |
| 5.00 | 4 | 180 | 0.025 | 6.000 | 3.000 | 11460 | 1145 | 20.6 |
| 6.00 | 4 | 180 | 0.030 | 7.200 | 3.600 | 9550 | 1145 | 29.7 |
| 8.00 | 4 | 180 | 0.040 | 9.600 | 4.800 | 7160 | 1145 | 52.8 |
| 10.00 | 4 | 180 | 0.050 | 12.000 | 6.000 | 5730 | 1145 | 82.5 |
| 12.00 | 4 | 180 | 0.055 | 14.400 | 7.200 | 4775 | 1050 | 108.9 |
| 16.00 | 4 | 180 | 0.055 | 19.200 | 9.600 | 3580 | 790 | 145.2 |
| 20.00 | 4 | 180 | 0.060 | 24.000 | 12.000 | 2865 | 690 | 190.0 |
| 3.00 | 3 | 130 | 0.015 | 3.600 | 1.800 | 13795 | 620 | 4.0 |
| 4.00 | 3 | 130 | 0.020 | 4.800 | 2.400 | 10345 | 620 | 7.2 |
| 5.00 | 4 | 130 | 0.025 | 6.000 | 3.000 | 8275 | 830 | 14.9 |
| 6.00 | 4 | 130 | 0.030 | 7.200 | 3.600 | 6895 | 830 | 21.5 |
| 8.00 | 4 | 130 | 0.040 | 9.600 | 4.800 | 5175 | 830 | 38.1 |
| 10.00 | 4 | 130 | 0.050 | 12.000 | 6.000 | 4140 | 830 | 59.6 |
| 12.00 | 4 | 130 | 0.055 | 14.400 | 7.200 | 3450 | 760 | 78.7 |
| 16.00 | 4 | 130 | 0.055 | 19.200 | 9.600 | 2585 | 570 | 104.9 |
| 20.00 | 4 | 130 | 0.060 | 24.000 | 12.000 | 2070 | 495 | 143.0 |
| 3.00 | 3 | 45 | 0.010 | 3.600 | 1.800 | 4775 | 145 | 0.9 |
| 4.00 | 3 | 45 | 0.015 | 4.800 | 2.400 | 3580 | 160 | 1.9 |
| 5.00 | 4 | 45 | 0.020 | 6.000 | 3.000 | 2865 | 230 | 4.1 |
| 6.00 | 4 | 45 | 0.025 | 7.200 | 3.600 | 2385 | 240 | 6.2 |
| 8.00 | 4 | 45 | 0.030 | 9.600 | 4.800 | 1790 | 215 | 9.9 |
| 10.00 | 4 | 45 | 0.040 | 12.000 | 6.000 | 1430 | 230 | 16.5 |
| 12.00 | 4 | 45 | 0.045 | 14.400 | 7.200 | 1195 | 215 | 22.3 |
| 16.00 | 4 | 45 | 0.045 | 19.200 | 9.600 | 895 | 160 | 29.7 |
| 20.00 | 4 | 45 | 0.050 | 24.000 | 12.000 | 715 | 145 | 41.3 |
| 3.00 | 3 | 55 | 0.010 | 3.600 | 1.800 | 5835 | 175 | 1.1 |
| 4.00 | 3 | 55 | 0.015 | 4.800 | 2.400 | 4375 | 195 | 2.3 |
| 5.00 | 4 | 55 | 0.020 | 6.000 | 3.000 | 3500 | 280 | 5.0 |
| 6.00 | 4 | 55 | 0.025 | 7.200 | 3.600 | 2920 | 290 | 7.6 |
| 8.00 | 4 | 55 | 0.030 | 9.600 | 4.800 | 2190 | 265 | 12.1 |
| 10.00 | 4 | 55 | 0.040 | 12.000 | 6.000 | 1750 | 280 | 20.2 |
| 12.00 | 4 | 55 | 0.045 | 14.400 | 7.200 | 1460 | 265 | 27.2 |
| 16.00 | 4 | 55 | 0.045 | 19.200 | 9.600 | 1095 | 195 | 36.3 |
| 20.00 | 4 | 55 | 0.050 | 24.000 | 12.000 | 875 | 175 | 50.4 |
| 3.00 | 3 | 150 | 0.015 | 3.000 | 3.000 | 15915 | 715 | 6.4 |
| 4.00 | 3 | 150 | 0.020 | 4.000 | 4.000 | 11935 | 715 | 11.5 |
| 5.00 | 4 | 150 | 0.025 | 5.000 | 5.000 | 9550 | 955 | 23.9 |
| 6.00 | 4 | 150 | 0.030 | 6.000 | 6.000 | 7960 | 955 | 34.4 |
| 8.00 | 4 | 150 | 0.040 | 8.000 | 8.000 | 5970 | 955 | 61.1 |
| 10.00 | 4 | 150 | 0.050 | 10.000 | 10.000 | 4775 | 955 | 95.5 |
| 12.00 | 4 | 150 | 0.055 | 12.000 | 12.000 | 3980 | 875 | 126.1 |
| 16.00 | 4 | 150 | 0.055 | 16.000 | 16.000 | 2985 | 655 | 168.1 |
| 20.00 | 4 | 150 | 0.060 | 20.000 | 20.000 | 2385 | 575 | 229.2 |
| 3.00 | 3 | 80 | 0.015 | 3.000 | 3.000 | 8490 | 380 | 3.4 |
| 4.00 | 3 | 80 | 0.020 | 4.000 | 4.000 | 6365 | 380 | 6.1 |
| 5.00 | 4 | 80 | 0.025 | 5.000 | 5.000 | 5095 | 510 | 12.7 |
| 6.00 | 4 | 80 | 0.030 | 6.000 | 6.000 | 4245 | 510 | 18.3 |
| 8.00 | 4 | 80 | 0.040 | 8.000 | 8.000 | 3185 | 510 | 32.6 |
| 10.00 | 4 | 80 | 0.050 | 10.000 | 10.000 | 2545 | 510 | 50.9 |
| 12.00 | 4 | 80 | 0.055 | 12.000 | 12.000 | 2120 | 465 | 67.2 |
| 16.00 | 4 | 80 | 0.055 | 16.000 | 16.000 | 1590 | 350 | 89.6 |
| 20.00 | 4 | 80 | 0.060 | 20.000 | 20.000 | 1275 | 305 | 122.2 |
| 3.00 | 3 | 35 | 0.010 | 3.000 | 3.000 | 3715 | 110 | 1.0 |
| 4.00 | 3 | 35 | 0.015 | 4.000 | 4.000 | 2785 | 125 | 2.0 |
| 5.00 | 4 | 35 | 0.020 | 5.000 | 5.000 | 2230 | 180 | 4.5 |
| 6.00 | 4 | 35 | 0.025 | 6.000 | 6.000 | 1855 | 185 | 6.7 |
| 8.00 | 4 | 35 | 0.030 | 8.000 | 8.000 | 1395 | 165 | 10.7 |
| 10.00 | 4 | 35 | 0.040 | 10.000 | 10.000 | 1115 | 180 | 17.8 |
| 12.00 | 4 | 35 | 0.045 | 12.000 | 12.000 | 930 | 165 | 24.1 |
| 16.00 | 4 | 35 | 0.045 | 16.000 | 16.000 | 695 | 125 | 32.1 |
| 20.00 | 4 | 35 | 0.050 | 20.000 | 20.000 | 555 | 110 | 44.6 |
| 3.00 | 3 | 45 | 0.010 | 3.000 | 3.000 | 4775 | 145 | 1.3 |
| 4.00 | 3 | 45 | 0.015 | 4.000 | 4.000 | 3580 | 160 | 2.6 |
| 5.00 | 4 | 45 | 0.020 | 5.000 | 5.000 | 2865 | 230 | 5.7 |
| 6.00 | 4 | 45 | 0.025 | 6.000 | 6.000 | 2385 | 240 | 8.6 |
| 8.00 | 4 | 45 | 0.030 | 8.000 | 8.000 | 1790 | 215 | 13.8 |
| 10.00 | 4 | 45 | 0.040 | 10.000 | 10.000 | 1430 | 230 | 22.9 |
| 12.00 | 4 | 45 | 0.045 | 12.000 | 12.000 | 1195 | 215 | 30.9 |
| 16.00 | 4 | 45 | 0.045 | 16.000 | 16.000 | 895 | 160 | 41.3 |
| 20.00 | 4 | 45 | 0.050 | 20.000 | 20.000 | 715 | 145 | 57.3 |

Frese cilindriche

Profilata, esecuzione normale



HM λ 38°
MG10 γ 0°



Sgrossatura

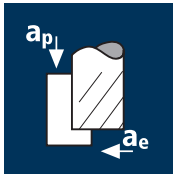
Finitura



| | | | | | | | | | |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|-------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | | | | | Inox Stainless | Ti Titanium | GG(G) |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|-------|

| Esempio: N° Ordine | | | | | | | | | | POLYCHROM | |
|--------------------|----------------------|----------------------|----------------|----------------|----------------|------|------|---|--|-----------|--|
| | | | | | | | | | | P45371 | |
| | | | | | | | | | | EUR | |
| Ø Code | d ₁ e8 | d ₂ h6 | l ₁ | l ₂ | l ₄ | 45° | α | z | | | |
| 180 | 3.00 | 6.00 | 57 | 8.00 | 15.56 | 0.25 | 6.0° | 3 | | 66.00 | |
| 220 | 4.00 | 6.00 | 57 | 11.00 | 16.89 | 0.30 | 4.0° | 3 | | 66.00 | |
| 260 | 5.00 | 6.00 | 57 | 13.00 | 17.22 | 0.35 | 2.0° | 4 | | 66.00 | |
| 300 | 6.00 | 6.00 | 57 | 13.00 | - | 0.35 | 0.0° | 4 | | 66.00 | |
| 391 | 8.00 | 8.00 | 63 | 19.00 | - | 0.45 | 0.0° | 4 | | 82.00 | |
| 450 | 10.00 | 10.00 | 72 | 22.00 | - | 0.60 | 0.0° | 4 | | 93.00 | |
| 501 | 12.00 | 12.00 | 83 | 26.00 | - | 0.60 | 0.0° | 4 | | 120.00 | |
| 610 | 16.00 | 16.00 | 92 | 32.00 | - | 0.70 | 0.0° | 4 | | 209.00 | |
| 612 | 16.00 | 16.00 | 92 | 32.00 | - | 0.70 | 0.0° | 6 | | 209.00 | |
| 682 | 20.00 | 20.00 | 104 | 38.00 | - | 0.70 | 0.0° | 4 | | 301.00 | |
| 684 | 20.00 | 20.00 | 104 | 38.00 | - | 0.70 | 0.0° | 6 | | 301.00 | |
| | | | | | | | | | | | |
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Applicazione



Materiale

Acciaio
850 - 1100 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 5.00 | 4 | 55 | 0.025 | 5.000 | 2.300 | 3500 | 350 | 4.0 |
| 6.00 | 4 | 55 | 0.030 | 6.000 | 2.700 | 2920 | 350 | 5.7 |
| 8.00 | 4 | 55 | 0.040 | 8.000 | 3.600 | 2190 | 350 | 10.1 |
| 10.00 | 4 | 55 | 0.050 | 10.000 | 4.500 | 1750 | 350 | 15.8 |
| 12.00 | 4 | 55 | 0.080 | 12.000 | 5.400 | 1460 | 465 | 30.3 |
| 16.00 | 4 | 55 | 0.105 | 16.000 | 7.200 | 1095 | 460 | 52.9 |
| 20.00 | 4 | 55 | 0.130 | 20.000 | 9.000 | 875 | 455 | 81.9 |
| 22.00 | 4 | 55 | 0.145 | 22.000 | 9.900 | 795 | 460 | 100.5 |
| 25.00 | 4 | 55 | 0.165 | 25.000 | 11.300 | 700 | 460 | 130.6 |

Acciaio
1100 - 1300 N/mm²



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 5.00 | 4 | 42 | 0.025 | 5.000 | 2.300 | 2675 | 265 | 3.1 |
| 6.00 | 4 | 42 | 0.030 | 6.000 | 2.700 | 2230 | 265 | 4.3 |
| 8.00 | 4 | 42 | 0.040 | 8.000 | 3.600 | 1670 | 265 | 7.7 |
| 10.00 | 4 | 42 | 0.050 | 10.000 | 4.500 | 1335 | 265 | 12.0 |
| 12.00 | 4 | 42 | 0.080 | 12.000 | 5.400 | 1115 | 355 | 23.1 |
| 16.00 | 4 | 42 | 0.105 | 16.000 | 7.200 | 835 | 350 | 40.4 |
| 20.00 | 4 | 42 | 0.130 | 20.000 | 9.000 | 670 | 350 | 62.6 |
| 22.00 | 4 | 42 | 0.145 | 22.000 | 9.900 | 610 | 350 | 76.8 |
| 25.00 | 4 | 42 | 0.165 | 25.000 | 11.300 | 535 | 355 | 99.7 |

Acciaio per lavorazione
a freddo (12% Cr)
fortemente legati
[1.2379]



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 5.00 | 4 | 25 | 0.025 | 5.000 | 2.300 | 1590 | 160 | 1.8 |
| 6.00 | 4 | 25 | 0.030 | 6.000 | 2.700 | 1325 | 160 | 2.6 |
| 8.00 | 4 | 25 | 0.040 | 8.000 | 3.600 | 995 | 160 | 4.6 |
| 10.00 | 4 | 25 | 0.050 | 10.000 | 4.500 | 795 | 160 | 7.2 |
| 12.00 | 4 | 25 | 0.080 | 12.000 | 5.400 | 665 | 210 | 13.8 |
| 16.00 | 4 | 25 | 0.105 | 16.000 | 7.200 | 495 | 210 | 24.1 |
| 20.00 | 4 | 25 | 0.130 | 20.000 | 9.000 | 400 | 205 | 37.2 |
| 22.00 | 4 | 25 | 0.145 | 22.000 | 9.900 | 360 | 210 | 45.7 |
| 25.00 | 4 | 25 | 0.165 | 25.000 | 11.300 | 320 | 210 | 59.3 |

Ghisa
(grigia / sferoidale)



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|-------|
| 5.00 | 4 | 47 | 0.025 | 5.000 | 2.300 | 2990 | 300 | 3.4 |
| 6.00 | 4 | 47 | 0.030 | 6.000 | 2.700 | 2495 | 300 | 4.8 |
| 8.00 | 4 | 47 | 0.040 | 8.000 | 3.600 | 1870 | 300 | 8.6 |
| 10.00 | 4 | 47 | 0.050 | 10.000 | 4.500 | 1495 | 300 | 13.5 |
| 12.00 | 4 | 47 | 0.080 | 12.000 | 5.400 | 1245 | 400 | 25.9 |
| 16.00 | 4 | 47 | 0.105 | 16.000 | 7.200 | 935 | 395 | 45.2 |
| 20.00 | 4 | 47 | 0.130 | 20.000 | 9.000 | 750 | 390 | 70.0 |
| 22.00 | 4 | 47 | 0.145 | 22.000 | 9.900 | 680 | 395 | 85.9 |
| 25.00 | 4 | 47 | 0.165 | 25.000 | 11.300 | 600 | 395 | 111.6 |



Acciaio
850 - 1100 N/mm²



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|-------|
| 5.00 | 4 | 53 | 0.020 | 5.000 | 5.000 | 3375 | 270 | 6.7 |
| 6.00 | 4 | 53 | 0.020 | 6.000 | 6.000 | 2810 | 225 | 8.1 |
| 8.00 | 4 | 53 | 0.030 | 8.000 | 8.000 | 2110 | 255 | 16.2 |
| 10.00 | 4 | 53 | 0.035 | 10.000 | 10.000 | 1685 | 235 | 23.6 |
| 12.00 | 4 | 53 | 0.060 | 12.000 | 12.000 | 1405 | 335 | 48.6 |
| 16.00 | 4 | 53 | 0.080 | 16.000 | 16.000 | 1055 | 335 | 86.4 |
| 20.00 | 4 | 53 | 0.100 | 20.000 | 20.000 | 845 | 335 | 135.0 |
| 22.00 | 4 | 53 | 0.110 | 22.000 | 22.000 | 765 | 335 | 163.3 |
| 25.00 | 4 | 53 | 0.125 | 25.000 | 25.000 | 675 | 335 | 210.9 |

Acciaio
1100 - 1300 N/mm²



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|-------|
| 5.00 | 4 | 40 | 0.020 | 5.000 | 5.000 | 2545 | 205 | 5.1 |
| 6.00 | 4 | 40 | 0.020 | 6.000 | 6.000 | 2120 | 170 | 6.1 |
| 8.00 | 4 | 40 | 0.030 | 8.000 | 8.000 | 1590 | 190 | 12.2 |
| 10.00 | 4 | 40 | 0.035 | 10.000 | 10.000 | 1275 | 180 | 17.8 |
| 12.00 | 4 | 40 | 0.060 | 12.000 | 12.000 | 1060 | 255 | 36.7 |
| 16.00 | 4 | 40 | 0.080 | 16.000 | 16.000 | 795 | 255 | 65.2 |
| 20.00 | 4 | 40 | 0.100 | 20.000 | 20.000 | 635 | 255 | 101.9 |
| 22.00 | 4 | 40 | 0.110 | 22.000 | 22.000 | 580 | 255 | 123.2 |
| 25.00 | 4 | 40 | 0.125 | 25.000 | 25.000 | 510 | 255 | 159.2 |

Acciaio per lavorazione
a freddo (12% Cr)
fortemente legati
[1.2379]



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 5.00 | 4 | 22 | 0.020 | 5.000 | 5.000 | 1400 | 110 | 2.8 |
| 6.00 | 4 | 22 | 0.020 | 6.000 | 6.000 | 1165 | 95 | 3.4 |
| 8.00 | 4 | 22 | 0.030 | 8.000 | 8.000 | 875 | 105 | 6.7 |
| 10.00 | 4 | 22 | 0.035 | 10.000 | 10.000 | 700 | 100 | 9.8 |
| 12.00 | 4 | 22 | 0.060 | 12.000 | 12.000 | 585 | 140 | 20.2 |
| 16.00 | 4 | 22 | 0.080 | 16.000 | 16.000 | 440 | 140 | 35.9 |
| 20.00 | 4 | 22 | 0.100 | 20.000 | 20.000 | 350 | 140 | 56.0 |
| 22.00 | 4 | 22 | 0.110 | 22.000 | 22.000 | 320 | 140 | 67.8 |
| 25.00 | 4 | 22 | 0.125 | 25.000 | 25.000 | 280 | 140 | 87.5 |

Ghisa
(grigia / sferoidale)



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|-------|
| 5.00 | 4 | 42 | 0.020 | 5.000 | 5.000 | 2675 | 215 | 5.3 |
| 6.00 | 4 | 42 | 0.020 | 6.000 | 6.000 | 2230 | 180 | 6.4 |
| 8.00 | 4 | 42 | 0.030 | 8.000 | 8.000 | 1670 | 200 | 12.8 |
| 10.00 | 4 | 42 | 0.035 | 10.000 | 10.000 | 1335 | 185 | 18.7 |
| 12.00 | 4 | 42 | 0.060 | 12.000 | 12.000 | 1115 | 265 | 38.5 |
| 16.00 | 4 | 42 | 0.080 | 16.000 | 16.000 | 835 | 265 | 68.4 |
| 20.00 | 4 | 42 | 0.100 | 20.000 | 20.000 | 670 | 265 | 107.0 |
| 22.00 | 4 | 42 | 0.110 | 22.000 | 22.000 | 610 | 265 | 129.4 |
| 25.00 | 4 | 42 | 0.125 | 25.000 | 25.000 | 535 | 265 | 167.1 |

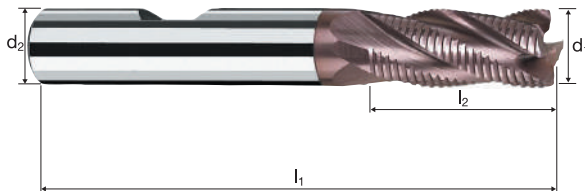
Frese cilindriche

Profilata NRC, esecuzione normale

HSS

HSS
PM/F

λ 30°
 γ 12°



Sgrossatura

Finitura



ReTool®

Rm
< 850

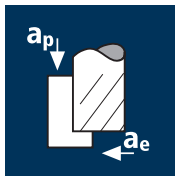
Rm
850-1100

Rm
1100-1300

GG(G)

| Esempio: N° Ordine | | | | | | | | | | UNICUT-4X | |
|-----------------------|----------------------|----------------------|----------------|----------------|----------------|------|------|---|--|-----------|--|
| | | | | | | | | | | U0619 | |
| | | | | | | | | | | EUR | |
| Ø Code | d ₁ k8 | d ₂ h6 | l ₁ | l ₂ | l ₄ | 45° | α | z | | | |
| 260 | 5.00 | 6.00 | 57 | 13.00 | 20.55 | 0.40 | 1.5° | 4 | | 68.00 | |
| 300 | 6.00 | 6.00 | 57 | 13.00 | - | 0.40 | 0.0° | 4 | | 68.00 | |
| 331 | 7.00 | 8.00 | 60 | 16.00 | 23.50 | 0.40 | 1.5° | 4 | | 70.00 | |
| 391 | 8.00 | 8.00 | 63 | 19.00 | - | 0.40 | 0.0° | 4 | | 70.00 | |
| 402 | 8.00 | 10.00 | 69 | 19.00 | 28.50 | 0.40 | 2.5° | 4 | | 70.00 | |
| 420 | 9.00 | 10.00 | 69 | 19.00 | 28.50 | 0.40 | 1.5° | 4 | | 76.00 | |
| 450 | 10.00 | 10.00 | 72 | 22.00 | - | 0.40 | 0.0° | 4 | | 76.00 | |
| 470 | 11.00 | 12.00 | 79 | 22.00 | 33.50 | 0.40 | 1.0° | 4 | | 85.00 | |
| 501 | 12.00 | 12.00 | 83 | 26.00 | - | 0.40 | 0.0° | 4 | | 85.00 | |
| 570 | 14.00 | 12.00 | 83 | 26.00 | - | 0.40 | 0.0° | 4 | | 116.00 | |
| 610 | 16.00 | 16.00 | 92 | 32.00 | - | 0.50 | 0.0° | 4 | | 116.00 | |
| 640 | 18.00 | 16.00 | 92 | 32.00 | - | 0.50 | 0.0° | 4 | | 162.00 | |
| 682 | 20.00 | 20.00 | 104 | 38.00 | - | 0.50 | 0.0° | 4 | | 162.00 | |
| 710 | 22.00 | 20.00 | 104 | 38.00 | - | 0.70 | 0.0° | 4 | | 238.00 | |
| 772 | 25.00 | 25.00 | 121 | 45.00 | - | 0.70 | 0.0° | 4 | | 238.00 | |

Applicazione



Materiale

Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _f [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 6.00 | 4 | 68 | 0.030 | 9.000 | 2.400 | 3610 | 435 | 9.4 |
| 8.00 | 4 | 68 | 0.040 | 12.000 | 3.200 | 2705 | 435 | 16.6 |
| 10.00 | 4 | 68 | 0.050 | 15.000 | 4.000 | 2165 | 435 | 26.0 |
| 12.00 | 4 | 68 | 0.080 | 18.000 | 4.800 | 1805 | 575 | 49.9 |
| 16.00 | 4 | 68 | 0.105 | 24.000 | 6.400 | 1355 | 570 | 87.3 |
| 20.00 | 4 | 68 | 0.130 | 30.000 | 8.000 | 1080 | 565 | 135.1 |
| 25.00 | 4 | 68 | 0.165 | 37.500 | 10.000 | 865 | 570 | 214.3 |

Acciaio
850 - 1100 N/mm²



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|-------|
| 6.00 | 4 | 52 | 0.030 | 9.000 | 2.400 | 2760 | 330 | 7.2 |
| 8.00 | 4 | 52 | 0.040 | 12.000 | 3.200 | 2070 | 330 | 12.7 |
| 10.00 | 4 | 52 | 0.050 | 15.000 | 4.000 | 1655 | 330 | 19.9 |
| 12.00 | 4 | 52 | 0.080 | 18.000 | 4.800 | 1380 | 440 | 38.1 |
| 16.00 | 4 | 52 | 0.105 | 24.000 | 6.400 | 1035 | 435 | 66.7 |
| 20.00 | 4 | 52 | 0.130 | 30.000 | 8.000 | 830 | 430 | 103.3 |
| 25.00 | 4 | 52 | 0.165 | 37.500 | 10.000 | 660 | 435 | 163.9 |

Acciaio
1100 - 1300 N/mm²

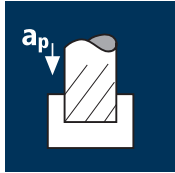


| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|-------|
| 6.00 | 4 | 40 | 0.030 | 9.000 | 2.400 | 2120 | 255 | 5.5 |
| 8.00 | 4 | 40 | 0.040 | 12.000 | 3.200 | 1590 | 255 | 9.8 |
| 10.00 | 4 | 40 | 0.050 | 15.000 | 4.000 | 1275 | 255 | 15.3 |
| 12.00 | 4 | 40 | 0.080 | 18.000 | 4.800 | 1060 | 340 | 29.3 |
| 16.00 | 4 | 40 | 0.105 | 24.000 | 6.400 | 795 | 335 | 51.3 |
| 20.00 | 4 | 40 | 0.130 | 30.000 | 8.000 | 635 | 330 | 79.5 |
| 25.00 | 4 | 40 | 0.165 | 37.500 | 10.000 | 510 | 335 | 126.1 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 6.00 | 4 | 30 | 0.030 | 9.000 | 2.400 | 1590 | 190 | 4.1 |
| 8.00 | 4 | 30 | 0.040 | 12.000 | 3.200 | 1195 | 190 | 7.3 |
| 10.00 | 4 | 30 | 0.050 | 15.000 | 4.000 | 955 | 190 | 11.5 |
| 12.00 | 4 | 30 | 0.080 | 18.000 | 4.800 | 795 | 255 | 22.0 |
| 16.00 | 4 | 30 | 0.105 | 24.000 | 6.400 | 595 | 250 | 38.5 |
| 20.00 | 4 | 30 | 0.130 | 30.000 | 8.000 | 475 | 250 | 59.6 |
| 25.00 | 4 | 30 | 0.165 | 37.500 | 10.000 | 380 | 250 | 94.5 |



Acciaio
< 850 N/mm²



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|-------|
| 6.00 | 4 | 62 | 0.020 | 6.000 | 6.000 | 3290 | 265 | 9.5 |
| 8.00 | 4 | 62 | 0.030 | 8.000 | 8.000 | 2465 | 295 | 18.9 |
| 10.00 | 4 | 62 | 0.035 | 10.000 | 10.000 | 1975 | 275 | 27.6 |
| 12.00 | 4 | 62 | 0.060 | 12.000 | 12.000 | 1645 | 395 | 56.8 |
| 16.00 | 4 | 62 | 0.080 | 16.000 | 16.000 | 1235 | 395 | 101.0 |
| 20.00 | 4 | 62 | 0.100 | 20.000 | 20.000 | 985 | 395 | 157.9 |
| 25.00 | 4 | 62 | 0.125 | 25.000 | 25.000 | 790 | 395 | 246.7 |

Acciaio
850 - 1100 N/mm²



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|-------|
| 6.00 | 4 | 50 | 0.020 | 6.000 | 6.000 | 2655 | 210 | 7.6 |
| 8.00 | 4 | 50 | 0.030 | 8.000 | 8.000 | 1990 | 240 | 15.3 |
| 10.00 | 4 | 50 | 0.035 | 10.000 | 10.000 | 1590 | 225 | 22.3 |
| 12.00 | 4 | 50 | 0.060 | 12.000 | 12.000 | 1325 | 320 | 45.8 |
| 16.00 | 4 | 50 | 0.080 | 16.000 | 16.000 | 995 | 320 | 81.5 |
| 20.00 | 4 | 50 | 0.100 | 20.000 | 20.000 | 795 | 320 | 127.3 |
| 25.00 | 4 | 50 | 0.125 | 25.000 | 25.000 | 635 | 320 | 198.9 |

Acciaio
1100 - 1300 N/mm²



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|-------|
| 6.00 | 4 | 37 | 0.020 | 6.000 | 6.000 | 1965 | 155 | 5.7 |
| 8.00 | 4 | 37 | 0.030 | 8.000 | 8.000 | 1470 | 175 | 11.3 |
| 10.00 | 4 | 37 | 0.035 | 10.000 | 10.000 | 1180 | 165 | 16.5 |
| 12.00 | 4 | 37 | 0.060 | 12.000 | 12.000 | 980 | 235 | 33.9 |
| 16.00 | 4 | 37 | 0.080 | 16.000 | 16.000 | 735 | 235 | 60.3 |
| 20.00 | 4 | 37 | 0.100 | 20.000 | 20.000 | 590 | 235 | 94.2 |
| 25.00 | 4 | 37 | 0.125 | 25.000 | 25.000 | 470 | 235 | 147.2 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 6.00 | 4 | 25 | 0.020 | 6.000 | 6.000 | 1325 | 105 | 3.8 |
| 8.00 | 4 | 25 | 0.030 | 8.000 | 8.000 | 995 | 120 | 7.6 |
| 10.00 | 4 | 25 | 0.035 | 10.000 | 10.000 | 795 | 110 | 11.1 |
| 12.00 | 4 | 25 | 0.060 | 12.000 | 12.000 | 665 | 160 | 22.9 |
| 16.00 | 4 | 25 | 0.080 | 16.000 | 16.000 | 495 | 160 | 40.7 |
| 20.00 | 4 | 25 | 0.100 | 20.000 | 20.000 | 400 | 160 | 63.7 |
| 25.00 | 4 | 25 | 0.125 | 25.000 | 25.000 | 320 | 160 | 99.5 |

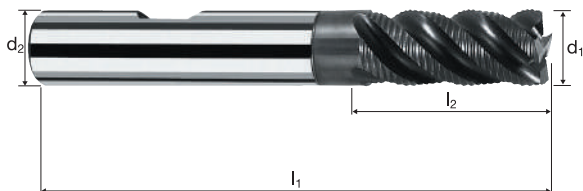
Frese cilindriche

Profilata, esecuzione normale

HSS

HSS
PM/F

λ 45°
 γ 2°



Sgrossatura

Finitura



ReTool®

Rm
< 850

Rm
850-1100

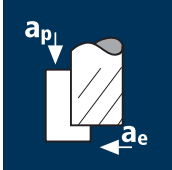
Rm
1100-1300

Inox
Stainless

| Esempio: N° Ordine | | | | | | | | POLYCHROM | |
|--------------------|----------------------|----------------------|----------------|----------------|------|---|-----------|-----------|--|
| | | | | | | | | P0540 | |
| Ø Code | d ₁ k8 | d ₂ h6 | l ₁ | l ₂ | 45° | z | | | |
| 300 | 6.00 | 6.00 | 57 | 13.00 | 0.35 | 4 | EUR 68.00 | | |
| 391 | 8.00 | 8.00 | 63 | 19.00 | 0.45 | 4 | 70.00 | | |
| 450 | 10.00 | 10.00 | 72 | 22.00 | 0.60 | 4 | 76.00 | | |
| 501 | 12.00 | 12.00 | 83 | 26.00 | 0.60 | 4 | 85.00 | | |
| 610 | 16.00 | 16.00 | 92 | 32.00 | 0.70 | 4 | 116.00 | | |
| 682 | 20.00 | 20.00 | 104 | 38.00 | 0.70 | 4 | 162.00 | | |
| 772 | 25.00 | 25.00 | 121 | 45.00 | 0.85 | 4 | 238.00 | | |
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Applicazione

Materiale



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|------------------------------------|--|
| Acciaio < 850 N/mm ² | |
|------------------------------------|--|

| | |
|---|--|
| Acciaio 850 - 1100 N/mm ² | |
|---|--|

| | |
|--|--|
| Inox normal [Cr-Ni/1.4301] [Cr-Ni-Mo/1.4571] | |
|--|--|

| | |
|--------------------------------|--|
| Ghisa (grigia / sferoidale) | |
|--------------------------------|--|



| | |
|------------------------------------|--|
| Acciaio < 850 N/mm ² | |
|------------------------------------|--|

| | |
|---|--|
| Acciaio 850 - 1100 N/mm ² | |
|---|--|

| | |
|--|--|
| Inox normal [Cr-Ni/1.4301] [Cr-Ni-Mo/1.4571] | |
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| | |
|--------------------------------|--|
| Ghisa (grigia / sferoidale) | |
|--------------------------------|--|

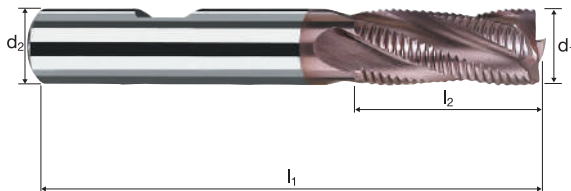
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 5.00 | 3 | 60 | 0.025 | 5.000 | 2.000 | 3820 | 285 | 2.9 |
| 6.00 | 3 | 60 | 0.025 | 6.000 | 2.400 | 3185 | 240 | 3.4 |
| 8.00 | 4 | 60 | 0.035 | 8.000 | 3.200 | 2385 | 335 | 8.6 |
| 10.00 | 4 | 60 | 0.045 | 10.000 | 4.000 | 1910 | 345 | 13.8 |
| 12.00 | 4 | 60 | 0.070 | 12.000 | 4.800 | 1590 | 445 | 25.7 |
| 16.00 | 4 | 60 | 0.095 | 16.000 | 6.400 | 1195 | 455 | 46.4 |
| 20.00 | 4 | 60 | 0.115 | 20.000 | 8.000 | 955 | 440 | 70.3 |
| 22.00 | 4 | 60 | 0.130 | 22.000 | 8.800 | 870 | 450 | 87.4 |
| 25.00 | 4 | 60 | 0.145 | 25.000 | 10.000 | 765 | 445 | 110.8 |
| 5.00 | 3 | 48 | 0.025 | 5.000 | 2.000 | 3055 | 230 | 2.3 |
| 6.00 | 3 | 48 | 0.025 | 6.000 | 2.400 | 2545 | 190 | 2.8 |
| 8.00 | 4 | 48 | 0.035 | 8.000 | 3.200 | 1910 | 265 | 6.8 |
| 10.00 | 4 | 48 | 0.045 | 10.000 | 4.000 | 1530 | 275 | 11.0 |
| 12.00 | 4 | 48 | 0.070 | 12.000 | 4.800 | 1275 | 355 | 20.5 |
| 16.00 | 4 | 48 | 0.095 | 16.000 | 6.400 | 955 | 365 | 37.2 |
| 20.00 | 4 | 48 | 0.115 | 20.000 | 8.000 | 765 | 350 | 56.2 |
| 22.00 | 4 | 48 | 0.130 | 22.000 | 8.800 | 695 | 360 | 69.9 |
| 25.00 | 4 | 48 | 0.145 | 25.000 | 10.000 | 610 | 355 | 88.6 |
| 5.00 | 3 | 25 | 0.025 | 5.000 | 2.000 | 1590 | 120 | 1.2 |
| 6.00 | 3 | 25 | 0.025 | 6.000 | 2.400 | 1325 | 100 | 1.4 |
| 8.00 | 4 | 25 | 0.035 | 8.000 | 3.200 | 995 | 140 | 3.6 |
| 10.00 | 4 | 25 | 0.045 | 10.000 | 4.000 | 795 | 145 | 5.7 |
| 12.00 | 4 | 25 | 0.070 | 12.000 | 4.800 | 665 | 185 | 10.7 |
| 16.00 | 4 | 25 | 0.095 | 16.000 | 6.400 | 495 | 190 | 19.4 |
| 20.00 | 4 | 25 | 0.115 | 20.000 | 8.000 | 400 | 185 | 29.3 |
| 22.00 | 4 | 25 | 0.130 | 22.000 | 8.800 | 360 | 190 | 36.4 |
| 25.00 | 4 | 25 | 0.145 | 25.000 | 10.000 | 320 | 185 | 46.2 |
| 5.00 | 3 | 42 | 0.025 | 5.000 | 2.000 | 2675 | 200 | 2.0 |
| 6.00 | 3 | 42 | 0.025 | 6.000 | 2.400 | 2230 | 165 | 2.4 |
| 8.00 | 4 | 42 | 0.035 | 8.000 | 3.200 | 1670 | 235 | 6.0 |
| 10.00 | 4 | 42 | 0.045 | 10.000 | 4.000 | 1335 | 240 | 9.6 |
| 12.00 | 4 | 42 | 0.070 | 12.000 | 4.800 | 1115 | 310 | 18.0 |
| 16.00 | 4 | 42 | 0.095 | 16.000 | 6.400 | 835 | 320 | 32.5 |
| 20.00 | 4 | 42 | 0.115 | 20.000 | 8.000 | 670 | 305 | 49.2 |
| 22.00 | 4 | 42 | 0.130 | 22.000 | 8.800 | 610 | 315 | 61.2 |
| 25.00 | 4 | 42 | 0.145 | 25.000 | 10.000 | 535 | 310 | 77.5 |
| 5.00 | 3 | 55 | 0.015 | 5.000 | 5.000 | 3500 | 160 | 3.9 |
| 6.00 | 3 | 55 | 0.020 | 6.000 | 6.000 | 2920 | 175 | 6.3 |
| 8.00 | 4 | 55 | 0.025 | 8.000 | 8.000 | 2190 | 220 | 14.0 |
| 10.00 | 4 | 55 | 0.035 | 10.000 | 10.000 | 1750 | 245 | 24.5 |
| 12.00 | 4 | 55 | 0.055 | 12.000 | 12.000 | 1460 | 320 | 46.2 |
| 16.00 | 4 | 55 | 0.070 | 16.000 | 16.000 | 1095 | 305 | 78.4 |
| 20.00 | 4 | 55 | 0.090 | 20.000 | 20.000 | 875 | 315 | 126.1 |
| 22.00 | 4 | 55 | 0.095 | 22.000 | 22.000 | 795 | 300 | 146.4 |
| 25.00 | 4 | 55 | 0.110 | 25.000 | 25.000 | 700 | 310 | 192.6 |
| 5.00 | 3 | 45 | 0.015 | 5.000 | 5.000 | 2865 | 130 | 3.2 |
| 6.00 | 3 | 45 | 0.020 | 6.000 | 6.000 | 2385 | 145 | 5.2 |
| 8.00 | 4 | 45 | 0.025 | 8.000 | 8.000 | 1790 | 180 | 11.5 |
| 10.00 | 4 | 45 | 0.035 | 10.000 | 10.000 | 1430 | 200 | 20.1 |
| 12.00 | 4 | 45 | 0.055 | 12.000 | 12.000 | 1195 | 265 | 37.8 |
| 16.00 | 4 | 45 | 0.070 | 16.000 | 16.000 | 895 | 250 | 64.2 |
| 20.00 | 4 | 45 | 0.090 | 20.000 | 20.000 | 715 | 260 | 103.1 |
| 22.00 | 4 | 45 | 0.095 | 22.000 | 22.000 | 650 | 245 | 119.7 |
| 25.00 | 4 | 45 | 0.110 | 25.000 | 25.000 | 575 | 250 | 157.6 |
| 5.00 | 3 | 22 | 0.015 | 5.000 | 5.000 | 1400 | 65 | 1.6 |
| 6.00 | 3 | 22 | 0.020 | 6.000 | 6.000 | 1165 | 70 | 2.5 |
| 8.00 | 4 | 22 | 0.025 | 8.000 | 8.000 | 875 | 90 | 5.6 |
| 10.00 | 4 | 22 | 0.035 | 10.000 | 10.000 | 700 | 100 | 9.8 |
| 12.00 | 4 | 22 | 0.055 | 12.000 | 12.000 | 585 | 130 | 18.5 |
| 16.00 | 4 | 22 | 0.070 | 16.000 | 16.000 | 440 | 125 | 31.4 |
| 20.00 | 4 | 22 | 0.090 | 20.000 | 20.000 | 350 | 125 | 50.4 |
| 22.00 | 4 | 22 | 0.095 | 22.000 | 22.000 | 320 | 120 | 58.5 |
| 25.00 | 4 | 22 | 0.110 | 25.000 | 25.000 | 280 | 125 | 77.0 |
| 5.00 | 3 | 36 | 0.015 | 5.000 | 5.000 | 2290 | 105 | 2.6 |
| 6.00 | 3 | 36 | 0.020 | 6.000 | 6.000 | 1910 | 115 | 4.1 |
| 8.00 | 4 | 36 | 0.025 | 8.000 | 8.000 | 1430 | 145 | 9.2 |
| 10.00 | 4 | 36 | 0.035 | 10.000 | 10.000 | 1145 | 160 | 16.0 |
| 12.00 | 4 | 36 | 0.055 | 12.000 | 12.000 | 955 | 210 | 30.3 |
| 16.00 | 4 | 36 | 0.070 | 16.000 | 16.000 | 715 | 200 | 51.3 |
| 20.00 | 4 | 36 | 0.090 | 20.000 | 20.000 | 575 | 205 | 82.5 |
| 22.00 | 4 | 36 | 0.095 | 22.000 | 22.000 | 520 | 200 | 95.8 |
| 25.00 | 4 | 36 | 0.110 | 25.000 | 25.000 | 460 | 200 | 126.1 |

Frese cilindriche

Profilata NRF, esecuzione normale

HSS

HSS
PM/F λ 25°
 γ 10°



Sgrossatura

Finitura



ReTool®

Rm
< 850

Rm
850-1100

Rm
1100-1300

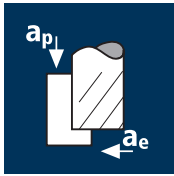
Inox
Stainless

Ti
Titanium

GG(G)

| Esempio: N° Ordine | | | | | | | | | | UNICUT-4X |
|-----------------------|-----------------------|----------------------|----------------|----------------|----------------|------|------|---|--|-----------|
| | | | | | | | | | | U0610 |
| | | | | | | | | | | EUR |
| Ø Code | d ₁ k12 | d ₂ h6 | l ₁ | l ₂ | l ₄ | 45° | α | z | | |
| 260 | 5.00 | 6.00 | 57 | 13.00 | 20.55 | 0.40 | 1.0° | 3 | | 51.70 |
| 300 | 6.00 | 6.00 | 57 | 13.00 | - | 0.40 | 0.0° | 3 | | 51.70 |
| 342 | 7.00 | 10.00 | 66 | 16.00 | 25.50 | 0.40 | 3.5° | 3 | | 53.10 |
| 391 | 8.00 | 8.00 | 63 | 19.00 | - | 0.40 | 0.0° | 4 | | 53.10 |
| 402 | 8.00 | 10.00 | 69 | 19.00 | 28.50 | 0.40 | 2.5° | 4 | | 53.10 |
| 420 | 9.00 | 10.00 | 69 | 19.00 | 28.50 | 0.40 | 1.5° | 4 | | 57.20 |
| 450 | 10.00 | 10.00 | 72 | 22.00 | - | 0.40 | 0.0° | 4 | | 57.20 |
| 470 | 11.00 | 12.00 | 79 | 22.00 | 33.50 | 0.40 | 1.0° | 4 | | 64.00 |
| 501 | 12.00 | 12.00 | 83 | 26.00 | - | 0.40 | 0.0° | 4 | | 64.00 |
| 540 | 13.00 | 12.00 | 83 | 26.00 | - | 0.40 | 0.0° | 4 | | 88.00 |
| 570 | 14.00 | 12.00 | 83 | 26.00 | - | 0.40 | 0.0° | 4 | | 88.00 |
| 581 | 15.00 | 12.00 | 83 | 26.00 | - | 0.50 | 0.0° | 4 | | 88.00 |
| 610 | 16.00 | 16.00 | 92 | 32.00 | - | 0.50 | 0.0° | 4 | | 88.00 |
| 640 | 18.00 | 16.00 | 92 | 32.00 | - | 0.50 | 0.0° | 4 | | 123.00 |
| 671 | 20.00 | 16.00 | 98 | 38.00 | - | 0.50 | 0.0° | 4 | | 123.00 |
| 682 | 20.00 | 20.00 | 104 | 38.00 | - | 0.50 | 0.0° | 4 | | 123.00 |
| 710 | 22.00 | 20.00 | 104 | 38.00 | - | 0.70 | 0.0° | 4 | | 180.00 |
| 741 | 24.00 | 20.00 | 111 | 45.00 | - | 0.70 | 0.0° | 4 | | 180.00 |
| 761 | 25.00 | 20.00 | 111 | 45.00 | - | 0.70 | 0.0° | 4 | | 180.00 |
| 772 | 25.00 | 25.00 | 121 | 45.00 | - | 0.70 | 0.0° | 4 | | 180.00 |

Applicazione



Materiale

Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 28.00 | 6 | 60 | 0.115 | 28.000 | 11.200 | 680 | 470 | 147.6 |
| 30.00 | 6 | 60 | 0.120 | 30.000 | 12.000 | 635 | 460 | 165.0 |
| 32.00 | 6 | 60 | 0.130 | 32.000 | 12.800 | 595 | 465 | 190.7 |
| 36.00 | 6 | 60 | 0.145 | 36.000 | 14.400 | 530 | 460 | 239.3 |
| 40.00 | 6 | 60 | 0.160 | 40.000 | 16.000 | 475 | 460 | 293.4 |

Acciaio
850 - 1100 N/mm²



| | | | | | | | | |
|-------|---|----|-------|--------|--------|-----|-----|-------|
| 28.00 | 6 | 48 | 0.115 | 28.000 | 11.200 | 545 | 375 | 118.1 |
| 30.00 | 6 | 48 | 0.120 | 30.000 | 12.000 | 510 | 365 | 132.0 |
| 32.00 | 6 | 48 | 0.130 | 32.000 | 12.800 | 475 | 370 | 152.5 |
| 36.00 | 6 | 48 | 0.145 | 36.000 | 14.400 | 425 | 370 | 191.4 |
| 40.00 | 6 | 48 | 0.160 | 40.000 | 16.000 | 380 | 365 | 234.7 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

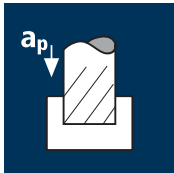


| | | | | | | | | |
|-------|---|----|-------|--------|--------|-----|-----|-------|
| 28.00 | 6 | 25 | 0.115 | 28.000 | 11.200 | 285 | 195 | 61.5 |
| 30.00 | 6 | 25 | 0.120 | 30.000 | 12.000 | 265 | 190 | 68.8 |
| 32.00 | 6 | 25 | 0.130 | 32.000 | 12.800 | 250 | 195 | 79.5 |
| 36.00 | 6 | 25 | 0.145 | 36.000 | 14.400 | 220 | 190 | 99.7 |
| 40.00 | 6 | 25 | 0.160 | 40.000 | 16.000 | 200 | 190 | 122.2 |

Ghisa
(griglia / sferoidale)



| | | | | | | | | |
|-------|---|----|-------|--------|--------|-----|-----|-------|
| 28.00 | 6 | 42 | 0.115 | 28.000 | 11.200 | 475 | 330 | 103.3 |
| 30.00 | 6 | 42 | 0.120 | 30.000 | 12.000 | 445 | 320 | 115.5 |
| 32.00 | 6 | 42 | 0.130 | 32.000 | 12.800 | 420 | 325 | 133.5 |
| 36.00 | 6 | 42 | 0.145 | 36.000 | 14.400 | 370 | 325 | 167.5 |
| 40.00 | 6 | 42 | 0.160 | 40.000 | 16.000 | 335 | 320 | 205.3 |



Acciaio
< 850 N/mm²



| | | | | | | | | |
|-------|---|----|-------|--------|--------|-----|-----|-------|
| 28.00 | 6 | 55 | 0.085 | 28.000 | 28.000 | 625 | 320 | 250.0 |
| 30.00 | 6 | 55 | 0.090 | 30.000 | 30.000 | 585 | 315 | 283.6 |
| 32.00 | 6 | 55 | 0.095 | 32.000 | 32.000 | 545 | 310 | 319.3 |
| 36.00 | 6 | 55 | 0.105 | 36.000 | 36.000 | 485 | 305 | 397.1 |
| 40.00 | 6 | 55 | 0.120 | 40.000 | 40.000 | 440 | 315 | 504.2 |

Acciaio
850 - 1100 N/mm²



| | | | | | | | | |
|-------|---|----|-------|--------|--------|-----|-----|-------|
| 28.00 | 6 | 45 | 0.085 | 28.000 | 28.000 | 510 | 260 | 204.5 |
| 30.00 | 6 | 45 | 0.090 | 30.000 | 30.000 | 475 | 260 | 232.0 |
| 32.00 | 6 | 45 | 0.095 | 32.000 | 32.000 | 450 | 255 | 261.3 |
| 36.00 | 6 | 45 | 0.105 | 36.000 | 36.000 | 400 | 250 | 324.9 |
| 40.00 | 6 | 45 | 0.120 | 40.000 | 40.000 | 360 | 260 | 412.5 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| | | | | | | | | |
|-------|---|----|-------|--------|--------|-----|-----|-------|
| 28.00 | 6 | 22 | 0.085 | 28.000 | 28.000 | 250 | 130 | 100.0 |
| 30.00 | 6 | 22 | 0.090 | 30.000 | 30.000 | 235 | 125 | 113.4 |
| 32.00 | 6 | 22 | 0.095 | 32.000 | 32.000 | 220 | 125 | 127.7 |
| 36.00 | 6 | 22 | 0.105 | 36.000 | 36.000 | 195 | 125 | 158.8 |
| 40.00 | 6 | 22 | 0.120 | 40.000 | 40.000 | 175 | 125 | 201.7 |

Ghisa
(griglia / sferoidale)



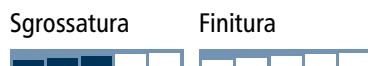
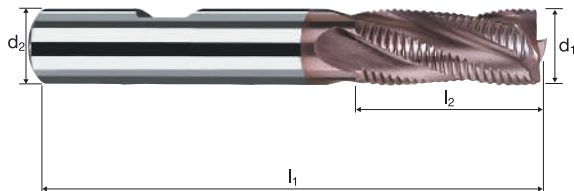
| | | | | | | | | |
|-------|---|----|-------|--------|--------|-----|-----|-------|
| 28.00 | 6 | 36 | 0.085 | 28.000 | 28.000 | 410 | 210 | 163.6 |
| 30.00 | 6 | 36 | 0.090 | 30.000 | 30.000 | 380 | 205 | 185.6 |
| 32.00 | 6 | 36 | 0.095 | 32.000 | 32.000 | 360 | 205 | 209.0 |
| 36.00 | 6 | 36 | 0.105 | 36.000 | 36.000 | 320 | 200 | 259.9 |
| 40.00 | 6 | 36 | 0.120 | 40.000 | 40.000 | 285 | 205 | 330.0 |

Frese cilindriche

Profilata NRF, esecuzione normale

HSS

HSS-E λ 25°
Co8 γ 10°



ReTool®

Rm < 850

Rm 850-1100

Rm 1100-1300

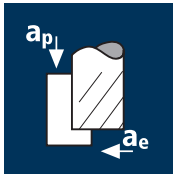
Inox
Stainless

Ti
Titanium

GG(G)

| Esempio: N° Ordine | Rivestimento | | Articolo | | Codice-ø | | UNICUT-4X | | |
|-----------------------|-----------------------|----------------------|----------------|----------------|----------------|------|-----------|-------|--------|
| | U | 0610 | 800 | | | | | U0610 | |
| Ø Code | d ₁ k12 | d ₂ h6 | l ₁ | l ₂ | l ₄ | 45° | α | z | EUR |
| 800 | 28.00 | 25.00 | 121 | 45.00 | - | 0.70 | 0.0° | 6 | 302.00 |
| 810 | 30.00 | 25.00 | 121 | 45.00 | - | 0.70 | 0.0° | 6 | 302.00 |
| 832 | 32.00 | 32.00 | 133 | 53.00 | - | 0.70 | 0.0° | 6 | 302.00 |
| 860 | 36.00 | 32.00 | 133 | 53.00 | - | 0.90 | 0.0° | 6 | 537.00 |
| 881 | 40.00 | 32.00 | 143 | 63.00 | - | 0.90 | 0.0° | 6 | 547.00 |
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| | | | | | | | | | |

Applicazione



Materiale

Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 6.00 | 4 | 64 | 0.025 | 6.000 | 2.400 | 3395 | 340 | 4.9 |
| 8.00 | 4 | 64 | 0.035 | 8.000 | 3.200 | 2545 | 355 | 9.1 |
| 10.00 | 4 | 64 | 0.045 | 10.000 | 4.000 | 2035 | 365 | 14.7 |
| 12.00 | 4 | 64 | 0.070 | 12.000 | 4.800 | 1700 | 475 | 27.4 |
| 16.00 | 4 | 64 | 0.095 | 16.000 | 6.400 | 1275 | 485 | 49.5 |
| 18.00 | 4 | 64 | 0.105 | 18.000 | 7.200 | 1130 | 475 | 61.6 |
| 20.00 | 4 | 64 | 0.115 | 20.000 | 8.000 | 1020 | 470 | 75.0 |
| 25.00 | 6 | 64 | 0.145 | 25.000 | 10.000 | 815 | 710 | 177.2 |
| 32.00 | 7 | 64 | 0.130 | 32.000 | 12.800 | 635 | 580 | 237.3 |

Acciaio
850 - 1100 N/mm²



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|-------|
| 6.00 | 4 | 52 | 0.025 | 6.000 | 2.400 | 2760 | 275 | 4.0 |
| 8.00 | 4 | 52 | 0.035 | 8.000 | 3.200 | 2070 | 290 | 7.4 |
| 10.00 | 4 | 52 | 0.045 | 10.000 | 4.000 | 1655 | 300 | 11.9 |
| 12.00 | 4 | 52 | 0.070 | 12.000 | 4.800 | 1380 | 385 | 22.2 |
| 16.00 | 4 | 52 | 0.095 | 16.000 | 6.400 | 1035 | 395 | 40.3 |
| 18.00 | 4 | 52 | 0.105 | 18.000 | 7.200 | 920 | 385 | 50.1 |
| 20.00 | 4 | 52 | 0.115 | 20.000 | 8.000 | 830 | 380 | 60.9 |
| 25.00 | 6 | 52 | 0.145 | 25.000 | 10.000 | 660 | 575 | 144.0 |
| 32.00 | 7 | 52 | 0.130 | 32.000 | 12.800 | 515 | 470 | 192.8 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

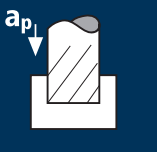


| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 6.00 | 4 | 26 | 0.025 | 6.000 | 2.400 | 1380 | 140 | 2.0 |
| 8.00 | 4 | 26 | 0.035 | 8.000 | 3.200 | 1035 | 145 | 3.7 |
| 10.00 | 4 | 26 | 0.045 | 10.000 | 4.000 | 830 | 150 | 6.0 |
| 12.00 | 4 | 26 | 0.070 | 12.000 | 4.800 | 690 | 195 | 11.1 |
| 16.00 | 4 | 26 | 0.095 | 16.000 | 6.400 | 515 | 195 | 20.1 |
| 18.00 | 4 | 26 | 0.105 | 18.000 | 7.200 | 460 | 195 | 25.0 |
| 20.00 | 4 | 26 | 0.115 | 20.000 | 8.000 | 415 | 190 | 30.5 |
| 25.00 | 6 | 26 | 0.145 | 25.000 | 10.000 | 330 | 290 | 72.0 |
| 32.00 | 7 | 26 | 0.130 | 32.000 | 12.800 | 260 | 235 | 96.4 |

Inox medium
[Cr-Ni-Mo+/1.4539]
Acciaio duplex
[17-4 PH]



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 6.00 | 4 | 22 | 0.025 | 6.000 | 2.400 | 1165 | 115 | 1.7 |
| 8.00 | 4 | 22 | 0.035 | 8.000 | 3.200 | 875 | 125 | 3.1 |
| 10.00 | 4 | 22 | 0.045 | 10.000 | 4.000 | 700 | 125 | 5.0 |
| 12.00 | 4 | 22 | 0.070 | 12.000 | 4.800 | 585 | 165 | 9.4 |
| 16.00 | 4 | 22 | 0.095 | 16.000 | 6.400 | 440 | 165 | 17.0 |
| 18.00 | 4 | 22 | 0.105 | 18.000 | 7.200 | 390 | 165 | 21.2 |
| 20.00 | 4 | 22 | 0.115 | 20.000 | 8.000 | 350 | 160 | 25.8 |
| 25.00 | 6 | 22 | 0.145 | 25.000 | 10.000 | 280 | 245 | 60.9 |
| 32.00 | 7 | 22 | 0.130 | 32.000 | 12.800 | 220 | 200 | 81.6 |



Acciaio
< 850 N/mm²



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|-------|
| 6.00 | 4 | 58 | 0.020 | 6.000 | 6.000 | 3075 | 245 | 8.9 |
| 8.00 | 4 | 58 | 0.025 | 8.000 | 8.000 | 2310 | 230 | 14.8 |
| 10.00 | 4 | 58 | 0.035 | 10.000 | 10.000 | 1845 | 260 | 25.8 |
| 12.00 | 4 | 58 | 0.055 | 12.000 | 12.000 | 1540 | 340 | 48.7 |
| 16.00 | 4 | 58 | 0.070 | 16.000 | 16.000 | 1155 | 325 | 82.7 |
| 18.00 | 4 | 58 | 0.080 | 18.000 | 18.000 | 1025 | 330 | 106.3 |
| 20.00 | 4 | 58 | 0.090 | 20.000 | 20.000 | 925 | 330 | 132.9 |

Acciaio
850 - 1100 N/mm²



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|-------|
| 6.00 | 4 | 48 | 0.020 | 6.000 | 6.000 | 2545 | 205 | 7.3 |
| 8.00 | 4 | 48 | 0.025 | 8.000 | 8.000 | 1910 | 190 | 12.2 |
| 10.00 | 4 | 48 | 0.035 | 10.000 | 10.000 | 1530 | 215 | 21.4 |
| 12.00 | 4 | 48 | 0.055 | 12.000 | 12.000 | 1275 | 280 | 40.3 |
| 16.00 | 4 | 48 | 0.070 | 16.000 | 16.000 | 955 | 265 | 68.4 |
| 18.00 | 4 | 48 | 0.080 | 18.000 | 18.000 | 850 | 270 | 88.0 |
| 20.00 | 4 | 48 | 0.090 | 20.000 | 20.000 | 765 | 275 | 110.0 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 6.00 | 4 | 23 | 0.020 | 6.000 | 6.000 | 1220 | 100 | 3.5 |
| 8.00 | 4 | 23 | 0.025 | 8.000 | 8.000 | 915 | 90 | 5.9 |
| 10.00 | 4 | 23 | 0.035 | 10.000 | 10.000 | 730 | 100 | 10.2 |
| 12.00 | 4 | 23 | 0.055 | 12.000 | 12.000 | 610 | 135 | 19.3 |
| 16.00 | 4 | 23 | 0.070 | 16.000 | 16.000 | 460 | 130 | 32.8 |
| 18.00 | 4 | 23 | 0.080 | 18.000 | 18.000 | 405 | 130 | 42.2 |
| 20.00 | 4 | 23 | 0.090 | 20.000 | 20.000 | 365 | 130 | 52.7 |

Inox medium
[Cr-Ni-Mo+/1.4539]
Acciaio duplex
[17-4 PH]



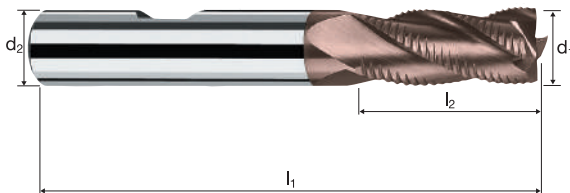
| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 6.00 | 4 | 20 | 0.020 | 6.000 | 6.000 | 1060 | 85 | 3.1 |
| 8.00 | 4 | 20 | 0.025 | 8.000 | 8.000 | 795 | 80 | 5.1 |
| 10.00 | 4 | 20 | 0.035 | 10.000 | 10.000 | 635 | 90 | 8.9 |
| 12.00 | 4 | 20 | 0.055 | 12.000 | 12.000 | 530 | 115 | 16.8 |
| 16.00 | 4 | 20 | 0.070 | 16.000 | 16.000 | 400 | 110 | 28.5 |
| 18.00 | 4 | 20 | 0.080 | 18.000 | 18.000 | 355 | 115 | 36.7 |
| 20.00 | 4 | 20 | 0.090 | 20.000 | 20.000 | 320 | 115 | 45.8 |

Frese cilindriche

Profilata NRF, esecuzione normale

HSS

HSS-E λ 30°
Co8 γ 12°



Sgrossatura

Finitura



ReTool®

Rm

< 850

Rm

850-1100

Rm

1100-1300

Inox

Stainless

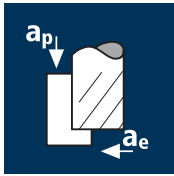
Ti

Titanium

GG(G)

| Esempio: N° Ordine | | | | | | | | | | UNICUT-4X |
|--------------------|--------------------|-------------------|----------------|----------------|----------------|------|------|---|--|-----------|
| | | | | | | | | | | U0609 |
| | | | | | | | | | | EUR |
| Ø Code | d ₁ k12 | d ₂ h6 | l ₁ | l ₂ | l ₄ | 45° | α | z | | |
| 300 | 6.00 | 6.00 | 57 | 13.00 | - | 0.40 | 0.0° | 4 | | 46.90 |
| 342 | 7.00 | 10.00 | 66 | 16.00 | 25.50 | 0.40 | 3.0° | 4 | | 48.20 |
| 402 | 8.00 | 10.00 | 69 | 19.00 | 28.50 | 0.40 | 2.5° | 4 | | 48.20 |
| 420 | 9.00 | 10.00 | 69 | 19.00 | 28.50 | 0.40 | 1.5° | 4 | | 51.90 |
| 450 | 10.00 | 10.00 | 72 | 22.00 | - | 0.40 | 0.0° | 4 | | 51.90 |
| 470 | 11.00 | 12.00 | 79 | 22.00 | 33.50 | 0.40 | 1.0° | 4 | | 58.30 |
| 501 | 12.00 | 12.00 | 83 | 26.00 | - | 0.40 | 0.0° | 4 | | 58.30 |
| 540 | 13.00 | 12.00 | 83 | 26.00 | - | 0.40 | 0.0° | 4 | | 79.00 |
| 570 | 14.00 | 12.00 | 83 | 26.00 | - | 0.40 | 0.0° | 4 | | 79.00 |
| 592 | 15.00 | 16.00 | 86 | 26.00 | 37.50 | 0.50 | 1.0° | 4 | | 79.00 |
| 610 | 16.00 | 16.00 | 92 | 32.00 | - | 0.50 | 0.0° | 4 | | 79.00 |
| 640 | 18.00 | 16.00 | 92 | 32.00 | - | 0.50 | 0.0° | 4 | | 111.00 |
| 682 | 20.00 | 20.00 | 104 | 38.00 | - | 0.50 | 0.0° | 4 | | 111.00 |
| 686 | 20.00 | 20.00 | 104 | 38.00 | - | 0.50 | 0.0° | 6 | | 111.00 |
| 710 | 22.00 | 20.00 | 104 | 38.00 | - | 0.70 | 0.0° | 6 | | 163.00 |
| 772 | 25.00 | 25.00 | 121 | 45.00 | - | 0.70 | 0.0° | 6 | | 163.00 |
| 832 | 32.00 | 32.00 | 133 | 53.00 | - | 0.70 | 0.0° | 7 | | 274.00 |

Applicazione



Materiale

Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 8.00 | 4 | 65 | 0.035 | 8.000 | 3.200 | 2585 | 360 | 9.3 |
| 10.00 | 4 | 65 | 0.045 | 10.000 | 4.000 | 2070 | 370 | 14.9 |
| 12.00 | 4 | 65 | 0.070 | 12.000 | 4.800 | 1725 | 485 | 27.8 |
| 16.00 | 4 | 65 | 0.095 | 16.000 | 6.400 | 1295 | 490 | 50.3 |
| 20.00 | 4 | 65 | 0.115 | 20.000 | 8.000 | 1035 | 475 | 76.1 |
| 25.00 | 6 | 65 | 0.145 | 25.000 | 10.000 | 830 | 720 | 180.0 |
| 32.00 | 7 | 65 | 0.130 | 32.000 | 12.800 | 645 | 590 | 241.0 |

Acciaio
850 - 1100 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 8.00 | 4 | 54 | 0.035 | 8.000 | 3.200 | 2150 | 300 | 7.7 |
| 10.00 | 4 | 54 | 0.045 | 10.000 | 4.000 | 1720 | 310 | 12.4 |
| 12.00 | 4 | 54 | 0.070 | 12.000 | 4.800 | 1430 | 400 | 23.1 |
| 16.00 | 4 | 54 | 0.095 | 16.000 | 6.400 | 1075 | 410 | 41.8 |
| 20.00 | 4 | 54 | 0.115 | 20.000 | 8.000 | 860 | 395 | 63.3 |
| 25.00 | 6 | 54 | 0.145 | 25.000 | 10.000 | 690 | 600 | 149.5 |
| 32.00 | 7 | 54 | 0.130 | 32.000 | 12.800 | 535 | 490 | 200.2 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 8.00 | 4 | 28 | 0.035 | 8.000 | 3.200 | 1115 | 155 | 4.0 |
| 10.00 | 4 | 28 | 0.045 | 10.000 | 4.000 | 890 | 160 | 6.4 |
| 12.00 | 4 | 28 | 0.070 | 12.000 | 4.800 | 745 | 210 | 12.0 |
| 16.00 | 4 | 28 | 0.095 | 16.000 | 6.400 | 555 | 210 | 21.7 |
| 20.00 | 4 | 28 | 0.115 | 20.000 | 8.000 | 445 | 205 | 32.8 |
| 25.00 | 6 | 28 | 0.145 | 25.000 | 10.000 | 355 | 310 | 77.5 |
| 32.00 | 7 | 28 | 0.130 | 32.000 | 12.800 | 280 | 255 | 103.8 |

Inox medium
[Cr-Ni-Mo+/1.4539]
Acciaio duplex
[17-4 PH]



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 8.00 | 4 | 22 | 0.035 | 8.000 | 3.200 | 875 | 125 | 3.1 |
| 10.00 | 4 | 22 | 0.045 | 10.000 | 4.000 | 700 | 125 | 5.0 |
| 12.00 | 4 | 22 | 0.070 | 12.000 | 4.800 | 585 | 165 | 9.4 |
| 16.00 | 4 | 22 | 0.095 | 16.000 | 6.400 | 440 | 165 | 17.0 |
| 20.00 | 4 | 22 | 0.115 | 20.000 | 8.000 | 350 | 160 | 25.8 |
| 25.00 | 6 | 22 | 0.145 | 25.000 | 10.000 | 280 | 245 | 60.9 |
| 32.00 | 7 | 22 | 0.130 | 32.000 | 12.800 | 220 | 200 | 81.6 |



Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 8.00 | 4 | 60 | 0.025 | 8.000 | 8.000 | 2385 | 240 | 15.3 |
| 10.00 | 4 | 60 | 0.035 | 10.000 | 10.000 | 1910 | 265 | 26.7 |
| 12.00 | 4 | 60 | 0.055 | 12.000 | 12.000 | 1590 | 350 | 50.4 |
| 16.00 | 4 | 60 | 0.070 | 16.000 | 16.000 | 1195 | 335 | 85.6 |
| 20.00 | 4 | 60 | 0.090 | 20.000 | 20.000 | 955 | 345 | 137.5 |
| 25.00 | 6 | 60 | 0.110 | 25.000 | 25.000 | 765 | 505 | 315.1 |
| 32.00 | 7 | 60 | 0.095 | 32.000 | 32.000 | 595 | 395 | 406.4 |

Acciaio
850 - 1100 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 8.00 | 4 | 50 | 0.025 | 8.000 | 8.000 | 1990 | 200 | 12.7 |
| 10.00 | 4 | 50 | 0.035 | 10.000 | 10.000 | 1590 | 225 | 22.3 |
| 12.00 | 4 | 50 | 0.055 | 12.000 | 12.000 | 1325 | 290 | 42.0 |
| 16.00 | 4 | 50 | 0.070 | 16.000 | 16.000 | 995 | 280 | 71.3 |
| 20.00 | 4 | 50 | 0.090 | 20.000 | 20.000 | 795 | 285 | 114.6 |
| 25.00 | 6 | 50 | 0.110 | 25.000 | 25.000 | 635 | 420 | 262.6 |
| 32.00 | 7 | 50 | 0.095 | 32.000 | 32.000 | 495 | 330 | 338.7 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 8.00 | 4 | 25 | 0.025 | 8.000 | 8.000 | 995 | 100 | 6.4 |
| 10.00 | 4 | 25 | 0.035 | 10.000 | 10.000 | 795 | 110 | 11.1 |
| 12.00 | 4 | 25 | 0.055 | 12.000 | 12.000 | 665 | 145 | 21.0 |
| 16.00 | 4 | 25 | 0.070 | 16.000 | 16.000 | 495 | 140 | 35.7 |
| 20.00 | 4 | 25 | 0.090 | 20.000 | 20.000 | 400 | 145 | 57.3 |
| 25.00 | 6 | 25 | 0.110 | 25.000 | 25.000 | 320 | 210 | 131.3 |
| 32.00 | 7 | 25 | 0.095 | 32.000 | 32.000 | 250 | 165 | 169.3 |

Inox medium
[Cr-Ni-Mo+/1.4539]
Acciaio duplex
[17-4 PH]



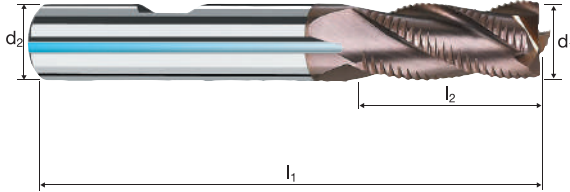
| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 8.00 | 4 | 20 | 0.025 | 8.000 | 8.000 | 795 | 80 | 5.1 |
| 10.00 | 4 | 20 | 0.035 | 10.000 | 10.000 | 635 | 90 | 8.9 |
| 12.00 | 4 | 20 | 0.055 | 12.000 | 12.000 | 530 | 115 | 16.8 |
| 16.00 | 4 | 20 | 0.070 | 16.000 | 16.000 | 400 | 110 | 28.5 |
| 20.00 | 4 | 20 | 0.090 | 20.000 | 20.000 | 320 | 115 | 45.8 |
| 25.00 | 6 | 20 | 0.110 | 25.000 | 25.000 | 255 | 170 | 105.0 |
| 32.00 | 7 | 20 | 0.095 | 32.000 | 32.000 | 200 | 130 | 135.5 |

Frese cilindriche

Profilata NRF, esecuzione normale, Pericool

HSS

HSS-E λ 30°
Co8 γ 12°



Sgrossatura



Finitura



ReTool®

Rm
< 850

Rm
850-1100

Rm
1100-1300

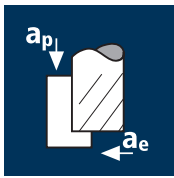
Inox
Stainless

Ti
Titanium

GG(G)

| | | | | | | | | | | UNICUT-4X |
|-----------------------|--------------|-------------|-------|-------|-------|------|----------|---|--|--------------|
| Esempio: N° Ordine | | | | | | | | | | U0695 |
| | | | | | | | | | | EUR |
| \emptyset Code | d_1 k12 | d_2 h6 | l_1 | l_2 | l_4 | 45° | α | z | | |
| 402 | 8.00 | 10.00 | 69 | 19.00 | 69.00 | 0.40 | 1.0° | 4 | | 63.00 |
| 450 | 10.00 | 10.00 | 72 | 22.00 | - | 0.40 | 0.0° | 4 | | 68.00 |
| 501 | 12.00 | 12.00 | 83 | 26.00 | - | 0.40 | 0.0° | 4 | | 76.00 |
| 610 | 16.00 | 16.00 | 92 | 32.00 | - | 0.50 | 0.0° | 4 | | 104.00 |
| 682 | 20.00 | 20.00 | 104 | 38.00 | - | 0.50 | 0.0° | 4 | | 145.00 |
| 772 | 25.00 | 25.00 | 121 | 45.00 | - | 0.70 | 0.0° | 6 | | 213.00 |
| 832 | 32.00 | 32.00 | 133 | 53.00 | - | 0.70 | 0.0° | 7 | | 358.00 |
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Applicazione



Materiale

Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 6.00 | 4 | 180 | 0.035 | 9.600 | 1.200 | 9550 | 1335 | 15.4 |
| 8.00 | 4 | 180 | 0.045 | 12.800 | 1.600 | 7160 | 1290 | 26.4 |
| 10.00 | 4 | 180 | 0.060 | 16.000 | 2.000 | 5730 | 1375 | 44.0 |
| 12.00 | 4 | 180 | 0.070 | 19.200 | 2.400 | 4775 | 1335 | 61.6 |
| 16.00 | 4 | 180 | 0.075 | 25.600 | 3.200 | 3580 | 1075 | 88.0 |
| 20.00 | 4 | 180 | 0.080 | 32.000 | 4.000 | 2865 | 915 | 117.3 |

Acciaio
850 - 1100 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 6.00 | 4 | 130 | 0.035 | 9.600 | 1.200 | 6895 | 965 | 11.1 |
| 8.00 | 4 | 130 | 0.045 | 12.800 | 1.600 | 5175 | 930 | 19.1 |
| 10.00 | 4 | 130 | 0.060 | 16.000 | 2.000 | 4140 | 995 | 31.8 |
| 12.00 | 4 | 130 | 0.070 | 19.200 | 2.400 | 3450 | 965 | 44.5 |
| 16.00 | 4 | 130 | 0.075 | 25.600 | 3.200 | 2585 | 775 | 63.6 |
| 20.00 | 4 | 130 | 0.080 | 32.000 | 4.000 | 2070 | 660 | 84.7 |

Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 6.00 | 4 | 45 | 0.025 | 9.600 | 1.200 | 2385 | 240 | 2.8 |
| 8.00 | 4 | 45 | 0.035 | 12.800 | 1.600 | 1790 | 250 | 5.1 |
| 10.00 | 4 | 45 | 0.045 | 16.000 | 2.000 | 1430 | 260 | 8.3 |
| 12.00 | 4 | 45 | 0.055 | 19.200 | 2.400 | 1195 | 265 | 12.1 |
| 16.00 | 4 | 45 | 0.060 | 25.600 | 3.200 | 895 | 215 | 17.6 |
| 20.00 | 4 | 45 | 0.065 | 32.000 | 4.000 | 715 | 185 | 23.8 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 6.00 | 4 | 60 | 0.025 | 9.600 | 1.200 | 3185 | 320 | 3.7 |
| 8.00 | 4 | 60 | 0.035 | 12.800 | 1.600 | 2385 | 335 | 6.8 |
| 10.00 | 4 | 60 | 0.045 | 16.000 | 2.000 | 1910 | 345 | 11.0 |
| 12.00 | 4 | 60 | 0.055 | 19.200 | 2.400 | 1590 | 350 | 16.1 |
| 16.00 | 4 | 60 | 0.060 | 25.600 | 3.200 | 1195 | 285 | 23.5 |
| 20.00 | 4 | 60 | 0.065 | 32.000 | 4.000 | 955 | 250 | 31.8 |



Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 6.00 | 4 | 150 | 0.030 | 3.300 | 6.000 | 7960 | 955 | 18.9 |
| 8.00 | 4 | 150 | 0.040 | 4.400 | 8.000 | 5970 | 955 | 33.6 |
| 10.00 | 4 | 150 | 0.050 | 5.500 | 10.000 | 4775 | 955 | 52.5 |
| 12.00 | 4 | 150 | 0.055 | 6.600 | 12.000 | 3980 | 875 | 69.3 |
| 16.00 | 4 | 150 | 0.055 | 8.800 | 16.000 | 2985 | 655 | 92.4 |
| 20.00 | 4 | 150 | 0.060 | 11.000 | 20.000 | 2385 | 575 | 126.1 |

Acciaio
850 - 1100 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 6.00 | 4 | 80 | 0.030 | 3.300 | 6.000 | 4245 | 510 | 10.1 |
| 8.00 | 4 | 80 | 0.040 | 4.400 | 8.000 | 3185 | 510 | 17.9 |
| 10.00 | 4 | 80 | 0.050 | 5.500 | 10.000 | 2545 | 510 | 28.0 |
| 12.00 | 4 | 80 | 0.055 | 6.600 | 12.000 | 2120 | 465 | 37.0 |
| 16.00 | 4 | 80 | 0.055 | 8.800 | 16.000 | 1590 | 350 | 49.3 |
| 20.00 | 4 | 80 | 0.060 | 11.000 | 20.000 | 1275 | 305 | 67.2 |

Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 6.00 | 4 | 35 | 0.025 | 3.300 | 6.000 | 1855 | 185 | 3.7 |
| 8.00 | 4 | 35 | 0.030 | 4.400 | 8.000 | 1395 | 165 | 5.9 |
| 10.00 | 4 | 35 | 0.040 | 5.500 | 10.000 | 1115 | 180 | 9.8 |
| 12.00 | 4 | 35 | 0.045 | 6.600 | 12.000 | 930 | 165 | 13.2 |
| 16.00 | 4 | 35 | 0.045 | 8.800 | 16.000 | 695 | 125 | 17.6 |
| 20.00 | 4 | 35 | 0.050 | 11.000 | 20.000 | 555 | 110 | 24.5 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



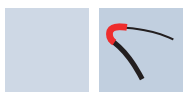
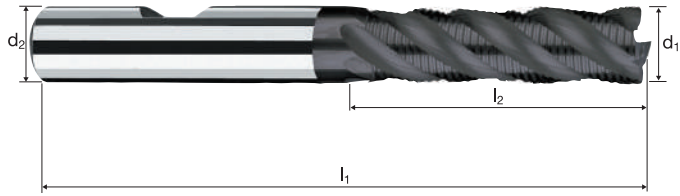
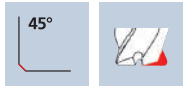
| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 6.00 | 4 | 50 | 0.025 | 3.300 | 6.000 | 2655 | 265 | 5.3 |
| 8.00 | 4 | 50 | 0.030 | 4.400 | 8.000 | 1990 | 240 | 8.4 |
| 10.00 | 4 | 50 | 0.040 | 5.500 | 10.000 | 1590 | 255 | 14.0 |
| 12.00 | 4 | 50 | 0.045 | 6.600 | 12.000 | 1325 | 240 | 18.9 |
| 16.00 | 4 | 50 | 0.045 | 8.800 | 16.000 | 995 | 180 | 25.2 |
| 20.00 | 4 | 50 | 0.050 | 11.000 | 20.000 | 795 | 160 | 35.0 |

Frese cilindriche SupraCarb®

Profilata, esecuzione medio-lunga



HM λ 38°
MG10 γ 0°



Sgrossatura **Finitura**

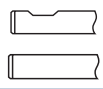


| | | | | | | | | | |
|--------------------|-----------------------|------------------------|--|--|--|--|--------------------------|-----------------------|----------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | | | | | Inox Stainless | Ti Titanium | GG(G) Tool Steel |
|--------------------|-----------------------|------------------------|--|--|--|--|--------------------------|-----------------------|----------------------------|

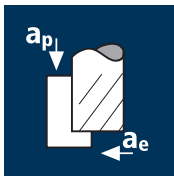
| Ø Code | d ₁ e8 | d ₂ h6 | l ₁ | l ₂ | 45° | z | POLYCHROM | |
|------------|----------------------|----------------------|----------------|----------------|------|---|-----------|---------------|
| | | | | | | | | |
| | | | | | | | | P15338 |
| | | | | | | | | P15238 |
| | | | | | | | | EUR |
| 300 | 6.00 | 6.00 | 63 | 19.00 | 0.35 | 4 | | 89.00 |
| 391 | 8.00 | 8.00 | 72 | 28.00 | 0.45 | 4 | | 109.00 |
| 450 | 10.00 | 10.00 | 84 | 34.00 | 0.60 | 4 | | 124.00 |
| 501 | 12.00 | 12.00 | 97 | 40.00 | 0.60 | 4 | | 160.00 |
| 610 | 16.00 | 16.00 | 108 | 48.00 | 0.70 | 4 | | 278.00 |
| 682 | 20.00 | 20.00 | 122 | 56.00 | 0.70 | 4 | | 402.00 |
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Esempio:
N° Ordine

Rivestimento: **P** Articolo: **15338** Codice-Ø: **300**



Applicazione



Materiale

Acciaio
< 850 N/mm²



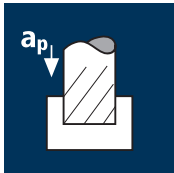
Acciaio
850 - 1100 N/mm²



Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Acciaio
< 850 N/mm²



Acciaio
850 - 1100 N/mm²



Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



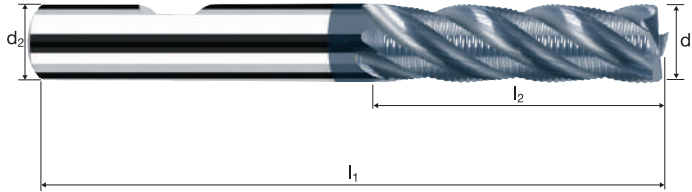
| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 3.00 | 3 | 180 | 0.015 | 4.800 | 0.600 | 19100 | 860 | 2.5 |
| 4.00 | 3 | 180 | 0.020 | 6.400 | 0.800 | 14325 | 860 | 4.4 |
| 5.00 | 4 | 180 | 0.025 | 8.000 | 1.000 | 11460 | 1145 | 9.2 |
| 6.00 | 4 | 180 | 0.035 | 9.600 | 1.200 | 9550 | 1335 | 15.4 |
| 8.00 | 4 | 180 | 0.045 | 12.800 | 1.600 | 7160 | 1290 | 26.4 |
| 10.00 | 4 | 180 | 0.060 | 16.000 | 2.000 | 5730 | 1375 | 44.0 |
| 12.00 | 4 | 180 | 0.070 | 19.200 | 2.400 | 4775 | 1335 | 61.6 |
| 16.00 | 4 | 180 | 0.075 | 25.600 | 3.200 | 3580 | 1075 | 88.0 |
| 20.00 | 4 | 180 | 0.080 | 32.000 | 4.000 | 2865 | 915 | 117.3 |
| 3.00 | 3 | 130 | 0.015 | 4.800 | 0.600 | 13795 | 620 | 1.8 |
| 4.00 | 3 | 130 | 0.020 | 6.400 | 0.800 | 10345 | 620 | 3.2 |
| 5.00 | 4 | 130 | 0.025 | 8.000 | 1.000 | 8275 | 830 | 6.6 |
| 6.00 | 4 | 130 | 0.035 | 9.600 | 1.200 | 6895 | 965 | 11.1 |
| 8.00 | 4 | 130 | 0.045 | 12.800 | 1.600 | 5175 | 930 | 19.1 |
| 10.00 | 4 | 130 | 0.060 | 16.000 | 2.000 | 4140 | 995 | 31.8 |
| 12.00 | 4 | 130 | 0.070 | 19.200 | 2.400 | 3450 | 965 | 44.5 |
| 16.00 | 4 | 130 | 0.075 | 25.600 | 3.200 | 2585 | 775 | 63.6 |
| 20.00 | 4 | 130 | 0.080 | 32.000 | 4.000 | 2070 | 660 | 84.7 |
| 3.00 | 3 | 45 | 0.010 | 4.800 | 0.600 | 4775 | 145 | 0.4 |
| 4.00 | 3 | 45 | 0.015 | 6.400 | 0.800 | 3580 | 160 | 0.8 |
| 5.00 | 4 | 45 | 0.020 | 8.000 | 1.000 | 2865 | 230 | 1.8 |
| 6.00 | 4 | 45 | 0.025 | 9.600 | 1.200 | 2385 | 240 | 2.8 |
| 8.00 | 4 | 45 | 0.035 | 12.800 | 1.600 | 1790 | 250 | 5.1 |
| 10.00 | 4 | 45 | 0.045 | 16.000 | 2.000 | 1430 | 260 | 8.3 |
| 12.00 | 4 | 45 | 0.055 | 19.200 | 2.400 | 1195 | 265 | 12.1 |
| 16.00 | 4 | 45 | 0.060 | 25.600 | 3.200 | 895 | 215 | 17.6 |
| 20.00 | 4 | 45 | 0.065 | 32.000 | 4.000 | 715 | 185 | 23.8 |
| 3.00 | 3 | 55 | 0.010 | 4.800 | 0.600 | 5835 | 175 | 0.5 |
| 4.00 | 3 | 55 | 0.015 | 6.400 | 0.800 | 4375 | 195 | 1.0 |
| 5.00 | 4 | 55 | 0.020 | 8.000 | 1.000 | 3500 | 280 | 2.2 |
| 6.00 | 4 | 55 | 0.025 | 9.600 | 1.200 | 2920 | 290 | 3.4 |
| 8.00 | 4 | 55 | 0.035 | 12.800 | 1.600 | 2190 | 305 | 6.3 |
| 10.00 | 4 | 55 | 0.045 | 16.000 | 2.000 | 1750 | 315 | 10.1 |
| 12.00 | 4 | 55 | 0.055 | 19.200 | 2.400 | 1460 | 320 | 14.8 |
| 16.00 | 4 | 55 | 0.060 | 25.600 | 3.200 | 1095 | 265 | 21.5 |
| 20.00 | 4 | 55 | 0.065 | 32.000 | 4.000 | 875 | 230 | 29.1 |
| 3.00 | 3 | 150 | 0.015 | 1.650 | 3.000 | 15915 | 715 | 3.5 |
| 4.00 | 3 | 150 | 0.020 | 2.200 | 4.000 | 11935 | 715 | 6.3 |
| 5.00 | 4 | 150 | 0.025 | 2.750 | 5.000 | 9550 | 955 | 13.1 |
| 6.00 | 4 | 150 | 0.030 | 3.300 | 6.000 | 7960 | 955 | 18.9 |
| 8.00 | 4 | 150 | 0.040 | 4.400 | 8.000 | 5970 | 955 | 33.6 |
| 10.00 | 4 | 150 | 0.050 | 5.500 | 10.000 | 4775 | 955 | 52.5 |
| 12.00 | 4 | 150 | 0.055 | 6.600 | 12.000 | 3980 | 875 | 69.3 |
| 16.00 | 4 | 150 | 0.055 | 8.800 | 16.000 | 2985 | 655 | 92.4 |
| 20.00 | 4 | 150 | 0.060 | 11.000 | 20.000 | 2385 | 575 | 126.1 |
| 3.00 | 3 | 80 | 0.015 | 1.650 | 3.000 | 8490 | 380 | 1.9 |
| 4.00 | 3 | 80 | 0.020 | 2.200 | 4.000 | 6365 | 380 | 3.4 |
| 5.00 | 4 | 80 | 0.025 | 2.750 | 5.000 | 5095 | 510 | 7.0 |
| 6.00 | 4 | 80 | 0.030 | 3.300 | 6.000 | 4245 | 510 | 10.1 |
| 8.00 | 4 | 80 | 0.040 | 4.400 | 8.000 | 3185 | 510 | 17.9 |
| 10.00 | 4 | 80 | 0.050 | 5.500 | 10.000 | 2545 | 510 | 28.0 |
| 12.00 | 4 | 80 | 0.055 | 6.600 | 12.000 | 2120 | 465 | 37.0 |
| 16.00 | 4 | 80 | 0.055 | 8.800 | 16.000 | 1590 | 350 | 49.3 |
| 20.00 | 4 | 80 | 0.060 | 11.000 | 20.000 | 1275 | 305 | 67.2 |
| 3.00 | 3 | 35 | 0.010 | 1.650 | 3.000 | 3715 | 110 | 0.6 |
| 4.00 | 3 | 35 | 0.015 | 2.200 | 4.000 | 2785 | 125 | 1.1 |
| 5.00 | 4 | 35 | 0.020 | 2.750 | 5.000 | 2230 | 180 | 2.5 |
| 6.00 | 4 | 35 | 0.025 | 3.300 | 6.000 | 1855 | 185 | 3.7 |
| 8.00 | 4 | 35 | 0.030 | 4.400 | 8.000 | 1395 | 165 | 5.9 |
| 10.00 | 4 | 35 | 0.040 | 5.500 | 10.000 | 1115 | 180 | 9.8 |
| 12.00 | 4 | 35 | 0.045 | 6.600 | 12.000 | 930 | 165 | 13.2 |
| 16.00 | 4 | 35 | 0.045 | 8.800 | 16.000 | 695 | 125 | 17.6 |
| 20.00 | 4 | 35 | 0.050 | 11.000 | 20.000 | 555 | 110 | 24.5 |
| 3.00 | 3 | 45 | 0.010 | 1.650 | 3.000 | 4775 | 145 | 0.7 |
| 4.00 | 3 | 45 | 0.015 | 2.200 | 4.000 | 3580 | 160 | 1.4 |
| 5.00 | 4 | 45 | 0.020 | 2.750 | 5.000 | 2865 | 230 | 3.2 |
| 6.00 | 4 | 45 | 0.025 | 3.300 | 6.000 | 2385 | 240 | 4.7 |
| 8.00 | 4 | 45 | 0.030 | 4.400 | 8.000 | 1790 | 215 | 7.6 |
| 10.00 | 4 | 45 | 0.040 | 5.500 | 10.000 | 1430 | 230 | 12.6 |
| 12.00 | 4 | 45 | 0.045 | 6.600 | 12.000 | 1195 | 215 | 17.0 |
| 16.00 | 4 | 45 | 0.045 | 8.800 | 16.000 | 895 | 160 | 22.7 |
| 20.00 | 4 | 45 | 0.050 | 11.000 | 20.000 | 715 | 145 | 31.5 |

Frese cilindriche

A taglienti lisci, esecuzione medio-lunga



HM λ 38°
MG10 γ 0°



Sgrossatura



Finitura

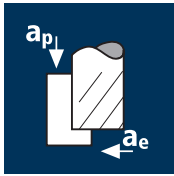


ReTool®

| | | | | | | | | | |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|-------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | | | | | Inox Stainless | Ti Titanium | GG(G) |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|-------|

| Esempio: N° Ordine | | Rivestimento P | Articolo 45372 | Codice-Ø 180 | | | | | | | | POLYCHROM |
|-----------------------|----------------------|----------------------|-------------------|-----------------|----------------|----------------|----------------|------|------|---|--|-----------|
| Ø Code | d ₁ e8 | d ₂ h6 | | | l ₁ | l ₂ | l ₄ | 45° | α | z | | EUR |
| 180 | 3.00 | 6.00 | | | 63 | 14.00 | 21.56 | 0.25 | 6.0° | 3 | | 79.00 |
| 220 | 4.00 | 6.00 | | | 63 | 17.00 | 23.09 | 0.30 | 4.0° | 3 | | 79.00 |
| 260 | 5.00 | 6.00 | | | 63 | 19.00 | 23.22 | 0.35 | 2.0° | 4 | | 79.00 |
| 300 | 6.00 | 6.00 | | | 63 | 19.00 | - | 0.35 | 0.0° | 4 | | 79.00 |
| 391 | 8.00 | 8.00 | | | 72 | 28.00 | - | 0.45 | 0.0° | 4 | | 97.00 |
| 450 | 10.00 | 10.00 | | | 84 | 34.00 | - | 0.60 | 0.0° | 4 | | 110.00 |
| 501 | 12.00 | 12.00 | | | 97 | 40.00 | - | 0.60 | 0.0° | 4 | | 142.00 |
| 610 | 16.00 | 16.00 | | | 108 | 48.00 | - | 0.70 | 0.0° | 4 | | 247.00 |
| 612 | 16.00 | 16.00 | | | 108 | 48.00 | - | 0.70 | 0.0° | 6 | | 247.00 |
| 682 | 20.00 | 20.00 | | | 122 | 56.00 | - | 0.70 | 0.0° | 4 | | 357.00 |
| 684 | 20.00 | 20.00 | | | 122 | 56.00 | - | 0.70 | 0.0° | 6 | | 357.00 |
| | | | | | | | | | | | | |
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Applicazione



Materiale

Acciaio
850 - 1100 N/mm²



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 6.00 | 4 | 38 | 0.025 | 12.000 | 1.500 | 2015 | 200 | 3.6 |
| 8.00 | 4 | 38 | 0.030 | 16.000 | 2.000 | 1510 | 180 | 5.8 |
| 10.00 | 4 | 38 | 0.040 | 20.000 | 2.500 | 1210 | 195 | 9.7 |
| 12.00 | 4 | 38 | 0.060 | 24.000 | 3.000 | 1010 | 240 | 17.4 |
| 16.00 | 4 | 38 | 0.085 | 32.000 | 4.000 | 755 | 255 | 32.9 |
| 20.00 | 4 | 38 | 0.105 | 40.000 | 5.000 | 605 | 255 | 50.8 |
| 25.00 | 4 | 38 | 0.130 | 50.000 | 6.250 | 485 | 250 | 78.6 |

Acciaio
1100 - 1300 N/mm²



| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 6.00 | 4 | 30 | 0.025 | 12.000 | 1.500 | 1590 | 160 | 2.9 |
| 8.00 | 4 | 30 | 0.030 | 16.000 | 2.000 | 1195 | 145 | 4.6 |
| 10.00 | 4 | 30 | 0.040 | 20.000 | 2.500 | 955 | 155 | 7.6 |
| 12.00 | 4 | 30 | 0.060 | 24.000 | 3.000 | 795 | 190 | 13.8 |
| 16.00 | 4 | 30 | 0.085 | 32.000 | 4.000 | 595 | 205 | 26.0 |
| 20.00 | 4 | 30 | 0.105 | 40.000 | 5.000 | 475 | 200 | 40.1 |
| 25.00 | 4 | 30 | 0.130 | 50.000 | 6.250 | 380 | 200 | 62.1 |

Acciaio per lavorazione
a freddo (12% Cr)
fortemente legati
[1.2379]

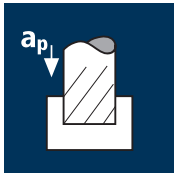


| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 6.00 | 4 | 24 | 0.025 | 12.000 | 1.500 | 1275 | 125 | 2.3 |
| 8.00 | 4 | 24 | 0.030 | 16.000 | 2.000 | 955 | 115 | 3.7 |
| 10.00 | 4 | 24 | 0.040 | 20.000 | 2.500 | 765 | 120 | 6.1 |
| 12.00 | 4 | 24 | 0.060 | 24.000 | 3.000 | 635 | 155 | 11.0 |
| 16.00 | 4 | 24 | 0.085 | 32.000 | 4.000 | 475 | 160 | 20.8 |
| 20.00 | 4 | 24 | 0.105 | 40.000 | 5.000 | 380 | 160 | 32.1 |
| 25.00 | 4 | 24 | 0.130 | 50.000 | 6.250 | 305 | 160 | 49.7 |

Ghisa
(griglia / sferoidale)



| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 6.00 | 4 | 34 | 0.025 | 12.000 | 1.500 | 1805 | 180 | 3.2 |
| 8.00 | 4 | 34 | 0.030 | 16.000 | 2.000 | 1355 | 160 | 5.2 |
| 10.00 | 4 | 34 | 0.040 | 20.000 | 2.500 | 1080 | 175 | 8.7 |
| 12.00 | 4 | 34 | 0.060 | 24.000 | 3.000 | 900 | 215 | 15.6 |
| 16.00 | 4 | 34 | 0.085 | 32.000 | 4.000 | 675 | 230 | 29.4 |
| 20.00 | 4 | 34 | 0.105 | 40.000 | 5.000 | 540 | 225 | 45.5 |
| 25.00 | 4 | 34 | 0.130 | 50.000 | 6.250 | 435 | 225 | 70.3 |



Acciaio
850 - 1100 N/mm²



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 6.00 | 4 | 35 | 0.020 | 4.200 | 6.000 | 1855 | 150 | 3.7 |
| 8.00 | 4 | 35 | 0.030 | 5.600 | 8.000 | 1395 | 165 | 7.5 |
| 10.00 | 4 | 35 | 0.035 | 7.000 | 10.000 | 1115 | 155 | 10.9 |
| 12.00 | 4 | 35 | 0.060 | 8.400 | 12.000 | 930 | 225 | 22.5 |
| 16.00 | 4 | 35 | 0.080 | 11.200 | 16.000 | 695 | 225 | 39.9 |
| 20.00 | 4 | 35 | 0.100 | 14.000 | 20.000 | 555 | 225 | 62.4 |
| 25.00 | 4 | 35 | 0.125 | 17.500 | 25.000 | 445 | 225 | 97.5 |

Acciaio
1100 - 1300 N/mm²



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 6.00 | 4 | 25 | 0.020 | 4.200 | 6.000 | 1325 | 105 | 2.7 |
| 8.00 | 4 | 25 | 0.030 | 5.600 | 8.000 | 995 | 120 | 5.3 |
| 10.00 | 4 | 25 | 0.035 | 7.000 | 10.000 | 795 | 110 | 7.8 |
| 12.00 | 4 | 25 | 0.060 | 8.400 | 12.000 | 665 | 160 | 16.0 |
| 16.00 | 4 | 25 | 0.080 | 11.200 | 16.000 | 495 | 160 | 28.5 |
| 20.00 | 4 | 25 | 0.100 | 14.000 | 20.000 | 400 | 160 | 44.6 |
| 25.00 | 4 | 25 | 0.125 | 17.500 | 25.000 | 320 | 160 | 69.6 |

Acciaio per lavorazione
a freddo (12% Cr)
fortemente legati
[1.2379]



| | | | | | | | | |
|-------|---|----|-------|--------|--------|-----|-----|------|
| 6.00 | 4 | 18 | 0.020 | 4.200 | 6.000 | 955 | 75 | 1.9 |
| 8.00 | 4 | 18 | 0.030 | 5.600 | 8.000 | 715 | 85 | 3.9 |
| 10.00 | 4 | 18 | 0.035 | 7.000 | 10.000 | 575 | 80 | 5.6 |
| 12.00 | 4 | 18 | 0.060 | 8.400 | 12.000 | 475 | 115 | 11.6 |
| 16.00 | 4 | 18 | 0.080 | 11.200 | 16.000 | 360 | 115 | 20.5 |
| 20.00 | 4 | 18 | 0.100 | 14.000 | 20.000 | 285 | 115 | 32.1 |
| 25.00 | 4 | 18 | 0.125 | 17.500 | 25.000 | 230 | 115 | 50.1 |

Ghisa
(griglia / sferoidale)



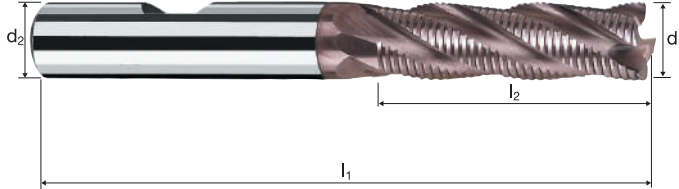
| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 6.00 | 4 | 29 | 0.020 | 4.200 | 6.000 | 1540 | 125 | 3.1 |
| 8.00 | 4 | 29 | 0.030 | 5.600 | 8.000 | 1155 | 140 | 6.2 |
| 10.00 | 4 | 29 | 0.035 | 7.000 | 10.000 | 925 | 130 | 9.0 |
| 12.00 | 4 | 29 | 0.060 | 8.400 | 12.000 | 770 | 185 | 18.6 |
| 16.00 | 4 | 29 | 0.080 | 11.200 | 16.000 | 575 | 185 | 33.1 |
| 20.00 | 4 | 29 | 0.100 | 14.000 | 20.000 | 460 | 185 | 51.7 |
| 25.00 | 4 | 29 | 0.125 | 17.500 | 25.000 | 370 | 185 | 80.8 |

Frese cilindriche

Profilata NRC, esecuzione medio-lunga

HSS

HSS λ 30°
PM/F γ 12°

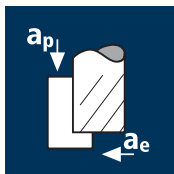


ReTool®

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|----------|-------------|--------------|--|--|--|--|--|--|--|--|-------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | | | | | | | | | GG(G) |
|----------|-------------|--------------|--|--|--|--|--|--|--|--|-------|

| Esempio: N° Ordine | | | | | | | | | | UNICUT-4X | |
|--------------------|-------------------|-------------------|----------------|----------------|----------------|------|---|--------------|------|-----------|----------|
| | | | | | | | | | | U0659 | |
| | | | | | | | | | | EUR | |
| Ø Code | d ₁ k8 | d ₂ h6 | l ₁ | l ₂ | l ₄ | 45° | z | Rivestimento | | Articolo | Codice-Ø |
| 300 | 6.00 | 6.00 | 63 | 19.00 | - | 0.40 | 4 | U | 0659 | 300 | |
| 402 | 8.00 | 10.00 | 78 | 28.00 | 37.50 | 0.40 | 4 | | | | |
| 450 | 10.00 | 10.00 | 84 | 34.00 | - | 0.40 | 4 | | | | |
| 501 | 12.00 | 12.00 | 97 | 40.00 | - | 0.40 | 4 | | | | |
| 610 | 16.00 | 16.00 | 108 | 48.00 | - | 0.50 | 4 | | | | |
| 682 | 20.00 | 20.00 | 122 | 56.00 | - | 0.50 | 4 | | | | |
| 772 | 25.00 | 25.00 | 144 | 68.00 | - | 0.70 | 4 | | | | |
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Applicazione



Materiale

Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 6.00 | 3 | 36 | 0.020 | 12.000 | 1.500 | 1910 | 115 | 2.1 |
| 8.00 | 4 | 36 | 0.030 | 16.000 | 2.000 | 1430 | 170 | 5.5 |
| 10.00 | 4 | 36 | 0.035 | 20.000 | 2.500 | 1145 | 160 | 8.0 |
| 12.00 | 4 | 36 | 0.055 | 24.000 | 3.000 | 955 | 210 | 15.1 |
| 16.00 | 4 | 36 | 0.075 | 32.000 | 4.000 | 715 | 215 | 27.5 |
| 20.00 | 4 | 36 | 0.095 | 40.000 | 5.000 | 575 | 220 | 43.5 |
| 25.00 | 4 | 36 | 0.115 | 50.000 | 6.250 | 460 | 210 | 65.9 |
| 30.00 | 6 | 36 | 0.095 | 60.000 | 7.500 | 380 | 220 | 98.0 |
| 32.00 | 6 | 36 | 0.105 | 64.000 | 8.000 | 360 | 225 | 115.5 |

Acciaio
850 - 1100 N/mm²



| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 6.00 | 3 | 30 | 0.020 | 12.000 | 1.500 | 1590 | 95 | 1.7 |
| 8.00 | 4 | 30 | 0.030 | 16.000 | 2.000 | 1195 | 145 | 4.6 |
| 10.00 | 4 | 30 | 0.035 | 20.000 | 2.500 | 955 | 135 | 6.7 |
| 12.00 | 4 | 30 | 0.055 | 24.000 | 3.000 | 795 | 175 | 12.6 |
| 16.00 | 4 | 30 | 0.075 | 32.000 | 4.000 | 595 | 180 | 22.9 |
| 20.00 | 4 | 30 | 0.095 | 40.000 | 5.000 | 475 | 180 | 36.3 |
| 25.00 | 4 | 30 | 0.115 | 50.000 | 6.250 | 380 | 175 | 54.9 |
| 30.00 | 6 | 30 | 0.095 | 60.000 | 7.500 | 320 | 180 | 81.6 |
| 32.00 | 6 | 30 | 0.105 | 64.000 | 8.000 | 300 | 190 | 96.3 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| | | | | | | | | |
|-------|---|----|-------|--------|-------|-----|----|------|
| 6.00 | 3 | 15 | 0.020 | 12.000 | 1.500 | 795 | 50 | 0.9 |
| 8.00 | 4 | 15 | 0.030 | 16.000 | 2.000 | 595 | 70 | 2.3 |
| 10.00 | 4 | 15 | 0.035 | 20.000 | 2.500 | 475 | 65 | 3.3 |
| 12.00 | 4 | 15 | 0.055 | 24.000 | 3.000 | 400 | 90 | 6.3 |
| 16.00 | 4 | 15 | 0.075 | 32.000 | 4.000 | 300 | 90 | 11.5 |
| 20.00 | 4 | 15 | 0.095 | 40.000 | 5.000 | 240 | 90 | 18.1 |
| 25.00 | 4 | 15 | 0.115 | 50.000 | 6.250 | 190 | 90 | 27.5 |
| 30.00 | 6 | 15 | 0.095 | 60.000 | 7.500 | 160 | 90 | 40.8 |
| 32.00 | 6 | 15 | 0.105 | 64.000 | 8.000 | 150 | 95 | 48.1 |

Ghisa
(griglia / sferoidale)



| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 6.00 | 3 | 28 | 0.020 | 12.000 | 1.500 | 1485 | 90 | 1.6 |
| 8.00 | 4 | 28 | 0.030 | 16.000 | 2.000 | 1115 | 135 | 4.3 |
| 10.00 | 4 | 28 | 0.035 | 20.000 | 2.500 | 890 | 125 | 6.2 |
| 12.00 | 4 | 28 | 0.055 | 24.000 | 3.000 | 745 | 165 | 11.8 |
| 16.00 | 4 | 28 | 0.075 | 32.000 | 4.000 | 555 | 165 | 21.4 |
| 20.00 | 4 | 28 | 0.095 | 40.000 | 5.000 | 445 | 170 | 33.9 |
| 25.00 | 4 | 28 | 0.115 | 50.000 | 6.250 | 355 | 165 | 51.2 |
| 30.00 | 6 | 28 | 0.095 | 60.000 | 7.500 | 295 | 170 | 76.2 |
| 32.00 | 6 | 28 | 0.105 | 64.000 | 8.000 | 280 | 175 | 89.8 |



Acciaio
< 850 N/mm²



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|-------|
| 6.00 | 3 | 30 | 0.020 | 4.200 | 6.000 | 1590 | 95 | 2.4 |
| 8.00 | 4 | 30 | 0.025 | 5.600 | 8.000 | 1195 | 120 | 5.3 |
| 10.00 | 4 | 30 | 0.035 | 7.000 | 10.000 | 955 | 135 | 9.4 |
| 12.00 | 4 | 30 | 0.055 | 8.400 | 12.000 | 795 | 175 | 17.6 |
| 16.00 | 4 | 30 | 0.070 | 11.200 | 16.000 | 595 | 165 | 29.9 |
| 20.00 | 4 | 30 | 0.090 | 14.000 | 20.000 | 475 | 170 | 48.1 |
| 25.00 | 4 | 30 | 0.110 | 17.500 | 25.000 | 380 | 170 | 73.5 |
| 30.00 | 6 | 30 | 0.090 | 21.000 | 30.000 | 320 | 170 | 108.3 |
| 32.00 | 6 | 30 | 0.095 | 22.400 | 32.000 | 300 | 170 | 121.9 |

Acciaio
850 - 1100 N/mm²



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|-------|
| 6.00 | 3 | 26 | 0.020 | 4.200 | 6.000 | 1380 | 85 | 2.1 |
| 8.00 | 4 | 26 | 0.025 | 5.600 | 8.000 | 1035 | 105 | 4.6 |
| 10.00 | 4 | 26 | 0.035 | 7.000 | 10.000 | 830 | 115 | 8.1 |
| 12.00 | 4 | 26 | 0.055 | 8.400 | 12.000 | 690 | 150 | 15.3 |
| 16.00 | 4 | 26 | 0.070 | 11.200 | 16.000 | 515 | 145 | 26.0 |
| 20.00 | 4 | 26 | 0.090 | 14.000 | 20.000 | 415 | 150 | 41.7 |
| 25.00 | 4 | 26 | 0.110 | 17.500 | 25.000 | 330 | 145 | 63.7 |
| 30.00 | 6 | 26 | 0.090 | 21.000 | 30.000 | 275 | 150 | 93.9 |
| 32.00 | 6 | 26 | 0.095 | 22.400 | 32.000 | 260 | 145 | 105.7 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| | | | | | | | | |
|-------|---|----|-------|--------|--------|-----|----|------|
| 6.00 | 3 | 14 | 0.020 | 4.200 | 6.000 | 745 | 45 | 1.1 |
| 8.00 | 4 | 14 | 0.025 | 5.600 | 8.000 | 555 | 55 | 2.5 |
| 10.00 | 4 | 14 | 0.035 | 7.000 | 10.000 | 445 | 60 | 4.4 |
| 12.00 | 4 | 14 | 0.055 | 8.400 | 12.000 | 370 | 80 | 8.2 |
| 16.00 | 4 | 14 | 0.070 | 11.200 | 16.000 | 280 | 80 | 14.0 |
| 20.00 | 4 | 14 | 0.090 | 14.000 | 20.000 | 225 | 80 | 22.5 |
| 25.00 | 4 | 14 | 0.110 | 17.500 | 25.000 | 180 | 80 | 34.3 |
| 30.00 | 6 | 14 | 0.090 | 21.000 | 30.000 | 150 | 80 | 50.5 |
| 32.00 | 6 | 14 | 0.095 | 22.400 | 32.000 | 140 | 80 | 56.9 |

Ghisa
(griglia / sferoidale)



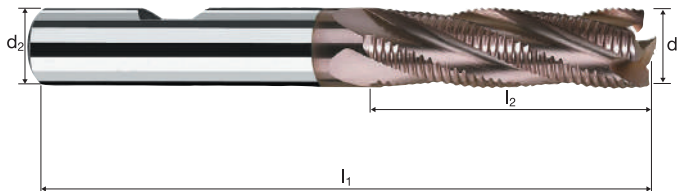
| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 6.00 | 3 | 22 | 0.020 | 4.200 | 6.000 | 1165 | 70 | 1.8 |
| 8.00 | 4 | 22 | 0.025 | 5.600 | 8.000 | 875 | 90 | 3.9 |
| 10.00 | 4 | 22 | 0.035 | 7.000 | 10.000 | 700 | 100 | 6.9 |
| 12.00 | 4 | 22 | 0.055 | 8.400 | 12.000 | 585 | 130 | 12.9 |
| 16.00 | 4 | 22 | 0.070 | 11.200 | 16.000 | 440 | 125 | 22.0 |
| 20.00 | 4 | 22 | 0.090 | 14.000 | 20.000 | 350 | 125 | 35.3 |
| 25.00 | 4 | 22 | 0.110 | 17.500 | 25.000 | 280 | 125 | 53.9 |
| 30.00 | 6 | 22 | 0.090 | 21.000 | 30.000 | 235 | 125 | 79.4 |
| 32.00 | 6 | 22 | 0.095 | 22.400 | 32.000 | 220 | 125 | 89.4 |

Frese cilindriche

Profilata NRF, esecuzione medio-lunga

HSS

HSS-E λ 25°
Co8 γ 10°



Sgrossatura

Finitura

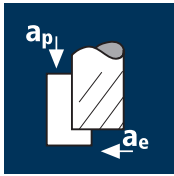


ReTool®

| | | | | | | | | | |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|-------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | | | | | Inox Stainless | Ti Titanium | GG(G) |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|-------|

| Esempio: N° Ordine | | | | | | | | | | UNICUT-4X |
|-----------------------|--------------|-------------|-------|-------|-------|------|----------|---|--|-----------|
| | | | | | | | | | | U0650 |
| | | | | | | | | | | EUR |
| \emptyset Code | d_1 k12 | d_2 h6 | l_1 | l_2 | l_4 | 45° | α | z | | |
| 260 | 5.00 | 6.00 | 63 | 19.00 | 26.55 | 0.40 | 1.5° | 3 | | 66.00 |
| 300 | 6.00 | 6.00 | 63 | 19.00 | - | 0.40 | 0.0° | 3 | | 66.00 |
| 402 | 8.00 | 10.00 | 78 | 28.00 | 37.50 | 0.40 | 2.0° | 4 | | 67.00 |
| 450 | 10.00 | 10.00 | 84 | 34.00 | - | 0.40 | 0.0° | 4 | | 73.00 |
| 501 | 12.00 | 12.00 | 97 | 40.00 | - | 0.40 | 0.0° | 4 | | 81.00 |
| 570 | 14.00 | 12.00 | 97 | 40.00 | - | 0.40 | 0.0° | 4 | | 111.00 |
| 610 | 16.00 | 16.00 | 108 | 48.00 | - | 0.50 | 0.0° | 4 | | 111.00 |
| 640 | 18.00 | 16.00 | 108 | 48.00 | - | 0.50 | 0.0° | 4 | | 155.00 |
| 682 | 20.00 | 20.00 | 122 | 56.00 | - | 0.50 | 0.0° | 4 | | 155.00 |
| 710 | 22.00 | 20.00 | 122 | 56.00 | - | 0.70 | 0.0° | 4 | | 228.00 |
| 772 | 25.00 | 25.00 | 144 | 68.00 | - | 0.70 | 0.0° | 4 | | 228.00 |
| 800 | 28.00 | 25.00 | 144 | 68.00 | - | 0.70 | 0.0° | 6 | | 384.00 |
| 810 | 30.00 | 25.00 | 144 | 68.00 | - | 0.70 | 0.0° | 6 | | 384.00 |
| 832 | 32.00 | 32.00 | 160 | 80.00 | - | 0.70 | 0.0° | 6 | | 384.00 |
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Applicazione



Materiale

Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 6.00 | 4 | 180 | 0.035 | 7.200 | 1.800 | 9550 | 1335 | 17.3 |
| 8.00 | 4 | 180 | 0.045 | 9.600 | 2.400 | 7160 | 1290 | 29.7 |
| 10.00 | 4 | 180 | 0.060 | 12.000 | 3.000 | 5730 | 1375 | 49.5 |
| 12.00 | 4 | 180 | 0.070 | 14.400 | 3.600 | 4775 | 1335 | 69.3 |
| 16.00 | 4 | 180 | 0.075 | 19.200 | 4.800 | 3580 | 1075 | 99.0 |
| 20.00 | 4 | 180 | 0.080 | 24.000 | 6.000 | 2865 | 915 | 132.0 |

Acciaio
850 - 1100 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 6.00 | 4 | 130 | 0.035 | 7.200 | 1.800 | 6895 | 965 | 12.5 |
| 8.00 | 4 | 130 | 0.045 | 9.600 | 2.400 | 5175 | 930 | 21.5 |
| 10.00 | 4 | 130 | 0.060 | 12.000 | 3.000 | 4140 | 995 | 35.8 |
| 12.00 | 4 | 130 | 0.070 | 14.400 | 3.600 | 3450 | 965 | 50.1 |
| 16.00 | 4 | 130 | 0.075 | 19.200 | 4.800 | 2585 | 775 | 71.5 |
| 20.00 | 4 | 130 | 0.080 | 24.000 | 6.000 | 2070 | 660 | 95.3 |

Leghe di titanio indurite
> 300 HB
[Ti6Al4V]

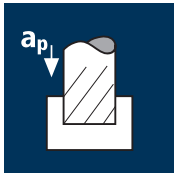


| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 6.00 | 4 | 45 | 0.025 | 7.200 | 1.800 | 2385 | 240 | 3.1 |
| 8.00 | 4 | 45 | 0.035 | 9.600 | 2.400 | 1790 | 250 | 5.8 |
| 10.00 | 4 | 45 | 0.045 | 12.000 | 3.000 | 1430 | 260 | 9.3 |
| 12.00 | 4 | 45 | 0.055 | 14.400 | 3.600 | 1195 | 265 | 13.6 |
| 16.00 | 4 | 45 | 0.060 | 19.200 | 4.800 | 895 | 215 | 19.8 |
| 20.00 | 4 | 45 | 0.065 | 24.000 | 6.000 | 715 | 185 | 26.8 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 6.00 | 4 | 60 | 0.025 | 7.200 | 1.800 | 3185 | 320 | 4.1 |
| 8.00 | 4 | 60 | 0.035 | 9.600 | 2.400 | 2385 | 335 | 7.7 |
| 10.00 | 4 | 60 | 0.045 | 12.000 | 3.000 | 1910 | 345 | 12.4 |
| 12.00 | 4 | 60 | 0.055 | 14.400 | 3.600 | 1590 | 350 | 18.2 |
| 16.00 | 4 | 60 | 0.060 | 19.200 | 4.800 | 1195 | 285 | 26.4 |
| 20.00 | 4 | 60 | 0.065 | 24.000 | 6.000 | 955 | 250 | 35.8 |



Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 6.00 | 4 | 150 | 0.030 | 3.600 | 6.000 | 7960 | 955 | 20.6 |
| 8.00 | 4 | 150 | 0.040 | 4.800 | 8.000 | 5970 | 955 | 36.7 |
| 10.00 | 4 | 150 | 0.050 | 6.000 | 10.000 | 4775 | 955 | 57.3 |
| 12.00 | 4 | 150 | 0.055 | 7.200 | 12.000 | 3980 | 875 | 75.6 |
| 16.00 | 4 | 150 | 0.055 | 9.600 | 16.000 | 2985 | 655 | 100.8 |
| 20.00 | 4 | 150 | 0.060 | 12.000 | 20.000 | 2385 | 575 | 137.5 |

Acciaio
850 - 1100 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 6.00 | 4 | 80 | 0.030 | 3.600 | 6.000 | 4245 | 510 | 11.0 |
| 8.00 | 4 | 80 | 0.040 | 4.800 | 8.000 | 3185 | 510 | 19.6 |
| 10.00 | 4 | 80 | 0.050 | 6.000 | 10.000 | 2545 | 510 | 30.6 |
| 12.00 | 4 | 80 | 0.055 | 7.200 | 12.000 | 2120 | 465 | 40.3 |
| 16.00 | 4 | 80 | 0.055 | 9.600 | 16.000 | 1590 | 350 | 53.8 |
| 20.00 | 4 | 80 | 0.060 | 12.000 | 20.000 | 1275 | 305 | 73.3 |

Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 6.00 | 4 | 35 | 0.025 | 3.600 | 6.000 | 1855 | 185 | 4.0 |
| 8.00 | 4 | 35 | 0.030 | 4.800 | 8.000 | 1395 | 165 | 6.4 |
| 10.00 | 4 | 35 | 0.040 | 6.000 | 10.000 | 1115 | 180 | 10.7 |
| 12.00 | 4 | 35 | 0.045 | 7.200 | 12.000 | 930 | 165 | 14.4 |
| 16.00 | 4 | 35 | 0.045 | 9.600 | 16.000 | 695 | 125 | 19.3 |
| 20.00 | 4 | 35 | 0.050 | 12.000 | 20.000 | 555 | 110 | 26.7 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 6.00 | 4 | 50 | 0.025 | 3.600 | 6.000 | 2655 | 265 | 5.7 |
| 8.00 | 4 | 50 | 0.030 | 4.800 | 8.000 | 1990 | 240 | 9.2 |
| 10.00 | 4 | 50 | 0.040 | 6.000 | 10.000 | 1590 | 255 | 15.3 |
| 12.00 | 4 | 50 | 0.045 | 7.200 | 12.000 | 1325 | 240 | 20.6 |
| 16.00 | 4 | 50 | 0.045 | 9.600 | 16.000 | 995 | 180 | 27.5 |
| 20.00 | 4 | 50 | 0.050 | 12.000 | 20.000 | 795 | 160 | 38.2 |

Frese cilindriche SupraCarb®

Profilata, esecuzione medio-lunga con scarico



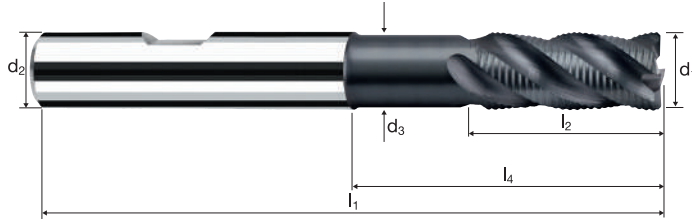
HM λ 38°
MG10 γ 0°

45°

Sgrossatura

Finitura

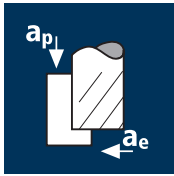
ReTool®



| | | | | | | | | | |
|----------|-------------|--------------|--|--|--|--|----------------|-------------|------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | | | | | Inox Stainless | Ti Titanium | GG(G) Tool Steel |
|----------|-------------|--------------|--|--|--|--|----------------|-------------|------------------|

| | | | | | | | | | | POLYCHROM | |
|--------------------|-------------------|-------------------|----------------|----------------|----------------|----------------|----------------|------|---|-----------|--|
| Esempio: N° Ordine | | | | | | | | | | P15339 | |
| | | | | | | | | | | P15239 | |
| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | 45° | z | EUR | |
| 300 | 6.00 | 6.00 | 5.50 | 63 | 13.00 | 25.34 | 26.00 | 0.35 | 4 | 90.00 | |
| 391 | 8.00 | 8.00 | 7.40 | 72 | 19.00 | 34.29 | 35.00 | 0.45 | 4 | 110.00 | |
| 450 | 10.00 | 10.00 | 9.20 | 84 | 22.00 | 42.20 | 43.00 | 0.60 | 4 | 125.00 | |
| 501 | 12.00 | 12.00 | 11.00 | 97 | 26.00 | 50.13 | 51.00 | 0.60 | 4 | 162.00 | |
| 610 | 16.00 | 16.00 | 15.00 | 108 | 32.00 | 58.13 | 59.00 | 0.70 | 4 | 282.00 | |
| 682 | 20.00 | 20.00 | 19.00 | 122 | 38.00 | 70.13 | 71.00 | 0.70 | 4 | 407.00 | |
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Applicazione



Materiale

Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 3.00 | 3 | 180 | 0.015 | 3.000 | 2.100 | 19100 | 860 | 5.4 |
| 4.00 | 3 | 180 | 0.020 | 4.000 | 2.800 | 14325 | 860 | 9.6 |
| 5.00 | 4 | 180 | 0.030 | 5.000 | 3.500 | 11460 | 1375 | 24.1 |
| 6.00 | 4 | 180 | 0.035 | 6.000 | 4.200 | 9550 | 1335 | 33.7 |
| 8.00 | 4 | 180 | 0.045 | 8.000 | 5.600 | 7160 | 1290 | 57.8 |
| 10.00 | 4 | 180 | 0.055 | 10.000 | 7.000 | 5730 | 1260 | 88.2 |
| 12.00 | 4 | 180 | 0.060 | 12.000 | 8.400 | 4775 | 1145 | 115.5 |
| 16.00 | 4 | 180 | 0.065 | 16.000 | 11.200 | 3580 | 930 | 166.8 |

Acciaio
850 - 1100 N/mm²



| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|-----|-------|
| 3.00 | 3 | 130 | 0.015 | 3.000 | 2.100 | 13795 | 620 | 3.9 |
| 4.00 | 3 | 130 | 0.020 | 4.000 | 2.800 | 10345 | 620 | 7.0 |
| 5.00 | 4 | 130 | 0.030 | 5.000 | 3.500 | 8275 | 995 | 17.4 |
| 6.00 | 4 | 130 | 0.035 | 6.000 | 4.200 | 6895 | 965 | 24.3 |
| 8.00 | 4 | 130 | 0.045 | 8.000 | 5.600 | 5175 | 930 | 41.7 |
| 10.00 | 4 | 130 | 0.055 | 10.000 | 7.000 | 4140 | 910 | 63.7 |
| 12.00 | 4 | 130 | 0.060 | 12.000 | 8.400 | 3450 | 830 | 83.4 |
| 16.00 | 4 | 130 | 0.065 | 16.000 | 11.200 | 2585 | 670 | 120.5 |

Leghe di titanio indurite
> 300 HB
[Ti6Al4V]

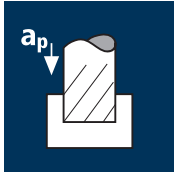


| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 3.00 | 3 | 45 | 0.015 | 3.000 | 2.100 | 4775 | 215 | 1.4 |
| 4.00 | 3 | 45 | 0.020 | 4.000 | 2.800 | 3580 | 215 | 2.4 |
| 5.00 | 4 | 45 | 0.020 | 5.000 | 3.500 | 2865 | 230 | 4.0 |
| 6.00 | 4 | 45 | 0.025 | 6.000 | 4.200 | 2385 | 240 | 6.0 |
| 8.00 | 4 | 45 | 0.035 | 8.000 | 5.600 | 1790 | 250 | 11.2 |
| 10.00 | 4 | 45 | 0.045 | 10.000 | 7.000 | 1430 | 260 | 18.0 |
| 12.00 | 4 | 45 | 0.050 | 12.000 | 8.400 | 1195 | 240 | 24.1 |
| 16.00 | 4 | 45 | 0.050 | 16.000 | 11.200 | 895 | 180 | 32.1 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 3.00 | 3 | 60 | 0.015 | 3.000 | 2.100 | 6365 | 285 | 1.8 |
| 4.00 | 3 | 60 | 0.020 | 4.000 | 2.800 | 4775 | 285 | 3.2 |
| 5.00 | 4 | 60 | 0.020 | 5.000 | 3.500 | 3820 | 305 | 5.3 |
| 6.00 | 4 | 60 | 0.025 | 6.000 | 4.200 | 3185 | 320 | 8.0 |
| 8.00 | 4 | 60 | 0.035 | 8.000 | 5.600 | 2385 | 335 | 15.0 |
| 10.00 | 4 | 60 | 0.045 | 10.000 | 7.000 | 1910 | 345 | 24.1 |
| 12.00 | 4 | 60 | 0.050 | 12.000 | 8.400 | 1590 | 320 | 32.1 |
| 16.00 | 4 | 60 | 0.050 | 16.000 | 11.200 | 1195 | 240 | 42.8 |



Acciaio
< 850 N/mm²



| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|-----|-------|
| 3.00 | 3 | 150 | 0.015 | 3.000 | 3.000 | 15915 | 715 | 6.4 |
| 4.00 | 3 | 150 | 0.020 | 4.000 | 4.000 | 11935 | 715 | 11.5 |
| 5.00 | 4 | 150 | 0.025 | 5.000 | 5.000 | 9550 | 955 | 23.9 |
| 6.00 | 4 | 150 | 0.030 | 6.000 | 6.000 | 7960 | 955 | 34.4 |
| 8.00 | 4 | 150 | 0.040 | 8.000 | 8.000 | 5970 | 955 | 61.1 |
| 10.00 | 4 | 150 | 0.050 | 10.000 | 10.000 | 4775 | 955 | 95.5 |
| 12.00 | 4 | 150 | 0.055 | 12.000 | 12.000 | 3980 | 875 | 126.1 |
| 16.00 | 4 | 150 | 0.055 | 16.000 | 16.000 | 2985 | 655 | 168.1 |

Acciaio
850 - 1100 N/mm²



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 3.00 | 3 | 80 | 0.015 | 3.000 | 3.000 | 8490 | 380 | 3.4 |
| 4.00 | 3 | 80 | 0.020 | 4.000 | 4.000 | 6365 | 380 | 6.1 |
| 5.00 | 4 | 80 | 0.025 | 5.000 | 5.000 | 5095 | 510 | 12.7 |
| 6.00 | 4 | 80 | 0.030 | 6.000 | 6.000 | 4245 | 510 | 18.3 |
| 8.00 | 4 | 80 | 0.040 | 8.000 | 8.000 | 3185 | 510 | 32.6 |
| 10.00 | 4 | 80 | 0.050 | 10.000 | 10.000 | 2545 | 510 | 50.9 |
| 12.00 | 4 | 80 | 0.055 | 12.000 | 12.000 | 2120 | 465 | 67.2 |
| 16.00 | 4 | 80 | 0.055 | 16.000 | 16.000 | 1590 | 350 | 89.6 |

Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 3.00 | 3 | 35 | 0.010 | 3.000 | 3.000 | 3715 | 110 | 1.0 |
| 4.00 | 3 | 35 | 0.015 | 4.000 | 4.000 | 2785 | 125 | 2.0 |
| 5.00 | 4 | 35 | 0.020 | 5.000 | 5.000 | 2230 | 180 | 4.5 |
| 6.00 | 4 | 35 | 0.025 | 6.000 | 6.000 | 1855 | 185 | 6.7 |
| 8.00 | 4 | 35 | 0.030 | 8.000 | 8.000 | 1395 | 165 | 10.7 |
| 10.00 | 4 | 35 | 0.040 | 10.000 | 10.000 | 1115 | 180 | 17.8 |
| 12.00 | 4 | 35 | 0.045 | 12.000 | 12.000 | 930 | 165 | 24.1 |
| 16.00 | 4 | 35 | 0.045 | 16.000 | 16.000 | 695 | 125 | 32.1 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



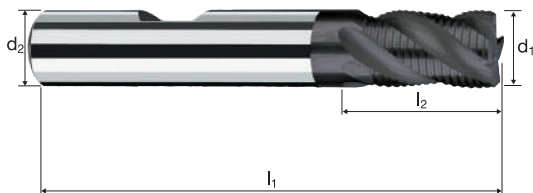
| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 3.00 | 3 | 50 | 0.010 | 3.000 | 3.000 | 5305 | 160 | 1.4 |
| 4.00 | 3 | 50 | 0.015 | 4.000 | 4.000 | 3980 | 180 | 2.9 |
| 5.00 | 4 | 50 | 0.020 | 5.000 | 5.000 | 3185 | 255 | 6.4 |
| 6.00 | 4 | 50 | 0.025 | 6.000 | 6.000 | 2655 | 265 | 9.5 |
| 8.00 | 4 | 50 | 0.030 | 8.000 | 8.000 | 1990 | 240 | 15.3 |
| 10.00 | 4 | 50 | 0.040 | 10.000 | 10.000 | 1590 | 255 | 25.5 |
| 12.00 | 4 | 50 | 0.045 | 12.000 | 12.000 | 1325 | 240 | 34.4 |
| 16.00 | 4 | 50 | 0.045 | 16.000 | 16.000 | 995 | 180 | 45.8 |

Frese cilindriche SupraCarb®

Profilata, esecuzione corta



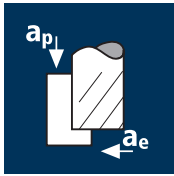
HM λ **38°**
MG10 γ **0°**



| | | | | | | | | | |
|----------|-------------|--------------|--|--|--|--|----------------|-------------|------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | | | | | Inox Stainless | Ti Titanium | GG(G) Tool Steel |
|----------|-------------|--------------|--|--|--|--|----------------|-------------|------------------|

| Esempio: N° Ordine | | | | | | | | | | POLYCHROM |
|--------------------|-------------------|-------------------|----------------|----------------|----------------|------|---|--|--|---------------|
| | | Rivestimento | Articolo | Codice-ø | | | | | | |
| | | P | 15360 | 180 | | | | | | P15360 |
| | | | | | | | | | | P15260 |
| Ø Code | d ₁ e8 | d ₂ h6 | l ₁ | l ₂ | l ₄ | 45° | z | | | EUR |
| 180 | 3.00 | 6.00 | 50 | 5.00 | 12.56 | 0.25 | 3 | | | 74.00 |
| 220 | 4.00 | 6.00 | 54 | 8.00 | 14.09 | 0.30 | 3 | | | 74.00 |
| 260 | 5.00 | 6.00 | 54 | 9.00 | 13.22 | 0.35 | 4 | | | 74.00 |
| 300 | 6.00 | 6.00 | 54 | 10.00 | - | 0.35 | 4 | | | 74.00 |
| 391 | 8.00 | 8.00 | 58 | 12.00 | - | 0.45 | 4 | | | 90.00 |
| 450 | 10.00 | 10.00 | 66 | 14.00 | - | 0.60 | 4 | | | 103.00 |
| 501 | 12.00 | 12.00 | 73 | 16.00 | - | 0.60 | 4 | | | 133.00 |
| 610 | 16.00 | 16.00 | 82 | 22.00 | - | 0.70 | 4 | | | 231.00 |
| 612 | 16.00 | 16.00 | 82 | 22.00 | - | 0.70 | 6 | | | 231.00 |
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Applicazione



Materiale

Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 6.00 | 4 | 180 | 0.030 | 7.200 | 1.500 | 9550 | 1145 | 12.4 |
| 8.00 | 4 | 180 | 0.040 | 9.600 | 2.000 | 7160 | 1145 | 22.0 |
| 10.00 | 4 | 180 | 0.055 | 12.000 | 2.500 | 5730 | 1260 | 37.8 |
| 12.00 | 4 | 180 | 0.065 | 14.400 | 3.000 | 4775 | 1240 | 53.6 |
| 16.00 | 4 | 180 | 0.070 | 19.200 | 4.000 | 3580 | 1005 | 77.0 |
| 20.00 | 4 | 180 | 0.075 | 24.000 | 5.000 | 2865 | 860 | 103.1 |

Acciaio
850 - 1100 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 6.00 | 4 | 130 | 0.030 | 7.200 | 1.500 | 6895 | 830 | 8.9 |
| 8.00 | 4 | 130 | 0.040 | 9.600 | 2.000 | 5175 | 830 | 15.9 |
| 10.00 | 4 | 130 | 0.055 | 12.000 | 2.500 | 4140 | 910 | 27.3 |
| 12.00 | 4 | 130 | 0.065 | 14.400 | 3.000 | 3450 | 895 | 38.7 |
| 16.00 | 4 | 130 | 0.070 | 19.200 | 4.000 | 2585 | 725 | 55.6 |
| 20.00 | 4 | 130 | 0.075 | 24.000 | 5.000 | 2070 | 620 | 74.5 |

Leghe di titanio indurite
> 300 HB
[Ti6Al4V]

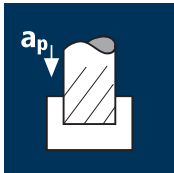


| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 6.00 | 4 | 45 | 0.025 | 7.200 | 1.500 | 2385 | 240 | 2.6 |
| 8.00 | 4 | 45 | 0.035 | 9.600 | 2.000 | 1790 | 250 | 4.8 |
| 10.00 | 4 | 45 | 0.045 | 12.000 | 2.500 | 1430 | 260 | 7.7 |
| 12.00 | 4 | 45 | 0.055 | 14.400 | 3.000 | 1195 | 265 | 11.3 |
| 16.00 | 4 | 45 | 0.060 | 19.200 | 4.000 | 895 | 215 | 16.5 |
| 20.00 | 4 | 45 | 0.065 | 24.000 | 5.000 | 715 | 185 | 22.3 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 6.00 | 4 | 60 | 0.025 | 7.200 | 1.500 | 3185 | 320 | 3.4 |
| 8.00 | 4 | 60 | 0.035 | 9.600 | 2.000 | 2385 | 335 | 6.4 |
| 10.00 | 4 | 60 | 0.045 | 12.000 | 2.500 | 1910 | 345 | 10.3 |
| 12.00 | 4 | 60 | 0.055 | 14.400 | 3.000 | 1590 | 350 | 15.1 |
| 16.00 | 4 | 60 | 0.060 | 19.200 | 4.000 | 1195 | 285 | 22.0 |
| 20.00 | 4 | 60 | 0.065 | 24.000 | 5.000 | 955 | 250 | 29.8 |



Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 6.00 | 4 | 150 | 0.025 | 3.000 | 6.000 | 7960 | 795 | 14.3 |
| 8.00 | 4 | 150 | 0.035 | 4.000 | 8.000 | 5970 | 835 | 26.7 |
| 10.00 | 4 | 150 | 0.045 | 5.000 | 10.000 | 4775 | 860 | 43.0 |
| 12.00 | 4 | 150 | 0.050 | 6.000 | 12.000 | 3980 | 795 | 57.3 |
| 16.00 | 4 | 150 | 0.050 | 8.000 | 16.000 | 2985 | 595 | 76.4 |
| 20.00 | 4 | 150 | 0.055 | 10.000 | 20.000 | 2385 | 525 | 105.0 |

Acciaio
850 - 1100 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 6.00 | 4 | 80 | 0.025 | 3.000 | 6.000 | 4245 | 425 | 7.6 |
| 8.00 | 4 | 80 | 0.035 | 4.000 | 8.000 | 3185 | 445 | 14.3 |
| 10.00 | 4 | 80 | 0.045 | 5.000 | 10.000 | 2545 | 460 | 22.9 |
| 12.00 | 4 | 80 | 0.050 | 6.000 | 12.000 | 2120 | 425 | 30.6 |
| 16.00 | 4 | 80 | 0.050 | 8.000 | 16.000 | 1590 | 320 | 40.7 |
| 20.00 | 4 | 80 | 0.055 | 10.000 | 20.000 | 1275 | 280 | 56.0 |

Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



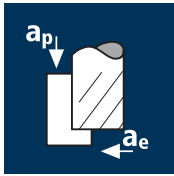
| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 6.00 | 4 | 35 | 0.020 | 3.000 | 6.000 | 1855 | 150 | 2.7 |
| 8.00 | 4 | 35 | 0.030 | 4.000 | 8.000 | 1395 | 165 | 5.3 |
| 10.00 | 4 | 35 | 0.035 | 5.000 | 10.000 | 1115 | 155 | 7.8 |
| 12.00 | 4 | 35 | 0.040 | 6.000 | 12.000 | 930 | 150 | 10.7 |
| 16.00 | 4 | 35 | 0.040 | 8.000 | 16.000 | 695 | 110 | 14.3 |
| 20.00 | 4 | 35 | 0.045 | 10.000 | 20.000 | 555 | 100 | 20.1 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 6.00 | 4 | 50 | 0.020 | 3.000 | 6.000 | 2655 | 210 | 3.8 |
| 8.00 | 4 | 50 | 0.030 | 4.000 | 8.000 | 1990 | 240 | 7.6 |
| 10.00 | 4 | 50 | 0.035 | 5.000 | 10.000 | 1590 | 225 | 11.1 |
| 12.00 | 4 | 50 | 0.040 | 6.000 | 12.000 | 1325 | 210 | 15.3 |
| 16.00 | 4 | 50 | 0.040 | 8.000 | 16.000 | 995 | 160 | 20.4 |
| 20.00 | 4 | 50 | 0.045 | 10.000 | 20.000 | 795 | 145 | 28.6 |

Applicazione



Materiale

Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 6.00 | 3 | 28 | 0.020 | 15.000 | 2.400 | 1485 | 90 | 3.2 |
| 8.00 | 4 | 28 | 0.030 | 20.000 | 3.200 | 1115 | 135 | 8.6 |
| 10.00 | 4 | 28 | 0.035 | 25.000 | 4.000 | 890 | 125 | 12.5 |
| 12.00 | 4 | 28 | 0.055 | 30.000 | 4.800 | 745 | 165 | 23.5 |
| 16.00 | 4 | 28 | 0.075 | 40.000 | 6.400 | 555 | 165 | 42.8 |
| 20.00 | 4 | 28 | 0.095 | 50.000 | 8.000 | 445 | 170 | 67.7 |
| 25.00 | 4 | 28 | 0.115 | 62.500 | 10.000 | 355 | 165 | 102.5 |
| 32.00 | 6 | 28 | 0.105 | 80.000 | 12.800 | 280 | 175 | 179.7 |
| 40.00 | 6 | 28 | 0.130 | 100.000 | 16.000 | 225 | 175 | 278.1 |

Acciaio
850 - 1100 N/mm²



| | | | | | | | | |
|-------|---|----|-------|---------|--------|------|-----|-------|
| 6.00 | 3 | 22 | 0.020 | 15.000 | 2.400 | 1165 | 70 | 2.5 |
| 8.00 | 4 | 22 | 0.030 | 20.000 | 3.200 | 875 | 105 | 6.7 |
| 10.00 | 4 | 22 | 0.035 | 25.000 | 4.000 | 700 | 100 | 9.8 |
| 12.00 | 4 | 22 | 0.055 | 30.000 | 4.800 | 585 | 130 | 18.5 |
| 16.00 | 4 | 22 | 0.075 | 40.000 | 6.400 | 440 | 130 | 33.6 |
| 20.00 | 4 | 22 | 0.095 | 50.000 | 8.000 | 350 | 135 | 53.2 |
| 25.00 | 4 | 22 | 0.115 | 62.500 | 10.000 | 280 | 130 | 80.5 |
| 32.00 | 6 | 22 | 0.105 | 80.000 | 12.800 | 220 | 140 | 141.2 |
| 40.00 | 6 | 22 | 0.130 | 100.000 | 16.000 | 175 | 135 | 218.5 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

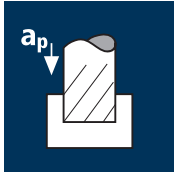


| | | | | | | | | |
|-------|---|----|-------|---------|--------|-----|----|-------|
| 6.00 | 3 | 11 | 0.020 | 15.000 | 2.400 | 585 | 35 | 1.3 |
| 8.00 | 4 | 11 | 0.030 | 20.000 | 3.200 | 440 | 55 | 3.4 |
| 10.00 | 4 | 11 | 0.035 | 25.000 | 4.000 | 350 | 50 | 4.9 |
| 12.00 | 4 | 11 | 0.055 | 30.000 | 4.800 | 290 | 65 | 9.2 |
| 16.00 | 4 | 11 | 0.075 | 40.000 | 6.400 | 220 | 65 | 16.8 |
| 20.00 | 4 | 11 | 0.095 | 50.000 | 8.000 | 175 | 65 | 26.6 |
| 25.00 | 4 | 11 | 0.115 | 62.500 | 10.000 | 140 | 65 | 40.3 |
| 32.00 | 6 | 11 | 0.105 | 80.000 | 12.800 | 110 | 70 | 70.6 |
| 40.00 | 6 | 11 | 0.130 | 100.000 | 16.000 | 90 | 70 | 109.2 |

Ghisa
(grigia / sferoidale)



| | | | | | | | | |
|-------|---|----|-------|---------|--------|------|-----|-------|
| 6.00 | 3 | 20 | 0.020 | 15.000 | 2.400 | 1060 | 65 | 2.3 |
| 8.00 | 4 | 20 | 0.030 | 20.000 | 3.200 | 795 | 95 | 6.1 |
| 10.00 | 4 | 20 | 0.035 | 25.000 | 4.000 | 635 | 90 | 8.9 |
| 12.00 | 4 | 20 | 0.055 | 30.000 | 4.800 | 530 | 115 | 16.8 |
| 16.00 | 4 | 20 | 0.075 | 40.000 | 6.400 | 400 | 120 | 30.6 |
| 20.00 | 4 | 20 | 0.095 | 50.000 | 8.000 | 320 | 120 | 48.4 |
| 25.00 | 4 | 20 | 0.115 | 62.500 | 10.000 | 255 | 115 | 73.2 |
| 32.00 | 6 | 20 | 0.105 | 80.000 | 12.800 | 200 | 125 | 128.3 |
| 40.00 | 6 | 20 | 0.130 | 100.000 | 16.000 | 160 | 125 | 198.6 |



Acciaio
< 850 N/mm²



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|-------|
| 6.00 | 3 | 25 | 0.020 | 3.000 | 6.000 | 1325 | 80 | 1.4 |
| 8.00 | 4 | 25 | 0.025 | 4.000 | 8.000 | 995 | 100 | 3.2 |
| 10.00 | 4 | 25 | 0.035 | 5.000 | 10.000 | 795 | 110 | 5.6 |
| 12.00 | 4 | 25 | 0.055 | 6.000 | 12.000 | 665 | 145 | 10.5 |
| 16.00 | 4 | 25 | 0.070 | 8.000 | 16.000 | 495 | 140 | 17.8 |
| 20.00 | 4 | 25 | 0.090 | 10.000 | 20.000 | 400 | 145 | 28.6 |
| 25.00 | 4 | 25 | 0.110 | 12.500 | 25.000 | 320 | 140 | 43.8 |
| 32.00 | 6 | 25 | 0.095 | 15.000 | 32.000 | 250 | 140 | 72.6 |
| 40.00 | 6 | 25 | 0.120 | 20.000 | 40.000 | 200 | 145 | 114.6 |

Acciaio
850 - 1100 N/mm²



| | | | | | | | | |
|-------|---|----|-------|--------|--------|-----|-----|------|
| 6.00 | 3 | 18 | 0.020 | 3.000 | 6.000 | 955 | 55 | 1.0 |
| 8.00 | 4 | 18 | 0.025 | 4.000 | 8.000 | 715 | 70 | 2.3 |
| 10.00 | 4 | 18 | 0.035 | 5.000 | 10.000 | 575 | 80 | 4.0 |
| 12.00 | 4 | 18 | 0.055 | 6.000 | 12.000 | 475 | 105 | 7.6 |
| 16.00 | 4 | 18 | 0.070 | 8.000 | 16.000 | 360 | 100 | 12.8 |
| 20.00 | 4 | 18 | 0.090 | 10.000 | 20.000 | 285 | 105 | 20.6 |
| 25.00 | 4 | 18 | 0.110 | 12.500 | 25.000 | 230 | 100 | 31.5 |
| 32.00 | 6 | 18 | 0.095 | 16.000 | 32.000 | 180 | 100 | 52.3 |
| 40.00 | 6 | 18 | 0.120 | 20.000 | 40.000 | 145 | 105 | 82.5 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| | | | | | | | | |
|-------|---|----|-------|--------|--------|-----|----|------|
| 6.00 | 3 | 10 | 0.020 | 3.000 | 6.000 | 530 | 30 | 0.6 |
| 8.00 | 4 | 10 | 0.025 | 4.000 | 8.000 | 400 | 40 | 1.3 |
| 10.00 | 4 | 10 | 0.035 | 5.000 | 10.000 | 320 | 45 | 2.2 |
| 12.00 | 4 | 10 | 0.055 | 6.000 | 12.000 | 265 | 60 | 4.2 |
| 16.00 | 4 | 10 | 0.070 | 8.000 | 16.000 | 200 | 55 | 7.1 |
| 20.00 | 4 | 10 | 0.090 | 10.000 | 20.000 | 160 | 55 | 11.5 |
| 25.00 | 4 | 10 | 0.110 | 12.500 | 25.000 | 125 | 55 | 17.5 |
| 32.00 | 6 | 10 | 0.095 | 16.000 | 32.000 | 100 | 55 | 29.0 |
| 40.00 | 6 | 10 | 0.120 | 20.000 | 40.000 | 80 | 55 | 45.8 |

Ghisa
(grigia / sferoidale)



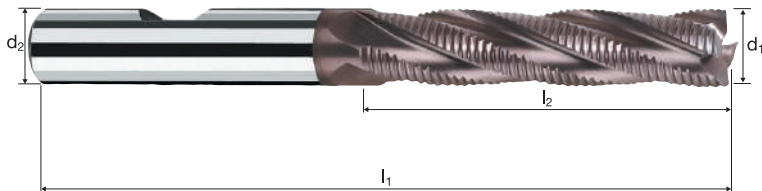
| | | | | | | | | |
|-------|---|----|-------|--------|--------|-----|----|------|
| 6.00 | 3 | 16 | 0.020 | 3.000 | 6.000 | 850 | 50 | 0.9 |
| 8.00 | 4 | 16 | 0.025 | 4.000 | 8.000 | 635 | 65 | 2.0 |
| 10.00 | 4 | 16 | 0.035 | 5.000 | 10.000 | 510 | 70 | 3.6 |
| 12.00 | 4 | 16 | 0.055 | 6.000 | 12.000 | 425 | 95 | 6.7 |
| 16.00 | 4 | 16 | 0.070 | 8.000 | 16.000 | 320 | 90 | 11.4 |
| 20.00 | 4 | 16 | 0.090 | 10.000 | 20.000 | 255 | 90 | 18.3 |
| 25.00 | 4 | 16 | 0.110 | 12.500 | 25.000 | 205 | 90 | 28.0 |
| 32.00 | 6 | 16 | 0.095 | 16.000 | 32.000 | 160 | 90 | 46.4 |
| 40.00 | 6 | 16 | 0.120 | 20.000 | 40.000 | 125 | 90 | 73.3 |

Frese cilindriche

Profilata NRF, esecuzione lunga

HSS

HSS
PM/F λ 25°
 γ 10°



Sgrossatura

Finitura



ReTool®

Rm
< 850

Rm
850-1100

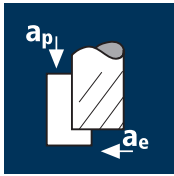
Rm
1100-1300

Inox
Stainless

GG(G)

| Esempio: N° Ordine | | | | | | | | | | UNICUT-4X | |
|-----------------------|-----------------------|----------------------|----------------|----------------|----------------|------|------|---|--|-----------|--|
| | | | | | | | | | | U0665 | |
| | | | | | | | | | | EUR | |
| Ø Code | d ₁ k12 | d ₂ h6 | l ₁ | l ₂ | l ₄ | 45° | α | z | | | |
| 260 | 5.00 | 6.00 | 68 | 24.00 | 31.55 | 0.40 | 1.0° | 3 | | 72.00 | |
| 300 | 6.00 | 6.00 | 68 | 24.00 | - | 0.40 | 0.0° | 3 | | 72.00 | |
| 342 | 7.00 | 10.00 | 80 | 30.00 | 39.50 | 0.40 | 2.5° | 3 | | 74.00 | |
| 391 | 8.00 | 8.00 | 82 | 38.00 | - | 0.40 | 0.0° | 4 | | 74.00 | |
| 402 | 8.00 | 10.00 | 88 | 38.00 | 47.50 | 0.40 | 1.0° | 4 | | 74.00 | |
| 420 | 9.00 | 10.00 | 88 | 38.00 | 47.50 | 0.40 | 0.0° | 4 | | 79.00 | |
| 450 | 10.00 | 10.00 | 95 | 45.00 | - | 0.40 | 0.0° | 4 | | 79.00 | |
| 470 | 11.00 | 12.00 | 102 | 45.00 | 56.50 | 0.40 | 0.0° | 4 | | 89.00 | |
| 501 | 12.00 | 12.00 | 110 | 53.00 | - | 0.40 | 0.0° | 4 | | 89.00 | |
| 540 | 13.00 | 12.00 | 110 | 53.00 | - | 0.40 | 0.0° | 4 | | 122.00 | |
| 570 | 14.00 | 12.00 | 110 | 53.00 | - | 0.40 | 0.0° | 4 | | 122.00 | |
| 610 | 16.00 | 16.00 | 123 | 63.00 | - | 0.50 | 0.0° | 4 | | 122.00 | |
| 640 | 18.00 | 16.00 | 123 | 63.00 | - | 0.50 | 0.0° | 4 | | 170.00 | |
| 682 | 20.00 | 20.00 | 141 | 75.00 | - | 0.50 | 0.0° | 4 | | 170.00 | |
| 710 | 22.00 | 20.00 | 141 | 75.00 | - | 0.70 | 0.0° | 4 | | 250.00 | |
| 772 | 25.00 | 25.00 | 166 | 90.00 | - | 0.70 | 0.0° | 4 | | 250.00 | |
| 800 | 28.00 | 25.00 | 166 | 90.00 | - | 0.70 | 0.0° | 6 | | 420.00 | |
| 810 | 30.00 | 25.00 | 166 | 90.00 | - | 0.70 | 0.0° | 6 | | 420.00 | |
| 832 | 32.00 | 32.00 | 186 | 106.00 | - | 0.70 | 0.0° | 6 | | 420.00 | |
| 860 | 36.00 | 32.00 | 186 | 106.00 | - | 0.90 | 0.0° | 6 | | 745.00 | |
| 892 | 40.00 | 40.00 | 217 | 125.00 | - | 0.90 | 0.0° | 6 | | 745.00 | |

Applicazione



Materiale

Acciaio
850 - 1100 N/mm²



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 6.00 | 4 | 27 | 0.015 | 6.000 | 1.200 | 1430 | 85 | 0.6 |
| 8.00 | 4 | 27 | 0.020 | 8.000 | 1.600 | 1075 | 85 | 1.1 |
| 10.00 | 4 | 27 | 0.025 | 10.000 | 2.000 | 860 | 85 | 1.7 |
| 12.00 | 4 | 27 | 0.035 | 12.000 | 2.400 | 715 | 100 | 2.9 |
| 16.00 | 4 | 27 | 0.050 | 16.000 | 3.200 | 535 | 105 | 5.5 |
| 20.00 | 4 | 27 | 0.060 | 20.000 | 4.000 | 430 | 105 | 8.3 |
| 25.00 | 4 | 27 | 0.080 | 25.000 | 5.000 | 345 | 110 | 13.8 |

Acciaio
1100 - 1300 N/mm²



| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|----|------|
| 6.00 | 4 | 22 | 0.015 | 6.000 | 1.200 | 1165 | 70 | 0.5 |
| 8.00 | 4 | 22 | 0.020 | 8.000 | 1.600 | 875 | 70 | 0.9 |
| 10.00 | 4 | 22 | 0.025 | 10.000 | 2.000 | 700 | 70 | 1.4 |
| 12.00 | 4 | 22 | 0.035 | 12.000 | 2.400 | 585 | 80 | 2.4 |
| 16.00 | 4 | 22 | 0.050 | 16.000 | 3.200 | 440 | 90 | 4.5 |
| 20.00 | 4 | 22 | 0.060 | 20.000 | 4.000 | 350 | 85 | 6.7 |
| 25.00 | 4 | 22 | 0.080 | 25.000 | 5.000 | 280 | 90 | 11.2 |

Acciaio per lavorazione
a freddo (12% Cr)
fortemente legati
[1.2379]

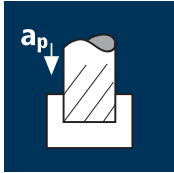


| | | | | | | | | |
|-------|---|----|-------|--------|-------|-----|----|-----|
| 6.00 | 4 | 16 | 0.015 | 6.000 | 1.200 | 850 | 50 | 0.4 |
| 8.00 | 4 | 16 | 0.020 | 8.000 | 1.600 | 635 | 50 | 0.7 |
| 10.00 | 4 | 16 | 0.025 | 10.000 | 2.000 | 510 | 50 | 1.0 |
| 12.00 | 4 | 16 | 0.035 | 12.000 | 2.400 | 425 | 60 | 1.7 |
| 16.00 | 4 | 16 | 0.050 | 16.000 | 3.200 | 320 | 65 | 3.3 |
| 20.00 | 4 | 16 | 0.060 | 20.000 | 4.000 | 255 | 60 | 4.9 |
| 25.00 | 4 | 16 | 0.080 | 25.000 | 5.000 | 205 | 65 | 8.1 |

Ghisa
(griglia / sferoidale)



| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|------|
| 6.00 | 4 | 24 | 0.015 | 6.000 | 1.200 | 1275 | 75 | 0.6 |
| 8.00 | 4 | 24 | 0.020 | 8.000 | 1.600 | 955 | 75 | 1.0 |
| 10.00 | 4 | 24 | 0.025 | 10.000 | 2.000 | 765 | 75 | 1.5 |
| 12.00 | 4 | 24 | 0.035 | 12.000 | 2.400 | 635 | 90 | 2.6 |
| 16.00 | 4 | 24 | 0.050 | 16.000 | 3.200 | 475 | 95 | 4.9 |
| 20.00 | 4 | 24 | 0.060 | 20.000 | 4.000 | 380 | 90 | 7.3 |
| 25.00 | 4 | 24 | 0.080 | 25.000 | 5.000 | 305 | 100 | 12.2 |



Acciaio
850 - 1100 N/mm²



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 6.00 | 4 | 24 | 0.020 | 3.000 | 6.000 | 1275 | 100 | 1.8 |
| 8.00 | 4 | 24 | 0.025 | 4.000 | 8.000 | 955 | 95 | 3.1 |
| 10.00 | 4 | 24 | 0.030 | 5.000 | 10.000 | 765 | 90 | 4.6 |
| 12.00 | 4 | 24 | 0.045 | 6.000 | 12.000 | 635 | 115 | 8.3 |
| 16.00 | 4 | 24 | 0.065 | 8.000 | 16.000 | 475 | 125 | 15.9 |
| 20.00 | 4 | 24 | 0.080 | 10.000 | 20.000 | 380 | 120 | 24.4 |
| 25.00 | 4 | 24 | 0.100 | 12.500 | 25.000 | 305 | 120 | 38.2 |

Acciaio
1100 - 1300 N/mm²



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 6.00 | 4 | 20 | 0.020 | 3.000 | 6.000 | 1060 | 85 | 1.5 |
| 8.00 | 4 | 20 | 0.025 | 4.000 | 8.000 | 795 | 80 | 2.5 |
| 10.00 | 4 | 20 | 0.030 | 5.000 | 10.000 | 635 | 75 | 3.8 |
| 12.00 | 4 | 20 | 0.045 | 6.000 | 12.000 | 530 | 95 | 6.9 |
| 16.00 | 4 | 20 | 0.065 | 8.000 | 16.000 | 400 | 105 | 13.2 |
| 20.00 | 4 | 20 | 0.080 | 10.000 | 20.000 | 320 | 100 | 20.4 |
| 25.00 | 4 | 20 | 0.100 | 12.500 | 25.000 | 255 | 100 | 31.8 |

Acciaio per lavorazione
a freddo (12% Cr)
fortemente legati
[1.2379]



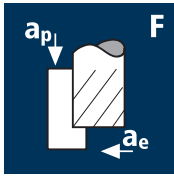
| | | | | | | | | |
|-------|---|----|-------|--------|--------|-----|----|------|
| 6.00 | 4 | 14 | 0.020 | 3.000 | 6.000 | 745 | 60 | 1.1 |
| 8.00 | 4 | 14 | 0.025 | 4.000 | 8.000 | 555 | 55 | 1.8 |
| 10.00 | 4 | 14 | 0.030 | 5.000 | 10.000 | 445 | 55 | 2.7 |
| 12.00 | 4 | 14 | 0.045 | 6.000 | 12.000 | 370 | 65 | 4.8 |
| 16.00 | 4 | 14 | 0.065 | 8.000 | 16.000 | 280 | 70 | 9.3 |
| 20.00 | 4 | 14 | 0.080 | 10.000 | 20.000 | 225 | 70 | 14.3 |
| 25.00 | 4 | 14 | 0.100 | 12.500 | 25.000 | 180 | 70 | 22.3 |

Ghisa
(griglia / sferoidale)



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|------|
| 6.00 | 4 | 21 | 0.020 | 3.000 | 6.000 | 1115 | 90 | 1.6 |
| 8.00 | 4 | 21 | 0.025 | 4.000 | 8.000 | 835 | 85 | 2.7 |
| 10.00 | 4 | 21 | 0.030 | 5.000 | 10.000 | 670 | 80 | 4.0 |
| 12.00 | 4 | 21 | 0.045 | 6.000 | 12.000 | 555 | 100 | 7.2 |
| 16.00 | 4 | 21 | 0.065 | 8.000 | 16.000 | 420 | 110 | 13.9 |
| 20.00 | 4 | 21 | 0.080 | 10.000 | 20.000 | 335 | 105 | 21.4 |
| 25.00 | 4 | 21 | 0.100 | 12.500 | 25.000 | 265 | 105 | 33.4 |

Applicazione



Materiale

Acciaio
850 - 1100 N/mm²



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|
| 3.00 | 5 | 160 | 0.025 | 8.000 | 0.030 | 16975 | 2120 |
| 4.00 | 5 | 160 | 0.029 | 11.000 | 0.030 | 12730 | 1845 |
| 5.00 | 5 | 160 | 0.033 | 13.000 | 0.060 | 10185 | 1680 |
| 6.00 | 5 | 160 | 0.036 | 13.000 | 0.060 | 8490 | 1530 |
| 8.00 | 7 | 160 | 0.041 | 19.000 | 0.100 | 6365 | 1825 |
| 10.00 | 7 | 160 | 0.046 | 22.000 | 0.100 | 5095 | 1640 |
| 12.00 | 7 | 160 | 0.051 | 26.000 | 0.120 | 4245 | 1515 |
| 16.00 | 7 | 160 | 0.059 | 32.000 | 0.120 | 3185 | 1315 |
| 20.00 | 7 | 160 | 0.065 | 38.000 | 0.150 | 2545 | 1160 |

Acciaio
1100 - 1300 N/mm²



| | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|------|
| 3.00 | 5 | 140 | 0.025 | 8.000 | 0.030 | 14855 | 1855 |
| 4.00 | 5 | 140 | 0.029 | 11.000 | 0.030 | 11140 | 1615 |
| 5.00 | 5 | 140 | 0.033 | 13.000 | 0.060 | 8915 | 1470 |
| 6.00 | 5 | 140 | 0.036 | 13.000 | 0.060 | 7425 | 1335 |
| 8.00 | 7 | 140 | 0.041 | 19.000 | 0.100 | 5570 | 1600 |
| 10.00 | 7 | 140 | 0.046 | 22.000 | 0.100 | 4455 | 1435 |
| 12.00 | 7 | 140 | 0.051 | 26.000 | 0.120 | 3715 | 1325 |
| 16.00 | 7 | 140 | 0.059 | 32.000 | 0.120 | 2785 | 1150 |
| 20.00 | 7 | 140 | 0.065 | 38.000 | 0.150 | 2230 | 1015 |

Acciaio da
utensile temprato
52 - 56 HRC



| | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|------|
| 3.00 | 5 | 120 | 0.025 | 8.000 | 0.030 | 12730 | 1590 |
| 4.00 | 5 | 120 | 0.029 | 11.000 | 0.030 | 9550 | 1385 |
| 5.00 | 5 | 120 | 0.033 | 13.000 | 0.060 | 7640 | 1260 |
| 6.00 | 5 | 120 | 0.036 | 13.000 | 0.060 | 6365 | 1145 |
| 8.00 | 7 | 120 | 0.041 | 19.000 | 0.100 | 4775 | 1370 |
| 10.00 | 7 | 120 | 0.046 | 22.000 | 0.100 | 3820 | 1230 |
| 12.00 | 7 | 120 | 0.051 | 26.000 | 0.120 | 3185 | 1135 |
| 16.00 | 7 | 120 | 0.059 | 32.000 | 0.120 | 2385 | 985 |
| 20.00 | 7 | 120 | 0.065 | 38.000 | 0.150 | 1910 | 870 |

Acciaio da
utensile temprato
56 - 60 HRC



| | | | | | | | |
|-------|---|----|-------|--------|-------|------|------|
| 3.00 | 5 | 80 | 0.025 | 8.000 | 0.030 | 8490 | 1060 |
| 4.00 | 5 | 80 | 0.029 | 11.000 | 0.030 | 6365 | 925 |
| 5.00 | 5 | 80 | 0.033 | 13.000 | 0.060 | 5095 | 840 |
| 6.00 | 5 | 80 | 0.036 | 13.000 | 0.060 | 4245 | 765 |
| 8.00 | 7 | 80 | 0.041 | 19.000 | 0.100 | 3185 | 915 |
| 10.00 | 7 | 80 | 0.046 | 22.000 | 0.100 | 2545 | 820 |
| 12.00 | 7 | 80 | 0.051 | 26.000 | 0.120 | 2120 | 760 |
| 16.00 | 7 | 80 | 0.059 | 32.000 | 0.120 | 1590 | 655 |
| 20.00 | 7 | 80 | 0.065 | 38.000 | 0.150 | 1275 | 580 |

Alluminio malleabile
Costruzione integrale Al



| | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|------|
| 3.00 | 5 | 396 | 0.025 | 8.000 | 0.030 | 42015 | 5250 |
| 4.00 | 5 | 450 | 0.029 | 11.000 | 0.030 | 35810 | 5190 |
| 5.00 | 5 | 450 | 0.033 | 13.000 | 0.060 | 28650 | 4725 |
| 6.00 | 5 | 450 | 0.036 | 13.000 | 0.060 | 23875 | 4295 |
| 8.00 | 7 | 450 | 0.041 | 19.000 | 0.100 | 17905 | 5140 |
| 10.00 | 7 | 450 | 0.046 | 22.000 | 0.100 | 14325 | 4610 |
| 12.00 | 7 | 450 | 0.051 | 26.000 | 0.120 | 11935 | 4260 |
| 16.00 | 7 | 450 | 0.045 | 24.000 | 0.200 | 8950 | 2820 |
| 20.00 | 7 | 450 | 0.065 | 38.000 | 0.150 | 7160 | 3260 |

Ghisa
(grigia / sferoidale)



| | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|------|
| 3.00 | 5 | 180 | 0.025 | 8.000 | 0.030 | 19100 | 2385 |
| 4.00 | 5 | 180 | 0.029 | 11.000 | 0.030 | 14325 | 2075 |
| 5.00 | 5 | 180 | 0.033 | 13.000 | 0.060 | 11460 | 1890 |
| 6.00 | 5 | 180 | 0.036 | 13.000 | 0.060 | 9550 | 1720 |
| 8.00 | 7 | 180 | 0.041 | 19.000 | 0.100 | 7160 | 2055 |
| 10.00 | 7 | 180 | 0.046 | 22.000 | 0.100 | 5730 | 1845 |
| 12.00 | 7 | 180 | 0.051 | 26.000 | 0.120 | 4775 | 1705 |
| 16.00 | 7 | 180 | 0.059 | 32.000 | 0.120 | 3580 | 1480 |
| 20.00 | 7 | 180 | 0.065 | 38.000 | 0.150 | 2865 | 1305 |

Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



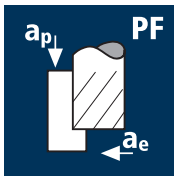
| | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|
| 3.00 | 5 | 70 | 0.025 | 8.000 | 0.030 | 7425 | 930 |
| 4.00 | 5 | 70 | 0.029 | 11.000 | 0.030 | 5570 | 810 |
| 5.00 | 5 | 70 | 0.033 | 13.000 | 0.060 | 4455 | 735 |
| 6.00 | 5 | 70 | 0.036 | 13.000 | 0.060 | 3715 | 670 |
| 8.00 | 7 | 70 | 0.041 | 19.000 | 0.100 | 2785 | 800 |
| 10.00 | 7 | 70 | 0.046 | 22.000 | 0.100 | 2230 | 715 |
| 12.00 | 7 | 70 | 0.051 | 26.000 | 0.120 | 1855 | 665 |
| 16.00 | 7 | 70 | 0.059 | 32.000 | 0.120 | 1395 | 575 |
| 20.00 | 7 | 70 | 0.065 | 38.000 | 0.150 | 1115 | 505 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| | | | | | | | |
|-------|---|----|-------|--------|-------|------|------|
| 3.00 | 5 | 80 | 0.025 | 8.000 | 0.030 | 8490 | 1060 |
| 4.00 | 5 | 80 | 0.029 | 11.000 | 0.030 | 6365 | 925 |
| 5.00 | 5 | 80 | 0.033 | 13.000 | 0.060 | 5095 | 840 |
| 6.00 | 5 | 80 | 0.036 | 13.000 | 0.060 | 4245 | 765 |
| 8.00 | 7 | 80 | 0.041 | 19.000 | 0.100 | 3185 | 915 |
| 10.00 | 7 | 80 | 0.046 | 22.000 | 0.100 | 2545 | 820 |
| 12.00 | 7 | 80 | 0.051 | 26.000 | 0.120 | 2120 | 760 |
| 16.00 | 7 | 80 | 0.059 | 32.000 | 0.120 | 1590 | 655 |
| 20.00 | 7 | 80 | 0.065 | 38.000 | 0.150 | 1275 | 580 |

Applicazione



Materiale

Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|
| 3.00 | 4 | 130 | 0.030 | 8.000 | 0.060 | 13795 | 1655 |
| 4.00 | 5 | 130 | 0.035 | 11.000 | 0.060 | 10345 | 1810 |
| 5.00 | 5 | 130 | 0.039 | 13.000 | 0.120 | 8275 | 1615 |
| 6.00 | 6 | 130 | 0.043 | 13.000 | 0.120 | 6895 | 1780 |
| 8.00 | 6 | 130 | 0.050 | 19.000 | 0.200 | 5175 | 1550 |
| 10.00 | 7 | 130 | 0.056 | 23.000 | 0.200 | 4140 | 1620 |
| 12.00 | 7 | 130 | 0.061 | 27.000 | 0.240 | 3450 | 1470 |
| 16.00 | 8 | 130 | 0.070 | 32.000 | 0.240 | 2585 | 1450 |
| 20.00 | 8 | 130 | 0.078 | 40.000 | 0.300 | 2070 | 1290 |

Acciaio
850 - 1100 N/mm²

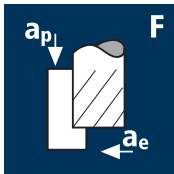


| | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|------|
| 3.00 | 4 | 110 | 0.030 | 8.000 | 0.060 | 11670 | 1400 |
| 4.00 | 5 | 110 | 0.035 | 11.000 | 0.060 | 8755 | 1530 |
| 5.00 | 5 | 110 | 0.039 | 13.000 | 0.120 | 7005 | 1365 |
| 6.00 | 6 | 110 | 0.043 | 13.000 | 0.120 | 5835 | 1505 |
| 8.00 | 6 | 110 | 0.050 | 19.000 | 0.200 | 4375 | 1315 |
| 10.00 | 7 | 110 | 0.056 | 23.000 | 0.200 | 3500 | 1375 |
| 12.00 | 7 | 110 | 0.061 | 27.000 | 0.240 | 2920 | 1245 |
| 16.00 | 8 | 110 | 0.070 | 32.000 | 0.240 | 2190 | 1225 |
| 20.00 | 8 | 110 | 0.078 | 40.000 | 0.300 | 1750 | 1090 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|
| 3.00 | 4 | 55 | 0.030 | 8.000 | 0.060 | 5835 | 700 |
| 4.00 | 5 | 55 | 0.035 | 11.000 | 0.060 | 4375 | 765 |
| 5.00 | 5 | 55 | 0.039 | 13.000 | 0.120 | 3500 | 685 |
| 6.00 | 6 | 55 | 0.043 | 13.000 | 0.120 | 2920 | 755 |
| 8.00 | 6 | 55 | 0.050 | 19.000 | 0.200 | 2190 | 655 |
| 10.00 | 7 | 55 | 0.056 | 23.000 | 0.200 | 1750 | 685 |
| 12.00 | 7 | 55 | 0.061 | 27.000 | 0.240 | 1460 | 625 |
| 16.00 | 8 | 55 | 0.070 | 32.000 | 0.240 | 1095 | 615 |
| 20.00 | 8 | 55 | 0.078 | 40.000 | 0.300 | 875 | 545 |



Acciaio
< 850 N/mm²



| | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|------|
| 3.00 | 4 | 160 | 0.025 | 8.000 | 0.030 | 16975 | 1700 |
| 4.00 | 5 | 160 | 0.029 | 11.000 | 0.030 | 12730 | 1845 |
| 5.00 | 5 | 160 | 0.033 | 13.000 | 0.060 | 10185 | 1680 |
| 6.00 | 6 | 160 | 0.036 | 13.000 | 0.060 | 8490 | 1835 |
| 8.00 | 6 | 160 | 0.041 | 19.000 | 0.100 | 6365 | 1565 |
| 10.00 | 7 | 160 | 0.046 | 23.000 | 0.100 | 5095 | 1640 |
| 12.00 | 7 | 160 | 0.051 | 27.000 | 0.120 | 4245 | 1515 |
| 16.00 | 8 | 160 | 0.059 | 32.000 | 0.120 | 3185 | 1500 |
| 20.00 | 8 | 160 | 0.065 | 40.000 | 0.150 | 2545 | 1325 |

Acciaio
850 - 1100 N/mm²



| | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|------|
| 3.00 | 4 | 140 | 0.025 | 8.000 | 0.030 | 14855 | 1485 |
| 4.00 | 5 | 140 | 0.029 | 11.000 | 0.030 | 11140 | 1615 |
| 5.00 | 5 | 140 | 0.033 | 13.000 | 0.060 | 8915 | 1470 |
| 6.00 | 6 | 140 | 0.036 | 13.000 | 0.060 | 7425 | 1605 |
| 8.00 | 6 | 140 | 0.041 | 19.000 | 0.100 | 5570 | 1370 |
| 10.00 | 7 | 140 | 0.046 | 23.000 | 0.100 | 4455 | 1435 |
| 12.00 | 7 | 140 | 0.051 | 27.000 | 0.120 | 3715 | 1325 |
| 16.00 | 8 | 140 | 0.059 | 32.000 | 0.120 | 2785 | 1315 |
| 20.00 | 8 | 140 | 0.065 | 40.000 | 0.150 | 2230 | 1160 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

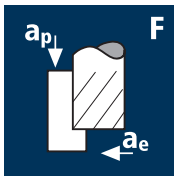


| | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|
| 3.00 | 4 | 70 | 0.025 | 8.000 | 0.030 | 7425 | 745 |
| 4.00 | 5 | 70 | 0.029 | 11.000 | 0.030 | 5570 | 810 |
| 5.00 | 5 | 70 | 0.033 | 13.000 | 0.060 | 4455 | 735 |
| 6.00 | 6 | 70 | 0.036 | 13.000 | 0.060 | 3715 | 800 |
| 8.00 | 6 | 70 | 0.041 | 19.000 | 0.100 | 2785 | 685 |
| 10.00 | 7 | 70 | 0.046 | 23.000 | 0.100 | 2230 | 715 |
| 12.00 | 7 | 70 | 0.051 | 27.000 | 0.120 | 1855 | 665 |
| 16.00 | 8 | 70 | 0.059 | 32.000 | 0.120 | 1395 | 655 |
| 20.00 | 8 | 70 | 0.065 | 40.000 | 0.150 | 1115 | 580 |



I dati di taglio adatti per altre applicazioni e materiali si trovano nel calcolatore dei parametri di taglio **ToolExpert E-Cut**

Applicazione



Materiale

Acciaio
< 850 N/mm²



Acciaio
850 - 1100 N/mm²



Acciaio
1100 - 1300 N/mm²



Ghisa
(griglia / sferoidale)



Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



Rame non legato



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|
| 6.00 | 6 | 150 | 0.016 | 9.000 | 0.100 | 7960 | 765 |
| 8.00 | 6 | 150 | 0.020 | 12.000 | 0.100 | 5970 | 715 |
| 10.00 | 6 | 150 | 0.026 | 15.000 | 0.100 | 4775 | 745 |
| 12.00 | 6 | 150 | 0.030 | 18.000 | 0.100 | 3980 | 715 |
| 16.00 | 6 | 150 | 0.040 | 24.000 | 0.200 | 2985 | 715 |
| 20.00 | 6 | 150 | 0.050 | 30.000 | 0.200 | 2385 | 715 |

| | | | | | | | |
|-------|---|-----|-------|--------|-------|------|-----|
| 6.00 | 6 | 120 | 0.016 | 9.000 | 0.100 | 6365 | 610 |
| 8.00 | 6 | 120 | 0.020 | 12.000 | 0.100 | 4775 | 575 |
| 10.00 | 6 | 120 | 0.026 | 15.000 | 0.100 | 3820 | 595 |
| 12.00 | 6 | 120 | 0.030 | 18.000 | 0.100 | 3185 | 575 |
| 16.00 | 6 | 120 | 0.040 | 24.000 | 0.200 | 2385 | 575 |
| 20.00 | 6 | 120 | 0.050 | 30.000 | 0.200 | 1910 | 575 |

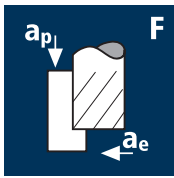
| | | | | | | | |
|-------|---|-----|-------|--------|-------|------|-----|
| 6.00 | 6 | 100 | 0.016 | 9.000 | 0.100 | 5305 | 510 |
| 8.00 | 6 | 100 | 0.020 | 12.000 | 0.100 | 3980 | 475 |
| 10.00 | 6 | 100 | 0.026 | 15.000 | 0.100 | 3185 | 495 |
| 12.00 | 6 | 100 | 0.030 | 18.000 | 0.100 | 2655 | 475 |
| 16.00 | 6 | 100 | 0.040 | 24.000 | 0.200 | 1990 | 475 |
| 20.00 | 6 | 100 | 0.050 | 30.000 | 0.200 | 1590 | 475 |

| | | | | | | | |
|-------|---|-----|-------|--------|-------|------|-----|
| 6.00 | 6 | 120 | 0.016 | 9.000 | 0.100 | 6365 | 610 |
| 8.00 | 6 | 120 | 0.020 | 12.000 | 0.100 | 4775 | 575 |
| 10.00 | 6 | 120 | 0.026 | 15.000 | 0.100 | 3820 | 595 |
| 12.00 | 6 | 120 | 0.030 | 18.000 | 0.100 | 3185 | 575 |
| 16.00 | 6 | 120 | 0.040 | 24.000 | 0.200 | 2385 | 575 |
| 20.00 | 6 | 120 | 0.050 | 30.000 | 0.200 | 1910 | 575 |

| | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|
| 6.00 | 6 | 50 | 0.016 | 9.000 | 0.100 | 2655 | 255 |
| 8.00 | 6 | 50 | 0.020 | 12.000 | 0.100 | 1990 | 240 |
| 10.00 | 6 | 50 | 0.026 | 15.000 | 0.100 | 1590 | 250 |
| 12.00 | 6 | 50 | 0.030 | 18.000 | 0.100 | 1325 | 240 |
| 16.00 | 6 | 50 | 0.040 | 24.000 | 0.200 | 995 | 240 |
| 20.00 | 6 | 50 | 0.050 | 30.000 | 0.200 | 795 | 240 |

| | | | | | | | |
|-------|---|-----|-------|--------|-------|------|-----|
| 6.00 | 6 | 180 | 0.016 | 9.000 | 0.100 | 9550 | 915 |
| 8.00 | 6 | 180 | 0.020 | 12.000 | 0.100 | 7160 | 860 |
| 10.00 | 6 | 180 | 0.026 | 15.000 | 0.100 | 5730 | 895 |
| 12.00 | 6 | 180 | 0.030 | 18.000 | 0.100 | 4775 | 860 |
| 16.00 | 6 | 180 | 0.040 | 24.000 | 0.200 | 3580 | 860 |
| 20.00 | 6 | 180 | 0.050 | 30.000 | 0.200 | 2865 | 860 |

Applicazione



Materiale

Acciaio
850 - 1100 N/mm²



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|
| 3.00 | 5 | 130 | 0.021 | 14.000 | 0.030 | 13795 | 1450 |
| 4.00 | 5 | 130 | 0.024 | 17.000 | 0.030 | 10345 | 1240 |
| 5.00 | 5 | 130 | 0.027 | 19.000 | 0.060 | 8275 | 1115 |
| 6.00 | 5 | 130 | 0.030 | 19.000 | 0.060 | 6895 | 1035 |
| 8.00 | 7 | 130 | 0.034 | 28.000 | 0.100 | 5175 | 1230 |
| 10.00 | 7 | 130 | 0.039 | 34.000 | 0.100 | 4140 | 1130 |
| 12.00 | 7 | 130 | 0.042 | 40.000 | 0.120 | 3450 | 1015 |
| 16.00 | 7 | 130 | 0.049 | 48.000 | 0.120 | 2585 | 885 |
| 20.00 | 7 | 130 | 0.055 | 56.000 | 0.150 | 2070 | 795 |

Acciaio
1100 - 1300 N/mm²



| | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|------|
| 3.00 | 5 | 110 | 0.021 | 14.000 | 0.030 | 11670 | 1225 |
| 4.00 | 5 | 110 | 0.024 | 17.000 | 0.030 | 8755 | 1050 |
| 5.00 | 5 | 110 | 0.027 | 19.000 | 0.060 | 7005 | 945 |
| 6.00 | 5 | 110 | 0.030 | 19.000 | 0.060 | 5835 | 875 |
| 8.00 | 7 | 110 | 0.034 | 28.000 | 0.100 | 4375 | 1040 |
| 10.00 | 7 | 110 | 0.039 | 34.000 | 0.100 | 3500 | 955 |
| 12.00 | 7 | 110 | 0.042 | 40.000 | 0.120 | 2920 | 860 |
| 16.00 | 7 | 110 | 0.049 | 48.000 | 0.120 | 2190 | 750 |
| 20.00 | 7 | 110 | 0.055 | 56.000 | 0.150 | 1750 | 675 |

Acciaio da
utensile temprato
52 - 56 HRC



| | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|------|
| 3.00 | 5 | 100 | 0.021 | 14.000 | 0.030 | 10610 | 1115 |
| 4.00 | 5 | 100 | 0.024 | 17.000 | 0.030 | 7960 | 955 |
| 5.00 | 5 | 100 | 0.027 | 19.000 | 0.060 | 6365 | 860 |
| 6.00 | 5 | 100 | 0.030 | 19.000 | 0.060 | 5305 | 795 |
| 8.00 | 7 | 100 | 0.034 | 28.000 | 0.100 | 3980 | 945 |
| 10.00 | 7 | 100 | 0.039 | 34.000 | 0.100 | 3185 | 870 |
| 12.00 | 7 | 100 | 0.042 | 40.000 | 0.120 | 2655 | 780 |
| 16.00 | 7 | 100 | 0.049 | 48.000 | 0.120 | 1990 | 680 |
| 20.00 | 7 | 100 | 0.055 | 56.000 | 0.150 | 1590 | 615 |

Acciaio da
utensile temprato
56 - 60 HRC



| | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|
| 3.00 | 5 | 60 | 0.021 | 14.000 | 0.030 | 6365 | 670 |
| 4.00 | 5 | 60 | 0.024 | 17.000 | 0.030 | 4775 | 575 |
| 5.00 | 5 | 60 | 0.027 | 19.000 | 0.060 | 3820 | 515 |
| 6.00 | 5 | 60 | 0.030 | 19.000 | 0.060 | 3185 | 475 |
| 8.00 | 7 | 60 | 0.034 | 28.000 | 0.100 | 2385 | 570 |
| 10.00 | 7 | 60 | 0.039 | 34.000 | 0.100 | 1910 | 520 |
| 12.00 | 7 | 60 | 0.042 | 40.000 | 0.120 | 1590 | 470 |
| 16.00 | 7 | 60 | 0.049 | 48.000 | 0.120 | 1195 | 410 |
| 20.00 | 7 | 60 | 0.055 | 56.000 | 0.150 | 955 | 370 |

Alluminio malleabile
Costruzione integrale Al



| | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|------|
| 3.00 | 5 | 360 | 0.021 | 14.000 | 0.030 | 38195 | 4010 |
| 4.00 | 5 | 360 | 0.024 | 17.000 | 0.030 | 28650 | 3440 |
| 5.00 | 5 | 360 | 0.027 | 19.000 | 0.060 | 22920 | 3095 |
| 6.00 | 5 | 360 | 0.030 | 19.000 | 0.060 | 19100 | 2865 |
| 8.00 | 7 | 360 | 0.034 | 28.000 | 0.100 | 14325 | 3410 |
| 10.00 | 7 | 360 | 0.039 | 34.000 | 0.100 | 11460 | 3130 |
| 12.00 | 7 | 360 | 0.042 | 40.000 | 0.120 | 9550 | 2805 |
| 16.00 | 7 | 360 | 0.045 | 40.000 | 0.250 | 7160 | 2255 |
| 20.00 | 7 | 360 | 0.055 | 56.000 | 0.150 | 5730 | 2205 |

Ghisa
(grigia / sferoidale)



| | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|------|
| 3.00 | 5 | 140 | 0.021 | 14.000 | 0.030 | 14855 | 1560 |
| 4.00 | 5 | 140 | 0.024 | 17.000 | 0.030 | 11140 | 1335 |
| 5.00 | 5 | 140 | 0.027 | 19.000 | 0.060 | 8915 | 1205 |
| 6.00 | 5 | 140 | 0.030 | 19.000 | 0.060 | 7425 | 1115 |
| 8.00 | 7 | 140 | 0.034 | 28.000 | 0.100 | 5570 | 1325 |
| 10.00 | 7 | 140 | 0.039 | 34.000 | 0.100 | 4455 | 1215 |
| 12.00 | 7 | 140 | 0.042 | 40.000 | 0.120 | 3715 | 1090 |
| 16.00 | 7 | 140 | 0.049 | 48.000 | 0.120 | 2785 | 955 |
| 20.00 | 7 | 140 | 0.055 | 56.000 | 0.150 | 2230 | 860 |

Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



| | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|
| 3.00 | 5 | 50 | 0.021 | 14.000 | 0.030 | 5305 | 555 |
| 4.00 | 5 | 50 | 0.024 | 17.000 | 0.030 | 3980 | 475 |
| 5.00 | 5 | 50 | 0.027 | 19.000 | 0.060 | 3185 | 430 |
| 6.00 | 5 | 50 | 0.030 | 19.000 | 0.060 | 2655 | 400 |
| 8.00 | 7 | 50 | 0.034 | 28.000 | 0.100 | 1990 | 475 |
| 10.00 | 7 | 50 | 0.039 | 34.000 | 0.100 | 1590 | 435 |
| 12.00 | 7 | 50 | 0.042 | 40.000 | 0.120 | 1325 | 390 |
| 16.00 | 7 | 50 | 0.049 | 48.000 | 0.120 | 995 | 340 |
| 20.00 | 7 | 50 | 0.055 | 56.000 | 0.150 | 795 | 305 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



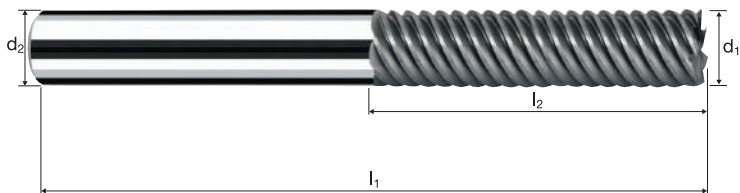
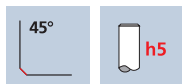
| | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|
| 3.00 | 5 | 60 | 0.021 | 14.000 | 0.030 | 6365 | 670 |
| 4.00 | 5 | 60 | 0.024 | 17.000 | 0.030 | 4775 | 575 |
| 5.00 | 5 | 60 | 0.027 | 19.000 | 0.060 | 3820 | 515 |
| 6.00 | 5 | 60 | 0.030 | 19.000 | 0.060 | 3185 | 475 |
| 8.00 | 7 | 60 | 0.034 | 28.000 | 0.100 | 2385 | 570 |
| 10.00 | 7 | 60 | 0.039 | 34.000 | 0.100 | 1910 | 520 |
| 12.00 | 7 | 60 | 0.042 | 40.000 | 0.120 | 1590 | 470 |
| 16.00 | 7 | 60 | 0.049 | 48.000 | 0.120 | 1195 | 410 |
| 20.00 | 7 | 60 | 0.055 | 56.000 | 0.150 | 955 | 370 |

Frese cilindriche MulticutXF

Finitura, esecuzione medio-lunga



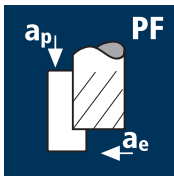
| | |
|----|---------------|
| HM | λ 65° |
| XA | γ 8° |



| | | | | | | | | | | |
|----------|-------------|--------------|--------------|-----------|-----------|----------|----------------|-------------|------------------|-----------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Inox Stainless | Ti Titanium | GG(G) Tool Steel | Aluminium |
|----------|-------------|--------------|--------------|-----------|-----------|----------|----------------|-------------|------------------|-----------|

| | | | | | | | | | | DURO-SI | POLYCHROM |
|--------------------|----------|----------|-------|-------|-------|------|----------|-----|--|---------|-----------|
| Esempio: N° Ordine | | | | | | | | | | H15251 | P15251 |
| | | | | | | | | | | EUR | EUR |
| \emptyset Code | d_1 e8 | d_2 h5 | l_1 | l_2 | l_4 | 45° | α | z | | | |
| | | | | | | | | | | | |
| 180 | 3.00 | 6.00 | 63 | 14.00 | 21.56 | - | 4.5° | 5 | | 111.00 | 107.00 |
| 220 | 4.00 | 6.00 | 63 | 17.00 | 23.09 | - | 3.0° | 5 | | 111.00 | 107.00 |
| 260 | 5.00 | 6.00 | 63 | 19.00 | 23.22 | - | 1.5° | 5 | | 111.00 | 107.00 |
| 300 | 6.00 | 6.00 | 63 | 19.00 | - | 0.15 | 0.0° | 5 | | 111.00 | 107.00 |
| 391 | 8.00 | 8.00 | 72 | 28.00 | - | 0.15 | 0.0° | 7 | | 139.00 | 134.00 |
| 450 | 10.00 | 10.00 | 84 | 34.00 | - | 0.20 | 0.0° | 7 | | 189.00 | 182.00 |
| 501 | 12.00 | 12.00 | 97 | 40.00 | - | 0.20 | 0.0° | 7 | | 234.00 | 225.00 |
| 610 | 16.00 | 16.00 | 108 | 48.00 | - | 0.20 | 0.0° | 7 | | 365.00 | 352.00 |
| 682 | 20.00 | 20.00 | 122 | 56.00 | - | 0.20 | 0.0° | 7 | | 533.00 | 513.00 |
| | | | | | | | | | | | |
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| | | | | | | | | | | | |

Applicazione



Materiale

Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|
| 3.00 | 4 | 100 | 0.025 | 11.000 | 0.060 | 10610 | 1060 |
| 4.00 | 5 | 100 | 0.029 | 13.000 | 0.060 | 7960 | 1155 |
| 5.00 | 5 | 100 | 0.033 | 16.000 | 0.120 | 6365 | 1050 |
| 6.00 | 6 | 100 | 0.036 | 21.000 | 0.120 | 5305 | 1145 |
| 8.00 | 6 | 100 | 0.041 | 31.000 | 0.200 | 3980 | 980 |
| 10.00 | 7 | 100 | 0.046 | 37.000 | 0.200 | 3185 | 1025 |
| 12.00 | 7 | 100 | 0.051 | 44.000 | 0.240 | 2655 | 945 |
| 16.00 | 8 | 100 | 0.059 | 53.000 | 0.240 | 1990 | 940 |
| 20.00 | 8 | 100 | 0.066 | 62.000 | 0.300 | 1590 | 840 |

Acciaio
850 - 1100 N/mm²

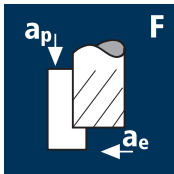


| | | | | | | | |
|-------|---|----|-------|--------|-------|------|------|
| 3.00 | 4 | 90 | 0.025 | 11.000 | 0.060 | 9550 | 955 |
| 4.00 | 5 | 90 | 0.029 | 13.000 | 0.060 | 7160 | 1040 |
| 5.00 | 5 | 90 | 0.033 | 16.000 | 0.120 | 5730 | 945 |
| 6.00 | 6 | 90 | 0.036 | 21.000 | 0.120 | 4775 | 1030 |
| 8.00 | 6 | 90 | 0.041 | 31.000 | 0.200 | 3580 | 880 |
| 10.00 | 7 | 90 | 0.046 | 37.000 | 0.200 | 2865 | 920 |
| 12.00 | 7 | 90 | 0.051 | 44.000 | 0.240 | 2385 | 850 |
| 16.00 | 8 | 90 | 0.059 | 53.000 | 0.240 | 1790 | 845 |
| 20.00 | 8 | 90 | 0.066 | 62.000 | 0.300 | 1430 | 755 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|
| 3.00 | 4 | 40 | 0.025 | 11.000 | 0.060 | 4245 | 425 |
| 4.00 | 5 | 40 | 0.029 | 13.000 | 0.060 | 3185 | 460 |
| 5.00 | 5 | 40 | 0.033 | 16.000 | 0.120 | 2545 | 420 |
| 6.00 | 6 | 40 | 0.036 | 21.000 | 0.120 | 2120 | 460 |
| 8.00 | 6 | 40 | 0.041 | 31.000 | 0.200 | 1590 | 390 |
| 10.00 | 7 | 40 | 0.046 | 37.000 | 0.200 | 1275 | 410 |
| 12.00 | 7 | 40 | 0.051 | 44.000 | 0.240 | 1060 | 380 |
| 16.00 | 8 | 40 | 0.059 | 53.000 | 0.240 | 795 | 375 |
| 20.00 | 8 | 40 | 0.066 | 62.000 | 0.300 | 635 | 335 |



Acciaio
< 850 N/mm²



| | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|------|
| 3.00 | 4 | 130 | 0.021 | 11.000 | 0.030 | 13795 | 1160 |
| 4.00 | 5 | 130 | 0.024 | 13.000 | 0.030 | 10345 | 1240 |
| 5.00 | 5 | 130 | 0.027 | 16.000 | 0.060 | 8275 | 1115 |
| 6.00 | 6 | 130 | 0.030 | 21.000 | 0.060 | 6895 | 1240 |
| 8.00 | 6 | 130 | 0.034 | 31.000 | 0.100 | 5175 | 1055 |
| 10.00 | 7 | 130 | 0.039 | 37.000 | 0.100 | 4140 | 1130 |
| 12.00 | 7 | 130 | 0.042 | 44.000 | 0.120 | 3450 | 1015 |
| 16.00 | 8 | 130 | 0.049 | 53.000 | 0.120 | 2585 | 1015 |
| 20.00 | 8 | 130 | 0.055 | 62.000 | 0.150 | 2070 | 910 |

Acciaio
850 - 1100 N/mm²



| | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|------|
| 3.00 | 4 | 110 | 0.021 | 11.000 | 0.030 | 11670 | 980 |
| 4.00 | 5 | 110 | 0.024 | 13.000 | 0.030 | 8755 | 1050 |
| 5.00 | 5 | 110 | 0.027 | 16.000 | 0.060 | 7005 | 945 |
| 6.00 | 6 | 110 | 0.030 | 21.000 | 0.060 | 5835 | 1050 |
| 8.00 | 6 | 110 | 0.034 | 31.000 | 0.100 | 4375 | 895 |
| 10.00 | 7 | 110 | 0.039 | 37.000 | 0.100 | 3500 | 955 |
| 12.00 | 7 | 110 | 0.042 | 44.000 | 0.120 | 2920 | 860 |
| 16.00 | 8 | 110 | 0.049 | 53.000 | 0.120 | 2190 | 860 |
| 20.00 | 8 | 110 | 0.055 | 62.000 | 0.150 | 1750 | 770 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|
| 3.00 | 4 | 60 | 0.021 | 11.000 | 0.030 | 6365 | 535 |
| 4.00 | 5 | 60 | 0.024 | 13.000 | 0.030 | 4775 | 575 |
| 5.00 | 5 | 60 | 0.027 | 16.000 | 0.060 | 3820 | 515 |
| 6.00 | 6 | 60 | 0.030 | 21.000 | 0.060 | 3185 | 575 |
| 8.00 | 6 | 60 | 0.034 | 31.000 | 0.100 | 2385 | 485 |
| 10.00 | 7 | 60 | 0.039 | 37.000 | 0.100 | 1910 | 520 |
| 12.00 | 7 | 60 | 0.042 | 44.000 | 0.120 | 1590 | 470 |
| 16.00 | 8 | 60 | 0.049 | 53.000 | 0.120 | 1195 | 470 |
| 20.00 | 8 | 60 | 0.055 | 62.000 | 0.150 | 955 | 420 |



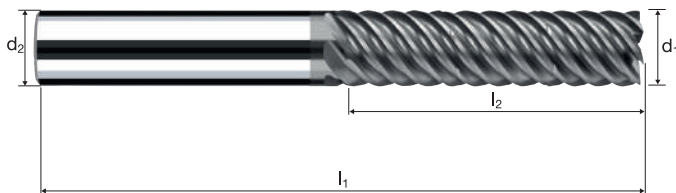
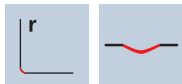
I dati di taglio adatti per altre applicazioni e materiali si trovano nel calcolatore dei parametri di taglio **ToolExpert E-Cut**

Frese cilindriche E-Cut

Finitura, esecuzione medio-lunga con rompitruciolo

HM
MG10

λ 55°
 γ 10°



Sgrossatura



Finitura

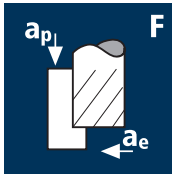


ReTool®

| | | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--------------|--|--|-------------------|----------------|---------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | | | Inox Stainless | Ti Titanium | GG(G) Tool Steel |
|-------------|----------------|-----------------|-----------------|--------------|--|--|-------------------|----------------|---------------------|

| Esempio: N° Ordine | | | | | | | | | | POLYCHROM |
|----------------------------|----------------------|----------------------|----------------|----------------|----------------|-------|------|---|--|-----------|
| | | | | | | | | | | P8311 |
| | | | | | | | | | | EUR |
| Ø Code | d ₁ e8 | d ₂ h6 | l ₁ | l ₂ | l ₄ | r | α | z | | |
| 180* | 3.00 | 6.00 | 63 | 11.00 | 20.26 | 0.050 | 4.5° | 4 | | 73.00 |
| 220* | 4.00 | 6.00 | 63 | 13.00 | 21.39 | 0.100 | 3.5° | 5 | | 73.00 |
| 260* | 5.00 | 6.00 | 63 | 16.00 | 23.52 | 0.100 | 1.5° | 5 | | 73.00 |
| 300 | 6.00 | 6.00 | 63 | 21.00 | - | 0.100 | 0.0° | 6 | | 73.00 |
| 391 | 8.00 | 8.00 | 72 | 31.00 | - | 0.150 | 0.0° | 6 | | 92.00 |
| 450 | 10.00 | 10.00 | 84 | 37.00 | - | 0.200 | 0.0° | 7 | | 125.00 |
| 501 | 12.00 | 12.00 | 97 | 44.00 | - | 0.200 | 0.0° | 7 | | 154.00 |
| 610 | 16.00 | 16.00 | 108 | 53.00 | - | 0.200 | 0.0° | 8 | | 241.00 |
| 682 | 20.00 | 20.00 | 122 | 62.00 | - | 0.250 | 0.0° | 8 | | 352.00 |
| * solo senza rompitruciolo | | | | | | | | | | |

Applicazione



Materiale

Acciaio
850 - 1100 N/mm²



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|
| 6.00 | 5 | 100 | 0.028 | 26.000 | 0.060 | 5305 | 745 |
| 8.00 | 7 | 100 | 0.032 | 36.000 | 0.100 | 3980 | 890 |
| 10.00 | 7 | 100 | 0.036 | 45.000 | 0.100 | 3185 | 800 |
| 12.00 | 7 | 100 | 0.039 | 53.000 | 0.120 | 2655 | 725 |
| 16.00 | 7 | 100 | 0.045 | 63.000 | 0.120 | 1990 | 625 |
| 20.00 | 7 | 100 | 0.050 | 75.000 | 0.150 | 1590 | 555 |

Acciaio
1100 - 1300 N/mm²



| | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|
| 6.00 | 5 | 90 | 0.028 | 26.000 | 0.060 | 4775 | 670 |
| 8.00 | 7 | 90 | 0.032 | 36.000 | 0.100 | 3580 | 800 |
| 10.00 | 7 | 90 | 0.036 | 45.000 | 0.100 | 2865 | 720 |
| 12.00 | 7 | 90 | 0.039 | 53.000 | 0.120 | 2385 | 650 |
| 16.00 | 7 | 90 | 0.045 | 63.000 | 0.120 | 1790 | 565 |
| 20.00 | 7 | 90 | 0.050 | 75.000 | 0.150 | 1430 | 500 |

Acciaio da
utensile temprato
52 - 56 HRC



| | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|
| 6.00 | 5 | 80 | 0.028 | 26.000 | 0.060 | 4245 | 595 |
| 8.00 | 7 | 80 | 0.032 | 36.000 | 0.100 | 3185 | 715 |
| 10.00 | 7 | 80 | 0.036 | 45.000 | 0.100 | 2545 | 640 |
| 12.00 | 7 | 80 | 0.039 | 53.000 | 0.120 | 2120 | 580 |
| 16.00 | 7 | 80 | 0.045 | 63.000 | 0.120 | 1590 | 500 |
| 20.00 | 7 | 80 | 0.050 | 75.000 | 0.150 | 1275 | 445 |

Acciaio da
utensile temprato
56 - 60 HRC



| | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|
| 6.00 | 5 | 50 | 0.028 | 26.000 | 0.060 | 2655 | 370 |
| 8.00 | 7 | 50 | 0.032 | 36.000 | 0.100 | 1990 | 445 |
| 10.00 | 7 | 50 | 0.036 | 45.000 | 0.100 | 1590 | 400 |
| 12.00 | 7 | 50 | 0.039 | 53.000 | 0.120 | 1325 | 360 |
| 16.00 | 7 | 50 | 0.045 | 63.000 | 0.120 | 995 | 315 |
| 20.00 | 7 | 50 | 0.050 | 75.000 | 0.150 | 795 | 280 |

Alluminio malleabile
Costruzione integrale Al



| | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|------|
| 6.00 | 5 | 290 | 0.028 | 26.000 | 0.060 | 15385 | 2155 |
| 8.00 | 7 | 290 | 0.032 | 36.000 | 0.100 | 11540 | 2585 |
| 10.00 | 7 | 290 | 0.036 | 45.000 | 0.100 | 9230 | 2325 |
| 12.00 | 7 | 290 | 0.039 | 53.000 | 0.120 | 7690 | 2100 |
| 16.00 | 7 | 360 | 0.045 | 56.000 | 0.250 | 7160 | 2255 |
| 20.00 | 7 | 290 | 0.050 | 75.000 | 0.150 | 4615 | 1615 |

Ghisa
(grigia / sferoidale)



| | | | | | | | |
|-------|---|-----|-------|--------|-------|------|-----|
| 6.00 | 5 | 110 | 0.028 | 26.000 | 0.060 | 5835 | 815 |
| 8.00 | 7 | 110 | 0.032 | 36.000 | 0.100 | 4375 | 980 |
| 10.00 | 7 | 110 | 0.036 | 45.000 | 0.100 | 3500 | 880 |
| 12.00 | 7 | 110 | 0.039 | 53.000 | 0.120 | 2920 | 795 |
| 16.00 | 7 | 110 | 0.045 | 63.000 | 0.120 | 2190 | 690 |
| 20.00 | 7 | 110 | 0.050 | 75.000 | 0.150 | 1750 | 615 |

Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



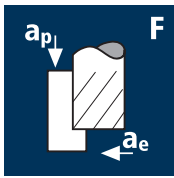
| | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|
| 6.00 | 5 | 40 | 0.028 | 26.000 | 0.060 | 2120 | 295 |
| 8.00 | 7 | 40 | 0.032 | 36.000 | 0.100 | 1590 | 355 |
| 10.00 | 7 | 40 | 0.036 | 45.000 | 0.100 | 1275 | 320 |
| 12.00 | 7 | 40 | 0.039 | 53.000 | 0.120 | 1060 | 290 |
| 16.00 | 7 | 40 | 0.045 | 63.000 | 0.120 | 795 | 250 |
| 20.00 | 7 | 40 | 0.050 | 75.000 | 0.150 | 635 | 225 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|
| 6.00 | 5 | 50 | 0.028 | 26.000 | 0.060 | 2655 | 370 |
| 8.00 | 7 | 50 | 0.032 | 36.000 | 0.100 | 1990 | 445 |
| 10.00 | 7 | 50 | 0.036 | 45.000 | 0.100 | 1590 | 400 |
| 12.00 | 7 | 50 | 0.039 | 53.000 | 0.120 | 1325 | 360 |
| 16.00 | 7 | 50 | 0.045 | 63.000 | 0.120 | 995 | 315 |
| 20.00 | 7 | 50 | 0.050 | 75.000 | 0.150 | 795 | 280 |

Applicazione



Materiale

Acciaio
850 - 1100 N/mm²



Acciaio
1100 - 1300 N/mm²



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



Alluminio malleabile
Costruzione integrale Al



Ghisa
(grigia / sferoidale)



Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|
| 6.00 | 5 | 80 | 0.026 | 32.000 | 0.060 | 4245 | 550 |
| 8.00 | 7 | 80 | 0.030 | 42.000 | 0.100 | 3185 | 670 |
| 10.00 | 7 | 80 | 0.033 | 53.000 | 0.100 | 2545 | 590 |
| 12.00 | 7 | 80 | 0.036 | 63.000 | 0.120 | 2120 | 535 |
| 16.00 | 7 | 80 | 0.042 | 84.000 | 0.120 | 1590 | 470 |
| 20.00 | 7 | 80 | 0.047 | 105.000 | 0.150 | 1275 | 420 |

| | | | | | | | |
|-------|---|----|-------|---------|-------|------|-----|
| 6.00 | 5 | 70 | 0.026 | 32.000 | 0.060 | 3715 | 485 |
| 8.00 | 7 | 70 | 0.030 | 42.000 | 0.100 | 2785 | 585 |
| 10.00 | 7 | 70 | 0.033 | 53.000 | 0.100 | 2230 | 515 |
| 12.00 | 7 | 70 | 0.036 | 63.000 | 0.120 | 1855 | 470 |
| 16.00 | 7 | 70 | 0.042 | 84.000 | 0.120 | 1395 | 410 |
| 20.00 | 7 | 70 | 0.047 | 105.000 | 0.150 | 1115 | 365 |

| | | | | | | | |
|-------|---|----|-------|---------|-------|------|-----|
| 6.00 | 5 | 60 | 0.026 | 32.000 | 0.060 | 3185 | 415 |
| 8.00 | 7 | 60 | 0.030 | 42.000 | 0.100 | 2385 | 500 |
| 10.00 | 7 | 60 | 0.033 | 53.000 | 0.100 | 1910 | 440 |
| 12.00 | 7 | 60 | 0.036 | 63.000 | 0.120 | 1590 | 400 |
| 16.00 | 7 | 60 | 0.042 | 84.000 | 0.120 | 1195 | 350 |
| 20.00 | 7 | 60 | 0.047 | 105.000 | 0.150 | 955 | 315 |

| | | | | | | | |
|-------|---|----|-------|---------|-------|------|-----|
| 6.00 | 5 | 40 | 0.026 | 32.000 | 0.060 | 2120 | 275 |
| 8.00 | 7 | 40 | 0.030 | 42.000 | 0.100 | 1590 | 335 |
| 10.00 | 7 | 40 | 0.033 | 53.000 | 0.100 | 1275 | 295 |
| 12.00 | 7 | 40 | 0.036 | 63.000 | 0.120 | 1060 | 265 |
| 16.00 | 7 | 40 | 0.042 | 84.000 | 0.120 | 795 | 235 |
| 20.00 | 7 | 40 | 0.047 | 105.000 | 0.150 | 635 | 210 |

| | | | | | | | |
|-------|---|-----|-------|---------|-------|-------|------|
| 6.00 | 5 | 230 | 0.026 | 32.000 | 0.060 | 12200 | 1585 |
| 8.00 | 7 | 230 | 0.030 | 42.000 | 0.100 | 9150 | 1920 |
| 10.00 | 7 | 230 | 0.033 | 53.000 | 0.100 | 7320 | 1690 |
| 12.00 | 7 | 230 | 0.036 | 63.000 | 0.120 | 6100 | 1535 |
| 20.00 | 7 | 230 | 0.047 | 105.000 | 0.150 | 3660 | 1205 |

| | | | | | | | |
|-------|---|----|-------|---------|-------|------|-----|
| 6.00 | 5 | 90 | 0.026 | 32.000 | 0.060 | 4775 | 620 |
| 8.00 | 7 | 90 | 0.030 | 42.000 | 0.100 | 3580 | 750 |
| 10.00 | 7 | 90 | 0.033 | 53.000 | 0.100 | 2865 | 660 |
| 12.00 | 7 | 90 | 0.036 | 63.000 | 0.120 | 2385 | 600 |
| 16.00 | 7 | 90 | 0.042 | 84.000 | 0.120 | 1790 | 525 |
| 20.00 | 7 | 90 | 0.047 | 105.000 | 0.150 | 1430 | 470 |

| | | | | | | | |
|-------|---|----|-------|---------|-------|------|-----|
| 6.00 | 5 | 30 | 0.026 | 32.000 | 0.060 | 1590 | 205 |
| 8.00 | 7 | 30 | 0.030 | 42.000 | 0.100 | 1195 | 250 |
| 10.00 | 7 | 30 | 0.033 | 53.000 | 0.100 | 955 | 220 |
| 12.00 | 7 | 30 | 0.036 | 63.000 | 0.120 | 795 | 200 |
| 16.00 | 7 | 30 | 0.042 | 84.000 | 0.120 | 595 | 175 |
| 20.00 | 7 | 30 | 0.047 | 105.000 | 0.150 | 475 | 155 |

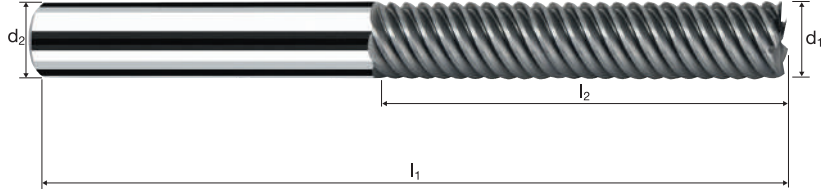
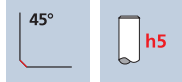
| | | | | | | | |
|-------|---|----|-------|---------|-------|------|-----|
| 6.00 | 5 | 40 | 0.026 | 32.000 | 0.060 | 2120 | 275 |
| 8.00 | 7 | 40 | 0.030 | 42.000 | 0.100 | 1590 | 335 |
| 10.00 | 7 | 40 | 0.033 | 53.000 | 0.100 | 1275 | 295 |
| 12.00 | 7 | 40 | 0.036 | 63.000 | 0.120 | 1060 | 265 |
| 16.00 | 7 | 40 | 0.042 | 84.000 | 0.120 | 795 | 235 |
| 20.00 | 7 | 40 | 0.047 | 105.000 | 0.150 | 635 | 210 |

Frese cilindriche MulticutXF

Finitura, esecuzione extralunga 5.2xd



| | |
|----|---------------|
| HM | λ 65° |
| XA | γ 8° |



| | | | | | | | | | |
|----------|-------------|--------------|--------------|-----------|-----------|----------|----------------|-------------|----------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Inox Stainless | Ti Titanium | GG(G) Tool Steel Aluminium |
|----------|-------------|--------------|--------------|-----------|-----------|----------|----------------|-------------|----------------------------|

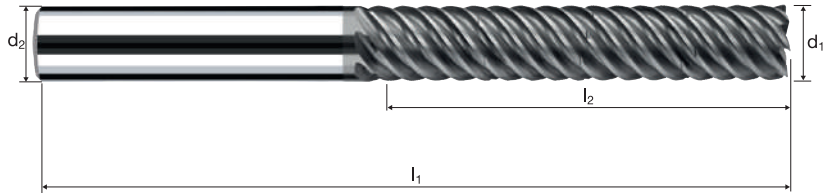
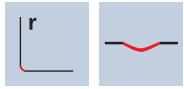
| | | | | | | | | | DURO-SI | POLYCHROM | | |
|--------------------|-------------------|-------------------|--------------|------|----------|--------|----------|--|---------|-----------|--------|--------|
| Esempio: N° Ordine | | | | | | | | | H8521 | P8521 | | |
| Ø Code | d ₁ e8 | d ₂ h5 | Rivestimento | | Articolo | | Codice-Ø | | 45° | z | EUR | EUR |
| | | | P | 8521 | 300 | | | | | | | |
| 300 | 6.00 | 6.00 | | | 73 | 32.00 | | | 0.15 | 5 | 121.00 | 117.00 |
| 391 | 8.00 | 8.00 | | | 84 | 42.00 | | | 0.15 | 7 | 151.00 | 146.00 |
| 450 | 10.00 | 10.00 | | | 100 | 53.00 | | | 0.20 | 7 | 206.00 | 198.00 |
| 501 | 12.00 | 12.00 | | | 117 | 63.00 | | | 0.20 | 7 | 254.00 | 245.00 |
| 610 | 16.00 | 16.00 | | | 144 | 84.00 | | | 0.20 | 7 | 397.00 | 383.00 |
| 682 | 20.00 | 20.00 | | | 169 | 105.00 | | | 0.20 | 7 | 580.00 | 559.00 |
| | | | | | | | | | | | | |
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Frese cilindriche E-Cut

Finitura, esecuzione extralunga 5.2xd con rompitruciolo



HM λ 55°
MG10 γ 10°



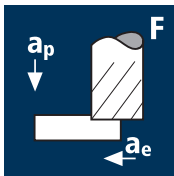
Sgrossatura Finitura

ReTool®

Rm < 850 Rm 850-1100 Rm 1100-1300 Rm 1300-1500 HRC 48-56 Inox Stainless Ti Titanium GG(G) Tool Steel

| | | | | | | | | POLYCHROM |
|--|-------------------|-------------------|----------------|----------------|-------|---|--|--------------|
| Esempio: N° Ordine | | | | | | | | |
| Rivestimento P Articolo 8321 Codice-Ø 300 | | | | | | | | |
| Ø Code | d ₁ e8 | d ₂ h6 | l ₁ | l ₂ | r | z | | |
| 300 | 6.00 | 6.00 | 73 | 32.00 | 0.100 | 6 | | P8321 |
| 391 | 8.00 | 8.00 | 84 | 42.00 | 0.150 | 6 | | EUR |
| 450 | 10.00 | 10.00 | 100 | 53.00 | 0.200 | 7 | | 83.00 |
| 501 | 12.00 | 12.00 | 117 | 63.00 | 0.200 | 7 | | 104.00 |
| 610 | 16.00 | 16.00 | 144 | 84.00 | 0.200 | 8 | | 141.00 |
| 682 | 20.00 | 20.00 | 169 | 105.00 | 0.250 | 8 | | 175.00 |
| | | | | | | | | 273.00 |
| | | | | | | | | 398.00 |
| | | | | | | | | |
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Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|
| 3.00 | 4 | 180 | 0.005 | 0.050 | 1.800 | 19100 | 380 |
| 4.00 | 4 | 180 | 0.006 | 0.050 | 2.400 | 14325 | 345 |
| 5.00 | 4 | 180 | 0.007 | 0.075 | 3.000 | 11460 | 320 |
| 6.00 | 4 | 180 | 0.008 | 0.075 | 3.600 | 9550 | 305 |
| 8.00 | 4 | 180 | 0.009 | 0.100 | 4.800 | 7160 | 260 |
| 10.00 | 4 | 180 | 0.010 | 0.100 | 6.000 | 5730 | 230 |
| 12.00 | 4 | 180 | 0.011 | 0.150 | 7.200 | 4775 | 210 |
| 16.00 | 4 | 180 | 0.013 | 0.150 | 9.600 | 3580 | 185 |

Acciaio da
utensile temprato
48 - 52 HRC



| | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-----|
| 3.00 | 4 | 180 | 0.005 | 0.050 | 1.800 | 19100 | 380 |
| 4.00 | 4 | 180 | 0.006 | 0.050 | 2.400 | 14325 | 345 |
| 5.00 | 4 | 180 | 0.007 | 0.075 | 3.000 | 11460 | 320 |
| 6.00 | 4 | 180 | 0.008 | 0.075 | 3.600 | 9550 | 305 |
| 8.00 | 4 | 180 | 0.009 | 0.100 | 4.800 | 7160 | 260 |
| 10.00 | 4 | 180 | 0.010 | 0.100 | 6.000 | 5730 | 230 |
| 12.00 | 4 | 180 | 0.011 | 0.150 | 7.200 | 4775 | 210 |
| 16.00 | 4 | 180 | 0.013 | 0.150 | 9.600 | 3580 | 185 |

Acciaio da
utensile temprato
52 - 56 HRC



| | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-----|
| 3.00 | 4 | 160 | 0.005 | 0.050 | 1.800 | 16975 | 340 |
| 4.00 | 4 | 160 | 0.006 | 0.050 | 2.400 | 12730 | 305 |
| 5.00 | 4 | 160 | 0.007 | 0.075 | 3.000 | 10185 | 285 |
| 6.00 | 4 | 160 | 0.008 | 0.075 | 3.600 | 8490 | 270 |
| 8.00 | 4 | 160 | 0.009 | 0.100 | 4.800 | 6365 | 230 |
| 10.00 | 4 | 160 | 0.010 | 0.100 | 6.000 | 5095 | 205 |
| 12.00 | 4 | 160 | 0.011 | 0.150 | 7.200 | 4245 | 185 |
| 16.00 | 4 | 160 | 0.013 | 0.150 | 9.600 | 3185 | 165 |

Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



| | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-----|
| 3.00 | 4 | 125 | 0.005 | 0.050 | 1.800 | 13265 | 265 |
| 4.00 | 4 | 125 | 0.006 | 0.050 | 2.400 | 9945 | 240 |
| 5.00 | 4 | 125 | 0.007 | 0.075 | 3.000 | 7960 | 225 |
| 6.00 | 4 | 125 | 0.008 | 0.075 | 3.600 | 6630 | 210 |
| 8.00 | 4 | 125 | 0.009 | 0.100 | 4.800 | 4975 | 180 |
| 10.00 | 4 | 125 | 0.010 | 0.100 | 6.000 | 3980 | 160 |
| 12.00 | 4 | 125 | 0.011 | 0.150 | 7.200 | 3315 | 145 |
| 16.00 | 4 | 125 | 0.013 | 0.150 | 9.600 | 2485 | 130 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



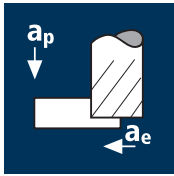
| | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-----|
| 3.00 | 4 | 250 | 0.005 | 0.050 | 1.800 | 26525 | 530 |
| 4.00 | 4 | 250 | 0.006 | 0.050 | 2.400 | 19895 | 475 |
| 5.00 | 4 | 250 | 0.007 | 0.075 | 3.000 | 15915 | 445 |
| 6.00 | 4 | 250 | 0.008 | 0.075 | 3.600 | 13265 | 425 |
| 8.00 | 4 | 250 | 0.009 | 0.100 | 4.800 | 9945 | 360 |
| 10.00 | 4 | 250 | 0.010 | 0.100 | 6.000 | 7960 | 320 |
| 12.00 | 4 | 250 | 0.011 | 0.150 | 7.200 | 6630 | 290 |
| 16.00 | 4 | 250 | 0.013 | 0.150 | 9.600 | 4975 | 260 |

Alluminio malleabile
Costruzione integrale Al



| | | | | | | | |
|-------|---|-----|-------|-------|--------|-------|-----|
| 3.00 | 4 | 280 | 0.006 | 0.050 | 1.800 | 29710 | 715 |
| 4.00 | 4 | 370 | 0.007 | 0.050 | 2.400 | 29445 | 825 |
| 5.00 | 4 | 400 | 0.008 | 0.075 | 3.250 | 25465 | 815 |
| 6.00 | 4 | 400 | 0.010 | 0.075 | 3.900 | 21220 | 850 |
| 8.00 | 4 | 450 | 0.012 | 0.100 | 5.600 | 17905 | 860 |
| 10.00 | 4 | 450 | 0.015 | 0.100 | 7.000 | 14325 | 860 |
| 12.00 | 4 | 500 | 0.018 | 0.150 | 8.400 | 13265 | 955 |
| 16.00 | 4 | 500 | 0.020 | 0.150 | 11.200 | 9945 | 795 |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



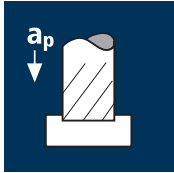
Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC

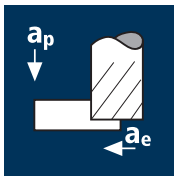


Acciaio da
utensile temprato
56 - 60 HRC



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 0.20 | 2 | 26 | 0.008 | 0.033 | 0.040 | 41380 | 625 | 0.8 |
| 0.30 | 2 | 40 | 0.011 | 0.050 | 0.060 | 42440 | 965 | 2.9 |
| 0.40 | 2 | 53 | 0.015 | 0.067 | 0.080 | 42175 | 1275 | 6.8 |
| 0.50 | 2 | 66 | 0.019 | 0.083 | 0.100 | 42015 | 1590 | 13.2 |
| 0.60 | 2 | 79 | 0.023 | 0.100 | 0.120 | 41910 | 1900 | 22.8 |
| 0.80 | 2 | 106 | 0.030 | 0.134 | 0.160 | 42175 | 2550 | 54.7 |
| 1.00 | 2 | 132 | 0.038 | 0.167 | 0.200 | 42015 | 3175 | 106.1 |
| 1.50 | 2 | 140 | 0.057 | 0.250 | 0.300 | 29710 | 3370 | 252.7 |
| 2.00 | 2 | 140 | 0.076 | 0.334 | 0.400 | 22280 | 3370 | 450.1 |
| 0.20 | 2 | 26 | 0.007 | 0.033 | 0.040 | 41380 | 595 | 0.8 |
| 0.30 | 2 | 40 | 0.011 | 0.050 | 0.060 | 42440 | 915 | 2.8 |
| 0.40 | 2 | 53 | 0.014 | 0.067 | 0.080 | 42175 | 1215 | 6.5 |
| 0.50 | 2 | 66 | 0.018 | 0.083 | 0.100 | 42015 | 1515 | 12.6 |
| 0.60 | 2 | 79 | 0.022 | 0.100 | 0.120 | 41910 | 1810 | 21.7 |
| 0.80 | 2 | 106 | 0.029 | 0.134 | 0.160 | 42175 | 2430 | 52.1 |
| 1.00 | 2 | 120 | 0.036 | 0.167 | 0.200 | 38195 | 2750 | 91.9 |
| 1.50 | 2 | 120 | 0.054 | 0.250 | 0.300 | 25465 | 2750 | 206.3 |
| 2.00 | 2 | 120 | 0.072 | 0.334 | 0.400 | 19100 | 2750 | 367.4 |
| 0.20 | 2 | 26 | 0.006 | 0.033 | 0.040 | 41380 | 495 | 0.7 |
| 0.30 | 2 | 40 | 0.009 | 0.050 | 0.060 | 42440 | 765 | 2.3 |
| 0.40 | 2 | 53 | 0.012 | 0.067 | 0.080 | 42175 | 1010 | 5.4 |
| 0.50 | 2 | 66 | 0.015 | 0.083 | 0.100 | 42015 | 1260 | 10.5 |
| 0.60 | 2 | 79 | 0.018 | 0.100 | 0.120 | 41910 | 1510 | 18.1 |
| 0.80 | 2 | 100 | 0.024 | 0.134 | 0.160 | 39790 | 1910 | 40.9 |
| 1.00 | 2 | 100 | 0.030 | 0.167 | 0.200 | 31830 | 1910 | 63.8 |
| 1.50 | 2 | 100 | 0.045 | 0.250 | 0.300 | 21220 | 1910 | 143.2 |
| 2.00 | 2 | 100 | 0.060 | 0.334 | 0.400 | 15915 | 1910 | 255.2 |
| 0.20 | 2 | 26 | 0.005 | 0.033 | 0.040 | 41380 | 445 | 0.6 |
| 0.30 | 2 | 40 | 0.008 | 0.050 | 0.060 | 42440 | 690 | 2.1 |
| 0.40 | 2 | 53 | 0.011 | 0.067 | 0.080 | 42175 | 910 | 4.9 |
| 0.50 | 2 | 60 | 0.014 | 0.083 | 0.100 | 38195 | 1030 | 8.6 |
| 0.60 | 2 | 60 | 0.016 | 0.100 | 0.120 | 31830 | 1030 | 12.4 |
| 0.80 | 2 | 60 | 0.022 | 0.134 | 0.160 | 23875 | 1030 | 22.1 |
| 1.00 | 2 | 60 | 0.027 | 0.167 | 0.200 | 19100 | 1030 | 34.4 |
| 1.50 | 2 | 60 | 0.041 | 0.250 | 0.300 | 12730 | 1030 | 77.3 |
| 2.00 | 2 | 60 | 0.054 | 0.334 | 0.400 | 9550 | 1030 | 137.8 |
| 0.20 | 2 | 26 | 0.004 | 0.013 | 0.200 | 41380 | 365 | 0.9 |
| 0.30 | 2 | 40 | 0.007 | 0.019 | 0.300 | 42440 | 560 | 3.2 |
| 0.40 | 2 | 53 | 0.009 | 0.025 | 0.400 | 42175 | 740 | 7.4 |
| 0.50 | 2 | 66 | 0.011 | 0.032 | 0.500 | 42015 | 925 | 14.8 |
| 0.60 | 2 | 79 | 0.013 | 0.038 | 0.600 | 41910 | 1105 | 25.2 |
| 0.80 | 2 | 106 | 0.018 | 0.051 | 0.800 | 42175 | 1485 | 60.6 |
| 1.00 | 2 | 120 | 0.022 | 0.064 | 1.000 | 38195 | 1680 | 107.6 |
| 1.50 | 2 | 120 | 0.033 | 0.095 | 1.500 | 25465 | 1680 | 239.5 |
| 2.00 | 2 | 120 | 0.044 | 0.127 | 2.000 | 19100 | 1680 | 426.9 |
| 0.20 | 2 | 26 | 0.004 | 0.013 | 0.200 | 41380 | 365 | 0.9 |
| 0.30 | 2 | 40 | 0.007 | 0.019 | 0.300 | 42440 | 560 | 3.2 |
| 0.40 | 2 | 53 | 0.009 | 0.025 | 0.400 | 42175 | 740 | 7.4 |
| 0.50 | 2 | 66 | 0.011 | 0.032 | 0.500 | 42015 | 925 | 14.8 |
| 0.60 | 2 | 79 | 0.013 | 0.038 | 0.600 | 41910 | 1105 | 25.2 |
| 0.80 | 2 | 100 | 0.018 | 0.051 | 0.800 | 39790 | 1400 | 57.1 |
| 1.00 | 2 | 100 | 0.022 | 0.064 | 1.000 | 31830 | 1400 | 89.6 |
| 1.50 | 2 | 100 | 0.033 | 0.095 | 1.500 | 21220 | 1400 | 199.6 |
| 2.00 | 2 | 100 | 0.044 | 0.127 | 2.000 | 15915 | 1400 | 355.7 |
| 0.20 | 2 | 26 | 0.004 | 0.013 | 0.200 | 41380 | 330 | 0.9 |
| 0.30 | 2 | 40 | 0.006 | 0.019 | 0.300 | 42440 | 510 | 2.9 |
| 0.40 | 2 | 53 | 0.008 | 0.025 | 0.400 | 42175 | 675 | 6.7 |
| 0.50 | 2 | 66 | 0.010 | 0.032 | 0.500 | 42015 | 840 | 13.4 |
| 0.60 | 2 | 79 | 0.012 | 0.038 | 0.600 | 41910 | 1005 | 22.9 |
| 0.80 | 2 | 80 | 0.016 | 0.051 | 0.800 | 31830 | 1020 | 41.6 |
| 1.00 | 2 | 80 | 0.020 | 0.064 | 1.000 | 25465 | 1020 | 65.2 |
| 1.50 | 2 | 80 | 0.030 | 0.095 | 1.500 | 16975 | 1020 | 145.1 |
| 2.00 | 2 | 80 | 0.040 | 0.127 | 2.000 | 12730 | 1020 | 258.7 |
| 0.20 | 2 | 26 | 0.004 | 0.013 | 0.200 | 41380 | 300 | 0.8 |
| 0.30 | 2 | 40 | 0.005 | 0.019 | 0.300 | 42440 | 460 | 2.6 |
| 0.40 | 2 | 40 | 0.007 | 0.025 | 0.400 | 31830 | 460 | 4.6 |
| 0.50 | 2 | 40 | 0.009 | 0.032 | 0.500 | 25465 | 460 | 7.3 |
| 0.60 | 2 | 40 | 0.011 | 0.038 | 0.600 | 21220 | 460 | 10.5 |
| 0.80 | 2 | 40 | 0.014 | 0.051 | 0.800 | 15915 | 460 | 18.7 |
| 1.00 | 2 | 40 | 0.018 | 0.064 | 1.000 | 12730 | 460 | 29.3 |
| 1.50 | 2 | 40 | 0.027 | 0.095 | 1.500 | 8490 | 460 | 65.3 |
| 2.00 | 2 | 40 | 0.036 | 0.127 | 2.000 | 6365 | 460 | 116.4 |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



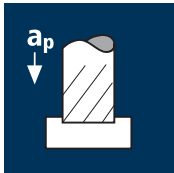
Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC

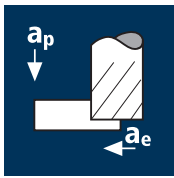


Acciaio da
utensile temprato
56 - 60 HRC



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 0.20 | 2 | 26 | 0.003 | 0.016 | 0.040 | 41380 | 210 | 0.1 |
| 0.30 | 2 | 40 | 0.003 | 0.024 | 0.060 | 42440 | 215 | 0.3 |
| 0.40 | 2 | 53 | 0.004 | 0.032 | 0.080 | 42175 | 320 | 0.8 |
| 0.50 | 2 | 66 | 0.005 | 0.040 | 0.100 | 42015 | 425 | 1.7 |
| 0.60 | 2 | 79 | 0.006 | 0.048 | 0.120 | 41910 | 530 | 3.0 |
| 0.80 | 2 | 106 | 0.009 | 0.065 | 0.160 | 42175 | 745 | 7.7 |
| 1.00 | 2 | 132 | 0.010 | 0.081 | 0.200 | 42015 | 845 | 13.7 |
| 1.50 | 2 | 140 | 0.015 | 0.121 | 0.300 | 29710 | 900 | 32.6 |
| 2.00 | 2 | 140 | 0.020 | 0.162 | 0.400 | 22280 | 900 | 58.2 |
| 0.20 | 2 | 26 | 0.002 | 0.016 | 0.040 | 41380 | 200 | 0.1 |
| 0.30 | 2 | 40 | 0.002 | 0.024 | 0.060 | 42440 | 205 | 0.3 |
| 0.40 | 2 | 53 | 0.004 | 0.032 | 0.080 | 42175 | 305 | 0.8 |
| 0.50 | 2 | 66 | 0.005 | 0.040 | 0.100 | 42015 | 405 | 1.6 |
| 0.60 | 2 | 79 | 0.006 | 0.048 | 0.120 | 41910 | 505 | 2.9 |
| 0.80 | 2 | 106 | 0.008 | 0.065 | 0.160 | 42175 | 710 | 7.4 |
| 1.00 | 2 | 120 | 0.010 | 0.081 | 0.200 | 38195 | 735 | 11.9 |
| 1.50 | 2 | 120 | 0.014 | 0.121 | 0.300 | 25465 | 735 | 26.6 |
| 2.00 | 2 | 120 | 0.019 | 0.162 | 0.400 | 19100 | 735 | 47.5 |
| 0.20 | 2 | 26 | 0.002 | 0.016 | 0.040 | 41380 | 165 | 0.1 |
| 0.30 | 2 | 40 | 0.002 | 0.024 | 0.060 | 42440 | 170 | 0.2 |
| 0.40 | 2 | 53 | 0.003 | 0.032 | 0.080 | 42175 | 255 | 0.6 |
| 0.50 | 2 | 66 | 0.004 | 0.040 | 0.100 | 42015 | 335 | 1.3 |
| 0.60 | 2 | 79 | 0.005 | 0.048 | 0.120 | 41910 | 420 | 2.4 |
| 0.80 | 2 | 100 | 0.007 | 0.065 | 0.160 | 39790 | 555 | 5.8 |
| 1.00 | 2 | 100 | 0.008 | 0.081 | 0.200 | 31830 | 510 | 8.3 |
| 1.50 | 2 | 100 | 0.012 | 0.121 | 0.300 | 21220 | 510 | 18.5 |
| 2.00 | 2 | 100 | 0.016 | 0.162 | 0.400 | 15915 | 510 | 33.0 |
| 0.20 | 2 | 26 | 0.002 | 0.016 | 0.040 | 41380 | 150 | 0.1 |
| 0.30 | 2 | 40 | 0.002 | 0.024 | 0.060 | 42440 | 155 | 0.2 |
| 0.40 | 2 | 53 | 0.003 | 0.032 | 0.080 | 42175 | 230 | 0.6 |
| 0.50 | 2 | 60 | 0.004 | 0.040 | 0.100 | 38195 | 275 | 1.1 |
| 0.60 | 2 | 60 | 0.004 | 0.048 | 0.120 | 31830 | 285 | 1.7 |
| 0.80 | 2 | 60 | 0.006 | 0.065 | 0.160 | 23875 | 300 | 3.1 |
| 1.00 | 2 | 60 | 0.007 | 0.081 | 0.200 | 19100 | 275 | 4.5 |
| 1.50 | 2 | 60 | 0.011 | 0.121 | 0.300 | 12730 | 275 | 10.0 |
| 2.00 | 2 | 60 | 0.014 | 0.162 | 0.400 | 9550 | 275 | 17.8 |
| 0.20 | 2 | 26 | 0.001 | 0.006 | 0.200 | 41380 | 90 | 0.1 |
| 0.30 | 2 | 40 | 0.002 | 0.009 | 0.300 | 42440 | 185 | 0.5 |
| 0.40 | 2 | 53 | 0.003 | 0.013 | 0.400 | 42175 | 280 | 1.4 |
| 0.50 | 2 | 66 | 0.003 | 0.016 | 0.500 | 42015 | 275 | 2.2 |
| 0.60 | 2 | 79 | 0.004 | 0.019 | 0.600 | 41910 | 370 | 4.2 |
| 0.80 | 2 | 106 | 0.007 | 0.025 | 0.800 | 42175 | 555 | 11.1 |
| 1.00 | 2 | 120 | 0.008 | 0.031 | 1.000 | 38195 | 590 | 18.2 |
| 1.50 | 2 | 120 | 0.011 | 0.047 | 1.500 | 25465 | 560 | 39.5 |
| 2.00 | 2 | 120 | 0.015 | 0.063 | 2.000 | 19100 | 590 | 74.1 |
| 0.20 | 2 | 26 | 0.001 | 0.006 | 0.200 | 41380 | 90 | 0.1 |
| 0.30 | 2 | 40 | 0.002 | 0.009 | 0.300 | 42440 | 185 | 0.5 |
| 0.40 | 2 | 53 | 0.003 | 0.013 | 0.400 | 42175 | 280 | 1.4 |
| 0.50 | 2 | 66 | 0.003 | 0.016 | 0.500 | 42015 | 275 | 2.2 |
| 0.60 | 2 | 79 | 0.004 | 0.019 | 0.600 | 41910 | 370 | 4.2 |
| 0.80 | 2 | 100 | 0.007 | 0.025 | 0.800 | 39790 | 525 | 10.5 |
| 1.00 | 2 | 100 | 0.008 | 0.031 | 1.000 | 31830 | 490 | 15.2 |
| 1.50 | 2 | 100 | 0.011 | 0.047 | 1.500 | 21220 | 465 | 32.9 |
| 2.00 | 2 | 100 | 0.015 | 0.063 | 2.000 | 15915 | 490 | 61.8 |
| 0.20 | 2 | 26 | 0.001 | 0.006 | 0.200 | 41380 | 85 | 0.1 |
| 0.30 | 2 | 40 | 0.002 | 0.009 | 0.300 | 42440 | 170 | 0.5 |
| 0.40 | 2 | 53 | 0.003 | 0.013 | 0.400 | 42175 | 255 | 1.3 |
| 0.50 | 2 | 66 | 0.003 | 0.016 | 0.500 | 42015 | 250 | 2.0 |
| 0.60 | 2 | 79 | 0.004 | 0.019 | 0.600 | 41910 | 335 | 3.8 |
| 0.80 | 2 | 80 | 0.006 | 0.025 | 0.800 | 31830 | 380 | 7.6 |
| 1.00 | 2 | 80 | 0.007 | 0.031 | 1.000 | 25465 | 355 | 11.1 |
| 1.50 | 2 | 80 | 0.010 | 0.047 | 1.500 | 16975 | 340 | 23.9 |
| 2.00 | 2 | 80 | 0.014 | 0.063 | 2.000 | 12730 | 355 | 44.9 |
| 0.20 | 2 | 26 | 0.001 | 0.006 | 0.200 | 41380 | 75 | 0.1 |
| 0.30 | 2 | 40 | 0.002 | 0.009 | 0.300 | 42440 | 155 | 0.4 |
| 0.40 | 2 | 40 | 0.003 | 0.013 | 0.400 | 31830 | 170 | 0.9 |
| 0.50 | 2 | 40 | 0.003 | 0.016 | 0.500 | 25465 | 140 | 1.1 |
| 0.60 | 2 | 40 | 0.004 | 0.019 | 0.600 | 21220 | 155 | 1.7 |
| 0.80 | 2 | 40 | 0.005 | 0.025 | 0.800 | 15915 | 170 | 3.4 |
| 1.00 | 2 | 40 | 0.006 | 0.031 | 1.000 | 12730 | 160 | 5.0 |
| 1.50 | 2 | 40 | 0.009 | 0.047 | 1.500 | 8490 | 155 | 10.8 |
| 2.00 | 2 | 40 | 0.013 | 0.063 | 2.000 | 6365 | 160 | 20.2 |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



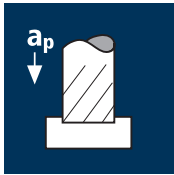
Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC

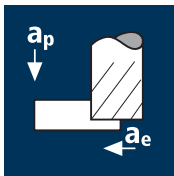


Acciaio da
utensile temprato
56 - 60 HRC



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 0.20 | 2 | 26 | 0.001 | 0.011 | 0.040 | 41380 | 125 | 0.1 |
| 0.40 | 2 | 53 | 0.003 | 0.021 | 0.080 | 42175 | 250 | 0.4 |
| 0.50 | 2 | 66 | 0.004 | 0.027 | 0.100 | 42015 | 315 | 0.8 |
| 0.80 | 2 | 106 | 0.006 | 0.043 | 0.160 | 42175 | 530 | 3.7 |
| 1.00 | 2 | 132 | 0.008 | 0.054 | 0.200 | 42015 | 635 | 6.9 |
| 1.50 | 2 | 140 | 0.011 | 0.080 | 0.300 | 29710 | 675 | 16.2 |
| 2.00 | 2 | 140 | 0.015 | 0.107 | 0.400 | 22280 | 675 | 28.8 |
| 2.50 | 2 | 140 | 0.019 | 0.132 | 0.500 | 17825 | 675 | 44.5 |
| 3.00 | 2 | 140 | 0.023 | 0.161 | 0.600 | 14855 | 675 | 65.1 |
| 0.20 | 2 | 26 | 0.001 | 0.011 | 0.040 | 41380 | 120 | 0.1 |
| 0.40 | 2 | 53 | 0.003 | 0.021 | 0.080 | 42175 | 240 | 0.4 |
| 0.50 | 2 | 66 | 0.004 | 0.027 | 0.100 | 42015 | 300 | 0.8 |
| 0.80 | 2 | 106 | 0.006 | 0.043 | 0.160 | 42175 | 505 | 3.5 |
| 1.00 | 2 | 120 | 0.007 | 0.054 | 0.200 | 38195 | 550 | 5.9 |
| 1.50 | 2 | 120 | 0.011 | 0.080 | 0.300 | 25465 | 550 | 13.2 |
| 2.00 | 2 | 120 | 0.014 | 0.107 | 0.400 | 19100 | 550 | 23.5 |
| 2.50 | 2 | 120 | 0.018 | 0.132 | 0.500 | 15280 | 550 | 36.3 |
| 3.00 | 2 | 120 | 0.022 | 0.161 | 0.600 | 12730 | 550 | 53.1 |
| 0.20 | 2 | 26 | 0.001 | 0.011 | 0.040 | 41380 | 100 | 0.0 |
| 0.40 | 2 | 53 | 0.002 | 0.021 | 0.080 | 42175 | 200 | 0.3 |
| 0.50 | 2 | 66 | 0.003 | 0.027 | 0.100 | 42015 | 250 | 0.7 |
| 0.80 | 2 | 100 | 0.005 | 0.043 | 0.160 | 39790 | 400 | 2.7 |
| 1.00 | 2 | 100 | 0.006 | 0.054 | 0.200 | 31830 | 380 | 4.1 |
| 1.50 | 2 | 100 | 0.009 | 0.080 | 0.300 | 21220 | 380 | 9.2 |
| 2.00 | 2 | 100 | 0.012 | 0.107 | 0.400 | 15915 | 380 | 16.3 |
| 2.50 | 2 | 100 | 0.015 | 0.132 | 0.500 | 12730 | 380 | 25.2 |
| 3.00 | 2 | 100 | 0.018 | 0.161 | 0.600 | 10610 | 380 | 36.9 |
| 0.20 | 2 | 26 | 0.001 | 0.011 | 0.040 | 41380 | 90 | 0.0 |
| 0.40 | 2 | 53 | 0.002 | 0.021 | 0.080 | 42175 | 180 | 0.3 |
| 0.50 | 2 | 60 | 0.003 | 0.027 | 0.100 | 38195 | 205 | 0.6 |
| 0.80 | 2 | 60 | 0.004 | 0.043 | 0.160 | 23875 | 215 | 1.5 |
| 1.00 | 2 | 60 | 0.005 | 0.054 | 0.200 | 19100 | 205 | 2.2 |
| 1.50 | 2 | 60 | 0.008 | 0.080 | 0.300 | 12730 | 205 | 5.0 |
| 2.00 | 2 | 60 | 0.011 | 0.107 | 0.400 | 9550 | 205 | 8.8 |
| 2.50 | 2 | 60 | 0.014 | 0.132 | 0.500 | 7640 | 205 | 13.6 |
| 3.00 | 2 | 60 | 0.016 | 0.161 | 0.600 | 6365 | 205 | 19.9 |
| 0.20 | 2 | 26 | 0.001 | 0.004 | 0.200 | 41380 | 90 | 0.1 |
| 0.40 | 2 | 53 | 0.002 | 0.008 | 0.400 | 42175 | 185 | 0.6 |
| 0.50 | 2 | 66 | 0.003 | 0.010 | 0.500 | 42015 | 275 | 1.4 |
| 0.80 | 2 | 106 | 0.004 | 0.017 | 0.800 | 42175 | 370 | 5.0 |
| 1.00 | 2 | 120 | 0.007 | 0.021 | 1.000 | 38195 | 505 | 10.6 |
| 1.50 | 2 | 120 | 0.009 | 0.031 | 1.500 | 25465 | 450 | 20.8 |
| 2.00 | 2 | 120 | 0.012 | 0.042 | 2.000 | 19100 | 460 | 38.8 |
| 2.50 | 2 | 120 | 0.015 | 0.052 | 2.500 | 15280 | 470 | 61.2 |
| 3.00 | 2 | 120 | 0.019 | 0.063 | 3.000 | 12730 | 475 | 90.0 |
| 0.20 | 2 | 26 | 0.001 | 0.004 | 0.200 | 41380 | 90 | 0.1 |
| 0.40 | 2 | 53 | 0.002 | 0.008 | 0.400 | 42175 | 185 | 0.6 |
| 0.50 | 2 | 66 | 0.003 | 0.010 | 0.500 | 42015 | 275 | 1.4 |
| 0.80 | 2 | 100 | 0.004 | 0.017 | 0.800 | 39790 | 350 | 4.8 |
| 1.00 | 2 | 100 | 0.007 | 0.021 | 1.000 | 31830 | 420 | 8.8 |
| 1.50 | 2 | 100 | 0.009 | 0.031 | 1.500 | 21220 | 375 | 17.4 |
| 2.00 | 2 | 100 | 0.012 | 0.042 | 2.000 | 15915 | 385 | 32.4 |
| 2.50 | 2 | 100 | 0.015 | 0.052 | 2.500 | 12730 | 390 | 51.0 |
| 3.00 | 2 | 100 | 0.019 | 0.063 | 3.000 | 10610 | 395 | 75.0 |
| 0.20 | 2 | 26 | 0.001 | 0.004 | 0.200 | 41380 | 85 | 0.1 |
| 0.40 | 2 | 53 | 0.002 | 0.008 | 0.400 | 42175 | 170 | 0.5 |
| 0.50 | 2 | 66 | 0.003 | 0.010 | 0.500 | 42015 | 250 | 1.3 |
| 0.80 | 2 | 80 | 0.004 | 0.017 | 0.800 | 31830 | 255 | 3.5 |
| 1.00 | 2 | 80 | 0.006 | 0.021 | 1.000 | 25465 | 305 | 6.4 |
| 1.50 | 2 | 80 | 0.008 | 0.031 | 1.500 | 16975 | 270 | 12.6 |
| 2.00 | 2 | 80 | 0.011 | 0.042 | 2.000 | 12730 | 280 | 23.5 |
| 2.50 | 2 | 80 | 0.014 | 0.052 | 2.500 | 10185 | 285 | 37.1 |
| 3.00 | 2 | 80 | 0.017 | 0.063 | 3.000 | 8490 | 290 | 54.5 |
| 0.20 | 2 | 26 | 0.001 | 0.004 | 0.200 | 41380 | 75 | 0.1 |
| 0.40 | 2 | 40 | 0.002 | 0.008 | 0.400 | 31830 | 115 | 0.4 |
| 0.50 | 2 | 40 | 0.003 | 0.010 | 0.500 | 25465 | 140 | 0.7 |
| 0.80 | 2 | 40 | 0.004 | 0.017 | 0.800 | 15915 | 115 | 1.6 |
| 1.00 | 2 | 40 | 0.005 | 0.021 | 1.000 | 12730 | 140 | 2.9 |
| 1.50 | 2 | 40 | 0.007 | 0.031 | 1.500 | 8490 | 120 | 5.7 |
| 2.00 | 2 | 40 | 0.010 | 0.042 | 2.000 | 6365 | 125 | 10.6 |
| 2.50 | 2 | 40 | 0.013 | 0.052 | 2.500 | 5095 | 130 | 16.7 |
| 3.00 | 2 | 40 | 0.015 | 0.063 | 3.000 | 4245 | 130 | 24.5 |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



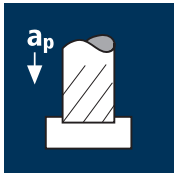
Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



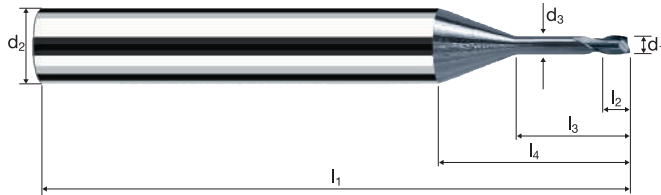
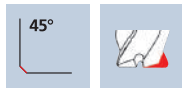
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 0.20 | 2 | 26 | 0.001 | 0.008 | 0.040 | 41380 | 105 | 0.0 |
| 0.30 | 2 | 40 | 0.003 | 0.012 | 0.060 | 42440 | 215 | 0.2 |
| 0.40 | 2 | 53 | 0.004 | 0.016 | 0.080 | 42175 | 320 | 0.4 |
| 0.50 | 2 | 66 | 0.004 | 0.020 | 0.100 | 42015 | 320 | 0.6 |
| 0.60 | 2 | 79 | 0.004 | 0.024 | 0.120 | 41910 | 315 | 0.9 |
| 0.80 | 2 | 106 | 0.005 | 0.032 | 0.160 | 42175 | 425 | 2.2 |
| 1.00 | 2 | 132 | 0.006 | 0.040 | 0.200 | 42015 | 530 | 4.2 |
| 1.50 | 2 | 140 | 0.010 | 0.060 | 0.300 | 29710 | 600 | 10.8 |
| 2.00 | 2 | 140 | 0.014 | 0.080 | 0.400 | 22280 | 620 | 19.8 |
| 0.20 | 2 | 26 | 0.001 | 0.008 | 0.040 | 41380 | 100 | 0.0 |
| 0.30 | 2 | 40 | 0.002 | 0.012 | 0.060 | 42440 | 205 | 0.1 |
| 0.40 | 2 | 53 | 0.004 | 0.016 | 0.080 | 42175 | 305 | 0.4 |
| 0.50 | 2 | 66 | 0.004 | 0.020 | 0.100 | 42015 | 305 | 0.6 |
| 0.60 | 2 | 79 | 0.004 | 0.024 | 0.120 | 41910 | 300 | 0.9 |
| 0.80 | 2 | 106 | 0.005 | 0.032 | 0.160 | 42175 | 405 | 2.1 |
| 1.00 | 2 | 120 | 0.006 | 0.040 | 0.200 | 38195 | 460 | 3.7 |
| 1.50 | 2 | 120 | 0.010 | 0.060 | 0.300 | 25465 | 490 | 8.8 |
| 2.00 | 2 | 120 | 0.013 | 0.080 | 0.400 | 19100 | 505 | 16.1 |
| 0.20 | 2 | 26 | 0.001 | 0.008 | 0.040 | 41380 | 85 | 0.0 |
| 0.30 | 2 | 40 | 0.002 | 0.012 | 0.060 | 42440 | 170 | 0.1 |
| 0.40 | 2 | 53 | 0.003 | 0.016 | 0.080 | 42175 | 255 | 0.3 |
| 0.50 | 2 | 66 | 0.003 | 0.020 | 0.100 | 42015 | 250 | 0.5 |
| 0.60 | 2 | 79 | 0.003 | 0.024 | 0.120 | 41910 | 250 | 0.7 |
| 0.80 | 2 | 100 | 0.004 | 0.032 | 0.160 | 39790 | 320 | 1.6 |
| 1.00 | 2 | 100 | 0.005 | 0.040 | 0.200 | 31830 | 320 | 2.5 |
| 1.50 | 2 | 100 | 0.008 | 0.060 | 0.300 | 21220 | 340 | 6.1 |
| 2.00 | 2 | 100 | 0.011 | 0.080 | 0.400 | 15915 | 350 | 11.2 |
| 0.20 | 2 | 26 | 0.001 | 0.008 | 0.040 | 41380 | 75 | 0.0 |
| 0.30 | 2 | 40 | 0.002 | 0.012 | 0.060 | 42440 | 155 | 0.1 |
| 0.40 | 2 | 53 | 0.003 | 0.016 | 0.080 | 42175 | 230 | 0.3 |
| 0.50 | 2 | 60 | 0.003 | 0.020 | 0.100 | 38195 | 205 | 0.4 |
| 0.60 | 2 | 60 | 0.003 | 0.024 | 0.120 | 31830 | 170 | 0.5 |
| 0.80 | 2 | 60 | 0.004 | 0.032 | 0.160 | 23875 | 170 | 0.9 |
| 1.00 | 2 | 60 | 0.004 | 0.040 | 0.200 | 19100 | 170 | 1.4 |
| 1.50 | 2 | 60 | 0.007 | 0.060 | 0.300 | 12730 | 185 | 3.3 |
| 2.00 | 2 | 60 | 0.010 | 0.080 | 0.400 | 9550 | 190 | 6.1 |
| 0.20 | 2 | 26 | 0.001 | 0.003 | 0.200 | 41380 | 90 | 0.1 |
| 0.30 | 2 | 40 | 0.002 | 0.005 | 0.300 | 42440 | 185 | 0.3 |
| 0.40 | 2 | 53 | 0.002 | 0.006 | 0.400 | 42175 | 185 | 0.4 |
| 0.50 | 2 | 66 | 0.003 | 0.008 | 0.500 | 42015 | 275 | 1.1 |
| 0.60 | 2 | 79 | 0.003 | 0.009 | 0.600 | 41910 | 275 | 1.5 |
| 0.80 | 2 | 106 | 0.004 | 0.013 | 0.800 | 42175 | 370 | 3.9 |
| 1.00 | 2 | 120 | 0.005 | 0.016 | 1.000 | 38195 | 420 | 6.7 |
| 1.50 | 2 | 120 | 0.009 | 0.023 | 1.500 | 25465 | 450 | 15.5 |
| 2.00 | 2 | 120 | 0.011 | 0.031 | 2.000 | 19100 | 420 | 26.1 |
| 0.20 | 2 | 26 | 0.001 | 0.003 | 0.200 | 41380 | 90 | 0.1 |
| 0.30 | 2 | 40 | 0.002 | 0.005 | 0.300 | 42440 | 185 | 0.3 |
| 0.40 | 2 | 53 | 0.002 | 0.006 | 0.400 | 42175 | 185 | 0.4 |
| 0.50 | 2 | 66 | 0.003 | 0.008 | 0.500 | 42015 | 275 | 1.1 |
| 0.60 | 2 | 79 | 0.003 | 0.009 | 0.600 | 41910 | 275 | 1.5 |
| 0.80 | 2 | 100 | 0.004 | 0.013 | 0.800 | 39790 | 350 | 3.6 |
| 1.00 | 2 | 100 | 0.005 | 0.016 | 1.000 | 31830 | 350 | 5.6 |
| 1.50 | 2 | 100 | 0.009 | 0.023 | 1.500 | 21220 | 375 | 12.9 |
| 2.00 | 2 | 100 | 0.011 | 0.031 | 2.000 | 15915 | 350 | 21.7 |
| 0.20 | 2 | 26 | 0.001 | 0.003 | 0.200 | 41380 | 85 | 0.0 |
| 0.30 | 2 | 40 | 0.002 | 0.005 | 0.300 | 42440 | 170 | 0.3 |
| 0.40 | 2 | 53 | 0.002 | 0.006 | 0.400 | 42175 | 170 | 0.4 |
| 0.50 | 2 | 66 | 0.003 | 0.008 | 0.500 | 42015 | 250 | 1.0 |
| 0.60 | 2 | 79 | 0.003 | 0.009 | 0.600 | 41910 | 250 | 1.4 |
| 0.80 | 2 | 80 | 0.004 | 0.013 | 0.800 | 31830 | 255 | 2.6 |
| 1.00 | 2 | 80 | 0.005 | 0.016 | 1.000 | 25465 | 255 | 4.1 |
| 1.50 | 2 | 80 | 0.008 | 0.023 | 1.500 | 16975 | 270 | 9.4 |
| 2.00 | 2 | 80 | 0.010 | 0.031 | 2.000 | 12730 | 255 | 15.8 |
| 0.20 | 2 | 26 | 0.001 | 0.003 | 0.200 | 41380 | 75 | 0.0 |
| 0.30 | 2 | 40 | 0.002 | 0.005 | 0.300 | 42440 | 155 | 0.2 |
| 0.40 | 2 | 40 | 0.002 | 0.006 | 0.400 | 31830 | 115 | 0.3 |
| 0.50 | 2 | 40 | 0.003 | 0.008 | 0.500 | 25465 | 140 | 0.6 |
| 0.60 | 2 | 40 | 0.003 | 0.009 | 0.600 | 21220 | 115 | 0.6 |
| 0.80 | 2 | 40 | 0.004 | 0.013 | 0.800 | 15915 | 115 | 1.2 |
| 1.00 | 2 | 40 | 0.004 | 0.016 | 1.000 | 12730 | 115 | 1.8 |
| 1.50 | 2 | 40 | 0.007 | 0.023 | 1.500 | 8490 | 120 | 4.2 |
| 2.00 | 2 | 40 | 0.009 | 0.031 | 2.000 | 6365 | 115 | 7.1 |

Frese cilindriche MicroX

Gambo \varnothing 6mm, scarico cilindrico, 4xd



HM λ 25°
XA γ -10°

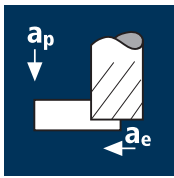


ReTool®

| | | | | | | | | | |
|----------|-------------|--------------|--------------|-----------|-----------|----------|----------------|-------------|----------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Inox Stainless | Ti Titanium | Cobalt-Chrome Copper |
|----------|-------------|--------------|--------------|-----------|-----------|----------|----------------|-------------|----------------------|

| Esempio: N° Ordine | | | | | | | | | | | X-AL | |
|-----------------------|------------------|--------------|-------------|-----------------------|-------|-------|-------|------|----------|---|-------|--------------|
| | | Rivestimento | Articolo | Codice- \varnothing | | | | | | | | |
| | | X | 6503 | 010 | | | | | | | | X6503 |
| \varnothing Code | d_1 0/-0.01 | d_2 h4 | d_3 | l_1 | l_2 | l_3 | l_4 | 45° | α | z | EUR | |
| 010 | 0.10 | 6.00 | 0.09 | 57 | 0.06 | 0.40 | 17.38 | - | 14.5° | 2 | 98.00 | |
| 020 | 0.20 | 6.00 | 0.18 | 57 | 0.12 | 0.80 | 17.42 | - | 14.5° | 2 | 79.00 | |
| 030 | 0.30 | 6.00 | 0.25 | 57 | 0.18 | 1.20 | 17.44 | - | 14.0° | 2 | 72.00 | |
| 040 | 0.40 | 6.00 | 0.35 | 57 | 0.24 | 1.60 | 17.56 | - | 13.5° | 2 | 72.00 | |
| 050 | 0.50 | 6.00 | 0.45 | 57 | 0.30 | 2.00 | 12.51 | - | 13.0° | 2 | 72.00 | |
| 060 | 0.60 | 6.00 | 0.55 | 57 | 0.36 | 2.40 | 12.73 | - | 12.5° | 2 | 72.00 | |
| 080 | 0.80 | 6.00 | 0.75 | 57 | 0.48 | 3.20 | 13.15 | - | 11.5° | 2 | 72.00 | |
| 100 | 1.00 | 6.00 | 0.95 | 57 | 1.00 | 4.00 | 14.08 | 0.07 | 11.0° | 2 | 72.00 | |
| 120 | 1.50 | 6.00 | 1.40 | 57 | 1.50 | 6.00 | 15.24 | 0.07 | 9.0° | 2 | 72.00 | |
| 140 | 2.00 | 6.00 | 1.90 | 61 | 2.00 | 8.00 | 16.31 | 0.10 | 7.5° | 2 | 72.00 | |
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Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



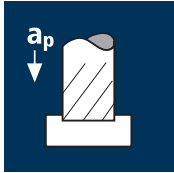
Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



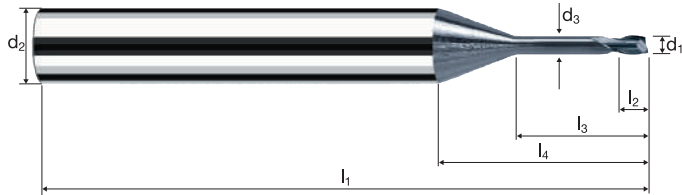
| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 0.20 | 2 | 26 | 0.001 | 0.006 | 0.040 | 41380 | 105 | 0.0 |
| 0.40 | 2 | 53 | 0.003 | 0.013 | 0.080 | 42175 | 215 | 0.2 |
| 0.50 | 2 | 66 | 0.004 | 0.016 | 0.100 | 42015 | 320 | 0.5 |
| 0.80 | 2 | 106 | 0.005 | 0.026 | 0.160 | 42175 | 425 | 1.8 |
| 1.00 | 2 | 132 | 0.006 | 0.032 | 0.200 | 42015 | 530 | 3.4 |
| 1.50 | 2 | 140 | 0.010 | 0.048 | 0.300 | 29710 | 600 | 8.6 |
| 2.00 | 2 | 140 | 0.013 | 0.064 | 0.400 | 22280 | 560 | 14.4 |
| 2.50 | 2 | 140 | 0.016 | 0.080 | 0.500 | 17825 | 585 | 23.4 |
| 3.00 | 2 | 140 | 0.020 | 0.096 | 0.600 | 14855 | 600 | 34.5 |
| 0.20 | 2 | 26 | 0.001 | 0.006 | 0.040 | 41380 | 100 | 0.0 |
| 0.40 | 2 | 53 | 0.002 | 0.013 | 0.080 | 42175 | 200 | 0.2 |
| 0.50 | 2 | 66 | 0.004 | 0.016 | 0.100 | 42015 | 305 | 0.5 |
| 0.80 | 2 | 106 | 0.005 | 0.026 | 0.160 | 42175 | 405 | 1.7 |
| 1.00 | 2 | 120 | 0.006 | 0.032 | 0.200 | 38195 | 460 | 2.9 |
| 1.50 | 2 | 120 | 0.010 | 0.048 | 0.300 | 25465 | 490 | 7.0 |
| 2.00 | 2 | 120 | 0.012 | 0.064 | 0.400 | 19100 | 460 | 11.7 |
| 2.50 | 2 | 120 | 0.016 | 0.080 | 0.500 | 15280 | 475 | 19.1 |
| 3.00 | 2 | 120 | 0.019 | 0.096 | 0.600 | 12730 | 490 | 28.2 |
| 0.20 | 2 | 26 | 0.001 | 0.006 | 0.040 | 41380 | 85 | 0.0 |
| 0.40 | 2 | 53 | 0.002 | 0.013 | 0.080 | 42175 | 170 | 0.2 |
| 0.50 | 2 | 66 | 0.003 | 0.016 | 0.100 | 42015 | 250 | 0.4 |
| 0.80 | 2 | 100 | 0.004 | 0.026 | 0.160 | 39790 | 320 | 1.3 |
| 1.00 | 2 | 100 | 0.005 | 0.032 | 0.200 | 31830 | 320 | 2.0 |
| 1.50 | 2 | 100 | 0.008 | 0.048 | 0.300 | 21220 | 340 | 4.9 |
| 2.00 | 2 | 100 | 0.010 | 0.064 | 0.400 | 15915 | 320 | 8.1 |
| 2.50 | 2 | 100 | 0.013 | 0.080 | 0.500 | 12730 | 330 | 13.2 |
| 3.00 | 2 | 100 | 0.016 | 0.096 | 0.600 | 10610 | 340 | 19.6 |
| 0.20 | 2 | 26 | 0.001 | 0.006 | 0.040 | 41380 | 75 | 0.0 |
| 0.40 | 2 | 53 | 0.002 | 0.013 | 0.080 | 42175 | 150 | 0.2 |
| 0.50 | 2 | 60 | 0.003 | 0.016 | 0.100 | 38195 | 205 | 0.3 |
| 0.80 | 2 | 60 | 0.004 | 0.026 | 0.160 | 23875 | 170 | 0.7 |
| 1.00 | 2 | 60 | 0.004 | 0.032 | 0.200 | 19100 | 170 | 1.1 |
| 1.50 | 2 | 60 | 0.007 | 0.048 | 0.300 | 12730 | 185 | 2.6 |
| 2.00 | 2 | 60 | 0.009 | 0.064 | 0.400 | 9550 | 170 | 4.4 |
| 2.50 | 2 | 60 | 0.012 | 0.080 | 0.500 | 7640 | 180 | 7.2 |
| 3.00 | 2 | 60 | 0.014 | 0.096 | 0.600 | 6365 | 185 | 10.6 |
| 0.20 | 2 | 26 | 0.001 | 0.003 | 0.200 | 41380 | 90 | 0.1 |
| 0.40 | 2 | 53 | 0.002 | 0.005 | 0.400 | 42175 | 185 | 0.4 |
| 0.50 | 2 | 66 | 0.003 | 0.006 | 0.500 | 42015 | 275 | 0.8 |
| 0.80 | 2 | 106 | 0.004 | 0.010 | 0.800 | 42175 | 370 | 3.0 |
| 1.00 | 2 | 120 | 0.005 | 0.013 | 1.000 | 38195 | 420 | 5.5 |
| 1.50 | 2 | 120 | 0.009 | 0.019 | 1.500 | 25465 | 450 | 12.8 |
| 2.00 | 2 | 120 | 0.011 | 0.025 | 2.000 | 19100 | 420 | 21.0 |
| 2.50 | 2 | 120 | 0.014 | 0.031 | 2.500 | 15280 | 435 | 33.9 |
| 3.00 | 2 | 120 | 0.016 | 0.038 | 3.000 | 12730 | 420 | 47.9 |
| 0.20 | 2 | 26 | 0.001 | 0.003 | 0.200 | 41380 | 90 | 0.1 |
| 0.40 | 2 | 53 | 0.002 | 0.005 | 0.400 | 42175 | 185 | 0.4 |
| 0.50 | 2 | 66 | 0.003 | 0.006 | 0.500 | 42015 | 275 | 0.8 |
| 0.80 | 2 | 100 | 0.004 | 0.010 | 0.800 | 39790 | 350 | 2.8 |
| 1.00 | 2 | 100 | 0.005 | 0.013 | 1.000 | 31830 | 350 | 4.6 |
| 1.50 | 2 | 100 | 0.009 | 0.019 | 1.500 | 21220 | 375 | 10.6 |
| 2.00 | 2 | 100 | 0.011 | 0.025 | 2.000 | 15915 | 350 | 17.5 |
| 2.50 | 2 | 100 | 0.014 | 0.031 | 2.500 | 12730 | 365 | 28.2 |
| 3.00 | 2 | 100 | 0.016 | 0.038 | 3.000 | 10610 | 350 | 39.9 |
| 0.20 | 2 | 26 | 0.001 | 0.003 | 0.200 | 41380 | 85 | 0.0 |
| 0.40 | 2 | 53 | 0.002 | 0.005 | 0.400 | 42175 | 170 | 0.3 |
| 0.50 | 2 | 66 | 0.003 | 0.006 | 0.500 | 42015 | 250 | 0.8 |
| 0.80 | 2 | 80 | 0.004 | 0.010 | 0.800 | 31830 | 255 | 2.0 |
| 1.00 | 2 | 80 | 0.005 | 0.013 | 1.000 | 25465 | 255 | 3.3 |
| 1.50 | 2 | 80 | 0.008 | 0.019 | 1.500 | 16975 | 270 | 7.7 |
| 2.00 | 2 | 80 | 0.010 | 0.025 | 2.000 | 12730 | 255 | 12.7 |
| 2.50 | 2 | 80 | 0.013 | 0.031 | 2.500 | 10185 | 265 | 20.5 |
| 3.00 | 2 | 80 | 0.015 | 0.038 | 3.000 | 8490 | 255 | 29.0 |
| 0.20 | 2 | 26 | 0.001 | 0.003 | 0.200 | 41380 | 75 | 0.0 |
| 0.40 | 2 | 40 | 0.002 | 0.005 | 0.400 | 31830 | 115 | 0.2 |
| 0.50 | 2 | 40 | 0.003 | 0.006 | 0.500 | 25465 | 140 | 0.4 |
| 0.80 | 2 | 40 | 0.004 | 0.010 | 0.800 | 15915 | 115 | 0.9 |
| 1.00 | 2 | 40 | 0.004 | 0.013 | 1.000 | 12730 | 115 | 1.5 |
| 1.50 | 2 | 40 | 0.007 | 0.019 | 1.500 | 8490 | 120 | 3.5 |
| 2.00 | 2 | 40 | 0.009 | 0.025 | 2.000 | 6365 | 115 | 5.7 |
| 2.50 | 2 | 40 | 0.012 | 0.031 | 2.500 | 5095 | 120 | 9.2 |
| 3.00 | 2 | 40 | 0.014 | 0.038 | 3.000 | 4245 | 115 | 13.1 |

Frese cilindriche MicroX

Gambo ø 6mm, scarico cilindrico, 5xd



HM λ 25°
XA γ -10°

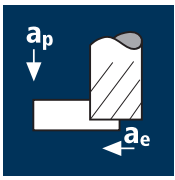


ReTool®

| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Inox Stainless | Ti Titanium | Cobalt-Chrome Copper |
|----------|-------------|--------------|--------------|-----------|-----------|----------|----------------|-------------|----------------------|
|----------|-------------|--------------|--------------|-----------|-----------|----------|----------------|-------------|----------------------|

| Esempio: N° Ordine | | | | | | | | | | | X-AL |
|--|---------------------------|----------------------|----------------|----------------|----------------|----------------|----------------|------|-------|---|-------|
| Rivestimento X Articolo 6504 Codice-ø 010 | | | | | | | | | | | X6504 |
| Ø Code | d ₁ 0/-0.01 | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | 45° | α | z | EUR |
| 010 | 0.10 | 6.00 | 0.09 | 57 | 0.06 | 0.50 | 17.48 | - | 14.5° | 2 | 98.00 |
| 020 | 0.20 | 6.00 | 0.18 | 57 | 0.12 | 1.00 | 17.62 | - | 14.0° | 2 | 79.00 |
| 030 | 0.30 | 6.00 | 0.25 | 57 | 0.18 | 1.50 | 17.74 | - | 13.5° | 2 | 72.00 |
| 040 | 0.40 | 6.00 | 0.35 | 57 | 0.24 | 2.00 | 17.96 | - | 13.0° | 2 | 72.00 |
| 050 | 0.50 | 6.00 | 0.45 | 57 | 0.30 | 2.50 | 13.01 | - | 12.5° | 2 | 72.00 |
| 060 | 0.60 | 6.00 | 0.55 | 57 | 0.36 | 3.00 | 13.33 | - | 12.0° | 2 | 72.00 |
| 080 | 0.80 | 6.00 | 0.75 | 57 | 0.48 | 4.00 | 13.95 | - | 11.0° | 2 | 72.00 |
| 100 | 1.00 | 6.00 | 0.95 | 57 | 1.00 | 5.00 | 15.08 | 0.07 | 10.0° | 2 | 72.00 |
| 108 | 1.20 | 6.00 | 1.10 | 57 | 1.20 | 6.00 | 15.80 | 0.07 | 9.5° | 2 | 72.00 |
| 120 | 1.50 | 6.00 | 1.40 | 61 | 1.50 | 7.50 | 16.74 | 0.07 | 8.5° | 2 | 72.00 |
| 140 | 2.00 | 6.00 | 1.90 | 61 | 2.00 | 10.00 | 18.31 | 0.10 | 7.0° | 2 | 72.00 |
| 160 | 2.50 | 6.00 | 2.30 | 61 | 2.50 | 12.50 | 20.06 | 0.10 | 5.5° | 2 | 72.00 |
| 180 | 3.00 | 6.00 | 2.80 | 66 | 3.00 | 15.00 | 21.63 | 0.10 | 4.5° | 2 | 72.00 |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



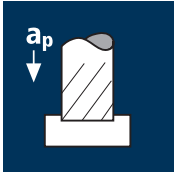
Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



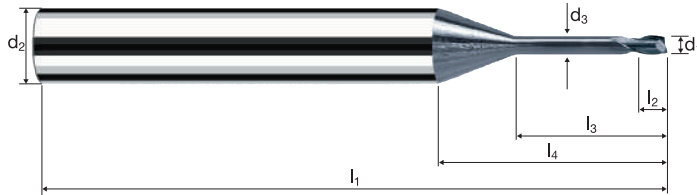
| d1 [mm] | z | v_c [m/min] | f_z [mm] | a_p [mm] | a_e [mm] | n [min ⁻¹] | v_r [mm/min] | Q [mm ³ /min] |
|------------|---|------------------|---------------|---------------|---------------|---------------------------|-------------------|-----------------------------|
| 0.20 | 2 | 26 | 0.001 | 0.005 | 0.040 | 41380 | 105 | 0.0 |
| 0.30 | 2 | 40 | 0.003 | 0.008 | 0.060 | 42440 | 215 | 0.1 |
| 0.40 | 2 | 53 | 0.003 | 0.011 | 0.080 | 42175 | 215 | 0.2 |
| 0.50 | 2 | 66 | 0.004 | 0.013 | 0.100 | 42015 | 320 | 0.4 |
| 0.60 | 2 | 79 | 0.004 | 0.016 | 0.120 | 41910 | 315 | 0.6 |
| 0.80 | 2 | 106 | 0.005 | 0.021 | 0.160 | 42175 | 425 | 1.4 |
| 1.00 | 2 | 132 | 0.006 | 0.027 | 0.200 | 42015 | 530 | 2.9 |
| 1.50 | 2 | 140 | 0.010 | 0.040 | 0.300 | 29710 | 600 | 7.2 |
| 2.00 | 2 | 140 | 0.013 | 0.053 | 0.400 | 22280 | 560 | 11.9 |
| 0.20 | 2 | 26 | 0.001 | 0.005 | 0.040 | 41380 | 100 | 0.0 |
| 0.30 | 2 | 40 | 0.002 | 0.008 | 0.060 | 42440 | 205 | 0.1 |
| 0.40 | 2 | 53 | 0.002 | 0.011 | 0.080 | 42175 | 200 | 0.2 |
| 0.50 | 2 | 66 | 0.004 | 0.013 | 0.100 | 42015 | 305 | 0.4 |
| 0.60 | 2 | 79 | 0.004 | 0.016 | 0.120 | 41910 | 300 | 0.6 |
| 0.80 | 2 | 106 | 0.005 | 0.021 | 0.160 | 42175 | 405 | 1.4 |
| 1.00 | 2 | 120 | 0.006 | 0.027 | 0.200 | 38195 | 460 | 2.5 |
| 1.50 | 2 | 120 | 0.010 | 0.040 | 0.300 | 25465 | 490 | 5.9 |
| 2.00 | 2 | 120 | 0.012 | 0.053 | 0.400 | 19100 | 460 | 9.7 |
| 0.20 | 2 | 26 | 0.001 | 0.005 | 0.040 | 41380 | 85 | 0.0 |
| 0.30 | 2 | 40 | 0.002 | 0.008 | 0.060 | 42440 | 170 | 0.1 |
| 0.40 | 2 | 53 | 0.002 | 0.011 | 0.080 | 42175 | 170 | 0.1 |
| 0.50 | 2 | 66 | 0.003 | 0.013 | 0.100 | 42015 | 250 | 0.3 |
| 0.60 | 2 | 79 | 0.003 | 0.016 | 0.120 | 41910 | 250 | 0.5 |
| 0.80 | 2 | 100 | 0.004 | 0.021 | 0.160 | 39790 | 320 | 1.1 |
| 1.00 | 2 | 100 | 0.005 | 0.027 | 0.200 | 31830 | 320 | 1.7 |
| 1.50 | 2 | 100 | 0.008 | 0.040 | 0.300 | 21220 | 340 | 4.1 |
| 2.00 | 2 | 100 | 0.010 | 0.053 | 0.400 | 15915 | 320 | 6.7 |
| 0.20 | 2 | 26 | 0.001 | 0.005 | 0.040 | 41380 | 75 | 0.0 |
| 0.30 | 2 | 40 | 0.002 | 0.008 | 0.060 | 42440 | 155 | 0.1 |
| 0.40 | 2 | 53 | 0.002 | 0.011 | 0.080 | 42175 | 150 | 0.1 |
| 0.50 | 2 | 60 | 0.003 | 0.013 | 0.100 | 38195 | 205 | 0.3 |
| 0.60 | 2 | 60 | 0.003 | 0.016 | 0.120 | 31830 | 170 | 0.3 |
| 0.80 | 2 | 60 | 0.004 | 0.021 | 0.160 | 23875 | 170 | 0.6 |
| 1.00 | 2 | 60 | 0.004 | 0.027 | 0.200 | 19100 | 170 | 0.9 |
| 1.50 | 2 | 60 | 0.007 | 0.040 | 0.300 | 12730 | 185 | 2.2 |
| 2.00 | 2 | 60 | 0.009 | 0.053 | 0.400 | 9550 | 170 | 3.6 |
| 0.20 | 2 | 26 | 0.001 | 0.002 | 0.200 | 41380 | 90 | 0.0 |
| 0.30 | 2 | 40 | 0.002 | 0.003 | 0.300 | 42440 | 185 | 0.2 |
| 0.40 | 2 | 53 | 0.002 | 0.004 | 0.400 | 42175 | 185 | 0.3 |
| 0.50 | 2 | 66 | 0.003 | 0.005 | 0.500 | 42015 | 275 | 0.7 |
| 0.60 | 2 | 79 | 0.003 | 0.006 | 0.600 | 41910 | 275 | 1.0 |
| 0.80 | 2 | 106 | 0.004 | 0.009 | 0.800 | 42175 | 370 | 2.5 |
| 1.00 | 2 | 120 | 0.005 | 0.010 | 1.000 | 38195 | 420 | 4.2 |
| 1.50 | 2 | 120 | 0.009 | 0.016 | 1.500 | 25465 | 450 | 10.8 |
| 2.00 | 2 | 120 | 0.011 | 0.021 | 2.000 | 19100 | 420 | 17.6 |
| 0.20 | 2 | 26 | 0.001 | 0.002 | 0.200 | 41380 | 90 | 0.0 |
| 0.30 | 2 | 40 | 0.002 | 0.003 | 0.300 | 42440 | 185 | 0.2 |
| 0.40 | 2 | 53 | 0.002 | 0.004 | 0.400 | 42175 | 185 | 0.3 |
| 0.50 | 2 | 66 | 0.003 | 0.005 | 0.500 | 42015 | 275 | 0.7 |
| 0.60 | 2 | 79 | 0.003 | 0.006 | 0.600 | 41910 | 275 | 1.0 |
| 0.80 | 2 | 100 | 0.004 | 0.009 | 0.800 | 39790 | 350 | 2.4 |
| 1.00 | 2 | 100 | 0.005 | 0.010 | 1.000 | 31830 | 350 | 3.5 |
| 1.50 | 2 | 100 | 0.009 | 0.016 | 1.500 | 21220 | 375 | 9.0 |
| 2.00 | 2 | 100 | 0.011 | 0.021 | 2.000 | 15915 | 350 | 14.7 |
| 0.20 | 2 | 26 | 0.001 | 0.002 | 0.200 | 41380 | 85 | 0.0 |
| 0.30 | 2 | 40 | 0.002 | 0.003 | 0.300 | 42440 | 170 | 0.2 |
| 0.40 | 2 | 53 | 0.002 | 0.004 | 0.400 | 42175 | 170 | 0.3 |
| 0.50 | 2 | 66 | 0.003 | 0.005 | 0.500 | 42015 | 250 | 0.6 |
| 0.60 | 2 | 79 | 0.003 | 0.006 | 0.600 | 41910 | 250 | 0.9 |
| 0.80 | 2 | 80 | 0.004 | 0.009 | 0.800 | 31830 | 255 | 1.7 |
| 1.00 | 2 | 80 | 0.005 | 0.010 | 1.000 | 25465 | 255 | 2.5 |
| 1.50 | 2 | 80 | 0.008 | 0.016 | 1.500 | 16975 | 270 | 6.5 |
| 2.00 | 2 | 80 | 0.010 | 0.021 | 2.000 | 12730 | 255 | 10.7 |
| 0.20 | 2 | 26 | 0.001 | 0.002 | 0.200 | 41380 | 75 | 0.0 |
| 0.30 | 2 | 40 | 0.002 | 0.003 | 0.300 | 42440 | 155 | 0.1 |
| 0.40 | 2 | 40 | 0.002 | 0.004 | 0.400 | 31830 | 115 | 0.2 |
| 0.50 | 2 | 40 | 0.003 | 0.005 | 0.500 | 25465 | 140 | 0.3 |
| 0.60 | 2 | 40 | 0.003 | 0.006 | 0.600 | 21220 | 115 | 0.4 |
| 0.80 | 2 | 40 | 0.004 | 0.009 | 0.800 | 15915 | 115 | 0.8 |
| 1.00 | 2 | 40 | 0.004 | 0.010 | 1.000 | 12730 | 115 | 1.1 |
| 1.50 | 2 | 40 | 0.007 | 0.016 | 1.500 | 8490 | 120 | 2.9 |
| 2.00 | 2 | 40 | 0.009 | 0.021 | 2.000 | 6365 | 115 | 4.8 |

Frese cilindriche MicroX

Gambo ø 6mm, scarico cilindrico, 6xd



HM λ 25°
XA γ -10°

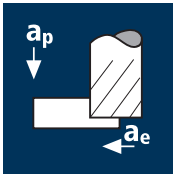


ReTool®

| | | | | | | | | | |
|----------|-------------|--------------|--------------|-----------|-----------|----------|----------------|-------------|----------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Inox Stainless | Ti Titanium | Cobalt-Chrome Copper |
|----------|-------------|--------------|--------------|-----------|-----------|----------|----------------|-------------|----------------------|

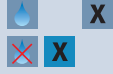
| Esempio: N° Ordine | | | | | | | | | | | X-AL | |
|-----------------------|---------------------------|----------------------|----------------|----------------|----------------|----------------|----------------|------|-------|---|-------|-------|
| | Rivestimento X | | Articolo 6505 | | Codice-ø 020 | | | | | | | X6505 |
| Ø Code | d ₁ 0/-0.01 | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | 45° | α | z | EUR | |
| 020 | 0.20 | 6.00 | 0.18 | 57 | 0.12 | 1.20 | 17.82 | - | 14.0° | 2 | 79.00 | |
| 030 | 0.30 | 6.00 | 0.25 | 57 | 0.18 | 1.80 | 18.04 | - | 13.0° | 2 | 72.00 | |
| 040 | 0.40 | 6.00 | 0.35 | 57 | 0.24 | 2.40 | 18.36 | - | 12.5° | 2 | 72.00 | |
| 050 | 0.50 | 6.00 | 0.45 | 57 | 0.30 | 3.00 | 13.51 | - | 12.0° | 2 | 72.00 | |
| 060 | 0.60 | 6.00 | 0.55 | 57 | 0.36 | 3.60 | 13.93 | - | 11.5° | 2 | 72.00 | |
| 080 | 0.80 | 6.00 | 0.75 | 57 | 0.48 | 4.80 | 14.75 | - | 10.5° | 2 | 72.00 | |
| 100 | 1.00 | 6.00 | 0.95 | 57 | 1.00 | 6.00 | 16.08 | 0.07 | 9.5° | 2 | 72.00 | |
| 120 | 1.50 | 6.00 | 1.40 | 61 | 1.50 | 9.00 | 18.24 | 0.07 | 7.5° | 2 | 72.00 | |
| 140 | 2.00 | 6.00 | 1.90 | 66 | 2.00 | 12.00 | 20.31 | 0.10 | 6.0° | 2 | 72.00 | |
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Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



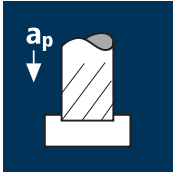
Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



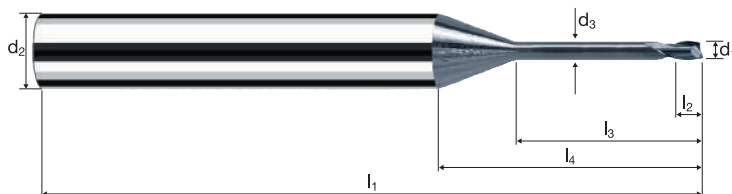
| d1 [mm] | z | v_c [m/min] | f_z [mm] | a_p [mm] | a_e [mm] | n [min ⁻¹] | v_r [mm/min] | Q [mm ³ /min] |
|------------|---|------------------|---------------|---------------|---------------|---------------------------|-------------------|-----------------------------|
| 0.20 | 2 | 26 | 0.001 | 0.004 | 0.040 | 41380 | 105 | 0.0 |
| 0.40 | 2 | 53 | 0.003 | 0.008 | 0.080 | 42175 | 215 | 0.1 |
| 0.50 | 2 | 66 | 0.004 | 0.010 | 0.100 | 42015 | 320 | 0.3 |
| 0.80 | 2 | 106 | 0.005 | 0.016 | 0.160 | 42175 | 425 | 1.1 |
| 1.00 | 2 | 132 | 0.006 | 0.020 | 0.200 | 42015 | 530 | 2.1 |
| 1.50 | 2 | 140 | 0.010 | 0.030 | 0.300 | 29710 | 600 | 5.4 |
| 2.00 | 2 | 140 | 0.013 | 0.040 | 0.400 | 22280 | 560 | 9.0 |
| 2.50 | 2 | 140 | 0.016 | 0.050 | 0.500 | 17825 | 585 | 14.6 |
| 3.00 | 2 | 140 | 0.019 | 0.060 | 0.600 | 14855 | 560 | 20.2 |
| 0.20 | 2 | 26 | 0.001 | 0.004 | 0.040 | 41380 | 100 | 0.0 |
| 0.40 | 2 | 53 | 0.002 | 0.008 | 0.080 | 42175 | 200 | 0.1 |
| 0.50 | 2 | 66 | 0.004 | 0.010 | 0.100 | 42015 | 305 | 0.3 |
| 0.80 | 2 | 106 | 0.005 | 0.016 | 0.160 | 42175 | 405 | 1.0 |
| 1.00 | 2 | 120 | 0.006 | 0.020 | 0.200 | 38195 | 460 | 1.8 |
| 1.50 | 2 | 120 | 0.010 | 0.030 | 0.300 | 25465 | 490 | 4.4 |
| 2.00 | 2 | 120 | 0.012 | 0.040 | 0.400 | 19100 | 460 | 7.3 |
| 2.50 | 2 | 120 | 0.016 | 0.050 | 0.500 | 15280 | 475 | 11.9 |
| 3.00 | 2 | 120 | 0.018 | 0.060 | 0.600 | 12730 | 460 | 16.5 |
| 0.20 | 2 | 26 | 0.001 | 0.004 | 0.040 | 41380 | 85 | 0.0 |
| 0.40 | 2 | 53 | 0.002 | 0.008 | 0.080 | 42175 | 170 | 0.1 |
| 0.50 | 2 | 66 | 0.003 | 0.010 | 0.100 | 42015 | 250 | 0.3 |
| 0.80 | 2 | 100 | 0.004 | 0.016 | 0.160 | 39790 | 320 | 0.8 |
| 1.00 | 2 | 100 | 0.005 | 0.020 | 0.200 | 31830 | 320 | 1.3 |
| 1.50 | 2 | 100 | 0.008 | 0.030 | 0.300 | 21220 | 340 | 3.1 |
| 2.00 | 2 | 100 | 0.010 | 0.040 | 0.400 | 15915 | 320 | 5.1 |
| 2.50 | 2 | 100 | 0.013 | 0.050 | 0.500 | 12730 | 330 | 8.3 |
| 3.00 | 2 | 100 | 0.015 | 0.060 | 0.600 | 10610 | 320 | 11.5 |
| 0.20 | 2 | 26 | 0.001 | 0.004 | 0.040 | 41380 | 75 | 0.0 |
| 0.40 | 2 | 53 | 0.002 | 0.008 | 0.080 | 42175 | 150 | 0.1 |
| 0.50 | 2 | 60 | 0.003 | 0.010 | 0.100 | 38195 | 205 | 0.2 |
| 0.80 | 2 | 60 | 0.004 | 0.016 | 0.160 | 23875 | 170 | 0.4 |
| 1.00 | 2 | 60 | 0.004 | 0.020 | 0.200 | 19100 | 170 | 0.7 |
| 1.50 | 2 | 60 | 0.007 | 0.030 | 0.300 | 12730 | 185 | 1.7 |
| 2.00 | 2 | 60 | 0.009 | 0.040 | 0.400 | 9550 | 170 | 2.8 |
| 2.50 | 2 | 60 | 0.012 | 0.050 | 0.500 | 7640 | 180 | 4.5 |
| 3.00 | 2 | 60 | 0.014 | 0.060 | 0.600 | 6365 | 170 | 6.2 |
| 0.20 | 2 | 26 | 0.001 | 0.002 | 0.200 | 41380 | 90 | 0.0 |
| 0.40 | 2 | 53 | 0.002 | 0.003 | 0.400 | 42175 | 185 | 0.2 |
| 0.50 | 2 | 66 | 0.003 | 0.004 | 0.500 | 42015 | 275 | 0.6 |
| 0.80 | 2 | 106 | 0.004 | 0.006 | 0.800 | 42175 | 370 | 1.8 |
| 1.00 | 2 | 120 | 0.005 | 0.008 | 1.000 | 38195 | 420 | 3.4 |
| 1.50 | 2 | 120 | 0.009 | 0.012 | 1.500 | 25465 | 450 | 8.1 |
| 2.00 | 2 | 120 | 0.011 | 0.016 | 2.000 | 19100 | 420 | 13.4 |
| 2.50 | 2 | 120 | 0.014 | 0.020 | 2.500 | 15280 | 435 | 21.8 |
| 3.00 | 2 | 120 | 0.016 | 0.023 | 3.000 | 12730 | 420 | 29.0 |
| 0.20 | 2 | 26 | 0.001 | 0.002 | 0.200 | 41380 | 90 | 0.0 |
| 0.40 | 2 | 53 | 0.002 | 0.003 | 0.400 | 42175 | 185 | 0.2 |
| 0.50 | 2 | 66 | 0.003 | 0.004 | 0.500 | 42015 | 275 | 0.6 |
| 0.80 | 2 | 100 | 0.004 | 0.006 | 0.800 | 39790 | 350 | 1.7 |
| 1.00 | 2 | 100 | 0.005 | 0.008 | 1.000 | 31830 | 350 | 2.8 |
| 1.50 | 2 | 100 | 0.009 | 0.012 | 1.500 | 21220 | 375 | 6.7 |
| 2.00 | 2 | 100 | 0.011 | 0.016 | 2.000 | 15915 | 350 | 11.2 |
| 2.50 | 2 | 100 | 0.014 | 0.020 | 2.500 | 12730 | 365 | 18.2 |
| 3.00 | 2 | 100 | 0.016 | 0.023 | 3.000 | 10610 | 350 | 24.2 |
| 0.20 | 2 | 26 | 0.001 | 0.002 | 0.200 | 41380 | 85 | 0.0 |
| 0.40 | 2 | 53 | 0.002 | 0.003 | 0.400 | 42175 | 170 | 0.2 |
| 0.50 | 2 | 66 | 0.003 | 0.004 | 0.500 | 42015 | 250 | 0.5 |
| 0.80 | 2 | 80 | 0.004 | 0.006 | 0.800 | 31830 | 255 | 1.2 |
| 1.00 | 2 | 80 | 0.005 | 0.008 | 1.000 | 25465 | 255 | 2.0 |
| 1.50 | 2 | 80 | 0.008 | 0.012 | 1.500 | 16975 | 270 | 4.9 |
| 2.00 | 2 | 80 | 0.010 | 0.016 | 2.000 | 12730 | 255 | 8.1 |
| 2.50 | 2 | 80 | 0.013 | 0.020 | 2.500 | 10185 | 265 | 13.2 |
| 3.00 | 2 | 80 | 0.015 | 0.023 | 3.000 | 8490 | 255 | 17.6 |
| 0.20 | 2 | 26 | 0.001 | 0.002 | 0.200 | 41380 | 75 | 0.0 |
| 0.40 | 2 | 40 | 0.002 | 0.003 | 0.400 | 31830 | 115 | 0.1 |
| 0.50 | 2 | 40 | 0.003 | 0.004 | 0.500 | 25465 | 140 | 0.3 |
| 0.80 | 2 | 40 | 0.004 | 0.006 | 0.800 | 15915 | 115 | 0.6 |
| 1.00 | 2 | 40 | 0.004 | 0.008 | 1.000 | 12730 | 115 | 0.9 |
| 1.50 | 2 | 40 | 0.007 | 0.012 | 1.500 | 8490 | 120 | 2.2 |
| 2.00 | 2 | 40 | 0.009 | 0.016 | 2.000 | 6365 | 115 | 3.7 |
| 2.50 | 2 | 40 | 0.012 | 0.020 | 2.500 | 5095 | 120 | 6.0 |
| 3.00 | 2 | 40 | 0.014 | 0.023 | 3.000 | 4245 | 115 | 7.9 |

Frese cilindriche MicroX

Gambo ø 6mm, scarico cilindrico, 8xd



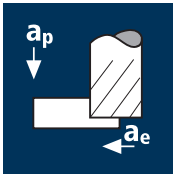
| | |
|-----------|---------------|
| HM | λ 25° |
| XA | γ -10° |



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|--------------------|-----------------------|------------------------|------------------------|---------------------|---------------------|--------------------|--------------------------|-----------------------|---------------------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Inox Stainless | Ti Titanium | Cobalt-Chrome Copper |
|--------------------|-----------------------|------------------------|------------------------|---------------------|---------------------|--------------------|--------------------------|-----------------------|---------------------------------------|

| Esempio: N° Ordine | | | | | | | | | | | X-AL |
|--|---------------------------|----------------------|----------------|----------------|----------------|----------------|----------------|------|-------|---|-------|
| Rivestimento X Articolo 6506 Codice-ø 020 | | | | | | | | | | | X6506 |
| Ø Code | d ₁ 0/-0.01 | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | 45° | α | z | EUR |
| 020 | 0.20 | 6.00 | 0.18 | 57 | 0.12 | 1.60 | 18.22 | - | 13.5° | 2 | 79.00 |
| 030 | 0.30 | 6.00 | 0.25 | 57 | 0.18 | 2.40 | 18.64 | - | 12.5° | 2 | 72.00 |
| 040 | 0.40 | 6.00 | 0.35 | 57 | 0.24 | 3.20 | 19.16 | - | 12.0° | 2 | 72.00 |
| 050 | 0.50 | 6.00 | 0.45 | 57 | 0.30 | 4.00 | 14.51 | - | 11.0° | 2 | 72.00 |
| 060 | 0.60 | 6.00 | 0.55 | 57 | 0.36 | 4.80 | 15.13 | - | 10.5° | 2 | 72.00 |
| 080 | 0.80 | 6.00 | 0.75 | 57 | 0.48 | 6.40 | 16.35 | - | 9.5° | 2 | 72.00 |
| 100 | 1.00 | 6.00 | 0.95 | 61 | 1.00 | 8.00 | 18.08 | 0.07 | 8.5° | 2 | 72.00 |
| 108 | 1.20 | 6.00 | 1.10 | 61 | 1.20 | 9.60 | 19.40 | 0.07 | 7.5° | 2 | 72.00 |
| 120 | 1.50 | 6.00 | 1.40 | 61 | 1.50 | 12.00 | 21.24 | 0.07 | 6.5° | 2 | 72.00 |
| 140 | 2.00 | 6.00 | 1.90 | 66 | 2.00 | 16.00 | 24.31 | 0.10 | 5.0° | 2 | 72.00 |
| 160 | 2.50 | 6.00 | 2.30 | 69 | 2.50 | 20.00 | 27.56 | 0.10 | 4.0° | 2 | 72.00 |
| 180 | 3.00 | 6.00 | 2.80 | 75 | 3.00 | 24.00 | 30.63 | 0.10 | 3.0° | 2 | 72.00 |
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Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



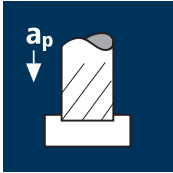
Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



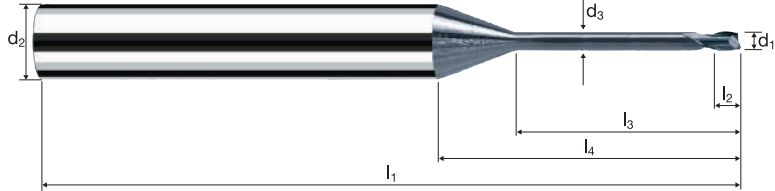
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 0.20 | 2 | 26 | 0.001 | 0.004 | 0.040 | 41380 | 105 | 0.0 |
| 0.40 | 2 | 53 | 0.003 | 0.008 | 0.080 | 42175 | 215 | 0.1 |
| 0.50 | 2 | 66 | 0.004 | 0.010 | 0.100 | 42015 | 320 | 0.3 |
| 0.80 | 2 | 106 | 0.005 | 0.016 | 0.160 | 42175 | 425 | 1.1 |
| 1.00 | 2 | 132 | 0.006 | 0.020 | 0.200 | 42015 | 530 | 2.1 |
| 1.50 | 2 | 140 | 0.010 | 0.030 | 0.300 | 29710 | 600 | 5.4 |
| 2.00 | 2 | 140 | 0.013 | 0.040 | 0.400 | 22280 | 560 | 9.0 |
| 2.50 | 2 | 140 | 0.016 | 0.050 | 0.500 | 17825 | 585 | 14.6 |
| 3.00 | 2 | 140 | 0.019 | 0.060 | 0.600 | 14855 | 560 | 20.2 |
| 0.20 | 2 | 26 | 0.001 | 0.004 | 0.040 | 41380 | 100 | 0.0 |
| 0.40 | 2 | 53 | 0.002 | 0.008 | 0.080 | 42175 | 200 | 0.1 |
| 0.50 | 2 | 66 | 0.004 | 0.010 | 0.100 | 42015 | 305 | 0.3 |
| 0.80 | 2 | 106 | 0.005 | 0.016 | 0.160 | 42175 | 405 | 1.0 |
| 1.00 | 2 | 120 | 0.006 | 0.020 | 0.200 | 38195 | 460 | 1.8 |
| 1.50 | 2 | 120 | 0.010 | 0.030 | 0.300 | 25465 | 490 | 4.4 |
| 2.00 | 2 | 120 | 0.012 | 0.040 | 0.400 | 19100 | 460 | 7.3 |
| 2.50 | 2 | 120 | 0.016 | 0.050 | 0.500 | 15280 | 475 | 11.9 |
| 3.00 | 2 | 120 | 0.018 | 0.060 | 0.600 | 12730 | 460 | 16.5 |
| 0.20 | 2 | 26 | 0.001 | 0.004 | 0.040 | 41380 | 85 | 0.0 |
| 0.40 | 2 | 53 | 0.002 | 0.008 | 0.080 | 42175 | 170 | 0.1 |
| 0.50 | 2 | 66 | 0.003 | 0.010 | 0.100 | 42015 | 250 | 0.3 |
| 0.80 | 2 | 100 | 0.004 | 0.016 | 0.160 | 39790 | 320 | 0.8 |
| 1.00 | 2 | 100 | 0.005 | 0.020 | 0.200 | 31830 | 320 | 1.3 |
| 1.50 | 2 | 100 | 0.008 | 0.030 | 0.300 | 21220 | 340 | 3.1 |
| 2.00 | 2 | 100 | 0.010 | 0.040 | 0.400 | 15915 | 320 | 5.1 |
| 2.50 | 2 | 100 | 0.013 | 0.050 | 0.500 | 12730 | 330 | 8.3 |
| 3.00 | 2 | 100 | 0.015 | 0.060 | 0.600 | 10610 | 320 | 11.5 |
| 0.20 | 2 | 26 | 0.001 | 0.004 | 0.040 | 41380 | 75 | 0.0 |
| 0.40 | 2 | 53 | 0.002 | 0.008 | 0.080 | 42175 | 150 | 0.1 |
| 0.50 | 2 | 60 | 0.003 | 0.010 | 0.100 | 38195 | 205 | 0.2 |
| 0.80 | 2 | 60 | 0.004 | 0.016 | 0.160 | 23875 | 170 | 0.4 |
| 1.00 | 2 | 60 | 0.004 | 0.020 | 0.200 | 19100 | 170 | 0.7 |
| 1.50 | 2 | 60 | 0.007 | 0.030 | 0.300 | 12730 | 185 | 1.7 |
| 2.00 | 2 | 60 | 0.009 | 0.040 | 0.400 | 9550 | 170 | 2.8 |
| 2.50 | 2 | 60 | 0.012 | 0.050 | 0.500 | 7640 | 180 | 4.5 |
| 3.00 | 2 | 60 | 0.014 | 0.060 | 0.600 | 6365 | 170 | 6.2 |
| 0.20 | 2 | 26 | 0.001 | 0.001 | 0.200 | 41380 | 90 | 0.0 |
| 0.40 | 2 | 53 | 0.002 | 0.003 | 0.400 | 42175 | 185 | 0.2 |
| 0.50 | 2 | 66 | 0.003 | 0.003 | 0.500 | 42015 | 275 | 0.4 |
| 0.80 | 2 | 106 | 0.004 | 0.005 | 0.800 | 42175 | 370 | 1.5 |
| 1.00 | 2 | 120 | 0.005 | 0.006 | 1.000 | 38195 | 420 | 2.5 |
| 1.50 | 2 | 120 | 0.009 | 0.009 | 1.500 | 25465 | 450 | 6.1 |
| 2.00 | 2 | 120 | 0.011 | 0.013 | 2.000 | 19100 | 420 | 10.9 |
| 2.50 | 2 | 120 | 0.014 | 0.016 | 2.500 | 15280 | 435 | 17.5 |
| 3.00 | 2 | 120 | 0.016 | 0.019 | 3.000 | 12730 | 420 | 23.9 |
| 0.20 | 2 | 26 | 0.001 | 0.001 | 0.200 | 41380 | 90 | 0.0 |
| 0.40 | 2 | 53 | 0.002 | 0.003 | 0.400 | 42175 | 185 | 0.2 |
| 0.50 | 2 | 66 | 0.003 | 0.003 | 0.500 | 42015 | 275 | 0.4 |
| 0.80 | 2 | 100 | 0.004 | 0.005 | 0.800 | 39790 | 350 | 1.4 |
| 1.00 | 2 | 100 | 0.005 | 0.006 | 1.000 | 31830 | 350 | 2.1 |
| 1.50 | 2 | 100 | 0.009 | 0.009 | 1.500 | 21220 | 375 | 5.0 |
| 2.00 | 2 | 100 | 0.011 | 0.013 | 2.000 | 15915 | 350 | 9.1 |
| 2.50 | 2 | 100 | 0.014 | 0.016 | 2.500 | 12730 | 365 | 14.6 |
| 3.00 | 2 | 100 | 0.016 | 0.019 | 3.000 | 10610 | 350 | 20.0 |
| 0.20 | 2 | 26 | 0.001 | 0.001 | 0.200 | 41380 | 85 | 0.0 |
| 0.40 | 2 | 53 | 0.002 | 0.003 | 0.400 | 42175 | 170 | 0.2 |
| 0.50 | 2 | 66 | 0.003 | 0.003 | 0.500 | 42015 | 250 | 0.4 |
| 0.80 | 2 | 80 | 0.004 | 0.005 | 0.800 | 31830 | 255 | 1.0 |
| 1.00 | 2 | 80 | 0.005 | 0.006 | 1.000 | 25465 | 255 | 1.5 |
| 1.50 | 2 | 80 | 0.008 | 0.009 | 1.500 | 16975 | 270 | 3.7 |
| 2.00 | 2 | 80 | 0.010 | 0.013 | 2.000 | 12730 | 255 | 6.6 |
| 2.50 | 2 | 80 | 0.013 | 0.016 | 2.500 | 10185 | 265 | 10.6 |
| 3.00 | 2 | 80 | 0.015 | 0.019 | 3.000 | 8490 | 255 | 14.5 |
| 0.20 | 2 | 26 | 0.001 | 0.001 | 0.200 | 41380 | 75 | 0.0 |
| 0.40 | 2 | 40 | 0.002 | 0.003 | 0.400 | 31830 | 115 | 0.1 |
| 0.50 | 2 | 40 | 0.003 | 0.003 | 0.500 | 25465 | 140 | 0.2 |
| 0.80 | 2 | 40 | 0.004 | 0.005 | 0.800 | 15915 | 115 | 0.5 |
| 1.00 | 2 | 40 | 0.004 | 0.006 | 1.000 | 12730 | 115 | 0.7 |
| 1.50 | 2 | 40 | 0.007 | 0.009 | 1.500 | 8490 | 120 | 1.7 |
| 2.00 | 2 | 40 | 0.009 | 0.013 | 2.000 | 6365 | 115 | 3.0 |
| 2.50 | 2 | 40 | 0.012 | 0.016 | 2.500 | 5095 | 120 | 4.8 |
| 3.00 | 2 | 40 | 0.014 | 0.019 | 3.000 | 4245 | 115 | 6.5 |

Frese cilindriche MicroX

Gambo ø 6mm, scarico cilindrico, 10xd



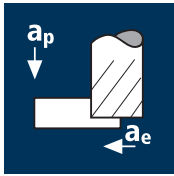
| | |
|-----------|----------------------|
| HM | λ 25° |
| XA | γ -10° |



| | | | | | | | | | |
|-----------|-----------|-----------|-----------|------------|------------|------------|-------------|-----------|----------------------|
| Rm | Rm | Rm | Rm | HRC | HRC | HRC | Inox | Ti | Cobalt-Chrome |
| < 850 | 850-1100 | 1100-1300 | 1300-1500 | 48-56 | 56-60 | > 60 | Stainless | Titanium | Copper |

| Esempio: N° Ordine | | | | | | | | | | | X-AL | |
|--|----------------|----------------|----------------|----------------|----------------|----------------|----------------|------|-------|---|-------|--|
| Rivestimento X Articolo 6508 Codice-ø 020 | | | | | | | | | | | X6508 | |
| Ø | d ₁ | d ₂ | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | 45° | α | z | EUR | |
| Code | 0/-0.01 | h4 | | | | | | | | | | |
| 020 | 0.20 | 6.00 | 0.18 | 57 | 0.12 | 2.00 | 18.62 | - | 13.0° | 2 | 79.00 | |
| 030 | 0.30 | 6.00 | 0.25 | 57 | 0.18 | 3.00 | 19.24 | - | 12.0° | 2 | 72.00 | |
| 040 | 0.40 | 6.00 | 0.35 | 57 | 0.24 | 4.00 | 19.96 | - | 11.0° | 2 | 72.00 | |
| 050 | 0.50 | 6.00 | 0.45 | 57 | 0.30 | 5.00 | 15.51 | - | 10.5° | 2 | 72.00 | |
| 060 | 0.60 | 6.00 | 0.55 | 57 | 0.36 | 6.00 | 16.33 | - | 10.0° | 2 | 72.00 | |
| 080 | 0.80 | 6.00 | 0.75 | 61 | 0.48 | 8.00 | 17.95 | - | 8.5° | 2 | 72.00 | |
| 100 | 1.00 | 6.00 | 0.95 | 61 | 1.00 | 10.00 | 20.08 | 0.07 | 7.5° | 2 | 72.00 | |
| 120 | 1.50 | 6.00 | 1.40 | 66 | 1.50 | 15.00 | 24.24 | 0.07 | 5.5° | 2 | 72.00 | |
| 140 | 2.00 | 6.00 | 1.90 | 69 | 2.00 | 20.00 | 28.31 | 0.10 | 4.5° | 2 | 72.00 | |
| 160 | 2.50 | 6.00 | 2.30 | 75 | 2.50 | 25.00 | 32.56 | 0.10 | 3.5° | 2 | 72.00 | |
| 180 | 3.00 | 6.00 | 2.80 | 80 | 3.00 | 30.00 | 36.63 | 0.10 | 2.5° | 2 | 72.00 | |
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Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



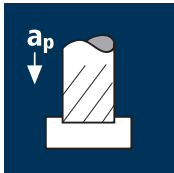
Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



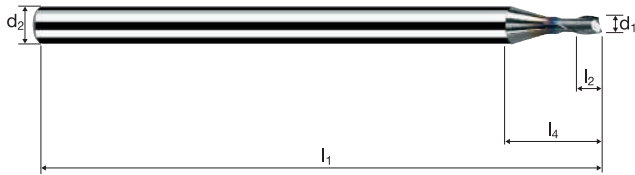
| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 0.20 | 2 | 26 | 0.005 | 0.010 | 0.040 | 41380 | 415 | 0.2 |
| 0.50 | 2 | 66 | 0.015 | 0.030 | 0.100 | 42015 | 1260 | 3.8 |
| 0.80 | 2 | 106 | 0.020 | 0.050 | 0.160 | 42175 | 1685 | 13.5 |
| 1.00 | 2 | 132 | 0.025 | 0.060 | 0.200 | 42015 | 2100 | 25.2 |
| 1.20 | 2 | 140 | 0.030 | 0.070 | 0.240 | 37135 | 2230 | 37.4 |
| 1.50 | 2 | 140 | 0.040 | 0.090 | 0.300 | 29710 | 2375 | 64.2 |
| 2.00 | 2 | 140 | 0.050 | 0.120 | 0.400 | 22280 | 2230 | 107.0 |
| 2.50 | 2 | 140 | 0.065 | 0.150 | 0.500 | 17825 | 2315 | 173.8 |
| 3.00 | 2 | 140 | 0.075 | 0.180 | 0.600 | 14855 | 2230 | 240.6 |
| 0.20 | 2 | 26 | 0.004 | 0.010 | 0.040 | 41380 | 330 | 0.1 |
| 0.50 | 2 | 66 | 0.014 | 0.030 | 0.100 | 42015 | 1175 | 3.5 |
| 0.80 | 2 | 106 | 0.020 | 0.050 | 0.160 | 42175 | 1685 | 13.5 |
| 1.00 | 2 | 120 | 0.024 | 0.060 | 0.200 | 38195 | 1835 | 22.0 |
| 1.20 | 2 | 120 | 0.028 | 0.070 | 0.240 | 31830 | 1785 | 29.9 |
| 1.50 | 2 | 120 | 0.038 | 0.090 | 0.300 | 25465 | 1935 | 52.3 |
| 2.00 | 2 | 120 | 0.048 | 0.120 | 0.400 | 19100 | 1835 | 88.0 |
| 2.50 | 2 | 120 | 0.062 | 0.150 | 0.500 | 15280 | 1895 | 142.1 |
| 3.00 | 2 | 120 | 0.072 | 0.180 | 0.600 | 12730 | 1835 | 198.0 |
| 0.20 | 2 | 26 | 0.004 | 0.010 | 0.040 | 41380 | 330 | 0.1 |
| 0.50 | 2 | 66 | 0.014 | 0.030 | 0.100 | 42015 | 1175 | 3.5 |
| 0.80 | 2 | 100 | 0.018 | 0.050 | 0.160 | 39790 | 1430 | 11.5 |
| 1.00 | 2 | 100 | 0.022 | 0.060 | 0.200 | 31830 | 1400 | 16.8 |
| 1.20 | 2 | 100 | 0.026 | 0.070 | 0.240 | 26525 | 1380 | 23.2 |
| 1.50 | 2 | 100 | 0.036 | 0.090 | 0.300 | 21220 | 1530 | 41.3 |
| 2.00 | 2 | 100 | 0.044 | 0.120 | 0.400 | 15915 | 1400 | 67.2 |
| 2.50 | 2 | 100 | 0.058 | 0.150 | 0.500 | 12730 | 1475 | 110.8 |
| 3.00 | 2 | 100 | 0.066 | 0.180 | 0.600 | 10610 | 1400 | 151.3 |
| 0.20 | 2 | 26 | 0.004 | 0.010 | 0.040 | 41380 | 330 | 0.1 |
| 0.50 | 2 | 60 | 0.012 | 0.030 | 0.100 | 38195 | 915 | 2.8 |
| 0.80 | 2 | 60 | 0.016 | 0.050 | 0.160 | 23875 | 765 | 6.1 |
| 1.00 | 2 | 60 | 0.020 | 0.060 | 0.200 | 19100 | 765 | 9.2 |
| 1.20 | 2 | 60 | 0.024 | 0.070 | 0.240 | 15915 | 765 | 12.8 |
| 1.50 | 2 | 60 | 0.032 | 0.090 | 0.300 | 12730 | 815 | 22.0 |
| 2.00 | 2 | 60 | 0.040 | 0.120 | 0.400 | 9550 | 765 | 36.7 |
| 2.50 | 2 | 60 | 0.052 | 0.150 | 0.500 | 7640 | 795 | 59.6 |
| 3.00 | 2 | 60 | 0.060 | 0.180 | 0.600 | 6365 | 765 | 82.5 |
| 0.20 | 2 | 26 | 0.005 | 0.020 | 0.200 | 41380 | 415 | 1.7 |
| 0.50 | 2 | 66 | 0.010 | 0.060 | 0.500 | 42015 | 840 | 25.2 |
| 0.80 | 2 | 106 | 0.020 | 0.090 | 0.800 | 42175 | 1685 | 121.5 |
| 1.00 | 2 | 120 | 0.020 | 0.110 | 1.000 | 38195 | 1530 | 168.1 |
| 1.20 | 2 | 120 | 0.025 | 0.130 | 1.200 | 31830 | 1590 | 248.3 |
| 1.50 | 2 | 120 | 0.035 | 0.170 | 1.500 | 25465 | 1785 | 454.5 |
| 2.00 | 2 | 120 | 0.045 | 0.220 | 2.000 | 19100 | 1720 | 756.3 |
| 2.50 | 2 | 120 | 0.055 | 0.280 | 2.500 | 15280 | 1680 | 1176.5 |
| 3.00 | 2 | 120 | 0.065 | 0.330 | 3.000 | 12730 | 1655 | 1638.7 |
| 0.20 | 2 | 26 | 0.004 | 0.020 | 0.200 | 41380 | 330 | 1.3 |
| 0.50 | 2 | 66 | 0.010 | 0.060 | 0.500 | 42015 | 840 | 25.2 |
| 0.80 | 2 | 100 | 0.020 | 0.090 | 0.800 | 39790 | 1590 | 114.6 |
| 1.00 | 2 | 100 | 0.020 | 0.110 | 1.000 | 31830 | 1275 | 140.1 |
| 1.20 | 2 | 100 | 0.024 | 0.130 | 1.200 | 26525 | 1275 | 198.6 |
| 1.50 | 2 | 100 | 0.034 | 0.170 | 1.500 | 21220 | 1445 | 368.0 |
| 2.00 | 2 | 100 | 0.042 | 0.220 | 2.000 | 15915 | 1335 | 588.2 |
| 2.50 | 2 | 100 | 0.052 | 0.280 | 2.500 | 12730 | 1325 | 926.9 |
| 3.00 | 2 | 100 | 0.062 | 0.330 | 3.000 | 10610 | 1315 | 1302.5 |
| 0.20 | 2 | 26 | 0.004 | 0.020 | 0.200 | 41380 | 330 | 1.3 |
| 0.50 | 2 | 66 | 0.008 | 0.060 | 0.500 | 42015 | 670 | 20.2 |
| 0.80 | 2 | 80 | 0.018 | 0.090 | 0.800 | 31830 | 1145 | 82.5 |
| 1.00 | 2 | 80 | 0.018 | 0.110 | 1.000 | 25465 | 915 | 100.8 |
| 1.20 | 2 | 80 | 0.022 | 0.130 | 1.200 | 21220 | 935 | 145.7 |
| 1.50 | 2 | 80 | 0.030 | 0.170 | 1.500 | 16975 | 1020 | 259.7 |
| 2.00 | 2 | 80 | 0.040 | 0.220 | 2.000 | 12730 | 1020 | 448.2 |
| 2.50 | 2 | 80 | 0.048 | 0.280 | 2.500 | 10185 | 980 | 684.5 |
| 3.00 | 2 | 80 | 0.058 | 0.330 | 3.000 | 8490 | 985 | 974.8 |
| 0.20 | 2 | 26 | 0.004 | 0.020 | 0.200 | 41380 | 330 | 1.3 |
| 0.50 | 2 | 40 | 0.008 | 0.060 | 0.500 | 25465 | 405 | 12.2 |
| 0.80 | 2 | 40 | 0.016 | 0.090 | 0.800 | 15915 | 510 | 36.7 |
| 1.00 | 2 | 40 | 0.016 | 0.110 | 1.000 | 12730 | 405 | 44.8 |
| 1.20 | 2 | 40 | 0.020 | 0.130 | 1.200 | 10610 | 425 | 66.2 |
| 1.50 | 2 | 40 | 0.028 | 0.170 | 1.500 | 8490 | 475 | 121.2 |
| 2.00 | 2 | 40 | 0.036 | 0.220 | 2.000 | 6365 | 460 | 201.7 |
| 2.50 | 2 | 40 | 0.044 | 0.280 | 2.500 | 5095 | 450 | 313.7 |
| 3.00 | 2 | 40 | 0.052 | 0.330 | 3.000 | 4245 | 440 | 437.0 |

Frese cilindriche MicroX (Microcut-C1H)

Gambo ø 3mm, 1xd



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|-----------|---------------|
| HM | λ 25° |
| XA | γ -10° |



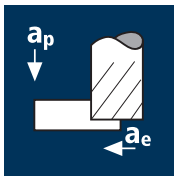
ToolSchool

ReTool®

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|----------|-------------|--------------|--------------|-----------|-----------|----------|-------------|----------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Ti Titanium | Tungsten |
|----------|-------------|--------------|--------------|-----------|-----------|----------|-------------|----------|

| Esempio: N° Ordine | | | | | | | | | | DURO-S | |
|--------------------|----------------------|-------------------|----------|----------|----------------|----------------|----------------|------|------------|--------|--------|
| | | Rivestimento | Articolo | Codice-ø | | | | | | | D15711 |
| Ø Code | d ₁ ±0.01 | d ₂ h6 | | | l ₁ | l ₂ | l ₄ | 45° | α | z | EUR |
| 020 | 0.20 | 3.00 | D | 15711 | 020 | 40 | 0.24 | 5.91 | - 14.5° | 2 | 85.00 |
| 030 | 0.30 | 3.00 | | | | 40 | 0.36 | 5.84 | - 14.0° | 2 | 78.00 |
| 040 | 0.40 | 3.00 | | | | 40 | 0.48 | 5.78 | - 14.0° | 2 | 74.00 |
| 050 | 0.50 | 3.00 | | | | 40 | 0.60 | 5.71 | - 13.5° | 2 | 74.00 |
| 060 | 0.60 | 3.00 | | | | 40 | 0.72 | 5.64 | - 13.0° | 2 | 71.00 |
| 080 | 0.80 | 3.00 | | | | 40 | 0.96 | 5.51 | - 12.5° | 2 | 71.00 |
| 100 | 1.00 | 3.00 | | | | 50 | 1.20 | 5.38 | 0.07 11.5° | 2 | 71.00 |
| 108 | 1.20 | 3.00 | | | | 50 | 1.40 | 5.29 | 0.07 10.5° | 2 | 71.00 |
| 120 | 1.50 | 3.00 | | | | 50 | 1.80 | 5.09 | 0.07 9.5° | 2 | 71.00 |
| 140 | 2.00 | 3.00 | | | | 50 | 2.40 | 4.76 | 0.10 7.0° | 2 | 71.00 |
| 160 | 2.50 | 3.00 | | | | 50 | 3.00 | 4.43 | 0.10 4.0° | 2 | 71.00 |
| 180 | 3.00 | 3.00 | | | | 50 | 3.60 | - | 0.10 0.0° | 2 | 71.00 |
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Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



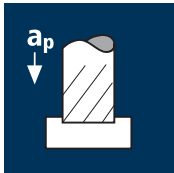
Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



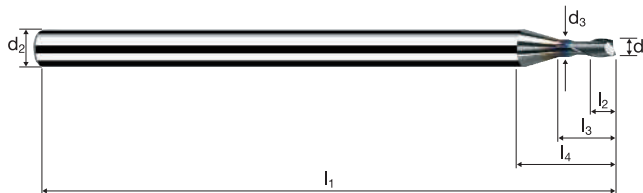
| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 0.50 | 2 | 66 | 0.015 | 0.030 | 0.100 | 42015 | 1260 | 3.8 |
| 0.60 | 2 | 79 | 0.015 | 0.030 | 0.120 | 41910 | 1255 | 4.5 |
| 0.80 | 2 | 106 | 0.020 | 0.040 | 0.160 | 42175 | 1685 | 10.8 |
| 1.00 | 2 | 132 | 0.025 | 0.060 | 0.200 | 42015 | 2100 | 25.2 |
| 1.20 | 2 | 140 | 0.030 | 0.070 | 0.240 | 37135 | 2230 | 37.4 |
| 1.50 | 2 | 140 | 0.040 | 0.080 | 0.300 | 29710 | 2375 | 57.0 |
| 2.00 | 2 | 140 | 0.050 | 0.110 | 0.400 | 22280 | 2230 | 98.0 |
| 2.50 | 2 | 140 | 0.065 | 0.140 | 0.500 | 17825 | 2315 | 162.2 |
| 3.00 | 2 | 140 | 0.075 | 0.170 | 0.600 | 14855 | 2230 | 227.3 |
| 0.50 | 2 | 66 | 0.014 | 0.030 | 0.100 | 42015 | 1175 | 3.5 |
| 0.60 | 2 | 79 | 0.014 | 0.030 | 0.120 | 41910 | 1175 | 4.2 |
| 0.80 | 2 | 106 | 0.020 | 0.040 | 0.160 | 42175 | 1685 | 10.8 |
| 1.00 | 2 | 120 | 0.024 | 0.060 | 0.200 | 38195 | 1835 | 22.0 |
| 1.20 | 2 | 120 | 0.028 | 0.070 | 0.240 | 31830 | 1785 | 29.9 |
| 1.50 | 2 | 120 | 0.038 | 0.080 | 0.300 | 25465 | 1935 | 46.4 |
| 2.00 | 2 | 120 | 0.048 | 0.110 | 0.400 | 19100 | 1835 | 80.7 |
| 2.50 | 2 | 120 | 0.062 | 0.140 | 0.500 | 15280 | 1895 | 132.6 |
| 3.00 | 2 | 120 | 0.072 | 0.170 | 0.600 | 12730 | 1835 | 187.0 |
| 0.50 | 2 | 66 | 0.014 | 0.030 | 0.100 | 42015 | 1175 | 3.5 |
| 0.60 | 2 | 79 | 0.014 | 0.030 | 0.120 | 41910 | 1175 | 4.2 |
| 0.80 | 2 | 100 | 0.018 | 0.040 | 0.160 | 39790 | 1430 | 9.2 |
| 1.00 | 2 | 100 | 0.022 | 0.060 | 0.200 | 31830 | 1400 | 16.8 |
| 1.20 | 2 | 100 | 0.026 | 0.070 | 0.240 | 26525 | 1380 | 23.2 |
| 1.50 | 2 | 100 | 0.036 | 0.080 | 0.300 | 21220 | 1530 | 36.7 |
| 2.00 | 2 | 100 | 0.044 | 0.110 | 0.400 | 15915 | 1400 | 61.6 |
| 2.50 | 2 | 100 | 0.058 | 0.140 | 0.500 | 12730 | 1475 | 103.4 |
| 3.00 | 2 | 100 | 0.066 | 0.170 | 0.600 | 10610 | 1400 | 142.9 |
| 0.50 | 2 | 60 | 0.012 | 0.030 | 0.100 | 38195 | 915 | 2.8 |
| 0.60 | 2 | 60 | 0.012 | 0.030 | 0.120 | 31830 | 765 | 2.8 |
| 0.80 | 2 | 60 | 0.016 | 0.040 | 0.160 | 23875 | 765 | 4.9 |
| 1.00 | 2 | 60 | 0.020 | 0.060 | 0.200 | 19100 | 765 | 9.2 |
| 1.20 | 2 | 60 | 0.024 | 0.070 | 0.240 | 15915 | 765 | 12.8 |
| 1.50 | 2 | 60 | 0.032 | 0.080 | 0.300 | 12730 | 815 | 19.6 |
| 2.00 | 2 | 60 | 0.040 | 0.110 | 0.400 | 9550 | 765 | 33.6 |
| 2.50 | 2 | 60 | 0.052 | 0.140 | 0.500 | 7640 | 795 | 55.6 |
| 3.00 | 2 | 60 | 0.060 | 0.170 | 0.600 | 6365 | 765 | 77.9 |
| 0.50 | 2 | 66 | 0.010 | 0.050 | 0.500 | 42015 | 840 | 21.0 |
| 0.60 | 2 | 79 | 0.015 | 0.050 | 0.600 | 41910 | 1255 | 37.7 |
| 0.80 | 2 | 106 | 0.020 | 0.070 | 0.800 | 42175 | 1685 | 94.5 |
| 1.00 | 2 | 120 | 0.020 | 0.090 | 1.000 | 38195 | 1530 | 137.5 |
| 1.20 | 2 | 120 | 0.025 | 0.110 | 1.200 | 31830 | 1590 | 210.1 |
| 1.50 | 2 | 120 | 0.035 | 0.140 | 1.500 | 25465 | 1785 | 374.3 |
| 2.00 | 2 | 120 | 0.045 | 0.180 | 2.000 | 19100 | 1720 | 618.8 |
| 2.50 | 2 | 120 | 0.055 | 0.230 | 2.500 | 15280 | 1680 | 966.4 |
| 3.00 | 2 | 120 | 0.065 | 0.270 | 3.000 | 12730 | 1655 | 1340.7 |
| 0.50 | 2 | 66 | 0.010 | 0.050 | 0.500 | 42015 | 840 | 21.0 |
| 0.60 | 2 | 79 | 0.014 | 0.050 | 0.600 | 41910 | 1175 | 35.2 |
| 0.80 | 2 | 100 | 0.020 | 0.070 | 0.800 | 39790 | 1590 | 89.1 |
| 1.00 | 2 | 100 | 0.020 | 0.090 | 1.000 | 31830 | 1275 | 114.6 |
| 1.20 | 2 | 100 | 0.024 | 0.110 | 1.200 | 26525 | 1275 | 168.1 |
| 1.50 | 2 | 100 | 0.034 | 0.140 | 1.500 | 21220 | 1445 | 303.0 |
| 2.00 | 2 | 100 | 0.042 | 0.180 | 2.000 | 15915 | 1335 | 481.3 |
| 2.50 | 2 | 100 | 0.052 | 0.230 | 2.500 | 12730 | 1325 | 761.4 |
| 3.00 | 2 | 100 | 0.062 | 0.270 | 3.000 | 10610 | 1315 | 1065.7 |
| 0.50 | 2 | 66 | 0.008 | 0.050 | 0.500 | 42015 | 670 | 16.8 |
| 0.60 | 2 | 79 | 0.014 | 0.050 | 0.600 | 41910 | 1175 | 35.2 |
| 0.80 | 2 | 80 | 0.018 | 0.070 | 0.800 | 31830 | 1145 | 64.2 |
| 1.00 | 2 | 80 | 0.018 | 0.090 | 1.000 | 25465 | 915 | 82.5 |
| 1.20 | 2 | 80 | 0.022 | 0.110 | 1.200 | 21220 | 935 | 123.2 |
| 1.50 | 2 | 80 | 0.030 | 0.140 | 1.500 | 16975 | 1020 | 213.9 |
| 2.00 | 2 | 80 | 0.040 | 0.180 | 2.000 | 12730 | 1020 | 366.7 |
| 2.50 | 2 | 80 | 0.048 | 0.230 | 2.500 | 10185 | 980 | 562.3 |
| 3.00 | 2 | 80 | 0.058 | 0.270 | 3.000 | 8490 | 985 | 797.6 |
| 0.50 | 2 | 40 | 0.008 | 0.050 | 0.500 | 25465 | 405 | 10.2 |
| 0.60 | 2 | 40 | 0.012 | 0.050 | 0.600 | 21220 | 510 | 15.3 |
| 0.80 | 2 | 40 | 0.016 | 0.070 | 0.800 | 15915 | 510 | 28.5 |
| 1.00 | 2 | 40 | 0.016 | 0.090 | 1.000 | 12730 | 405 | 36.7 |
| 1.20 | 2 | 40 | 0.020 | 0.110 | 1.200 | 10610 | 425 | 56.0 |
| 1.50 | 2 | 40 | 0.028 | 0.140 | 1.500 | 8490 | 475 | 99.8 |
| 2.00 | 2 | 40 | 0.036 | 0.180 | 2.000 | 6365 | 460 | 165.0 |
| 2.50 | 2 | 40 | 0.044 | 0.230 | 2.500 | 5095 | 450 | 257.7 |
| 3.00 | 2 | 40 | 0.052 | 0.270 | 3.000 | 4245 | 440 | 357.5 |

Frese cilindriche MicroX (Microcut-C3H)

Gambo \varnothing 3mm, scarico cilindrico, 3xd



| | |
|----------|--------------------------------|
| HM XA | λ 25° γ -10° |
|----------|--------------------------------|

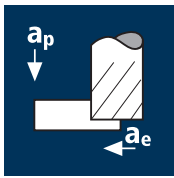


ToolSchool ReTool®

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|-------------|----------------|-----------------|-----------------|--------------|--------------|-------------|----------------|----------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Ti Titanium | Tungsten |
|-------------|----------------|-----------------|-----------------|--------------|--------------|-------------|----------------|----------|

| Esempio: N° Ordine | | | | | | | | | | | DURO-S |
|-----------------------|---------------------|-------------|-------|-------|-------|-------|-------|------|----------|---|--------|
| | | | | | | | | | | | D5722 |
| | | | | | | | | | | | EUR |
| \varnothing Code | d_1 ± 0.01 | d_2 h6 | d_3 | l_1 | l_2 | l_3 | l_4 | 45° | α | z | |
| 050 | 0.50 | 3.00 | 0.45 | 40 | 0.60 | 1.50 | 6.65 | - | 11.5° | 2 | 74.00 |
| 060 | 0.60 | 3.00 | 0.55 | 40 | 0.72 | 1.80 | 6.77 | - | 11.0° | 2 | 71.00 |
| 080 | 0.80 | 3.00 | 0.75 | 40 | 0.96 | 2.40 | 6.99 | - | 10.0° | 2 | 71.00 |
| 100 | 1.00 | 3.00 | 0.95 | 50 | 1.20 | 3.00 | 7.22 | 0.07 | 8.5° | 2 | 71.00 |
| 108 | 1.20 | 3.00 | 1.10 | 50 | 1.44 | 3.60 | 7.54 | 0.07 | 7.5° | 2 | 71.00 |
| 120 | 1.50 | 3.00 | 1.40 | 50 | 1.80 | 4.50 | 7.88 | 0.07 | 6.0° | 2 | 71.00 |
| 140 | 2.00 | 3.00 | 1.90 | 50 | 2.40 | 6.00 | 8.45 | 0.10 | 4.0° | 2 | 71.00 |
| 160 | 2.50 | 3.00 | 2.30 | 50 | 3.00 | 7.50 | 9.20 | 0.10 | 2.0° | 2 | 71.00 |
| 180 | 3.00 | 3.00 | 2.80 | 50 | 3.60 | 8.56 | 9.00 | 0.10 | 0.0° | 2 | 71.00 |
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Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 0.50 | 2 | 66 | 0.015 | 0.030 | 0.100 | 42015 | 1260 | 3.8 |
| 0.60 | 2 | 79 | 0.015 | 0.030 | 0.120 | 41910 | 1255 | 4.5 |
| 0.80 | 2 | 106 | 0.020 | 0.040 | 0.160 | 42175 | 1685 | 10.8 |
| 1.00 | 2 | 132 | 0.025 | 0.050 | 0.200 | 42015 | 2100 | 21.0 |
| 1.20 | 2 | 140 | 0.030 | 0.060 | 0.240 | 37135 | 2230 | 32.1 |
| 1.50 | 2 | 140 | 0.040 | 0.080 | 0.300 | 29710 | 2375 | 57.0 |
| 2.00 | 2 | 140 | 0.050 | 0.100 | 0.400 | 22280 | 2230 | 89.1 |
| 2.50 | 2 | 140 | 0.065 | 0.130 | 0.500 | 17825 | 2315 | 150.6 |
| 3.00 | 2 | 140 | 0.075 | 0.150 | 0.600 | 14855 | 2230 | 200.5 |

Acciaio da
utensile temprato
48 - 52 HRC



| | | | | | | | | |
|------|---|-----|-------|-------|-------|-------|------|-------|
| 0.50 | 2 | 66 | 0.014 | 0.030 | 0.100 | 42015 | 1175 | 3.5 |
| 0.60 | 2 | 79 | 0.014 | 0.030 | 0.120 | 41910 | 1175 | 4.2 |
| 0.80 | 2 | 106 | 0.020 | 0.040 | 0.160 | 42175 | 1685 | 10.8 |
| 1.00 | 2 | 120 | 0.024 | 0.050 | 0.200 | 38195 | 1835 | 18.3 |
| 1.20 | 2 | 120 | 0.028 | 0.060 | 0.240 | 31830 | 1785 | 25.7 |
| 1.50 | 2 | 120 | 0.038 | 0.080 | 0.300 | 25465 | 1935 | 46.4 |
| 2.00 | 2 | 120 | 0.048 | 0.100 | 0.400 | 19100 | 1835 | 73.3 |
| 2.50 | 2 | 120 | 0.062 | 0.130 | 0.500 | 15280 | 1895 | 123.1 |
| 3.00 | 2 | 120 | 0.072 | 0.150 | 0.600 | 12730 | 1835 | 165.0 |

Acciaio da
utensile temprato
52 - 56 HRC

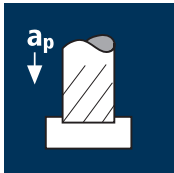


| | | | | | | | | |
|------|---|-----|-------|-------|-------|-------|------|-------|
| 0.50 | 2 | 66 | 0.014 | 0.030 | 0.100 | 42015 | 1175 | 3.5 |
| 0.60 | 2 | 79 | 0.014 | 0.030 | 0.120 | 41910 | 1175 | 4.2 |
| 0.80 | 2 | 100 | 0.018 | 0.040 | 0.160 | 39790 | 1430 | 9.2 |
| 1.00 | 2 | 100 | 0.022 | 0.050 | 0.200 | 31830 | 1400 | 14.0 |
| 1.20 | 2 | 100 | 0.026 | 0.060 | 0.240 | 26525 | 1380 | 19.9 |
| 1.50 | 2 | 100 | 0.036 | 0.080 | 0.300 | 21220 | 1530 | 36.7 |
| 2.00 | 2 | 100 | 0.044 | 0.100 | 0.400 | 15915 | 1400 | 56.0 |
| 2.50 | 2 | 100 | 0.058 | 0.130 | 0.500 | 12730 | 1475 | 96.0 |
| 3.00 | 2 | 100 | 0.066 | 0.150 | 0.600 | 10610 | 1400 | 126.1 |

Acciaio da
utensile temprato
56 - 60 HRC



| | | | | | | | | |
|------|---|----|-------|-------|-------|-------|-----|------|
| 0.50 | 2 | 60 | 0.012 | 0.030 | 0.100 | 38195 | 915 | 2.8 |
| 0.60 | 2 | 60 | 0.012 | 0.030 | 0.120 | 31830 | 765 | 2.8 |
| 0.80 | 2 | 60 | 0.016 | 0.040 | 0.160 | 23875 | 765 | 4.9 |
| 1.00 | 2 | 60 | 0.020 | 0.050 | 0.200 | 19100 | 765 | 7.6 |
| 1.20 | 2 | 60 | 0.024 | 0.060 | 0.240 | 15915 | 765 | 11.0 |
| 1.50 | 2 | 60 | 0.032 | 0.080 | 0.300 | 12730 | 815 | 19.6 |
| 2.00 | 2 | 60 | 0.040 | 0.100 | 0.400 | 9550 | 765 | 30.6 |
| 2.50 | 2 | 60 | 0.052 | 0.130 | 0.500 | 7640 | 795 | 51.6 |
| 3.00 | 2 | 60 | 0.060 | 0.150 | 0.600 | 6365 | 765 | 68.8 |



Acciaio da
utensile temprato
42 - 48 HRC



| | | | | | | | | |
|------|---|-----|-------|-------|-------|-------|------|--------|
| 0.50 | 2 | 66 | 0.010 | 0.040 | 0.500 | 42015 | 840 | 16.8 |
| 0.60 | 2 | 79 | 0.015 | 0.040 | 0.600 | 41910 | 1255 | 30.2 |
| 0.80 | 2 | 106 | 0.020 | 0.060 | 0.800 | 42175 | 1685 | 81.0 |
| 1.00 | 2 | 120 | 0.020 | 0.070 | 1.000 | 38195 | 1530 | 107.0 |
| 1.20 | 2 | 120 | 0.025 | 0.080 | 1.200 | 31830 | 1590 | 152.8 |
| 1.50 | 2 | 120 | 0.035 | 0.110 | 1.500 | 25465 | 1785 | 294.1 |
| 2.00 | 2 | 120 | 0.045 | 0.140 | 2.000 | 19100 | 1720 | 481.3 |
| 2.50 | 2 | 120 | 0.055 | 0.180 | 2.500 | 15280 | 1680 | 756.3 |
| 3.00 | 2 | 120 | 0.065 | 0.210 | 3.000 | 12730 | 1655 | 1042.8 |

Acciaio da
utensile temprato
48 - 52 HRC



| | | | | | | | | |
|------|---|-----|-------|-------|-------|-------|------|-------|
| 0.50 | 2 | 66 | 0.010 | 0.040 | 0.500 | 42015 | 840 | 16.8 |
| 0.60 | 2 | 79 | 0.014 | 0.040 | 0.600 | 41910 | 1175 | 28.2 |
| 0.80 | 2 | 100 | 0.020 | 0.060 | 0.800 | 39790 | 1590 | 76.4 |
| 1.00 | 2 | 100 | 0.020 | 0.070 | 1.000 | 31830 | 1275 | 89.1 |
| 1.20 | 2 | 100 | 0.024 | 0.080 | 1.200 | 26525 | 1275 | 122.2 |
| 1.50 | 2 | 100 | 0.034 | 0.110 | 1.500 | 21220 | 1445 | 238.1 |
| 2.00 | 2 | 100 | 0.042 | 0.140 | 2.000 | 15915 | 1335 | 374.3 |
| 2.50 | 2 | 100 | 0.052 | 0.180 | 2.500 | 12730 | 1325 | 595.9 |
| 3.00 | 2 | 100 | 0.062 | 0.210 | 3.000 | 10610 | 1315 | 828.9 |

Acciaio da
utensile temprato
52 - 56 HRC



| | | | | | | | | |
|------|---|----|-------|-------|-------|-------|------|-------|
| 0.50 | 2 | 66 | 0.008 | 0.040 | 0.500 | 42015 | 670 | 13.4 |
| 0.60 | 2 | 79 | 0.014 | 0.040 | 0.600 | 41910 | 1175 | 28.2 |
| 0.80 | 2 | 80 | 0.018 | 0.060 | 0.800 | 31830 | 1145 | 55.0 |
| 1.00 | 2 | 80 | 0.018 | 0.070 | 1.000 | 25465 | 915 | 64.2 |
| 1.20 | 2 | 80 | 0.022 | 0.080 | 1.200 | 21220 | 935 | 89.6 |
| 1.50 | 2 | 80 | 0.030 | 0.110 | 1.500 | 16975 | 1020 | 168.1 |
| 2.00 | 2 | 80 | 0.040 | 0.140 | 2.000 | 12730 | 1020 | 285.2 |
| 2.50 | 2 | 80 | 0.048 | 0.180 | 2.500 | 10185 | 980 | 440.0 |
| 3.00 | 2 | 80 | 0.058 | 0.210 | 3.000 | 8490 | 985 | 620.3 |

Acciaio da
utensile temprato
56 - 60 HRC



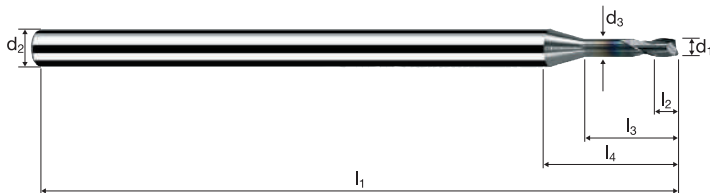
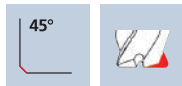
| | | | | | | | | |
|------|---|----|-------|-------|-------|-------|-----|-------|
| 0.50 | 2 | 40 | 0.008 | 0.040 | 0.500 | 25465 | 405 | 8.1 |
| 0.60 | 2 | 40 | 0.012 | 0.040 | 0.600 | 21220 | 510 | 12.2 |
| 0.80 | 2 | 40 | 0.016 | 0.060 | 0.800 | 15915 | 510 | 24.4 |
| 1.00 | 2 | 40 | 0.016 | 0.070 | 1.000 | 12730 | 405 | 28.5 |
| 1.20 | 2 | 40 | 0.020 | 0.080 | 1.200 | 10610 | 425 | 40.7 |
| 1.50 | 2 | 40 | 0.028 | 0.110 | 1.500 | 8490 | 475 | 78.4 |
| 2.00 | 2 | 40 | 0.036 | 0.140 | 2.000 | 6365 | 460 | 128.3 |
| 2.50 | 2 | 40 | 0.044 | 0.180 | 2.500 | 5095 | 450 | 201.7 |
| 3.00 | 2 | 40 | 0.052 | 0.210 | 3.000 | 4245 | 440 | 278.1 |

Frese cilindriche MicroX (Microcut-C5H)

Gambo \varnothing 3mm, scarico cilindrico, 5xd



HM λ 25°
XA γ -10°

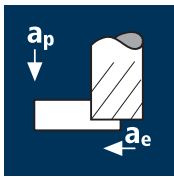


ToolSchool ReTool®

| | | | | | | | | |
|----------|-------------|--------------|--------------|-----------|-----------|----------|-------------|----------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Ti Titanium | Tungsten |
|----------|-------------|--------------|--------------|-----------|-----------|----------|-------------|----------|

| Esempio: N° Ordine | | Rivestimento | Articolo | Codice- \varnothing | | | | | | | | DURO-S |
|--------------------|---------------------|--------------|----------|-----------------------|-------|-------|-------|------|----------|---|-------|--------|
| | | D | 5724 | 050 | | | | | | | | D5724 |
| \varnothing Code | d_1 ± 0.01 | d_2 h6 | d_3 | l_1 | l_2 | l_3 | l_4 | 45° | α | z | EUR | |
| 050 | 0.50 | 3.00 | 0.45 | 40 | 0.60 | 2.50 | 7.65 | - | 10.0° | 2 | 74.00 | |
| 060 | 0.60 | 3.00 | 0.55 | 40 | 0.72 | 3.00 | 7.97 | - | 9.5° | 2 | 71.00 | |
| 070 | 0.70 | 3.00 | 0.65 | 40 | 0.84 | 3.50 | 8.28 | - | 8.5° | 2 | 71.00 | |
| 080 | 0.80 | 3.00 | 0.75 | 40 | 0.96 | 4.00 | 8.59 | - | 8.0° | 2 | 71.00 | |
| 090 | 0.90 | 3.00 | 0.85 | 40 | 1.08 | 4.50 | 8.91 | 0.07 | 7.5° | 2 | 71.00 | |
| 100 | 1.00 | 3.00 | 0.95 | 50 | 1.20 | 5.00 | 9.22 | 0.07 | 7.0° | 2 | 71.00 | |
| 108 | 1.20 | 3.00 | 1.10 | 50 | 1.44 | 6.00 | 9.94 | 0.07 | 5.5° | 2 | 71.00 | |
| 120 | 1.50 | 3.00 | 1.40 | 50 | 1.80 | 7.50 | 10.88 | 0.07 | 4.5° | 2 | 71.00 | |
| 132 | 1.80 | 3.00 | 1.70 | 50 | 2.16 | 9.00 | 11.82 | 0.08 | 3.5° | 2 | 71.00 | |
| 140 | 2.00 | 3.00 | 1.90 | 50 | 2.40 | 10.00 | 12.45 | 0.10 | 2.5° | 2 | 71.00 | |
| 152 | 2.30 | 3.00 | 2.10 | 50 | 2.76 | 11.50 | 13.57 | 0.10 | 2.0° | 2 | 71.00 | |
| 160 | 2.50 | 3.00 | 2.30 | 50 | 3.00 | 12.50 | 14.20 | 0.10 | 1.5° | 2 | 71.00 | |
| 172 | 2.80 | 3.00 | 2.60 | 50 | 3.36 | 14.00 | 15.14 | 0.10 | 0.5° | 2 | 71.00 | |
| 180 | 3.00 | 3.00 | 2.80 | 50 | 3.60 | 14.56 | 15.00 | 0.10 | 0.0° | 2 | 71.00 | |
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Applicazione



Materiale

Acciaio
850 - 1100 N/mm²



Acciaio
1100 - 1300 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]



Acciaio
850 - 1100 N/mm²



Acciaio
1100 - 1300 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 0.20 | 2 | 26 | 0.004 | 0.160 | 0.030 | 41380 | 330 | 1.6 |
| 0.50 | 2 | 66 | 0.012 | 0.400 | 0.080 | 42015 | 1010 | 32.3 |
| 0.80 | 2 | 106 | 0.018 | 0.640 | 0.120 | 42175 | 1520 | 116.6 |
| 1.00 | 2 | 132 | 0.022 | 0.800 | 0.150 | 42015 | 1850 | 221.8 |
| 1.20 | 2 | 158 | 0.026 | 0.960 | 0.180 | 41910 | 2180 | 376.6 |
| 1.50 | 2 | 180 | 0.034 | 1.200 | 0.230 | 38195 | 2595 | 716.9 |
| 2.00 | 2 | 180 | 0.044 | 1.600 | 0.300 | 28650 | 2520 | 1210.1 |
| 2.50 | 2 | 180 | 0.056 | 2.000 | 0.380 | 22920 | 2565 | 1950.8 |
| 3.00 | 2 | 180 | 0.066 | 2.400 | 0.450 | 19100 | 2520 | 2722.7 |
| 0.20 | 2 | 26 | 0.004 | 0.160 | 0.030 | 41380 | 330 | 1.6 |
| 0.50 | 2 | 66 | 0.010 | 0.400 | 0.080 | 42015 | 840 | 26.9 |
| 0.80 | 2 | 106 | 0.016 | 0.640 | 0.120 | 42175 | 1350 | 103.7 |
| 1.00 | 2 | 132 | 0.020 | 0.800 | 0.150 | 42015 | 1680 | 201.7 |
| 1.20 | 2 | 158 | 0.024 | 0.960 | 0.180 | 41910 | 2010 | 347.6 |
| 1.50 | 2 | 160 | 0.030 | 1.200 | 0.230 | 33955 | 2035 | 562.3 |
| 2.00 | 2 | 160 | 0.040 | 1.600 | 0.300 | 25465 | 2035 | 977.8 |
| 2.50 | 2 | 160 | 0.050 | 2.000 | 0.380 | 20370 | 2035 | 1548.3 |
| 3.00 | 2 | 160 | 0.060 | 2.400 | 0.450 | 16975 | 2035 | 2200.2 |
| 0.20 | 2 | 26 | 0.004 | 0.160 | 0.030 | 41380 | 330 | 1.6 |
| 0.50 | 2 | 66 | 0.010 | 0.400 | 0.080 | 42015 | 840 | 26.9 |
| 0.80 | 2 | 80 | 0.014 | 0.640 | 0.120 | 31830 | 890 | 68.4 |
| 1.00 | 2 | 80 | 0.018 | 0.800 | 0.150 | 25465 | 915 | 110.0 |
| 1.20 | 2 | 80 | 0.020 | 0.960 | 0.180 | 21220 | 850 | 146.7 |
| 1.50 | 2 | 80 | 0.028 | 1.200 | 0.230 | 16975 | 950 | 262.4 |
| 2.00 | 2 | 80 | 0.036 | 1.600 | 0.300 | 12730 | 915 | 440.0 |
| 2.50 | 2 | 80 | 0.044 | 2.000 | 0.380 | 10185 | 895 | 681.2 |
| 3.00 | 2 | 80 | 0.052 | 2.400 | 0.450 | 8490 | 885 | 953.4 |
| 0.20 | 2 | 26 | 0.002 | 0.160 | 0.030 | 41380 | 165 | 0.8 |
| 0.50 | 2 | 60 | 0.008 | 0.400 | 0.080 | 38195 | 610 | 19.6 |
| 0.80 | 2 | 60 | 0.012 | 0.640 | 0.120 | 23875 | 575 | 44.0 |
| 1.00 | 2 | 60 | 0.016 | 0.800 | 0.150 | 19100 | 610 | 73.3 |
| 1.20 | 2 | 60 | 0.018 | 0.960 | 0.180 | 15915 | 575 | 99.0 |
| 1.50 | 2 | 60 | 0.024 | 1.200 | 0.230 | 12730 | 610 | 168.7 |
| 2.00 | 2 | 60 | 0.030 | 1.600 | 0.300 | 9550 | 575 | 275.0 |
| 2.50 | 2 | 60 | 0.040 | 2.000 | 0.380 | 7640 | 610 | 464.5 |
| 3.00 | 2 | 60 | 0.046 | 2.400 | 0.450 | 6365 | 585 | 632.5 |
| 0.20 | 2 | 26 | 0.004 | 0.020 | 0.200 | 41380 | 330 | 1.3 |
| 0.50 | 2 | 66 | 0.010 | 0.060 | 0.500 | 42015 | 840 | 25.2 |
| 0.80 | 2 | 106 | 0.014 | 0.100 | 0.800 | 42175 | 1180 | 94.5 |
| 1.00 | 2 | 132 | 0.018 | 0.120 | 1.000 | 42015 | 1515 | 181.5 |
| 1.20 | 2 | 158 | 0.022 | 0.140 | 1.200 | 41910 | 1845 | 309.8 |
| 1.50 | 2 | 160 | 0.028 | 0.180 | 1.500 | 33955 | 1900 | 513.4 |
| 2.00 | 2 | 160 | 0.036 | 0.240 | 2.000 | 25465 | 1835 | 880.1 |
| 2.50 | 2 | 160 | 0.046 | 0.300 | 2.500 | 20370 | 1875 | 1405.7 |
| 3.00 | 2 | 160 | 0.054 | 0.360 | 3.000 | 16975 | 1835 | 1980.1 |
| 0.20 | 2 | 26 | 0.004 | 0.020 | 0.200 | 41380 | 330 | 1.3 |
| 0.50 | 2 | 66 | 0.010 | 0.060 | 0.500 | 42015 | 840 | 25.2 |
| 0.80 | 2 | 106 | 0.014 | 0.100 | 0.800 | 42175 | 1180 | 94.5 |
| 1.00 | 2 | 132 | 0.018 | 0.120 | 1.000 | 42015 | 1515 | 181.5 |
| 1.20 | 2 | 140 | 0.020 | 0.140 | 1.200 | 37135 | 1485 | 249.6 |
| 1.50 | 2 | 140 | 0.026 | 0.180 | 1.500 | 29710 | 1545 | 417.1 |
| 2.00 | 2 | 140 | 0.034 | 0.240 | 2.000 | 22280 | 1515 | 727.3 |
| 2.50 | 2 | 140 | 0.044 | 0.300 | 2.500 | 17825 | 1570 | 1176.5 |
| 3.00 | 2 | 140 | 0.052 | 0.360 | 3.000 | 14855 | 1545 | 1668.5 |
| 0.20 | 2 | 26 | 0.004 | 0.020 | 0.200 | 41380 | 330 | 1.3 |
| 0.50 | 2 | 66 | 0.008 | 0.060 | 0.500 | 42015 | 670 | 20.2 |
| 0.80 | 2 | 70 | 0.012 | 0.100 | 0.800 | 27850 | 670 | 53.5 |
| 1.00 | 2 | 70 | 0.016 | 0.120 | 1.000 | 22280 | 715 | 85.6 |
| 1.20 | 2 | 70 | 0.020 | 0.140 | 1.200 | 18570 | 745 | 124.8 |
| 1.50 | 2 | 70 | 0.024 | 0.180 | 1.500 | 14855 | 715 | 192.5 |
| 2.00 | 2 | 70 | 0.032 | 0.240 | 2.000 | 11140 | 715 | 342.2 |
| 2.50 | 2 | 70 | 0.040 | 0.300 | 2.500 | 8915 | 715 | 534.8 |
| 3.00 | 2 | 70 | 0.048 | 0.360 | 3.000 | 7425 | 715 | 770.1 |
| 0.20 | 2 | 26 | 0.004 | 0.020 | 0.200 | 41380 | 330 | 1.3 |
| 0.50 | 2 | 50 | 0.008 | 0.060 | 0.500 | 31830 | 510 | 15.3 |
| 0.80 | 2 | 50 | 0.012 | 0.100 | 0.800 | 19895 | 475 | 38.2 |
| 1.00 | 2 | 50 | 0.014 | 0.120 | 1.000 | 15915 | 445 | 53.5 |
| 1.20 | 2 | 50 | 0.018 | 0.140 | 1.200 | 13265 | 475 | 80.2 |
| 1.50 | 2 | 50 | 0.022 | 0.180 | 1.500 | 10610 | 465 | 126.1 |
| 2.00 | 2 | 50 | 0.028 | 0.240 | 2.000 | 7960 | 445 | 213.9 |
| 2.50 | 2 | 50 | 0.036 | 0.300 | 2.500 | 6365 | 460 | 343.8 |
| 3.00 | 2 | 50 | 0.044 | 0.360 | 3.000 | 5305 | 465 | 504.2 |

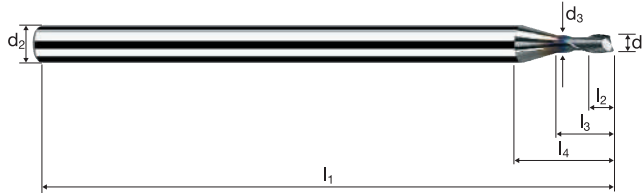
Frese cilindriche Microcut

Gambo ø 3mm, scarico cilindrico, 3xd



HM
MG10

λ 25°
 γ 6°

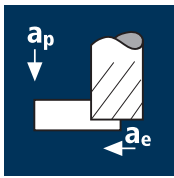


ReTool®

| | | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--|--|--|-------------------|----------------|--|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | | | | Inox Stainless | Ti Titanium | Cobalt-Chrome Gold / Platinum Copper |
|-------------|----------------|-----------------|-----------------|--|--|--|-------------------|----------------|--|

| Esempio: N° Ordine | | | | | | | | | | | MICRO |
|-----------------------|-------------------------|----------------------|----------------|----------------|----------------|----------------|----------------|------|-------|---|-------|
| Rivestimento | | | | | | | | | | | |
| Articolo | | | | | | | | | | | |
| Codice-ø | | | | | | | | | | | |
| Ø Code | d ₁ ±0.01 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | 45° | α | z | |
| 020 | 0.20 | 3.00 | 0.18 | 40 | 0.24 | 0.60 | 8.86 | - | 9.5° | 2 | M5712 |
| 030 | 0.30 | 3.00 | 0.25 | 40 | 0.36 | 0.90 | 8.96 | - | 9.0° | 2 | EUR |
| 040 | 0.40 | 3.00 | 0.35 | 40 | 0.48 | 1.20 | 8.98 | - | 9.0° | 2 | 82.00 |
| 050 | 0.50 | 3.00 | 0.45 | 40 | 0.60 | 1.50 | 6.65 | - | 11.5° | 2 | 75.00 |
| 060 | 0.60 | 3.00 | 0.55 | 40 | 0.72 | 1.80 | 6.77 | - | 11.0° | 2 | 72.00 |
| 080 | 0.80 | 3.00 | 0.75 | 40 | 0.96 | 2.40 | 6.99 | - | 10.0° | 2 | 72.00 |
| 100 | 1.00 | 3.00 | 0.95 | 50 | 1.20 | 3.00 | 7.22 | 0.07 | 8.5° | 2 | 69.00 |
| 108 | 1.20 | 3.00 | 1.10 | 50 | 1.44 | 3.60 | 7.54 | 0.07 | 7.5° | 2 | 69.00 |
| 120 | 1.50 | 3.00 | 1.40 | 50 | 1.80 | 4.50 | 7.88 | 0.07 | 6.0° | 2 | 69.00 |
| 140 | 2.00 | 3.00 | 1.90 | 50 | 2.40 | 6.00 | 8.45 | 0.10 | 4.0° | 2 | 69.00 |
| 160 | 2.50 | 3.00 | 2.30 | 50 | 3.00 | 7.50 | 9.20 | 0.10 | 2.0° | 2 | 69.00 |
| 180 | 3.00 | 3.00 | 2.80 | 50 | 3.60 | 8.56 | 9.00 | 0.10 | 0.0° | 2 | 69.00 |

Applicazione



Materiale

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



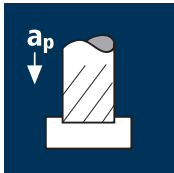
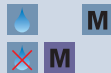
Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]



Oro



Acciaio
850 - 1300 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]



Oro



Acciaio
850 - 1300 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 0.50 | 3 | 66 | 0.010 | 0.400 | 0.080 | 42015 | 1260 | 40.3 |
| 0.60 | 3 | 79 | 0.012 | 0.480 | 0.090 | 41910 | 1510 | 65.2 |
| 0.80 | 3 | 80 | 0.016 | 0.640 | 0.120 | 31830 | 1530 | 117.3 |
| 1.00 | 3 | 80 | 0.020 | 0.800 | 0.150 | 25465 | 1530 | 183.3 |
| 1.20 | 3 | 80 | 0.024 | 0.960 | 0.180 | 21220 | 1530 | 264.0 |
| 1.50 | 3 | 80 | 0.030 | 1.200 | 0.230 | 16975 | 1530 | 421.7 |
| 2.00 | 3 | 80 | 0.040 | 1.600 | 0.300 | 12730 | 1530 | 733.4 |
| 2.50 | 3 | 80 | 0.050 | 2.000 | 0.380 | 10185 | 1530 | 1161.2 |
| 3.00 | 3 | 80 | 0.060 | 2.400 | 0.450 | 8490 | 1530 | 1650.1 |
| 0.50 | 3 | 50 | 0.008 | 0.400 | 0.080 | 31830 | 765 | 24.4 |
| 0.60 | 3 | 50 | 0.010 | 0.480 | 0.090 | 26525 | 795 | 34.4 |
| 0.80 | 3 | 50 | 0.012 | 0.640 | 0.120 | 19895 | 715 | 55.0 |
| 1.00 | 3 | 50 | 0.016 | 0.800 | 0.150 | 15915 | 765 | 91.7 |
| 1.20 | 3 | 50 | 0.020 | 0.960 | 0.180 | 13265 | 795 | 137.5 |
| 1.50 | 3 | 50 | 0.024 | 1.200 | 0.230 | 10610 | 765 | 210.8 |
| 2.00 | 3 | 50 | 0.032 | 1.600 | 0.300 | 7960 | 765 | 366.7 |
| 2.50 | 3 | 50 | 0.040 | 2.000 | 0.380 | 6365 | 765 | 580.6 |
| 3.00 | 3 | 50 | 0.048 | 2.400 | 0.450 | 5305 | 765 | 825.1 |
| 0.50 | 3 | 180 | 0.012 | 0.400 | 0.080 | 114590 | 4125 | 132.0 |
| 0.60 | 3 | 180 | 0.014 | 0.480 | 0.090 | 95495 | 4010 | 173.3 |
| 0.80 | 3 | 180 | 0.020 | 0.640 | 0.120 | 71620 | 4295 | 330.0 |
| 1.00 | 3 | 180 | 0.024 | 0.800 | 0.150 | 57295 | 4125 | 495.0 |
| 1.20 | 3 | 180 | 0.028 | 0.960 | 0.180 | 47745 | 4010 | 693.0 |
| 1.50 | 3 | 180 | 0.036 | 1.200 | 0.230 | 38195 | 4125 | 1138.6 |
| 2.00 | 3 | 180 | 0.048 | 1.600 | 0.300 | 28650 | 4125 | 1980.1 |
| 2.50 | 3 | 180 | 0.060 | 2.000 | 0.380 | 22920 | 4125 | 3135.2 |
| 3.00 | 3 | 180 | 0.072 | 2.400 | 0.450 | 19100 | 4125 | 4455.3 |
| 0.50 | 3 | 66 | 0.010 | 0.400 | 0.080 | 42015 | 1260 | 40.3 |
| 0.60 | 3 | 79 | 0.012 | 0.480 | 0.090 | 41910 | 1510 | 65.2 |
| 0.80 | 3 | 106 | 0.016 | 0.640 | 0.120 | 42175 | 2025 | 155.5 |
| 1.00 | 3 | 120 | 0.020 | 0.800 | 0.150 | 38195 | 2290 | 275.0 |
| 1.20 | 3 | 120 | 0.024 | 0.960 | 0.180 | 31830 | 2290 | 396.0 |
| 1.50 | 3 | 120 | 0.030 | 1.200 | 0.230 | 25465 | 2290 | 632.5 |
| 2.00 | 3 | 120 | 0.040 | 1.600 | 0.300 | 19100 | 2290 | 1100.1 |
| 2.50 | 3 | 120 | 0.050 | 2.000 | 0.380 | 15280 | 2290 | 1741.8 |
| 3.00 | 3 | 120 | 0.060 | 2.400 | 0.450 | 12730 | 2290 | 2475.2 |
| 0.50 | 3 | 60 | 0.008 | 0.060 | 0.500 | 38195 | 915 | 27.5 |
| 0.60 | 3 | 60 | 0.008 | 0.070 | 0.600 | 31830 | 765 | 32.1 |
| 0.80 | 3 | 60 | 0.012 | 0.100 | 0.800 | 23875 | 860 | 68.8 |
| 1.00 | 3 | 60 | 0.014 | 0.120 | 1.000 | 19100 | 800 | 96.3 |
| 1.20 | 3 | 60 | 0.018 | 0.140 | 1.200 | 15915 | 860 | 144.4 |
| 1.50 | 3 | 60 | 0.022 | 0.180 | 1.500 | 12730 | 840 | 226.9 |
| 2.00 | 3 | 60 | 0.028 | 0.240 | 2.000 | 9550 | 800 | 385.0 |
| 2.50 | 3 | 60 | 0.036 | 0.300 | 2.500 | 7640 | 825 | 618.8 |
| 3.00 | 3 | 60 | 0.042 | 0.360 | 3.000 | 6365 | 800 | 866.3 |
| 0.50 | 3 | 40 | 0.006 | 0.060 | 0.500 | 25465 | 460 | 13.8 |
| 0.60 | 3 | 40 | 0.006 | 0.070 | 0.600 | 21220 | 380 | 16.0 |
| 0.80 | 3 | 40 | 0.010 | 0.100 | 0.800 | 15915 | 475 | 38.2 |
| 1.00 | 3 | 40 | 0.012 | 0.120 | 1.000 | 12730 | 460 | 55.0 |
| 1.20 | 3 | 40 | 0.014 | 0.140 | 1.200 | 10610 | 445 | 74.9 |
| 1.50 | 3 | 40 | 0.018 | 0.180 | 1.500 | 8490 | 460 | 123.8 |
| 2.00 | 3 | 40 | 0.022 | 0.240 | 2.000 | 6365 | 420 | 201.7 |
| 2.50 | 3 | 40 | 0.028 | 0.300 | 2.500 | 5095 | 430 | 320.9 |
| 3.00 | 3 | 40 | 0.034 | 0.360 | 3.000 | 4245 | 435 | 467.5 |
| 0.50 | 3 | 160 | 0.010 | 0.060 | 0.500 | 101860 | 3055 | 91.7 |
| 0.60 | 3 | 160 | 0.010 | 0.070 | 0.600 | 84885 | 2545 | 107.0 |
| 0.80 | 3 | 160 | 0.014 | 0.100 | 0.800 | 63660 | 2675 | 213.9 |
| 1.00 | 3 | 160 | 0.016 | 0.120 | 1.000 | 50930 | 2445 | 293.4 |
| 1.20 | 3 | 160 | 0.022 | 0.140 | 1.200 | 42440 | 2800 | 470.6 |
| 1.50 | 3 | 160 | 0.026 | 0.180 | 1.500 | 33955 | 2650 | 715.1 |
| 2.00 | 3 | 160 | 0.034 | 0.240 | 2.000 | 25465 | 2595 | 1246.8 |
| 2.50 | 3 | 160 | 0.044 | 0.300 | 2.500 | 20370 | 2690 | 2016.8 |
| 3.00 | 3 | 160 | 0.050 | 0.360 | 3.000 | 16975 | 2545 | 2750.2 |
| 0.50 | 3 | 66 | 0.008 | 0.060 | 0.500 | 42015 | 1010 | 30.3 |
| 0.60 | 3 | 79 | 0.008 | 0.070 | 0.600 | 41910 | 1005 | 42.2 |
| 0.80 | 3 | 100 | 0.012 | 0.100 | 0.800 | 39790 | 1430 | 114.6 |
| 1.00 | 3 | 100 | 0.014 | 0.120 | 1.000 | 31830 | 1335 | 160.4 |
| 1.20 | 3 | 100 | 0.018 | 0.140 | 1.200 | 26525 | 1430 | 240.6 |
| 1.50 | 3 | 100 | 0.022 | 0.180 | 1.500 | 21220 | 1400 | 378.2 |
| 2.00 | 3 | 100 | 0.028 | 0.240 | 2.000 | 15915 | 1335 | 641.7 |
| 2.50 | 3 | 100 | 0.036 | 0.300 | 2.500 | 12730 | 1375 | 1031.3 |
| 3.00 | 3 | 100 | 0.042 | 0.360 | 3.000 | 10610 | 1335 | 1443.9 |

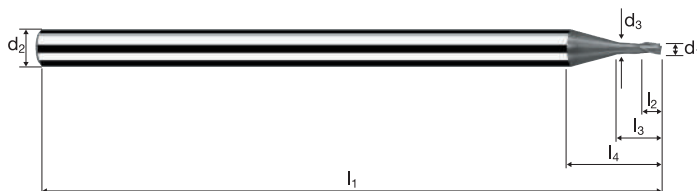
Frese cilindriche Microcut

Gambo ø 3mm, scarico cilindrico, 3xd

Base-X
B

HM λ 25°
XA γ -10°

90°



ReTool®

Rm
< 850

Rm
850-1100

Rm
1100-1300

Rm
1300-1500

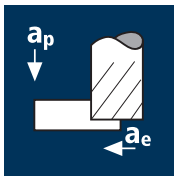
Inox
Stainless

Ti
Titanium

Cobalt-Chrome
Gold / Platinum
Copper

| | | | | | | | | | | MICRO | |
|-----------------------|-------------------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------|---|--------|--|
| Esempio: N° Ordine | | | | | | | | | | | |
| | | | | | | | | | | M15752 | |
| | | | | | | | | | | EUR | |
| Ø Code | d ₁ ±0.01 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | α | z | | |
| | Rivestimento | | | Articolo | | Codice-ø | | | | | |
| | M | | | 15752 | | 050 | | | | | |
| 050 | 0.50 | 3.00 | 0.45 | 40 | 0.60 | 1.50 | 6.65 | 11.5° | 3 | 74.00 | |
| 060 | 0.60 | 3.00 | 0.55 | 40 | 0.72 | 1.80 | 6.77 | 11.0° | 3 | 71.00 | |
| 080 | 0.80 | 3.00 | 0.75 | 40 | 0.96 | 2.40 | 6.99 | 10.0° | 3 | 71.00 | |
| 100 | 1.00 | 3.00 | 0.95 | 50 | 1.20 | 3.00 | 7.22 | 8.5° | 3 | 71.00 | |
| 108 | 1.20 | 3.00 | 1.10 | 50 | 1.44 | 3.60 | 7.54 | 7.5° | 3 | 71.00 | |
| 120 | 1.50 | 3.00 | 1.40 | 60 | 1.80 | 4.50 | 7.88 | 6.0° | 3 | 71.00 | |
| 140 | 2.00 | 3.00 | 1.90 | 60 | 2.40 | 6.00 | 8.45 | 4.0° | 3 | 71.00 | |
| 160 | 2.50 | 3.00 | 2.30 | 60 | 3.00 | 7.50 | 9.20 | 2.0° | 3 | 71.00 | |
| 180 | 3.00 | 3.00 | 2.80 | 60 | 3.60 | 8.56 | 9.00 | 0.0° | 3 | 71.00 | |

Applicazione



Materiale

Acciaio
850 - 1100 N/mm²



Acciaio
1100 - 1300 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]



Acciaio
850 - 1100 N/mm²



Acciaio
1100 - 1300 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]



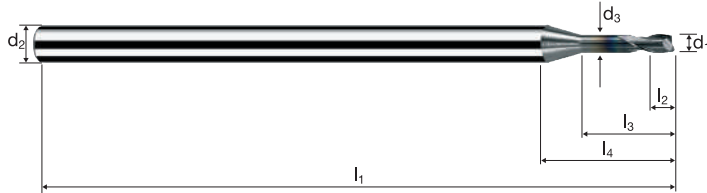
| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 0.50 | 2 | 66 | 0.012 | 0.400 | 0.070 | 42015 | 1010 | 28.2 |
| 0.60 | 2 | 79 | 0.014 | 0.480 | 0.080 | 41910 | 1175 | 45.1 |
| 0.80 | 2 | 106 | 0.018 | 0.640 | 0.100 | 42175 | 1520 | 97.2 |
| 1.00 | 2 | 132 | 0.022 | 0.800 | 0.130 | 42015 | 1850 | 192.3 |
| 1.20 | 2 | 158 | 0.026 | 0.960 | 0.160 | 41910 | 2180 | 334.7 |
| 1.50 | 2 | 180 | 0.034 | 1.200 | 0.200 | 38195 | 2595 | 623.4 |
| 2.00 | 2 | 180 | 0.044 | 1.600 | 0.260 | 28650 | 2520 | 1048.7 |
| 2.50 | 2 | 180 | 0.056 | 2.000 | 0.330 | 22920 | 2565 | 1694.1 |
| 3.00 | 2 | 180 | 0.066 | 2.400 | 0.390 | 19100 | 2520 | 2359.7 |
| 0.50 | 2 | 66 | 0.010 | 0.400 | 0.070 | 42015 | 840 | 23.5 |
| 0.60 | 2 | 79 | 0.012 | 0.480 | 0.080 | 41910 | 1005 | 38.6 |
| 0.80 | 2 | 106 | 0.016 | 0.640 | 0.100 | 42175 | 1350 | 86.4 |
| 1.00 | 2 | 132 | 0.020 | 0.800 | 0.130 | 42015 | 1680 | 174.8 |
| 1.20 | 2 | 158 | 0.024 | 0.960 | 0.160 | 41910 | 2010 | 309.0 |
| 1.50 | 2 | 160 | 0.030 | 1.200 | 0.200 | 33955 | 2035 | 488.9 |
| 2.00 | 2 | 160 | 0.040 | 1.600 | 0.260 | 25465 | 2035 | 847.5 |
| 2.50 | 2 | 160 | 0.050 | 2.000 | 0.330 | 20370 | 2035 | 1344.5 |
| 3.00 | 2 | 160 | 0.060 | 2.400 | 0.390 | 16975 | 2035 | 1906.8 |
| 0.50 | 2 | 66 | 0.010 | 0.400 | 0.070 | 42015 | 840 | 23.5 |
| 0.60 | 2 | 79 | 0.012 | 0.480 | 0.080 | 41910 | 1005 | 38.6 |
| 0.80 | 2 | 80 | 0.014 | 0.640 | 0.100 | 31830 | 890 | 57.0 |
| 1.00 | 2 | 80 | 0.018 | 0.800 | 0.130 | 25465 | 915 | 95.3 |
| 1.20 | 2 | 80 | 0.020 | 0.960 | 0.160 | 21220 | 850 | 130.4 |
| 1.50 | 2 | 80 | 0.028 | 1.200 | 0.200 | 16975 | 950 | 228.2 |
| 2.00 | 2 | 80 | 0.036 | 1.600 | 0.260 | 12730 | 915 | 381.4 |
| 2.50 | 2 | 80 | 0.044 | 2.000 | 0.330 | 10185 | 895 | 591.6 |
| 3.00 | 2 | 80 | 0.052 | 2.400 | 0.390 | 8490 | 885 | 826.3 |
| 0.50 | 2 | 60 | 0.008 | 0.400 | 0.070 | 38195 | 610 | 17.1 |
| 0.60 | 2 | 60 | 0.010 | 0.480 | 0.080 | 31830 | 635 | 24.4 |
| 0.80 | 2 | 60 | 0.012 | 0.640 | 0.100 | 23875 | 575 | 36.7 |
| 1.00 | 2 | 60 | 0.016 | 0.800 | 0.130 | 19100 | 610 | 63.6 |
| 1.20 | 2 | 60 | 0.018 | 0.960 | 0.160 | 15915 | 575 | 88.0 |
| 1.50 | 2 | 60 | 0.024 | 1.200 | 0.200 | 12730 | 610 | 146.7 |
| 2.00 | 2 | 60 | 0.030 | 1.600 | 0.260 | 9550 | 575 | 238.4 |
| 2.50 | 2 | 60 | 0.040 | 2.000 | 0.330 | 7640 | 610 | 403.4 |
| 3.00 | 2 | 60 | 0.046 | 2.400 | 0.390 | 6365 | 585 | 548.2 |
| 0.50 | 2 | 66 | 0.010 | 0.060 | 0.500 | 42015 | 840 | 25.2 |
| 0.60 | 2 | 79 | 0.010 | 0.070 | 0.600 | 41910 | 840 | 35.2 |
| 0.80 | 2 | 106 | 0.014 | 0.090 | 0.800 | 42175 | 1180 | 85.0 |
| 1.00 | 2 | 132 | 0.018 | 0.110 | 1.000 | 42015 | 1515 | 166.4 |
| 1.20 | 2 | 158 | 0.022 | 0.130 | 1.200 | 41910 | 1845 | 287.7 |
| 1.50 | 2 | 160 | 0.028 | 0.170 | 1.500 | 33955 | 1900 | 484.8 |
| 2.00 | 2 | 160 | 0.036 | 0.220 | 2.000 | 25465 | 1835 | 806.7 |
| 2.50 | 2 | 160 | 0.046 | 0.280 | 2.500 | 20370 | 1875 | 1311.9 |
| 3.00 | 2 | 160 | 0.054 | 0.330 | 3.000 | 16975 | 1835 | 1815.1 |
| 0.50 | 2 | 66 | 0.010 | 0.060 | 0.500 | 42015 | 840 | 25.2 |
| 0.60 | 2 | 79 | 0.010 | 0.070 | 0.600 | 41910 | 840 | 35.2 |
| 0.80 | 2 | 106 | 0.014 | 0.090 | 0.800 | 42175 | 1180 | 85.0 |
| 1.00 | 2 | 132 | 0.018 | 0.110 | 1.000 | 42015 | 1515 | 166.4 |
| 1.20 | 2 | 140 | 0.020 | 0.130 | 1.200 | 37135 | 1485 | 231.7 |
| 1.50 | 2 | 140 | 0.026 | 0.170 | 1.500 | 29710 | 1545 | 393.9 |
| 2.00 | 2 | 140 | 0.034 | 0.220 | 2.000 | 22280 | 1515 | 666.7 |
| 2.50 | 2 | 140 | 0.044 | 0.280 | 2.500 | 17825 | 1570 | 1098.0 |
| 3.00 | 2 | 140 | 0.052 | 0.330 | 3.000 | 14855 | 1545 | 1529.4 |
| 0.50 | 2 | 66 | 0.008 | 0.060 | 0.500 | 42015 | 670 | 20.2 |
| 0.60 | 2 | 70 | 0.008 | 0.070 | 0.600 | 37135 | 595 | 25.0 |
| 0.80 | 2 | 70 | 0.012 | 0.090 | 0.800 | 27850 | 670 | 48.1 |
| 1.00 | 2 | 70 | 0.016 | 0.110 | 1.000 | 22280 | 715 | 78.4 |
| 1.20 | 2 | 70 | 0.020 | 0.130 | 1.200 | 18570 | 745 | 115.9 |
| 1.50 | 2 | 70 | 0.024 | 0.170 | 1.500 | 14855 | 715 | 181.8 |
| 2.00 | 2 | 70 | 0.032 | 0.220 | 2.000 | 11140 | 715 | 313.7 |
| 2.50 | 2 | 70 | 0.040 | 0.280 | 2.500 | 8915 | 715 | 499.1 |
| 3.00 | 2 | 70 | 0.048 | 0.330 | 3.000 | 7425 | 715 | 705.9 |
| 0.50 | 2 | 50 | 0.008 | 0.060 | 0.500 | 31830 | 510 | 15.3 |
| 0.60 | 2 | 50 | 0.008 | 0.070 | 0.600 | 26525 | 425 | 17.8 |
| 0.80 | 2 | 50 | 0.012 | 0.090 | 0.800 | 19895 | 475 | 34.4 |
| 1.00 | 2 | 50 | 0.014 | 0.110 | 1.000 | 15915 | 445 | 49.0 |
| 1.20 | 2 | 50 | 0.018 | 0.130 | 1.200 | 13265 | 475 | 74.5 |
| 1.50 | 2 | 50 | 0.022 | 0.170 | 1.500 | 10610 | 465 | 119.0 |
| 2.00 | 2 | 50 | 0.028 | 0.220 | 2.000 | 7960 | 445 | 196.1 |
| 2.50 | 2 | 50 | 0.036 | 0.280 | 2.500 | 6365 | 460 | 320.9 |
| 3.00 | 2 | 50 | 0.044 | 0.330 | 3.000 | 5305 | 465 | 462.2 |

Frese cilindriche Microcut

Gambo ø 3mm, scarico cilindrico, 5xd



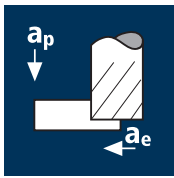
| | |
|------------|------------------------------|
| HM MG10 | λ 25° γ 6° |
|------------|------------------------------|



| | | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--|--|--|-------------------|----------------|--|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | | | | Inox Stainless | Ti Titanium | Cobalt-Chrome Gold / Platinum Copper |
|-------------|----------------|-----------------|-----------------|--|--|--|-------------------|----------------|--|

| Ø Code | d ₁ ±0.01 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | 45° | α | z | MICRO |
|--|-------------------------|----------------------|----------------|----------------|----------------|----------------|----------------|------|-------|---|--------------|
| | | | | | | | | | | | EUR |
| Esempio: N° Ordine Rivestimento M Articolo 5714 Codice-ø 050 | | | | | | | | | | | |
| | | | | | | | | | | | M5714 |
| 050 | 0.50 | 3.00 | 0.45 | 40 | 0.60 | 2.50 | 7.65 | - | 10.0° | 2 | 72.00 |
| 060 | 0.60 | 3.00 | 0.55 | 40 | 0.72 | 3.00 | 7.97 | - | 9.5° | 2 | 69.00 |
| 070 | 0.70 | 3.00 | 0.65 | 40 | 0.84 | 3.50 | 8.28 | - | 8.5° | 2 | 69.00 |
| 080 | 0.80 | 3.00 | 0.75 | 40 | 0.96 | 4.00 | 8.59 | - | 8.0° | 2 | 69.00 |
| 090 | 0.90 | 3.00 | 0.85 | 40 | 1.08 | 4.50 | 8.91 | - | 7.5° | 2 | 69.00 |
| 100 | 1.00 | 3.00 | 0.95 | 50 | 1.20 | 5.00 | 9.22 | 0.07 | 7.0° | 2 | 69.00 |
| 108 | 1.20 | 3.00 | 1.10 | 50 | 1.44 | 6.00 | 9.94 | 0.07 | 5.5° | 2 | 69.00 |
| 120 | 1.50 | 3.00 | 1.40 | 50 | 1.80 | 7.50 | 10.88 | 0.07 | 4.5° | 2 | 69.00 |
| 132 | 1.80 | 3.00 | 1.70 | 50 | 2.16 | 9.00 | 11.82 | 0.07 | 3.5° | 2 | 69.00 |
| 140 | 2.00 | 3.00 | 1.90 | 50 | 2.40 | 10.00 | 12.45 | 0.10 | 2.5° | 2 | 69.00 |
| 152 | 2.30 | 3.00 | 2.10 | 50 | 2.76 | 11.50 | 13.57 | 0.10 | 2.0° | 2 | 69.00 |
| 160 | 2.50 | 3.00 | 2.30 | 50 | 3.00 | 12.50 | 14.20 | 0.10 | 1.5° | 2 | 69.00 |
| 172 | 2.80 | 3.00 | 2.60 | 50 | 3.36 | 14.00 | 15.14 | 0.10 | 0.5° | 2 | 69.00 |
| 180 | 3.00 | 3.00 | 2.80 | 50 | 3.60 | 14.56 | 15.00 | 0.10 | 0.0° | 2 | 69.00 |
| | | | | | | | | | | | |
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Applicazione



Materiale

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



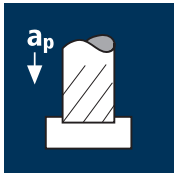
Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]



Oro



Acciaio
850 - 1300 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



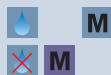
Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]



Oro



Acciaio
850 - 1300 N/mm²



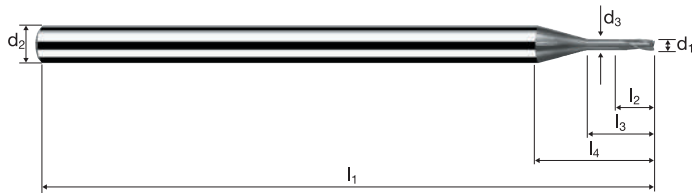
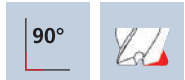
| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 0.50 | 3 | 66 | 0.010 | 0.400 | 0.070 | 42015 | 1260 | 35.3 |
| 0.60 | 3 | 79 | 0.010 | 0.480 | 0.080 | 41910 | 1255 | 48.3 |
| 0.80 | 3 | 80 | 0.014 | 0.640 | 0.100 | 31830 | 1335 | 85.6 |
| 1.00 | 3 | 80 | 0.018 | 0.800 | 0.130 | 25465 | 1375 | 143.0 |
| 1.20 | 3 | 80 | 0.022 | 0.960 | 0.160 | 21220 | 1400 | 215.1 |
| 1.50 | 3 | 80 | 0.028 | 1.200 | 0.200 | 16975 | 1425 | 342.2 |
| 2.00 | 3 | 80 | 0.036 | 1.600 | 0.260 | 12730 | 1375 | 572.0 |
| 2.50 | 3 | 80 | 0.046 | 2.000 | 0.330 | 10185 | 1405 | 927.7 |
| 3.00 | 3 | 80 | 0.054 | 2.400 | 0.390 | 8490 | 1375 | 1287.1 |
| 0.50 | 3 | 50 | 0.008 | 0.400 | 0.070 | 31830 | 765 | 21.4 |
| 0.60 | 3 | 50 | 0.008 | 0.480 | 0.080 | 26525 | 635 | 24.4 |
| 0.80 | 3 | 50 | 0.012 | 0.640 | 0.100 | 19895 | 715 | 45.8 |
| 1.00 | 3 | 50 | 0.014 | 0.800 | 0.130 | 15915 | 670 | 69.5 |
| 1.20 | 3 | 50 | 0.018 | 0.960 | 0.160 | 13265 | 715 | 110.0 |
| 1.50 | 3 | 50 | 0.022 | 1.200 | 0.200 | 10610 | 700 | 168.1 |
| 2.00 | 3 | 50 | 0.028 | 1.600 | 0.260 | 7960 | 670 | 278.1 |
| 2.50 | 3 | 50 | 0.036 | 2.000 | 0.330 | 6365 | 690 | 453.8 |
| 3.00 | 3 | 50 | 0.044 | 2.400 | 0.390 | 5305 | 700 | 655.5 |
| 0.50 | 3 | 180 | 0.012 | 0.400 | 0.070 | 114590 | 4125 | 115.5 |
| 0.60 | 3 | 180 | 0.012 | 0.480 | 0.080 | 95495 | 3440 | 132.0 |
| 0.80 | 3 | 180 | 0.016 | 0.640 | 0.100 | 71620 | 3440 | 220.0 |
| 1.00 | 3 | 180 | 0.022 | 0.800 | 0.130 | 57295 | 3780 | 393.3 |
| 1.20 | 3 | 180 | 0.026 | 0.960 | 0.160 | 47745 | 3725 | 572.0 |
| 1.50 | 3 | 180 | 0.034 | 1.200 | 0.200 | 38195 | 3895 | 935.1 |
| 2.00 | 3 | 180 | 0.044 | 1.600 | 0.260 | 28650 | 3780 | 1573.1 |
| 2.50 | 3 | 180 | 0.056 | 2.000 | 0.330 | 22920 | 3850 | 2541.2 |
| 3.00 | 3 | 180 | 0.064 | 2.400 | 0.390 | 19100 | 3665 | 3432.2 |
| 0.50 | 3 | 66 | 0.010 | 0.400 | 0.070 | 42015 | 1260 | 35.3 |
| 0.60 | 3 | 79 | 0.010 | 0.480 | 0.080 | 41910 | 1255 | 48.3 |
| 0.80 | 3 | 106 | 0.014 | 0.640 | 0.100 | 42175 | 1770 | 113.4 |
| 1.00 | 3 | 120 | 0.018 | 0.800 | 0.130 | 38195 | 2065 | 214.5 |
| 1.20 | 3 | 120 | 0.022 | 0.960 | 0.160 | 31830 | 2100 | 322.7 |
| 1.50 | 3 | 120 | 0.028 | 1.200 | 0.200 | 25465 | 2140 | 513.4 |
| 2.00 | 3 | 120 | 0.036 | 1.600 | 0.260 | 19100 | 2065 | 858.1 |
| 2.50 | 3 | 120 | 0.046 | 2.000 | 0.330 | 15280 | 2110 | 1391.6 |
| 3.00 | 3 | 120 | 0.054 | 2.400 | 0.390 | 12730 | 2065 | 1930.6 |
| 0.50 | 3 | 60 | 0.006 | 0.050 | 0.500 | 38195 | 690 | 17.2 |
| 0.60 | 3 | 60 | 0.008 | 0.060 | 0.600 | 31830 | 765 | 27.5 |
| 0.80 | 3 | 60 | 0.010 | 0.080 | 0.800 | 23875 | 715 | 45.8 |
| 1.00 | 3 | 60 | 0.014 | 0.100 | 1.000 | 19100 | 800 | 80.2 |
| 1.20 | 3 | 60 | 0.016 | 0.120 | 1.200 | 15915 | 765 | 110.0 |
| 1.50 | 3 | 60 | 0.020 | 0.150 | 1.500 | 12730 | 765 | 171.9 |
| 2.00 | 3 | 60 | 0.026 | 0.200 | 2.000 | 9550 | 745 | 297.9 |
| 2.50 | 3 | 60 | 0.034 | 0.250 | 2.500 | 7640 | 780 | 487.0 |
| 3.00 | 3 | 60 | 0.040 | 0.300 | 3.000 | 6365 | 765 | 687.5 |
| 0.50 | 3 | 40 | 0.004 | 0.050 | 0.500 | 25465 | 305 | 7.6 |
| 0.60 | 3 | 40 | 0.006 | 0.060 | 0.600 | 21220 | 380 | 13.8 |
| 0.80 | 3 | 40 | 0.008 | 0.080 | 0.800 | 15915 | 380 | 24.4 |
| 1.00 | 3 | 40 | 0.012 | 0.100 | 1.000 | 12730 | 460 | 45.8 |
| 1.20 | 3 | 40 | 0.012 | 0.120 | 1.200 | 10610 | 380 | 55.0 |
| 1.50 | 3 | 40 | 0.016 | 0.150 | 1.500 | 8490 | 405 | 91.7 |
| 2.00 | 3 | 40 | 0.020 | 0.200 | 2.000 | 6365 | 380 | 152.8 |
| 2.50 | 3 | 40 | 0.028 | 0.250 | 2.500 | 5095 | 430 | 267.4 |
| 3.00 | 3 | 40 | 0.032 | 0.300 | 3.000 | 4245 | 405 | 366.7 |
| 0.50 | 3 | 160 | 0.008 | 0.050 | 0.500 | 101860 | 2445 | 61.1 |
| 0.60 | 3 | 160 | 0.010 | 0.060 | 0.600 | 84885 | 2545 | 91.7 |
| 0.80 | 3 | 160 | 0.012 | 0.080 | 0.800 | 63660 | 2290 | 146.7 |
| 1.00 | 3 | 160 | 0.016 | 0.100 | 1.000 | 50930 | 2445 | 244.5 |
| 1.20 | 3 | 160 | 0.020 | 0.120 | 1.200 | 42440 | 2545 | 366.7 |
| 1.50 | 3 | 160 | 0.024 | 0.150 | 1.500 | 33955 | 2445 | 550.0 |
| 2.00 | 3 | 160 | 0.032 | 0.200 | 2.000 | 25465 | 2445 | 977.8 |
| 2.50 | 3 | 160 | 0.040 | 0.250 | 2.500 | 20370 | 2445 | 1527.9 |
| 3.00 | 3 | 160 | 0.048 | 0.300 | 3.000 | 16975 | 2445 | 2200.2 |
| 0.50 | 3 | 66 | 0.006 | 0.050 | 0.500 | 42015 | 755 | 18.9 |
| 0.60 | 3 | 79 | 0.008 | 0.060 | 0.600 | 41910 | 1005 | 36.2 |
| 0.80 | 3 | 100 | 0.010 | 0.080 | 0.800 | 39790 | 1195 | 76.4 |
| 1.00 | 3 | 100 | 0.014 | 0.100 | 1.000 | 31830 | 1335 | 133.7 |
| 1.20 | 3 | 100 | 0.016 | 0.120 | 1.200 | 26525 | 1275 | 183.3 |
| 1.50 | 3 | 100 | 0.020 | 0.150 | 1.500 | 21220 | 1275 | 286.5 |
| 2.00 | 3 | 100 | 0.026 | 0.200 | 2.000 | 15915 | 1240 | 496.6 |
| 2.50 | 3 | 100 | 0.034 | 0.250 | 2.500 | 12730 | 1300 | 811.7 |
| 3.00 | 3 | 100 | 0.040 | 0.300 | 3.000 | 10610 | 1275 | 1145.9 |

Frese cilindriche Microcut

Gambo ø 3mm, scarico cilindrico, 5xd



HM
XA λ 25°
 γ -10°

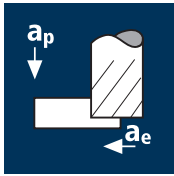


ReTool®

Rm < 850 Rm 850-1100 Rm 1100-1300 Rm 1300-1500 Inox Stainless Ti Titanium Cobalt-Chrome Gold / Platinum Copper

| Esempio: N° Ordine | | | | | | | | | | MICRO | |
|--------------------|-------------------------|----------------------|--------------------------|--------------------------|------------------------|----------------|----------------|-------|---|-------|--------|
| | | | Rivestimento M | Articolo 15754 | Codice-ø 050 | | | | | | M15754 |
| Ø Code | d ₁ ±0.01 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | α | z | | EUR |
| 050 | 0.50 | 3.00 | 0.45 | 40 | 0.60 | 2.50 | 7.65 | 10.0° | 3 | | 74.00 |
| 060 | 0.60 | 3.00 | 0.55 | 40 | 0.72 | 3.00 | 7.97 | 9.5° | 3 | | 71.00 |
| 080 | 0.80 | 3.00 | 0.75 | 40 | 0.96 | 4.00 | 8.59 | 8.0° | 3 | | 71.00 |
| 100 | 1.00 | 3.00 | 0.95 | 50 | 1.20 | 5.00 | 9.22 | 7.0° | 3 | | 71.00 |
| 108 | 1.20 | 3.00 | 1.10 | 50 | 1.44 | 6.00 | 9.94 | 5.5° | 3 | | 71.00 |
| 120 | 1.50 | 3.00 | 1.40 | 60 | 1.80 | 7.50 | 10.88 | 4.5° | 3 | | 71.00 |
| 140 | 2.00 | 3.00 | 1.90 | 60 | 2.40 | 10.00 | 12.45 | 2.5° | 3 | | 71.00 |
| 160 | 2.50 | 3.00 | 2.30 | 60 | 3.00 | 12.50 | 14.20 | 1.5° | 3 | | 71.00 |
| 180 | 3.00 | 3.00 | 2.80 | 60 | 3.60 | 14.56 | 15.00 | 0.0° | 3 | | 71.00 |
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Applicazione



Materiale

Acciaio
850 - 1100 N/mm²



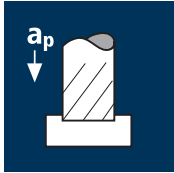
Acciaio
1100 - 1300 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]



Acciaio
850 - 1100 N/mm²



Acciaio
1100 - 1300 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]

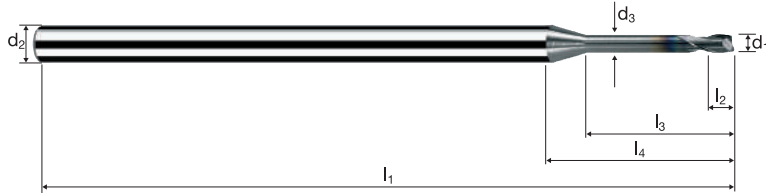


| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 0.50 | 2 | 66 | 0.012 | 0.300 | 0.060 | 42015 | 1010 | 18.2 |
| 0.60 | 2 | 79 | 0.014 | 0.360 | 0.070 | 41910 | 1175 | 29.6 |
| 0.80 | 2 | 106 | 0.018 | 0.480 | 0.090 | 42175 | 1520 | 65.6 |
| 1.00 | 2 | 132 | 0.022 | 0.600 | 0.110 | 42015 | 1850 | 122.0 |
| 1.20 | 2 | 158 | 0.026 | 0.720 | 0.130 | 41910 | 2180 | 204.0 |
| 1.50 | 2 | 180 | 0.034 | 0.900 | 0.170 | 38195 | 2595 | 397.4 |
| 2.00 | 2 | 180 | 0.044 | 1.200 | 0.220 | 28650 | 2520 | 665.5 |
| 2.50 | 2 | 180 | 0.056 | 1.500 | 0.280 | 22920 | 2565 | 1078.1 |
| 3.00 | 2 | 180 | 0.066 | 1.800 | 0.330 | 19100 | 2520 | 1497.5 |
| 0.50 | 2 | 66 | 0.010 | 0.300 | 0.060 | 42015 | 840 | 15.1 |
| 0.60 | 2 | 79 | 0.012 | 0.360 | 0.070 | 41910 | 1005 | 25.3 |
| 0.80 | 2 | 106 | 0.016 | 0.480 | 0.090 | 42175 | 1350 | 58.3 |
| 1.00 | 2 | 132 | 0.020 | 0.600 | 0.110 | 42015 | 1680 | 110.9 |
| 1.20 | 2 | 158 | 0.024 | 0.720 | 0.130 | 41910 | 2010 | 188.3 |
| 1.50 | 2 | 160 | 0.030 | 0.900 | 0.170 | 33955 | 2035 | 311.7 |
| 2.00 | 2 | 160 | 0.040 | 1.200 | 0.220 | 25465 | 2035 | 537.8 |
| 2.50 | 2 | 160 | 0.050 | 1.500 | 0.280 | 20370 | 2035 | 855.6 |
| 3.00 | 2 | 160 | 0.060 | 1.800 | 0.330 | 16975 | 2035 | 1210.1 |
| 0.50 | 2 | 66 | 0.010 | 0.300 | 0.060 | 42015 | 840 | 15.1 |
| 0.60 | 2 | 79 | 0.012 | 0.360 | 0.070 | 41910 | 1005 | 25.3 |
| 0.80 | 2 | 80 | 0.014 | 0.480 | 0.090 | 31830 | 890 | 38.5 |
| 1.00 | 2 | 80 | 0.018 | 0.600 | 0.110 | 25465 | 915 | 60.5 |
| 1.20 | 2 | 80 | 0.020 | 0.720 | 0.130 | 21220 | 850 | 79.5 |
| 1.50 | 2 | 80 | 0.028 | 0.900 | 0.170 | 16975 | 950 | 145.5 |
| 2.00 | 2 | 80 | 0.036 | 1.200 | 0.220 | 12730 | 915 | 242.0 |
| 2.50 | 2 | 80 | 0.044 | 1.500 | 0.280 | 10185 | 895 | 376.5 |
| 3.00 | 2 | 80 | 0.052 | 1.800 | 0.330 | 8490 | 885 | 524.4 |
| 0.50 | 2 | 60 | 0.008 | 0.300 | 0.060 | 38195 | 610 | 11.0 |
| 0.60 | 2 | 60 | 0.010 | 0.360 | 0.070 | 31830 | 635 | 16.0 |
| 0.80 | 2 | 60 | 0.012 | 0.480 | 0.090 | 23875 | 575 | 24.8 |
| 1.00 | 2 | 60 | 0.016 | 0.600 | 0.110 | 19100 | 610 | 40.3 |
| 1.20 | 2 | 60 | 0.018 | 0.720 | 0.130 | 15915 | 575 | 53.6 |
| 1.50 | 2 | 60 | 0.024 | 0.900 | 0.170 | 12730 | 610 | 93.5 |
| 2.00 | 2 | 60 | 0.030 | 1.200 | 0.220 | 9550 | 575 | 151.3 |
| 2.50 | 2 | 60 | 0.040 | 1.500 | 0.280 | 7640 | 610 | 256.7 |
| 3.00 | 2 | 60 | 0.046 | 1.800 | 0.330 | 6365 | 585 | 347.9 |
| 0.50 | 2 | 66 | 0.010 | 0.050 | 0.500 | 42015 | 840 | 21.0 |
| 0.60 | 2 | 79 | 0.010 | 0.060 | 0.600 | 41910 | 840 | 30.2 |
| 0.80 | 2 | 106 | 0.014 | 0.080 | 0.800 | 42175 | 1180 | 75.6 |
| 1.00 | 2 | 132 | 0.018 | 0.100 | 1.000 | 42015 | 1515 | 151.3 |
| 1.20 | 2 | 158 | 0.022 | 0.120 | 1.200 | 41910 | 1845 | 265.5 |
| 1.50 | 2 | 160 | 0.028 | 0.150 | 1.500 | 33955 | 1900 | 427.8 |
| 2.00 | 2 | 160 | 0.036 | 0.200 | 2.000 | 25465 | 1835 | 733.4 |
| 2.50 | 2 | 160 | 0.046 | 0.250 | 2.500 | 20370 | 1875 | 1171.4 |
| 3.00 | 2 | 160 | 0.054 | 0.300 | 3.000 | 16975 | 1835 | 1650.1 |
| 0.50 | 2 | 66 | 0.010 | 0.050 | 0.500 | 42015 | 840 | 21.0 |
| 0.60 | 2 | 79 | 0.010 | 0.060 | 0.600 | 41910 | 840 | 30.2 |
| 0.80 | 2 | 106 | 0.014 | 0.080 | 0.800 | 42175 | 1180 | 75.6 |
| 1.00 | 2 | 132 | 0.018 | 0.100 | 1.000 | 42015 | 1515 | 151.3 |
| 1.20 | 2 | 140 | 0.020 | 0.120 | 1.200 | 37135 | 1485 | 213.9 |
| 1.50 | 2 | 140 | 0.026 | 0.150 | 1.500 | 29710 | 1545 | 347.6 |
| 2.00 | 2 | 140 | 0.034 | 0.200 | 2.000 | 22280 | 1515 | 606.1 |
| 2.50 | 2 | 140 | 0.044 | 0.250 | 2.500 | 17825 | 1570 | 980.4 |
| 3.00 | 2 | 140 | 0.052 | 0.300 | 3.000 | 14855 | 1545 | 1390.4 |
| 0.50 | 2 | 66 | 0.008 | 0.050 | 0.500 | 42015 | 670 | 16.8 |
| 0.60 | 2 | 70 | 0.008 | 0.060 | 0.600 | 37135 | 595 | 21.4 |
| 0.80 | 2 | 70 | 0.012 | 0.080 | 0.800 | 27850 | 670 | 42.8 |
| 1.00 | 2 | 70 | 0.016 | 0.100 | 1.000 | 22280 | 715 | 71.3 |
| 1.20 | 2 | 70 | 0.020 | 0.120 | 1.200 | 18570 | 745 | 107.0 |
| 1.50 | 2 | 70 | 0.024 | 0.150 | 1.500 | 14855 | 715 | 160.4 |
| 2.00 | 2 | 70 | 0.032 | 0.200 | 2.000 | 11140 | 715 | 285.2 |
| 2.50 | 2 | 70 | 0.040 | 0.250 | 2.500 | 8915 | 715 | 445.6 |
| 3.00 | 2 | 70 | 0.048 | 0.300 | 3.000 | 7425 | 715 | 641.7 |
| 0.50 | 2 | 50 | 0.008 | 0.050 | 0.500 | 31830 | 510 | 12.7 |
| 0.60 | 2 | 50 | 0.008 | 0.060 | 0.600 | 26525 | 425 | 15.3 |
| 0.80 | 2 | 50 | 0.012 | 0.080 | 0.800 | 19895 | 475 | 30.6 |
| 1.00 | 2 | 50 | 0.014 | 0.100 | 1.000 | 15915 | 445 | 44.6 |
| 1.20 | 2 | 50 | 0.018 | 0.120 | 1.200 | 13265 | 475 | 68.8 |
| 1.50 | 2 | 50 | 0.022 | 0.150 | 1.500 | 10610 | 465 | 105.0 |
| 2.00 | 2 | 50 | 0.028 | 0.200 | 2.000 | 7960 | 445 | 178.3 |
| 2.50 | 2 | 50 | 0.036 | 0.250 | 2.500 | 6365 | 460 | 286.5 |
| 3.00 | 2 | 50 | 0.044 | 0.300 | 3.000 | 5305 | 465 | 420.2 |

Frese cilindriche Microcut

Gambo \emptyset 3mm, scarico cilindrico, 8xd

HM
MG10 λ 25°
 γ 6°



ReTool®

Rm
< 850

Rm
850-1100

Rm
1100-1300

Rm
1300-1500

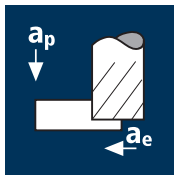
Inox
Stainless

Ti
Titanium

Cobalt-Chrome
Gold / Platinum
Copper

| Esempio: N° Ordine | | | | | | | | | | | MICRO |
|-----------------------|---------------------|-------------|-------|-------|-------|-------|-------|------|----------|---|-------|
| Rivestimento | | | | | | | | | | | M5716 |
| Articolo | | | | | | | | | | | EUR |
| Codice- \emptyset | | | | | | | | | | | |
| \emptyset Code | d_1 ± 0.01 | d_2 h6 | d_3 | l_1 | l_2 | l_3 | l_4 | 45° | α | z | |
| 050 | 0.50 | 3.00 | 0.45 | 40 | 0.60 | 4.00 | 9.15 | - | 8.5° | 2 | 72.00 |
| 060 | 0.60 | 3.00 | 0.55 | 40 | 0.72 | 4.80 | 9.77 | - | 7.5° | 2 | 69.00 |
| 080 | 0.80 | 3.00 | 0.75 | 40 | 0.96 | 6.40 | 10.99 | - | 6.0° | 2 | 69.00 |
| 100 | 1.00 | 3.00 | 0.95 | 50 | 1.20 | 8.00 | 12.22 | 0.07 | 5.0° | 2 | 69.00 |
| 108 | 1.20 | 3.00 | 1.10 | 50 | 1.44 | 9.60 | 13.54 | 0.07 | 4.0° | 2 | 69.00 |
| 120 | 1.50 | 3.00 | 1.40 | 60 | 1.80 | 12.00 | 15.38 | 0.07 | 3.0° | 2 | 69.00 |
| 140 | 2.00 | 3.00 | 1.90 | 60 | 2.40 | 16.00 | 18.45 | 0.10 | 2.0° | 2 | 69.00 |
| 160 | 2.50 | 3.00 | 2.30 | 60 | 3.00 | 20.00 | 21.70 | 0.10 | 1.0° | 2 | 69.00 |
| 180 | 3.00 | 3.00 | 2.80 | 60 | 3.60 | 23.56 | 24.00 | 0.10 | 0.0° | 2 | 69.00 |
| | | | | | | | | | | | |
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Applicazione



Materiale

Acciaio
850 - 1100 N/mm²



Acciaio
1100 - 1300 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]



Acciaio
850 - 1100 N/mm²



Acciaio
1100 - 1300 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 0.50 | 2 | 66 | 0.012 | 0.250 | 0.060 | 42015 | 1010 | 15.1 |
| 0.60 | 2 | 79 | 0.014 | 0.300 | 0.070 | 41910 | 1175 | 24.6 |
| 0.80 | 2 | 106 | 0.018 | 0.400 | 0.090 | 42175 | 1520 | 54.7 |
| 1.00 | 2 | 132 | 0.022 | 0.500 | 0.110 | 42015 | 1850 | 101.7 |
| 1.20 | 2 | 158 | 0.026 | 0.600 | 0.130 | 41910 | 2180 | 170.0 |
| 1.50 | 2 | 180 | 0.034 | 0.750 | 0.170 | 38195 | 2595 | 331.2 |
| 2.00 | 2 | 180 | 0.044 | 1.000 | 0.220 | 28650 | 2520 | 554.6 |
| 2.50 | 2 | 180 | 0.056 | 1.250 | 0.280 | 22920 | 2565 | 898.4 |
| 3.00 | 2 | 180 | 0.066 | 1.500 | 0.330 | 19100 | 2520 | 1247.9 |
| 0.50 | 2 | 66 | 0.010 | 0.250 | 0.060 | 42015 | 840 | 12.6 |
| 0.60 | 2 | 79 | 0.012 | 0.300 | 0.070 | 41910 | 1005 | 21.1 |
| 0.80 | 2 | 106 | 0.016 | 0.400 | 0.090 | 42175 | 1350 | 48.6 |
| 1.00 | 2 | 132 | 0.020 | 0.500 | 0.110 | 42015 | 1680 | 92.4 |
| 1.20 | 2 | 158 | 0.024 | 0.600 | 0.130 | 41910 | 2010 | 156.9 |
| 1.50 | 2 | 160 | 0.030 | 0.750 | 0.170 | 33955 | 2035 | 259.7 |
| 2.00 | 2 | 160 | 0.040 | 1.000 | 0.220 | 25465 | 2035 | 448.2 |
| 2.50 | 2 | 160 | 0.050 | 1.250 | 0.280 | 20370 | 2035 | 713.0 |
| 3.00 | 2 | 160 | 0.060 | 1.500 | 0.330 | 16975 | 2035 | 1008.4 |
| 0.50 | 2 | 66 | 0.010 | 0.250 | 0.060 | 42015 | 840 | 12.6 |
| 0.60 | 2 | 79 | 0.012 | 0.300 | 0.070 | 41910 | 1005 | 21.1 |
| 0.80 | 2 | 80 | 0.014 | 0.400 | 0.090 | 31830 | 890 | 32.1 |
| 1.00 | 2 | 80 | 0.018 | 0.500 | 0.110 | 25465 | 915 | 50.4 |
| 1.20 | 2 | 80 | 0.020 | 0.600 | 0.130 | 21220 | 850 | 66.2 |
| 1.50 | 2 | 80 | 0.028 | 0.750 | 0.170 | 16975 | 950 | 121.2 |
| 2.00 | 2 | 80 | 0.036 | 1.000 | 0.220 | 12730 | 915 | 201.7 |
| 2.50 | 2 | 80 | 0.044 | 1.250 | 0.280 | 10185 | 895 | 313.7 |
| 3.00 | 2 | 80 | 0.052 | 1.500 | 0.330 | 8490 | 885 | 437.0 |
| 0.50 | 2 | 60 | 0.008 | 0.250 | 0.060 | 38195 | 610 | 9.2 |
| 0.60 | 2 | 60 | 0.010 | 0.300 | 0.070 | 31830 | 635 | 13.4 |
| 0.80 | 2 | 60 | 0.012 | 0.400 | 0.090 | 23875 | 575 | 20.6 |
| 1.00 | 2 | 60 | 0.016 | 0.500 | 0.110 | 19100 | 610 | 33.6 |
| 1.20 | 2 | 60 | 0.018 | 0.600 | 0.130 | 15915 | 575 | 44.7 |
| 1.50 | 2 | 60 | 0.024 | 0.750 | 0.170 | 12730 | 610 | 77.9 |
| 2.00 | 2 | 60 | 0.030 | 1.000 | 0.220 | 9550 | 575 | 126.1 |
| 2.50 | 2 | 60 | 0.040 | 1.250 | 0.280 | 7640 | 610 | 213.9 |
| 3.00 | 2 | 60 | 0.046 | 1.500 | 0.330 | 6365 | 585 | 289.9 |
| 0.50 | 2 | 66 | 0.010 | 0.040 | 0.500 | 42015 | 840 | 16.8 |
| 0.60 | 2 | 79 | 0.010 | 0.050 | 0.600 | 41910 | 840 | 25.1 |
| 0.80 | 2 | 106 | 0.014 | 0.060 | 0.800 | 42175 | 1180 | 56.7 |
| 1.00 | 2 | 132 | 0.018 | 0.080 | 1.000 | 42015 | 1515 | 121.0 |
| 1.20 | 2 | 158 | 0.022 | 0.100 | 1.200 | 41910 | 1845 | 221.3 |
| 1.50 | 2 | 160 | 0.028 | 0.120 | 1.500 | 33955 | 1900 | 342.2 |
| 2.00 | 2 | 160 | 0.036 | 0.160 | 2.000 | 25465 | 1835 | 586.7 |
| 2.50 | 2 | 160 | 0.046 | 0.200 | 2.500 | 20370 | 1875 | 937.1 |
| 3.00 | 2 | 160 | 0.054 | 0.240 | 3.000 | 16975 | 1835 | 1320.1 |
| 0.50 | 2 | 66 | 0.010 | 0.040 | 0.500 | 42015 | 840 | 16.8 |
| 0.60 | 2 | 79 | 0.010 | 0.050 | 0.600 | 41910 | 840 | 25.1 |
| 0.80 | 2 | 106 | 0.014 | 0.060 | 0.800 | 42175 | 1180 | 56.7 |
| 1.00 | 2 | 132 | 0.018 | 0.080 | 1.000 | 42015 | 1515 | 121.0 |
| 1.20 | 2 | 140 | 0.020 | 0.100 | 1.200 | 37135 | 1485 | 178.3 |
| 1.50 | 2 | 140 | 0.026 | 0.120 | 1.500 | 29710 | 1545 | 278.1 |
| 2.00 | 2 | 140 | 0.034 | 0.160 | 2.000 | 22280 | 1515 | 484.8 |
| 2.50 | 2 | 140 | 0.044 | 0.200 | 2.500 | 17825 | 1570 | 784.3 |
| 3.00 | 2 | 140 | 0.052 | 0.240 | 3.000 | 14855 | 1545 | 1112.3 |
| 0.50 | 2 | 66 | 0.008 | 0.040 | 0.500 | 42015 | 670 | 13.4 |
| 0.60 | 2 | 70 | 0.008 | 0.050 | 0.600 | 37135 | 595 | 17.8 |
| 0.80 | 2 | 70 | 0.012 | 0.060 | 0.800 | 27850 | 670 | 32.1 |
| 1.00 | 2 | 70 | 0.016 | 0.080 | 1.000 | 22280 | 715 | 57.0 |
| 1.20 | 2 | 70 | 0.020 | 0.100 | 1.200 | 18570 | 745 | 89.1 |
| 1.50 | 2 | 70 | 0.024 | 0.120 | 1.500 | 14855 | 715 | 128.3 |
| 2.00 | 2 | 70 | 0.032 | 0.160 | 2.000 | 11140 | 715 | 228.2 |
| 2.50 | 2 | 70 | 0.040 | 0.200 | 2.500 | 8915 | 715 | 356.5 |
| 3.00 | 2 | 70 | 0.048 | 0.240 | 3.000 | 7425 | 715 | 513.4 |
| 0.50 | 2 | 50 | 0.008 | 0.040 | 0.500 | 31830 | 510 | 10.2 |
| 0.60 | 2 | 50 | 0.008 | 0.050 | 0.600 | 26525 | 425 | 12.7 |
| 0.80 | 2 | 50 | 0.012 | 0.060 | 0.800 | 19895 | 475 | 22.9 |
| 1.00 | 2 | 50 | 0.014 | 0.080 | 1.000 | 15915 | 445 | 35.7 |
| 1.20 | 2 | 50 | 0.018 | 0.100 | 1.200 | 13265 | 475 | 57.3 |
| 1.50 | 2 | 50 | 0.022 | 0.120 | 1.500 | 10610 | 465 | 84.0 |
| 2.00 | 2 | 50 | 0.028 | 0.160 | 2.000 | 7960 | 445 | 142.6 |
| 2.50 | 2 | 50 | 0.036 | 0.200 | 2.500 | 6365 | 460 | 229.2 |
| 3.00 | 2 | 50 | 0.044 | 0.240 | 3.000 | 5305 | 465 | 336.1 |

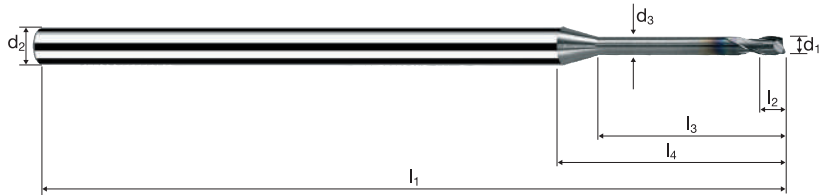
Frese cilindriche Microcut

Gambo \varnothing 3mm, scarico cilindrico, 10xd



HM λ 25°
MG10 γ 6°

45°

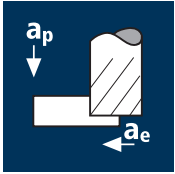


ReTool®

| | | | | | | | | | |
|----------|-------------|--------------|--------------|--|--|--|-------------------|----------------|---------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | | | | Inox Stainless | Ti Titanium | Gold / Platinum Copper |
|----------|-------------|--------------|--------------|--|--|--|-------------------|----------------|---------------------------|

| Esempio: N° Ordine | | | | | | | | | | | MICRO | |
|--------------------|-----------------------|-------------------|----------------|----------------------|----------------|---------------------|----------------|------|------|---|-------|--|
| | | | | | | | | | | | M5717 | |
| | | | | | | | | | | | EUR | |
| Ø Code | d ₁ ±0.01 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | 45° | α | z | | |
| | Rivestimento M | | | Articolo 5717 | | Codice-ø 050 | | | | | | |
| 050 | 0.50 | 3.00 | 0.45 | 40 | 0.60 | 5.00 | 10.15 | - | 7.5° | 2 | 72.00 | |
| 060 | 0.60 | 3.00 | 0.55 | 40 | 0.72 | 6.00 | 10.97 | - | 7.0° | 2 | 69.00 | |
| 080 | 0.80 | 3.00 | 0.75 | 40 | 0.96 | 8.00 | 12.59 | - | 5.5° | 2 | 69.00 | |
| 100 | 1.00 | 3.00 | 0.95 | 50 | 1.20 | 10.00 | 14.22 | 0.07 | 4.5° | 2 | 69.00 | |
| 108 | 1.20 | 3.00 | 1.10 | 50 | 1.44 | 12.00 | 15.94 | 0.07 | 3.5° | 2 | 69.00 | |
| 120 | 1.50 | 3.00 | 1.40 | 60 | 1.80 | 15.00 | 18.38 | 0.07 | 2.5° | 2 | 69.00 | |
| 140 | 2.00 | 3.00 | 1.90 | 60 | 2.40 | 20.00 | 22.45 | 0.10 | 1.5° | 2 | 69.00 | |
| 160 | 2.50 | 3.00 | 2.30 | 60 | 3.00 | 25.00 | 26.70 | 0.10 | 1.0° | 2 | 69.00 | |
| 180 | 3.00 | 3.00 | 2.80 | 60 | 3.60 | 29.56 | 30.00 | 0.10 | 0.0° | 2 | 69.00 | |

Applicazione



Materiale

Acciaio
850 - 1100 N/mm²



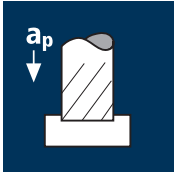
Acciaio
1100 - 1300 N/mm²



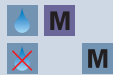
Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]



Acciaio
850 - 1100 N/mm²



Acciaio
1100 - 1300 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]



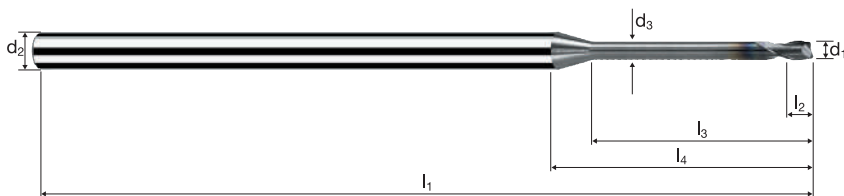
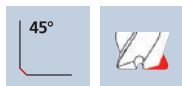
| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 1.00 | 2 | 132 | 0.022 | 0.400 | 0.090 | 42015 | 1850 | 66.6 |
| 1.20 | 2 | 158 | 0.026 | 0.480 | 0.110 | 41910 | 2180 | 115.1 |
| 1.50 | 2 | 180 | 0.034 | 0.600 | 0.140 | 38195 | 2595 | 218.2 |
| 2.00 | 2 | 180 | 0.044 | 0.800 | 0.180 | 28650 | 2520 | 363.0 |
| 2.50 | 2 | 180 | 0.056 | 1.000 | 0.230 | 22920 | 2565 | 590.4 |
| 3.00 | 2 | 180 | 0.066 | 1.200 | 0.270 | 19100 | 2520 | 816.8 |
| 1.00 | 2 | 132 | 0.020 | 0.400 | 0.090 | 42015 | 1680 | 60.5 |
| 1.20 | 2 | 158 | 0.024 | 0.480 | 0.110 | 41910 | 2010 | 106.2 |
| 1.50 | 2 | 160 | 0.030 | 0.600 | 0.140 | 33955 | 2035 | 171.1 |
| 2.00 | 2 | 160 | 0.040 | 0.800 | 0.180 | 25465 | 2035 | 293.4 |
| 2.50 | 2 | 160 | 0.050 | 1.000 | 0.230 | 20370 | 2035 | 468.6 |
| 3.00 | 2 | 160 | 0.060 | 1.200 | 0.270 | 16975 | 2035 | 660.0 |
| 1.00 | 2 | 80 | 0.018 | 0.400 | 0.090 | 25465 | 915 | 33.0 |
| 1.20 | 2 | 80 | 0.020 | 0.480 | 0.110 | 21220 | 850 | 44.8 |
| 1.50 | 2 | 80 | 0.028 | 0.600 | 0.140 | 16975 | 950 | 79.9 |
| 2.00 | 2 | 80 | 0.036 | 0.800 | 0.180 | 12730 | 915 | 132.0 |
| 2.50 | 2 | 80 | 0.044 | 1.000 | 0.230 | 10185 | 895 | 206.2 |
| 3.00 | 2 | 80 | 0.052 | 1.200 | 0.270 | 8490 | 885 | 286.0 |
| 1.00 | 2 | 60 | 0.016 | 0.400 | 0.090 | 19100 | 610 | 22.0 |
| 1.20 | 2 | 60 | 0.018 | 0.480 | 0.110 | 15915 | 575 | 30.3 |
| 1.50 | 2 | 60 | 0.024 | 0.600 | 0.140 | 12730 | 610 | 51.3 |
| 2.00 | 2 | 60 | 0.030 | 0.800 | 0.180 | 9550 | 575 | 82.5 |
| 2.50 | 2 | 60 | 0.040 | 1.000 | 0.230 | 7640 | 610 | 140.6 |
| 3.00 | 2 | 60 | 0.046 | 1.200 | 0.270 | 6365 | 585 | 189.8 |
| 1.00 | 2 | 132 | 0.018 | 0.060 | 1.000 | 42015 | 1515 | 90.8 |
| 1.20 | 2 | 158 | 0.022 | 0.070 | 1.200 | 41910 | 1845 | 154.9 |
| 1.50 | 2 | 160 | 0.028 | 0.090 | 1.500 | 33955 | 1900 | 256.7 |
| 2.00 | 2 | 160 | 0.036 | 0.120 | 2.000 | 25465 | 1835 | 440.0 |
| 2.50 | 2 | 160 | 0.046 | 0.150 | 2.500 | 20370 | 1875 | 702.8 |
| 3.00 | 2 | 160 | 0.054 | 0.180 | 3.000 | 16975 | 1835 | 990.1 |
| 1.00 | 2 | 132 | 0.018 | 0.060 | 1.000 | 42015 | 1515 | 90.8 |
| 1.20 | 2 | 140 | 0.020 | 0.070 | 1.200 | 37135 | 1485 | 124.8 |
| 1.50 | 2 | 140 | 0.026 | 0.090 | 1.500 | 29710 | 1545 | 208.6 |
| 2.00 | 2 | 140 | 0.034 | 0.120 | 2.000 | 22280 | 1515 | 363.6 |
| 2.50 | 2 | 140 | 0.044 | 0.150 | 2.500 | 17825 | 1570 | 588.2 |
| 3.00 | 2 | 140 | 0.052 | 0.180 | 3.000 | 14855 | 1545 | 834.2 |
| 1.00 | 2 | 70 | 0.016 | 0.060 | 1.000 | 22280 | 715 | 42.8 |
| 1.20 | 2 | 70 | 0.020 | 0.070 | 1.200 | 18570 | 745 | 62.4 |
| 1.50 | 2 | 70 | 0.024 | 0.090 | 1.500 | 14855 | 715 | 96.3 |
| 2.00 | 2 | 70 | 0.032 | 0.120 | 2.000 | 11140 | 715 | 171.1 |
| 2.50 | 2 | 70 | 0.040 | 0.150 | 2.500 | 8915 | 715 | 267.4 |
| 3.00 | 2 | 70 | 0.048 | 0.180 | 3.000 | 7425 | 715 | 385.0 |
| 1.00 | 2 | 50 | 0.014 | 0.060 | 1.000 | 15915 | 445 | 26.7 |
| 1.20 | 2 | 50 | 0.018 | 0.070 | 1.200 | 13265 | 475 | 40.1 |
| 1.50 | 2 | 50 | 0.022 | 0.090 | 1.500 | 10610 | 465 | 63.0 |
| 2.00 | 2 | 50 | 0.028 | 0.120 | 2.000 | 7960 | 445 | 107.0 |
| 2.50 | 2 | 50 | 0.036 | 0.150 | 2.500 | 6365 | 460 | 171.9 |
| 3.00 | 2 | 50 | 0.044 | 0.180 | 3.000 | 5305 | 465 | 252.1 |

Frese cilindriche Microcut

Gambo \varnothing 3mm, scarico cilindrico, 12xd



HM
MG10 λ 25°
 γ 6°

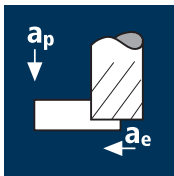


ReTool®

| | | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--|--|--|-------------------|----------------|---------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | | | | Inox Stainless | Ti Titanium | Gold / Platinum Copper |
|-------------|----------------|-----------------|-----------------|--|--|--|-------------------|----------------|---------------------------|

| | | | | | | | | | | | MICRO |
|--|---------------------|-------------|-------|-------|-------|-------|-------|------|----------|---|-------|
| Esempio: N° Ordine M Rivestimento 5721 Articolo 100 Codice- \varnothing | | | | | | | | | | | M5721 |
| \varnothing Code | d_1 ± 0.01 | d_2 h6 | d_3 | l_1 | l_2 | l_3 | l_4 | 45° | α | z | EUR |
| 100 | 1.00 | 3.00 | 0.95 | 50 | 1.20 | 12.00 | 16.22 | 0.07 | 4.0° | 2 | 69.00 |
| 108 | 1.20 | 3.00 | 1.10 | 60 | 1.44 | 14.40 | 18.34 | 0.07 | 3.0° | 2 | 69.00 |
| 120 | 1.50 | 3.00 | 1.40 | 60 | 1.80 | 18.00 | 21.38 | 0.07 | 2.5° | 2 | 69.00 |
| 140 | 2.00 | 3.00 | 1.90 | 60 | 2.40 | 24.00 | 26.45 | 0.10 | 1.5° | 2 | 69.00 |
| 160 | 2.50 | 3.00 | 2.30 | 70 | 3.00 | 30.00 | 31.70 | 0.10 | 0.5° | 2 | 69.00 |
| 180 | 3.00 | 3.00 | 2.80 | 70 | 3.60 | 35.56 | 36.00 | 0.10 | 0.0° | 2 | 69.00 |
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Applicazione



Materiale

Acciaio
850 - 1100 N/mm²



Acciaio
1100 - 1300 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]



Acciaio
850 - 1100 N/mm²



Acciaio
1100 - 1300 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]



| d1 [mm] | z | v_c [m/min] | f_s [mm] | a_p [mm] | a_e [mm] | n [min ⁻¹] | v_r [mm/min] | Q [mm ³ /min] |
|---------|---|---------------|------------|------------|------------|------------------------|----------------|--------------------------|
| 1.00 | 2 | 132 | 0.018 | 0.300 | 0.090 | 42015 | 1515 | 40.8 |
| 1.20 | 2 | 158 | 0.022 | 0.360 | 0.110 | 41910 | 1845 | 73.0 |
| 1.50 | 2 | 180 | 0.028 | 0.450 | 0.140 | 38195 | 2140 | 134.8 |
| 2.00 | 2 | 180 | 0.036 | 0.600 | 0.180 | 28650 | 2065 | 222.8 |
| 2.50 | 2 | 180 | 0.046 | 0.750 | 0.230 | 22920 | 2110 | 363.7 |
| 3.00 | 2 | 180 | 0.054 | 0.900 | 0.270 | 19100 | 2065 | 501.2 |

| | | | | | | | | |
|------|---|-----|-------|-------|-------|-------|------|-------|
| 1.00 | 2 | 132 | 0.016 | 0.300 | 0.090 | 42015 | 1345 | 36.3 |
| 1.20 | 2 | 158 | 0.020 | 0.360 | 0.110 | 41910 | 1675 | 66.4 |
| 1.50 | 2 | 160 | 0.026 | 0.450 | 0.140 | 33955 | 1765 | 111.2 |
| 2.00 | 2 | 160 | 0.032 | 0.600 | 0.180 | 25465 | 1630 | 176.0 |
| 2.50 | 2 | 160 | 0.042 | 0.750 | 0.230 | 20370 | 1710 | 295.2 |
| 3.00 | 2 | 160 | 0.048 | 0.900 | 0.270 | 16975 | 1630 | 396.0 |

| | | | | | | | | |
|------|---|----|-------|-------|-------|-------|-----|-------|
| 1.00 | 2 | 80 | 0.014 | 0.300 | 0.090 | 25465 | 715 | 19.3 |
| 1.20 | 2 | 80 | 0.018 | 0.360 | 0.110 | 21220 | 765 | 30.3 |
| 1.50 | 2 | 80 | 0.022 | 0.450 | 0.140 | 16975 | 745 | 47.1 |
| 2.00 | 2 | 80 | 0.028 | 0.600 | 0.180 | 12730 | 715 | 77.0 |
| 2.50 | 2 | 80 | 0.036 | 0.750 | 0.230 | 10185 | 735 | 126.5 |
| 3.00 | 2 | 80 | 0.044 | 0.900 | 0.270 | 8490 | 745 | 181.5 |

| | | | | | | | | |
|------|---|----|-------|-------|-------|-------|-----|-------|
| 1.00 | 2 | 60 | 0.012 | 0.300 | 0.090 | 19100 | 460 | 12.4 |
| 1.20 | 2 | 60 | 0.016 | 0.360 | 0.110 | 15915 | 510 | 20.2 |
| 1.50 | 2 | 60 | 0.020 | 0.450 | 0.140 | 12730 | 510 | 32.1 |
| 2.00 | 2 | 60 | 0.026 | 0.600 | 0.180 | 9550 | 495 | 53.6 |
| 2.50 | 2 | 60 | 0.032 | 0.750 | 0.230 | 7640 | 490 | 84.3 |
| 3.00 | 2 | 60 | 0.038 | 0.900 | 0.270 | 6365 | 485 | 117.6 |

| | | | | | | | | |
|------|---|-----|-------|-------|-------|-------|------|-------|
| 1.00 | 2 | 132 | 0.016 | 0.040 | 1.000 | 42015 | 1345 | 53.8 |
| 1.20 | 2 | 158 | 0.018 | 0.050 | 1.200 | 41910 | 1510 | 90.5 |
| 1.50 | 2 | 160 | 0.024 | 0.060 | 1.500 | 33955 | 1630 | 146.7 |
| 2.00 | 2 | 160 | 0.030 | 0.080 | 2.000 | 25465 | 1530 | 244.5 |
| 2.50 | 2 | 160 | 0.038 | 0.100 | 2.500 | 20370 | 1550 | 387.1 |
| 3.00 | 2 | 160 | 0.046 | 0.120 | 3.000 | 16975 | 1560 | 562.3 |

| | | | | | | | | |
|------|---|-----|-------|-------|-------|-------|------|-------|
| 1.00 | 2 | 132 | 0.016 | 0.040 | 1.000 | 42015 | 1345 | 53.8 |
| 1.20 | 2 | 140 | 0.018 | 0.050 | 1.200 | 37135 | 1335 | 80.2 |
| 1.50 | 2 | 140 | 0.022 | 0.060 | 1.500 | 29710 | 1305 | 117.6 |
| 2.00 | 2 | 140 | 0.028 | 0.080 | 2.000 | 22280 | 1250 | 199.6 |
| 2.50 | 2 | 140 | 0.036 | 0.100 | 2.500 | 17825 | 1285 | 320.9 |
| 3.00 | 2 | 140 | 0.044 | 0.120 | 3.000 | 14855 | 1305 | 470.6 |

| | | | | | | | | |
|------|---|----|-------|-------|-------|-------|-----|-------|
| 1.00 | 2 | 70 | 0.014 | 0.040 | 1.000 | 22280 | 625 | 25.0 |
| 1.20 | 2 | 70 | 0.016 | 0.050 | 1.200 | 18570 | 595 | 35.7 |
| 1.50 | 2 | 70 | 0.022 | 0.060 | 1.500 | 14855 | 655 | 58.8 |
| 2.00 | 2 | 70 | 0.026 | 0.080 | 2.000 | 11140 | 580 | 92.7 |
| 2.50 | 2 | 70 | 0.034 | 0.100 | 2.500 | 8915 | 605 | 151.5 |
| 3.00 | 2 | 70 | 0.040 | 0.120 | 3.000 | 7425 | 595 | 213.9 |

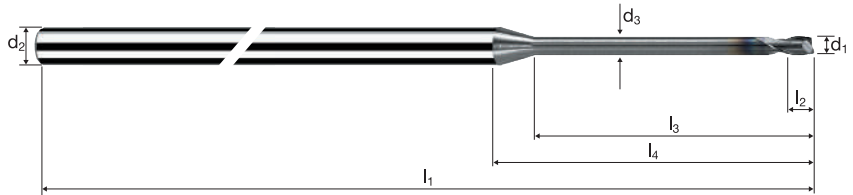
| | | | | | | | | |
|------|---|----|-------|-------|-------|-------|-----|-------|
| 1.00 | 2 | 50 | 0.012 | 0.040 | 1.000 | 15915 | 380 | 15.3 |
| 1.20 | 2 | 50 | 0.014 | 0.050 | 1.200 | 13265 | 370 | 22.3 |
| 1.50 | 2 | 50 | 0.020 | 0.060 | 1.500 | 10610 | 425 | 38.2 |
| 2.00 | 2 | 50 | 0.024 | 0.080 | 2.000 | 7960 | 380 | 61.1 |
| 2.50 | 2 | 50 | 0.030 | 0.100 | 2.500 | 6365 | 380 | 95.5 |
| 3.00 | 2 | 50 | 0.036 | 0.120 | 3.000 | 5305 | 380 | 137.5 |

Frese cilindriche Microcut

Gambo ø 3mm, scarico cilindrico, 15xd



HM
MG10 λ 25°
 γ 6°

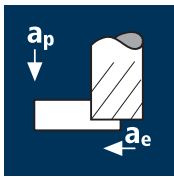


ReTool®

| | | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--|--|--|-------------------|----------------|---------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | | | | Inox Stainless | Ti Titanium | Gold / Platinum Copper |
|-------------|----------------|-----------------|-----------------|--|--|--|-------------------|----------------|---------------------------|

| Esempio: N° Ordine | | | | | | | | | | | MICRO |
|-----------------------|-------------------------|----------------------|----------------|----------------|----------------|----------------|----------------|------|------|---|-------|
| | | | | | | | | | | | M5723 |
| | | | | | | | | | | | EUR |
| Ø Code | d ₁ ±0.01 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | 45° | α | z | |
| 100 | 1.00 | 3.00 | 0.95 | 60 | 1.20 | 15.00 | 19.22 | 0.07 | 3.5° | 2 | 69.00 |
| 108 | 1.20 | 3.00 | 1.10 | 60 | 1.44 | 18.00 | 21.94 | 0.07 | 2.5° | 2 | 69.00 |
| 120 | 1.50 | 3.00 | 1.40 | 70 | 1.80 | 22.50 | 25.88 | 0.07 | 2.0° | 2 | 69.00 |
| 140 | 2.00 | 3.00 | 1.90 | 70 | 2.40 | 30.00 | 32.45 | 0.10 | 1.0° | 2 | 69.00 |
| 160 | 2.50 | 3.00 | 2.30 | 70 | 3.00 | 37.50 | 39.20 | 0.10 | 0.5° | 2 | 69.00 |
| 180 | 3.00 | 3.00 | 2.80 | 80 | 3.60 | 44.56 | 45.00 | 0.10 | 0.0° | 2 | 69.00 |
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Applicazione



Materiale

Acciaio
850 - 1100 N/mm²



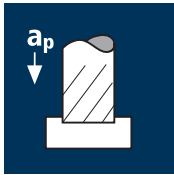
Acciaio
1100 - 1300 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]



Acciaio
850 - 1100 N/mm²



Acciaio
1100 - 1300 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 1.00 | 2 | 132 | 0.018 | 0.200 | 0.070 | 42015 | 1515 | 21.2 |
| 1.20 | 2 | 158 | 0.022 | 0.240 | 0.080 | 41910 | 1845 | 35.4 |
| 1.50 | 2 | 180 | 0.028 | 0.300 | 0.110 | 38195 | 2140 | 70.6 |
| 2.00 | 2 | 180 | 0.036 | 0.400 | 0.140 | 28650 | 2065 | 115.5 |
| 2.50 | 2 | 180 | 0.046 | 0.500 | 0.180 | 22920 | 2110 | 189.8 |
| 3.00 | 2 | 180 | 0.054 | 0.600 | 0.210 | 19100 | 2065 | 259.9 |

| | | | | | | | | |
|------|---|-----|-------|-------|-------|-------|------|-------|
| 1.00 | 2 | 132 | 0.016 | 0.200 | 0.070 | 42015 | 1345 | 18.8 |
| 1.20 | 2 | 158 | 0.020 | 0.240 | 0.080 | 41910 | 1675 | 32.2 |
| 1.50 | 2 | 160 | 0.026 | 0.300 | 0.110 | 33955 | 1765 | 58.3 |
| 2.00 | 2 | 160 | 0.032 | 0.400 | 0.140 | 25465 | 1630 | 91.3 |
| 2.50 | 2 | 160 | 0.042 | 0.500 | 0.180 | 20370 | 1710 | 154.0 |
| 3.00 | 2 | 160 | 0.048 | 0.600 | 0.210 | 16975 | 1630 | 205.3 |

| | | | | | | | | |
|------|---|----|-------|-------|-------|-------|-----|------|
| 1.00 | 2 | 80 | 0.014 | 0.200 | 0.070 | 25465 | 715 | 10.0 |
| 1.20 | 2 | 80 | 0.018 | 0.240 | 0.080 | 21220 | 765 | 14.7 |
| 1.50 | 2 | 80 | 0.022 | 0.300 | 0.110 | 16975 | 745 | 24.6 |
| 2.00 | 2 | 80 | 0.028 | 0.400 | 0.140 | 12730 | 715 | 39.9 |
| 2.50 | 2 | 80 | 0.036 | 0.500 | 0.180 | 10185 | 735 | 66.0 |
| 3.00 | 2 | 80 | 0.044 | 0.600 | 0.210 | 8490 | 745 | 94.1 |

| | | | | | | | | |
|------|---|----|-------|-------|-------|-------|-----|------|
| 1.00 | 2 | 60 | 0.012 | 0.200 | 0.070 | 19100 | 460 | 6.4 |
| 1.20 | 2 | 60 | 0.016 | 0.240 | 0.080 | 15915 | 510 | 9.8 |
| 1.50 | 2 | 60 | 0.020 | 0.300 | 0.110 | 12730 | 510 | 16.8 |
| 2.00 | 2 | 60 | 0.026 | 0.400 | 0.140 | 9550 | 495 | 27.8 |
| 2.50 | 2 | 60 | 0.032 | 0.500 | 0.180 | 7640 | 490 | 44.0 |
| 3.00 | 2 | 60 | 0.038 | 0.600 | 0.210 | 6365 | 485 | 61.0 |

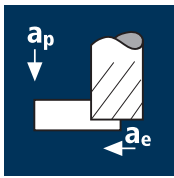
| | | | | | | | | |
|------|---|-----|-------|-------|-------|-------|------|-------|
| 1.00 | 2 | 132 | 0.016 | 0.030 | 1.000 | 42015 | 1345 | 40.3 |
| 1.20 | 2 | 158 | 0.018 | 0.040 | 1.200 | 41910 | 1510 | 72.4 |
| 1.50 | 2 | 160 | 0.024 | 0.050 | 1.500 | 33955 | 1630 | 122.2 |
| 2.00 | 2 | 160 | 0.030 | 0.060 | 2.000 | 25465 | 1530 | 183.3 |
| 2.50 | 2 | 160 | 0.038 | 0.080 | 2.500 | 20370 | 1550 | 309.7 |
| 3.00 | 2 | 160 | 0.046 | 0.090 | 3.000 | 16975 | 1560 | 421.7 |

| | | | | | | | | |
|------|---|-----|-------|-------|-------|-------|------|-------|
| 1.00 | 2 | 132 | 0.016 | 0.030 | 1.000 | 42015 | 1345 | 40.3 |
| 1.20 | 2 | 140 | 0.018 | 0.040 | 1.200 | 37135 | 1335 | 64.2 |
| 1.50 | 2 | 140 | 0.022 | 0.050 | 1.500 | 29710 | 1305 | 98.0 |
| 2.00 | 2 | 140 | 0.028 | 0.060 | 2.000 | 22280 | 1250 | 149.7 |
| 2.50 | 2 | 140 | 0.036 | 0.080 | 2.500 | 17825 | 1285 | 256.7 |
| 3.00 | 2 | 140 | 0.044 | 0.090 | 3.000 | 14855 | 1305 | 352.9 |

| | | | | | | | | |
|------|---|----|-------|-------|-------|-------|-----|-------|
| 1.00 | 2 | 70 | 0.014 | 0.030 | 1.000 | 22280 | 625 | 18.7 |
| 1.20 | 2 | 70 | 0.016 | 0.040 | 1.200 | 18570 | 595 | 28.5 |
| 1.50 | 2 | 70 | 0.022 | 0.050 | 1.500 | 14855 | 655 | 49.0 |
| 2.00 | 2 | 70 | 0.026 | 0.060 | 2.000 | 11140 | 580 | 69.5 |
| 2.50 | 2 | 70 | 0.034 | 0.080 | 2.500 | 8915 | 605 | 121.2 |
| 3.00 | 2 | 70 | 0.040 | 0.090 | 3.000 | 7425 | 595 | 160.4 |

| | | | | | | | | |
|------|---|----|-------|-------|-------|-------|-----|-------|
| 1.00 | 2 | 50 | 0.012 | 0.030 | 1.000 | 15915 | 380 | 11.5 |
| 1.20 | 2 | 50 | 0.014 | 0.040 | 1.200 | 13265 | 370 | 17.8 |
| 1.50 | 2 | 50 | 0.020 | 0.050 | 1.500 | 10610 | 425 | 31.8 |
| 2.00 | 2 | 50 | 0.024 | 0.060 | 2.000 | 7960 | 380 | 45.8 |
| 2.50 | 2 | 50 | 0.030 | 0.080 | 2.500 | 6365 | 380 | 76.4 |
| 3.00 | 2 | 50 | 0.036 | 0.090 | 3.000 | 5305 | 380 | 103.1 |

Applicazione



Materiale

Acciaio
< 850 N/mm²



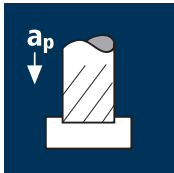
Ottone a truciolo corto
[CuZn]



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



Acciaio
< 850 N/mm²



Ottone a truciolo corto
[CuZn]



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



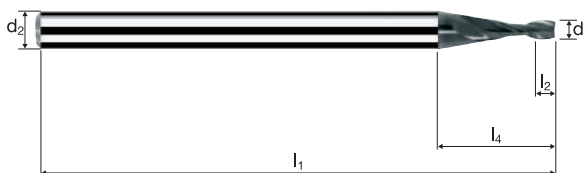
| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 0.20 | 2 | 26 | 0.002 | 0.200 | 0.040 | 41380 | 165 | 1.3 |
| 0.40 | 2 | 53 | 0.004 | 0.400 | 0.080 | 42175 | 335 | 10.8 |
| 0.50 | 2 | 66 | 0.006 | 0.500 | 0.100 | 42015 | 505 | 25.2 |
| 0.60 | 2 | 79 | 0.008 | 0.600 | 0.120 | 41910 | 670 | 48.3 |
| 0.80 | 2 | 106 | 0.010 | 0.800 | 0.160 | 42175 | 845 | 108.0 |
| 1.00 | 2 | 132 | 0.012 | 1.000 | 0.200 | 42015 | 1010 | 201.7 |
| 1.20 | 2 | 158 | 0.014 | 1.200 | 0.240 | 41910 | 1175 | 338.0 |
| 1.50 | 2 | 180 | 0.018 | 1.500 | 0.300 | 38195 | 1375 | 618.8 |
| 1.80 | 2 | 180 | 0.022 | 1.800 | 0.360 | 31830 | 1400 | 907.6 |
| 0.20 | 2 | 26 | 0.002 | 0.200 | 0.040 | 41380 | 165 | 1.3 |
| 0.40 | 2 | 53 | 0.004 | 0.400 | 0.080 | 42175 | 335 | 10.8 |
| 0.50 | 2 | 66 | 0.006 | 0.500 | 0.100 | 42015 | 505 | 25.2 |
| 0.60 | 2 | 79 | 0.008 | 0.600 | 0.120 | 41910 | 670 | 48.3 |
| 0.80 | 2 | 106 | 0.012 | 0.800 | 0.160 | 42175 | 1010 | 129.6 |
| 1.00 | 2 | 132 | 0.014 | 1.000 | 0.200 | 42015 | 1175 | 235.3 |
| 1.20 | 2 | 158 | 0.016 | 1.200 | 0.240 | 41910 | 1340 | 386.2 |
| 1.50 | 2 | 190 | 0.020 | 1.500 | 0.300 | 40320 | 1615 | 725.7 |
| 1.80 | 2 | 190 | 0.024 | 1.800 | 0.360 | 33600 | 1615 | 1045.1 |
| 0.20 | 2 | 26 | 0.002 | 0.200 | 0.040 | 41380 | 165 | 1.3 |
| 0.40 | 2 | 53 | 0.004 | 0.400 | 0.080 | 42175 | 335 | 10.8 |
| 0.50 | 2 | 66 | 0.004 | 0.500 | 0.100 | 42015 | 335 | 16.8 |
| 0.60 | 2 | 70 | 0.006 | 0.600 | 0.120 | 37135 | 445 | 32.1 |
| 0.80 | 2 | 70 | 0.008 | 0.800 | 0.160 | 27850 | 445 | 57.0 |
| 1.00 | 2 | 70 | 0.010 | 1.000 | 0.200 | 22280 | 445 | 89.1 |
| 1.20 | 2 | 70 | 0.012 | 1.200 | 0.240 | 18570 | 445 | 128.3 |
| 1.50 | 2 | 70 | 0.014 | 1.500 | 0.300 | 14855 | 415 | 187.2 |
| 1.80 | 2 | 70 | 0.018 | 1.800 | 0.360 | 12380 | 445 | 288.8 |
| 0.20 | 2 | 26 | 0.002 | 0.200 | 0.040 | 41380 | 165 | 1.3 |
| 0.40 | 2 | 50 | 0.002 | 0.400 | 0.080 | 39790 | 160 | 5.1 |
| 0.50 | 2 | 50 | 0.004 | 0.500 | 0.100 | 31830 | 255 | 12.7 |
| 0.60 | 2 | 50 | 0.006 | 0.600 | 0.120 | 26525 | 320 | 22.9 |
| 0.80 | 2 | 50 | 0.008 | 0.800 | 0.160 | 19895 | 320 | 40.7 |
| 1.00 | 2 | 50 | 0.008 | 1.000 | 0.200 | 15915 | 255 | 50.9 |
| 1.20 | 2 | 50 | 0.010 | 1.200 | 0.240 | 13265 | 265 | 76.4 |
| 1.50 | 2 | 50 | 0.012 | 1.500 | 0.300 | 10610 | 255 | 114.6 |
| 1.80 | 2 | 50 | 0.016 | 1.800 | 0.360 | 8840 | 285 | 183.3 |
| 0.20 | 2 | 26 | 0.002 | 0.040 | 0.200 | 41380 | 165 | 1.3 |
| 0.40 | 2 | 53 | 0.004 | 0.080 | 0.400 | 42175 | 335 | 10.8 |
| 0.50 | 2 | 66 | 0.006 | 0.100 | 0.500 | 42015 | 505 | 25.2 |
| 0.60 | 2 | 79 | 0.006 | 0.120 | 0.600 | 41910 | 505 | 36.2 |
| 0.80 | 2 | 106 | 0.008 | 0.160 | 0.800 | 42175 | 675 | 86.4 |
| 1.00 | 2 | 132 | 0.012 | 0.200 | 1.000 | 42015 | 1010 | 201.7 |
| 1.20 | 2 | 158 | 0.014 | 0.240 | 1.200 | 41910 | 1175 | 338.0 |
| 1.50 | 2 | 160 | 0.016 | 0.300 | 1.500 | 33955 | 1085 | 488.9 |
| 1.80 | 2 | 160 | 0.020 | 0.360 | 1.800 | 28295 | 1130 | 733.4 |
| 0.20 | 2 | 26 | 0.002 | 0.040 | 0.200 | 41380 | 165 | 1.3 |
| 0.40 | 2 | 53 | 0.004 | 0.080 | 0.400 | 42175 | 335 | 10.8 |
| 0.50 | 2 | 66 | 0.006 | 0.100 | 0.500 | 42015 | 505 | 25.2 |
| 0.60 | 2 | 79 | 0.006 | 0.120 | 0.600 | 41910 | 505 | 36.2 |
| 0.80 | 2 | 106 | 0.008 | 0.160 | 0.800 | 42175 | 675 | 86.4 |
| 1.00 | 2 | 132 | 0.012 | 0.200 | 1.000 | 42015 | 1010 | 201.7 |
| 1.20 | 2 | 158 | 0.014 | 0.240 | 1.200 | 41910 | 1175 | 338.0 |
| 1.50 | 2 | 170 | 0.016 | 0.300 | 1.500 | 36075 | 1155 | 519.5 |
| 1.80 | 2 | 170 | 0.022 | 0.360 | 1.800 | 30065 | 1325 | 857.1 |
| 0.20 | 2 | 26 | 0.002 | 0.040 | 0.200 | 41380 | 165 | 1.3 |
| 0.40 | 2 | 53 | 0.004 | 0.080 | 0.400 | 42175 | 335 | 10.8 |
| 0.50 | 2 | 60 | 0.006 | 0.100 | 0.500 | 38195 | 460 | 22.9 |
| 0.60 | 2 | 60 | 0.006 | 0.120 | 0.600 | 31830 | 380 | 27.5 |
| 0.80 | 2 | 60 | 0.008 | 0.160 | 0.800 | 23875 | 380 | 48.9 |
| 1.00 | 2 | 60 | 0.010 | 0.200 | 1.000 | 19100 | 380 | 76.4 |
| 1.20 | 2 | 60 | 0.012 | 0.240 | 1.200 | 15915 | 380 | 110.0 |
| 1.50 | 2 | 60 | 0.014 | 0.300 | 1.500 | 12730 | 355 | 160.4 |
| 1.80 | 2 | 60 | 0.018 | 0.360 | 1.800 | 10610 | 380 | 247.5 |
| 0.20 | 2 | 26 | 0.002 | 0.040 | 0.200 | 41380 | 165 | 1.3 |
| 0.40 | 2 | 40 | 0.004 | 0.080 | 0.400 | 31830 | 255 | 8.1 |
| 0.50 | 2 | 40 | 0.004 | 0.100 | 0.500 | 25465 | 205 | 10.2 |
| 0.60 | 2 | 40 | 0.004 | 0.120 | 0.600 | 21220 | 170 | 12.2 |
| 0.80 | 2 | 40 | 0.006 | 0.160 | 0.800 | 15915 | 190 | 24.4 |
| 1.00 | 2 | 40 | 0.010 | 0.200 | 1.000 | 12730 | 255 | 50.9 |
| 1.20 | 2 | 40 | 0.012 | 0.240 | 1.200 | 10610 | 255 | 73.3 |
| 1.50 | 2 | 40 | 0.012 | 0.300 | 1.500 | 8490 | 205 | 91.7 |
| 1.80 | 2 | 40 | 0.016 | 0.360 | 1.800 | 7075 | 225 | 146.7 |

Frese cilindriche

Gambo \varnothing 3mm, 1.5xd



HM
MG10 λ 30°
 γ 8°

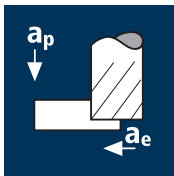


ReTool®

| | | | | | | | | | |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|---|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | | | | | Inox Stainless | Ti Titanium | CuZn Brass Gold / Platinum Copper |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|---|

| Esempio: N° Ordine | | | | | | | | | MICRO |
|---|---------------------|-------------|-------|-------|-------|----------|-----|--|--------|
| Rivestimento Articolo Codice- \varnothing | | | | | | | | | |
| M 45709 010 | | | | | | | | | M45709 |
| \varnothing Code | d_1 ± 0.01 | d_2 h6 | l_1 | l_2 | l_4 | α | z | | EUR |
| 010 | 0.10 | 3.00 | 40 | 0.15 | 6.01 | 14.5° | 2 | | 45.40 |
| 015 | 0.15 | 3.00 | 40 | 0.23 | 5.99 | 14.5° | 2 | | 45.40 |
| 020 | 0.20 | 3.00 | 40 | 0.30 | 5.97 | 14.5° | 2 | | 41.90 |
| 025 | 0.25 | 3.00 | 40 | 0.38 | 5.96 | 14.0° | 2 | | 41.90 |
| 030 | 0.30 | 3.00 | 40 | 0.45 | 5.93 | 14.0° | 2 | | 38.40 |
| 040 | 0.40 | 3.00 | 40 | 0.60 | 5.90 | 13.5° | 2 | | 36.70 |
| 050 | 0.50 | 3.00 | 40 | 0.75 | 5.86 | 13.0° | 2 | | 36.70 |
| 060 | 0.60 | 3.00 | 40 | 0.90 | 5.82 | 12.5° | 2 | | 34.90 |
| 070 | 0.70 | 3.00 | 40 | 1.05 | 5.79 | 12.5° | 2 | | 34.90 |
| 080 | 0.80 | 3.00 | 40 | 1.20 | 5.75 | 12.0° | 2 | | 34.90 |
| 090 | 0.90 | 3.00 | 40 | 1.35 | 5.71 | 11.5° | 2 | | 34.90 |
| 100 | 1.00 | 3.00 | 40 | 1.50 | 5.68 | 11.0° | 2 | | 34.90 |
| 104 | 1.10 | 3.00 | 40 | 1.65 | 5.69 | 10.5° | 2 | | 34.90 |
| 108 | 1.20 | 3.00 | 40 | 1.80 | 5.65 | 10.0° | 2 | | 34.90 |
| 112 | 1.30 | 3.00 | 40 | 1.95 | 5.62 | 9.5° | 2 | | 34.90 |
| 116 | 1.40 | 3.00 | 40 | 2.10 | 5.58 | 9.0° | 2 | | 34.90 |
| 120 | 1.50 | 3.00 | 40 | 2.25 | 5.54 | 8.5° | 2 | | 34.90 |
| 123 | 1.60 | 3.00 | 40 | 2.40 | 5.51 | 8.0° | 2 | | 34.90 |
| 126 | 1.70 | 3.00 | 40 | 2.55 | 5.47 | 7.5° | 2 | | 34.90 |
| 130 | 1.80 | 3.00 | 40 | 2.70 | 5.43 | 7.0° | 2 | | 34.90 |
| 135 | 1.90 | 3.00 | 40 | 2.85 | 5.40 | 6.5° | 2 | | 34.90 |

Applicazione



Materiale

Acciaio
< 850 N/mm²



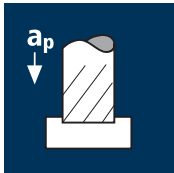
Ottone a truciolo corto
[CuZn]



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



Acciaio
< 850 N/mm²



Ottone a truciolo corto
[CuZn]



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

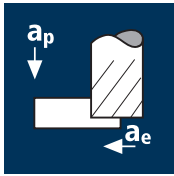


Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 2.00 | 2 | 180 | 0.024 | 2.000 | 0.400 | 28650 | 1375 | 1.1 |
| 2.10 | 2 | 180 | 0.024 | 2.100 | 0.420 | 27285 | 1310 | 1.2 |
| 2.20 | 2 | 180 | 0.026 | 2.200 | 0.440 | 26045 | 1355 | 1.3 |
| 2.30 | 2 | 180 | 0.028 | 2.300 | 0.460 | 24910 | 1395 | 1.5 |
| 2.40 | 2 | 180 | 0.028 | 2.400 | 0.480 | 23875 | 1335 | 1.5 |
| 2.50 | 2 | 180 | 0.030 | 2.500 | 0.500 | 22920 | 1375 | 1.7 |
| 2.60 | 2 | 180 | 0.030 | 2.600 | 0.520 | 22035 | 1320 | 1.8 |
| 2.70 | 2 | 180 | 0.032 | 2.700 | 0.540 | 21220 | 1360 | 2.0 |
| 2.80 | 2 | 180 | 0.032 | 2.800 | 0.560 | 20465 | 1310 | 2.1 |
| 2.00 | 2 | 190 | 0.026 | 2.000 | 0.400 | 30240 | 1570 | 1.3 |
| 2.10 | 2 | 190 | 0.026 | 2.100 | 0.420 | 28800 | 1500 | 1.3 |
| 2.20 | 2 | 190 | 0.028 | 2.200 | 0.440 | 27490 | 1540 | 1.5 |
| 2.30 | 2 | 190 | 0.030 | 2.300 | 0.460 | 26295 | 1580 | 1.7 |
| 2.40 | 2 | 190 | 0.030 | 2.400 | 0.480 | 25200 | 1510 | 1.7 |
| 2.50 | 2 | 190 | 0.034 | 2.500 | 0.500 | 24190 | 1645 | 2.1 |
| 2.60 | 2 | 190 | 0.034 | 2.600 | 0.520 | 23260 | 1580 | 2.1 |
| 2.70 | 2 | 190 | 0.036 | 2.700 | 0.540 | 22400 | 1615 | 2.4 |
| 2.80 | 2 | 190 | 0.036 | 2.800 | 0.560 | 21600 | 1555 | 2.4 |
| 2.00 | 2 | 70 | 0.020 | 2.000 | 0.400 | 11140 | 445 | 0.4 |
| 2.10 | 2 | 70 | 0.020 | 2.100 | 0.420 | 10610 | 425 | 0.4 |
| 2.20 | 2 | 70 | 0.020 | 2.200 | 0.440 | 10130 | 405 | 0.4 |
| 2.30 | 2 | 70 | 0.022 | 2.300 | 0.460 | 9690 | 425 | 0.5 |
| 2.40 | 2 | 70 | 0.022 | 2.400 | 0.480 | 9285 | 410 | 0.5 |
| 2.50 | 2 | 70 | 0.024 | 2.500 | 0.500 | 8915 | 430 | 0.5 |
| 2.60 | 2 | 70 | 0.024 | 2.600 | 0.520 | 8570 | 410 | 0.6 |
| 2.70 | 2 | 70 | 0.026 | 2.700 | 0.540 | 8250 | 430 | 0.6 |
| 2.80 | 2 | 70 | 0.026 | 2.800 | 0.560 | 7960 | 415 | 0.6 |
| 2.00 | 2 | 50 | 0.016 | 2.000 | 0.400 | 7960 | 255 | 0.2 |
| 2.10 | 2 | 50 | 0.016 | 2.100 | 0.420 | 7580 | 245 | 0.2 |
| 2.20 | 2 | 50 | 0.018 | 2.200 | 0.440 | 7235 | 260 | 0.3 |
| 2.30 | 2 | 50 | 0.020 | 2.300 | 0.460 | 6920 | 275 | 0.3 |
| 2.40 | 2 | 50 | 0.020 | 2.400 | 0.480 | 6630 | 265 | 0.3 |
| 2.50 | 2 | 50 | 0.022 | 2.500 | 0.500 | 6365 | 280 | 0.4 |
| 2.60 | 2 | 50 | 0.022 | 2.600 | 0.520 | 6120 | 270 | 0.4 |
| 2.70 | 2 | 50 | 0.022 | 2.700 | 0.540 | 5895 | 260 | 0.4 |
| 2.80 | 2 | 50 | 0.022 | 2.800 | 0.560 | 5685 | 250 | 0.4 |
| 2.00 | 2 | 160 | 0.022 | 0.400 | 2.000 | 25465 | 1120 | 0.9 |
| 2.10 | 2 | 160 | 0.024 | 0.420 | 2.100 | 24250 | 1165 | 1.0 |
| 2.20 | 2 | 160 | 0.024 | 0.440 | 2.200 | 23150 | 1110 | 1.1 |
| 2.30 | 2 | 160 | 0.026 | 0.460 | 2.300 | 22145 | 1150 | 1.2 |
| 2.40 | 2 | 160 | 0.026 | 0.480 | 2.400 | 21220 | 1105 | 1.3 |
| 2.50 | 2 | 160 | 0.028 | 0.500 | 2.500 | 20370 | 1140 | 1.4 |
| 2.60 | 2 | 160 | 0.028 | 0.520 | 2.600 | 19590 | 1095 | 1.5 |
| 2.70 | 2 | 160 | 0.030 | 0.540 | 2.700 | 18865 | 1130 | 1.7 |
| 2.80 | 2 | 160 | 0.032 | 0.560 | 2.800 | 18190 | 1165 | 1.8 |
| 2.00 | 2 | 170 | 0.024 | 0.400 | 2.000 | 27055 | 1300 | 1.0 |
| 2.10 | 2 | 170 | 0.026 | 0.420 | 2.100 | 25770 | 1340 | 1.2 |
| 2.20 | 2 | 170 | 0.026 | 0.440 | 2.200 | 24595 | 1280 | 1.2 |
| 2.30 | 2 | 170 | 0.028 | 0.460 | 2.300 | 23525 | 1320 | 1.4 |
| 2.40 | 2 | 170 | 0.028 | 0.480 | 2.400 | 22545 | 1265 | 1.5 |
| 2.50 | 2 | 170 | 0.030 | 0.500 | 2.500 | 21645 | 1300 | 1.6 |
| 2.60 | 2 | 170 | 0.030 | 0.520 | 2.600 | 20815 | 1250 | 1.7 |
| 2.70 | 2 | 170 | 0.032 | 0.540 | 2.700 | 20040 | 1285 | 1.9 |
| 2.80 | 2 | 170 | 0.034 | 0.560 | 2.800 | 19325 | 1315 | 2.1 |
| 2.00 | 2 | 60 | 0.020 | 0.400 | 2.000 | 9550 | 380 | 0.3 |
| 2.10 | 2 | 60 | 0.022 | 0.420 | 2.100 | 9095 | 400 | 0.4 |
| 2.20 | 2 | 60 | 0.022 | 0.440 | 2.200 | 8680 | 380 | 0.4 |
| 2.30 | 2 | 60 | 0.022 | 0.460 | 2.300 | 8305 | 365 | 0.4 |
| 2.40 | 2 | 60 | 0.022 | 0.480 | 2.400 | 7960 | 350 | 0.4 |
| 2.50 | 2 | 60 | 0.024 | 0.500 | 2.500 | 7640 | 365 | 0.5 |
| 2.60 | 2 | 60 | 0.024 | 0.520 | 2.600 | 7345 | 355 | 0.5 |
| 2.70 | 2 | 60 | 0.026 | 0.540 | 2.700 | 7075 | 370 | 0.5 |
| 2.80 | 2 | 60 | 0.028 | 0.560 | 2.800 | 6820 | 380 | 0.6 |
| 2.00 | 2 | 40 | 0.018 | 0.400 | 2.000 | 6365 | 230 | 0.2 |
| 2.10 | 2 | 40 | 0.020 | 0.420 | 2.100 | 6065 | 245 | 0.2 |
| 2.20 | 2 | 40 | 0.020 | 0.440 | 2.200 | 5785 | 230 | 0.2 |
| 2.30 | 2 | 40 | 0.020 | 0.460 | 2.300 | 5535 | 220 | 0.2 |
| 2.40 | 2 | 40 | 0.020 | 0.480 | 2.400 | 5305 | 210 | 0.2 |
| 2.50 | 2 | 40 | 0.022 | 0.500 | 2.500 | 5095 | 225 | 0.3 |
| 2.60 | 2 | 40 | 0.022 | 0.520 | 2.600 | 4895 | 215 | 0.3 |
| 2.70 | 2 | 40 | 0.024 | 0.540 | 2.700 | 4715 | 225 | 0.3 |
| 2.80 | 2 | 40 | 0.026 | 0.560 | 2.800 | 4545 | 235 | 0.4 |

Applicazione



Materiale

Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 0.30 | 2 | 40 | 0.006 | 0.240 | 0.050 | 42440 | 510 | 6.1 |
| 0.50 | 2 | 66 | 0.010 | 0.400 | 0.080 | 42015 | 840 | 26.9 |
| 0.60 | 2 | 79 | 0.010 | 0.480 | 0.090 | 41910 | 840 | 36.2 |
| 0.80 | 2 | 106 | 0.014 | 0.640 | 0.120 | 42175 | 1180 | 90.7 |
| 1.00 | 2 | 132 | 0.018 | 0.800 | 0.150 | 42015 | 1515 | 181.5 |
| 1.20 | 2 | 158 | 0.022 | 0.960 | 0.180 | 41910 | 1845 | 318.7 |
| 1.50 | 2 | 180 | 0.028 | 1.200 | 0.230 | 38195 | 2140 | 590.4 |
| 1.80 | 2 | 180 | 0.032 | 1.440 | 0.270 | 31830 | 2035 | 792.1 |
| 2.00 | 2 | 180 | 0.036 | 1.600 | 0.300 | 28650 | 2065 | 990.1 |

Acciaio
850 - 1100 N/mm²



| | | | | | | | | |
|------|---|-----|-------|-------|-------|-------|------|-------|
| 0.30 | 2 | 40 | 0.006 | 0.240 | 0.050 | 42440 | 510 | 6.1 |
| 0.50 | 2 | 66 | 0.010 | 0.400 | 0.080 | 42015 | 840 | 26.9 |
| 0.60 | 2 | 79 | 0.010 | 0.480 | 0.090 | 41910 | 840 | 36.2 |
| 0.80 | 2 | 106 | 0.012 | 0.640 | 0.120 | 42175 | 1010 | 77.7 |
| 1.00 | 2 | 132 | 0.016 | 0.800 | 0.150 | 42015 | 1345 | 161.3 |
| 1.20 | 2 | 158 | 0.020 | 0.960 | 0.180 | 41910 | 1675 | 289.7 |
| 1.50 | 2 | 160 | 0.026 | 1.200 | 0.230 | 33955 | 1765 | 487.3 |
| 1.80 | 2 | 160 | 0.028 | 1.440 | 0.270 | 28295 | 1585 | 616.0 |
| 2.00 | 2 | 160 | 0.032 | 1.600 | 0.300 | 25465 | 1630 | 782.3 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

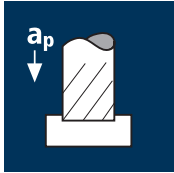


| | | | | | | | | |
|------|---|----|-------|-------|-------|-------|-----|-------|
| 0.30 | 2 | 40 | 0.004 | 0.240 | 0.050 | 42440 | 340 | 4.1 |
| 0.50 | 2 | 66 | 0.008 | 0.400 | 0.080 | 42015 | 670 | 21.5 |
| 0.60 | 2 | 70 | 0.008 | 0.480 | 0.090 | 37135 | 595 | 25.7 |
| 0.80 | 2 | 70 | 0.012 | 0.640 | 0.120 | 27850 | 670 | 51.3 |
| 1.00 | 2 | 70 | 0.014 | 0.800 | 0.150 | 22280 | 625 | 74.9 |
| 1.20 | 2 | 70 | 0.018 | 0.960 | 0.180 | 18570 | 670 | 115.5 |
| 1.50 | 2 | 70 | 0.022 | 1.200 | 0.230 | 14855 | 655 | 180.4 |
| 1.80 | 2 | 70 | 0.026 | 1.440 | 0.270 | 12380 | 645 | 250.3 |
| 2.00 | 2 | 70 | 0.028 | 1.600 | 0.300 | 11140 | 625 | 299.5 |

Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]



| | | | | | | | | |
|------|---|----|-------|-------|-------|-------|-----|-------|
| 0.30 | 2 | 40 | 0.004 | 0.240 | 0.050 | 42440 | 340 | 4.1 |
| 0.50 | 2 | 60 | 0.008 | 0.400 | 0.080 | 38195 | 610 | 19.6 |
| 0.60 | 2 | 60 | 0.008 | 0.480 | 0.090 | 31830 | 510 | 22.0 |
| 0.80 | 2 | 60 | 0.010 | 0.640 | 0.120 | 23875 | 475 | 36.7 |
| 1.00 | 2 | 60 | 0.012 | 0.800 | 0.150 | 19100 | 460 | 55.0 |
| 1.20 | 2 | 60 | 0.016 | 0.960 | 0.180 | 15915 | 510 | 88.0 |
| 1.50 | 2 | 60 | 0.020 | 1.200 | 0.230 | 12730 | 510 | 140.6 |
| 1.80 | 2 | 60 | 0.022 | 1.440 | 0.270 | 10610 | 465 | 181.5 |
| 2.00 | 2 | 60 | 0.026 | 1.600 | 0.300 | 9550 | 495 | 238.4 |



Acciaio
< 850 N/mm²



| | | | | | | | | |
|------|---|-----|-------|-------|-------|-------|------|-------|
| 0.30 | 2 | 40 | 0.006 | 0.040 | 0.300 | 42440 | 510 | 6.1 |
| 0.50 | 2 | 66 | 0.008 | 0.060 | 0.500 | 42015 | 670 | 20.2 |
| 0.60 | 2 | 79 | 0.010 | 0.070 | 0.600 | 41910 | 840 | 35.2 |
| 0.80 | 2 | 106 | 0.014 | 0.100 | 0.800 | 42175 | 1180 | 94.5 |
| 1.00 | 2 | 132 | 0.016 | 0.120 | 1.000 | 42015 | 1345 | 161.3 |
| 1.20 | 2 | 158 | 0.020 | 0.140 | 1.200 | 41910 | 1675 | 281.6 |
| 1.50 | 2 | 160 | 0.026 | 0.180 | 1.500 | 33955 | 1765 | 476.7 |
| 1.80 | 2 | 160 | 0.030 | 0.220 | 1.800 | 28295 | 1700 | 672.3 |
| 2.00 | 2 | 160 | 0.034 | 0.240 | 2.000 | 25465 | 1730 | 831.2 |

Acciaio
850 - 1100 N/mm²



| | | | | | | | | |
|------|---|-----|-------|-------|-------|-------|------|-------|
| 0.30 | 2 | 40 | 0.006 | 0.040 | 0.300 | 42440 | 510 | 6.1 |
| 0.50 | 2 | 66 | 0.008 | 0.060 | 0.500 | 42015 | 670 | 20.2 |
| 0.60 | 2 | 79 | 0.010 | 0.070 | 0.600 | 41910 | 840 | 35.2 |
| 0.80 | 2 | 106 | 0.014 | 0.100 | 0.800 | 42175 | 1180 | 94.5 |
| 1.00 | 2 | 132 | 0.016 | 0.120 | 1.000 | 42015 | 1345 | 161.3 |
| 1.20 | 2 | 140 | 0.020 | 0.140 | 1.200 | 37135 | 1485 | 249.6 |
| 1.50 | 2 | 140 | 0.024 | 0.180 | 1.500 | 29710 | 1425 | 385.0 |
| 1.80 | 2 | 140 | 0.028 | 0.220 | 1.800 | 24755 | 1385 | 549.0 |
| 2.00 | 2 | 140 | 0.032 | 0.240 | 2.000 | 22280 | 1425 | 684.5 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| | | | | | | | | |
|------|---|----|-------|-------|-------|-------|-----|-------|
| 0.30 | 2 | 40 | 0.006 | 0.040 | 0.300 | 42440 | 510 | 6.1 |
| 0.50 | 2 | 60 | 0.008 | 0.060 | 0.500 | 38195 | 610 | 18.3 |
| 0.60 | 2 | 60 | 0.008 | 0.070 | 0.600 | 31830 | 510 | 21.4 |
| 0.80 | 2 | 60 | 0.012 | 0.100 | 0.800 | 23875 | 575 | 45.8 |
| 1.00 | 2 | 60 | 0.014 | 0.120 | 1.000 | 19100 | 535 | 64.2 |
| 1.20 | 2 | 60 | 0.018 | 0.140 | 1.200 | 15915 | 575 | 96.3 |
| 1.50 | 2 | 60 | 0.022 | 0.180 | 1.500 | 12730 | 560 | 151.3 |
| 1.80 | 2 | 60 | 0.026 | 0.220 | 1.800 | 10610 | 550 | 218.5 |
| 2.00 | 2 | 60 | 0.030 | 0.240 | 2.000 | 9550 | 575 | 275.0 |

Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]



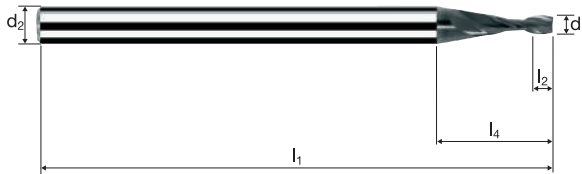
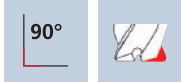
| | | | | | | | | |
|------|---|----|-------|-------|-------|-------|-----|-------|
| 0.30 | 2 | 40 | 0.004 | 0.040 | 0.300 | 42440 | 340 | 4.1 |
| 0.50 | 2 | 50 | 0.006 | 0.060 | 0.500 | 31830 | 380 | 11.5 |
| 0.60 | 2 | 50 | 0.008 | 0.070 | 0.600 | 26525 | 425 | 17.8 |
| 0.80 | 2 | 50 | 0.012 | 0.100 | 0.800 | 19895 | 475 | 38.2 |
| 1.00 | 2 | 50 | 0.012 | 0.120 | 1.000 | 15915 | 380 | 45.8 |
| 1.20 | 2 | 50 | 0.016 | 0.140 | 1.200 | 13265 | 425 | 71.3 |
| 1.50 | 2 | 50 | 0.020 | 0.180 | 1.500 | 10610 | 425 | 114.6 |
| 1.80 | 2 | 50 | 0.024 | 0.220 | 1.800 | 8840 | 425 | 168.1 |
| 2.00 | 2 | 50 | 0.028 | 0.240 | 2.000 | 7960 | 445 | 213.9 |

Frese cilindriche

Gambo \varnothing 3mm, 3xd



HM λ 30°
MG10 γ 12°

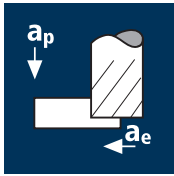


ReTool®

| | | | | | | | | | |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|---------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | | | | | Inox Stainless | Ti Titanium | Copper Aluminium |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|---------------------|

| Esempio: N° Ordine | | | | | | | | | MICRO | |
|-----------------------|---------------------|-------------|-------|-------|-------|----------|---|-------|-------|--------|
| | | | | | | | | | 5710 | M45710 |
| \varnothing Code | d_1 ± 0.01 | d_2 h6 | l_1 | l_2 | l_4 | α | z | EUR | EUR | |
| 030 | 0.30 | 3.00 | 40 | 1.00 | 8.97 | 9.0° | 2 | 34.50 | 39.40 | |
| 040 | 0.40 | 3.00 | 40 | 1.00 | 8.69 | 9.0° | 2 | 32.90 | 37.60 | |
| 050 | 0.50 | 3.00 | 40 | 1.50 | 8.90 | 8.5° | 2 | 32.90 | 37.60 | |
| 060 | 0.60 | 3.00 | 40 | 1.50 | 8.62 | 8.5° | 2 | 31.30 | 35.80 | |
| 070 | 0.70 | 3.00 | 40 | 2.00 | 8.83 | 8.0° | 2 | 31.30 | 35.80 | |
| 080 | 0.80 | 3.00 | 40 | 2.00 | 8.55 | 8.0° | 2 | 31.30 | 35.80 | |
| 090 | 0.90 | 3.00 | 40 | 2.50 | 8.77 | 7.5° | 2 | 31.30 | 35.80 | |
| 100 | 1.00 | 3.00 | 40 | 3.00 | 8.98 | 7.0° | 2 | 31.30 | 35.80 | |
| 104 | 1.10 | 3.00 | 40 | 3.00 | 8.75 | 6.5° | 2 | 31.30 | 35.80 | |
| 108 | 1.20 | 3.00 | 40 | 4.00 | 9.47 | 6.0° | 2 | 31.30 | 35.80 | |
| 112 | 1.30 | 3.00 | 40 | 4.00 | 9.18 | 5.5° | 2 | 31.30 | 35.80 | |
| 116 | 1.40 | 3.00 | 40 | 4.00 | 8.90 | 5.5° | 2 | 31.30 | 35.80 | |
| 120 | 1.50 | 3.00 | 40 | 4.00 | 8.62 | 5.5° | 2 | 31.30 | 35.80 | |
| 123 | 1.60 | 3.00 | 40 | 5.00 | 9.33 | 4.5° | 2 | 31.30 | 35.80 | |
| 126 | 1.70 | 3.00 | 40 | 5.00 | 7.41 | 5.5° | 2 | 31.30 | 35.80 | |
| 130 | 1.80 | 3.00 | 40 | 5.00 | 7.28 | 5.5° | 2 | 31.30 | 35.80 | |
| 135 | 1.90 | 3.00 | 40 | 5.00 | 7.14 | 5.0° | 2 | 31.30 | 35.80 | |
| 140 | 2.00 | 3.00 | 40 | 5.00 | 7.00 | 4.5° | 2 | 31.30 | 35.80 | |

Applicazione



Materiale

Acciaio
< 850 N/mm²



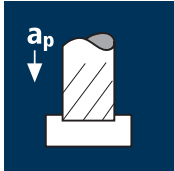
Acciaio
850 - 1100 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]



Acciaio
< 850 N/mm²



Acciaio
850 - 1100 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 2.10 | 2 | 180 | 0.038 | 1.680 | 0.320 | 27285 | 2075 | 1.1 |
| 2.20 | 2 | 180 | 0.040 | 1.760 | 0.330 | 26045 | 2085 | 1.2 |
| 2.30 | 2 | 180 | 0.042 | 1.840 | 0.350 | 24910 | 2095 | 1.3 |
| 2.40 | 2 | 180 | 0.044 | 1.920 | 0.360 | 23875 | 2100 | 1.5 |
| 2.50 | 2 | 180 | 0.046 | 2.000 | 0.380 | 22920 | 2110 | 1.6 |
| 3.00 | 2 | 180 | 0.054 | 2.400 | 0.450 | 19100 | 2065 | 2.2 |

| | | | | | | | | |
|------|---|-----|-------|-------|-------|-------|------|-----|
| 2.10 | 2 | 160 | 0.034 | 1.680 | 0.320 | 24250 | 1650 | 0.9 |
| 2.20 | 2 | 160 | 0.036 | 1.760 | 0.330 | 23150 | 1665 | 1.0 |
| 2.30 | 2 | 160 | 0.038 | 1.840 | 0.350 | 22145 | 1685 | 1.1 |
| 2.40 | 2 | 160 | 0.040 | 1.920 | 0.360 | 21220 | 1700 | 1.2 |
| 2.50 | 2 | 160 | 0.042 | 2.000 | 0.380 | 20370 | 1710 | 1.3 |
| 3.00 | 2 | 160 | 0.048 | 2.400 | 0.450 | 16975 | 1630 | 1.8 |

| | | | | | | | | |
|------|---|----|-------|-------|-------|-------|-----|-----|
| 2.10 | 2 | 70 | 0.030 | 1.680 | 0.320 | 10610 | 635 | 0.3 |
| 2.20 | 2 | 70 | 0.032 | 1.760 | 0.330 | 10130 | 650 | 0.4 |
| 2.30 | 2 | 70 | 0.034 | 1.840 | 0.350 | 9690 | 660 | 0.4 |
| 2.40 | 2 | 70 | 0.036 | 1.920 | 0.360 | 9285 | 670 | 0.5 |
| 2.50 | 2 | 70 | 0.036 | 2.000 | 0.380 | 8915 | 640 | 0.5 |
| 3.00 | 2 | 70 | 0.044 | 2.400 | 0.450 | 7425 | 655 | 0.7 |

| | | | | | | | | |
|------|---|----|-------|-------|-------|------|-----|-----|
| 2.10 | 2 | 60 | 0.026 | 1.680 | 0.320 | 9095 | 475 | 0.3 |
| 2.20 | 2 | 60 | 0.028 | 1.760 | 0.330 | 8680 | 485 | 0.3 |
| 2.30 | 2 | 60 | 0.030 | 1.840 | 0.350 | 8305 | 500 | 0.3 |
| 2.40 | 2 | 60 | 0.030 | 1.920 | 0.360 | 7960 | 475 | 0.3 |
| 2.50 | 2 | 60 | 0.032 | 2.000 | 0.380 | 7640 | 490 | 0.4 |
| 3.00 | 2 | 60 | 0.038 | 2.400 | 0.450 | 6365 | 485 | 0.5 |

| | | | | | | | | |
|------|---|-----|-------|-------|-------|-------|------|-----|
| 2.10 | 2 | 160 | 0.036 | 0.250 | 2.100 | 24250 | 1745 | 0.9 |
| 2.20 | 2 | 160 | 0.036 | 0.260 | 2.200 | 23150 | 1665 | 1.0 |
| 2.30 | 2 | 160 | 0.038 | 0.280 | 2.300 | 22145 | 1685 | 1.1 |
| 2.40 | 2 | 160 | 0.040 | 0.290 | 2.400 | 21220 | 1700 | 1.2 |
| 2.50 | 2 | 160 | 0.042 | 0.300 | 2.500 | 20370 | 1710 | 1.3 |
| 3.00 | 2 | 160 | 0.050 | 0.360 | 3.000 | 16975 | 1700 | 1.8 |

| | | | | | | | | |
|------|---|-----|-------|-------|-------|-------|------|-----|
| 2.10 | 2 | 140 | 0.034 | 0.250 | 2.100 | 21220 | 1445 | 0.8 |
| 2.20 | 2 | 140 | 0.034 | 0.260 | 2.200 | 20255 | 1375 | 0.8 |
| 2.30 | 2 | 140 | 0.036 | 0.280 | 2.300 | 19375 | 1395 | 0.9 |
| 2.40 | 2 | 140 | 0.038 | 0.290 | 2.400 | 18570 | 1410 | 1.0 |
| 2.50 | 2 | 140 | 0.040 | 0.300 | 2.500 | 17825 | 1425 | 1.1 |
| 3.00 | 2 | 140 | 0.048 | 0.360 | 3.000 | 14855 | 1425 | 1.5 |

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|------|---|----|-------|-------|-------|------|-----|-----|
| 2.10 | 2 | 60 | 0.032 | 0.250 | 2.100 | 9095 | 580 | 0.3 |
| 2.20 | 2 | 60 | 0.032 | 0.260 | 2.200 | 8680 | 555 | 0.3 |
| 2.30 | 2 | 60 | 0.034 | 0.280 | 2.300 | 8305 | 565 | 0.4 |
| 2.40 | 2 | 60 | 0.036 | 0.290 | 2.400 | 7960 | 575 | 0.4 |
| 2.50 | 2 | 60 | 0.036 | 0.300 | 2.500 | 7640 | 550 | 0.4 |
| 3.00 | 2 | 60 | 0.044 | 0.360 | 3.000 | 6365 | 560 | 0.6 |

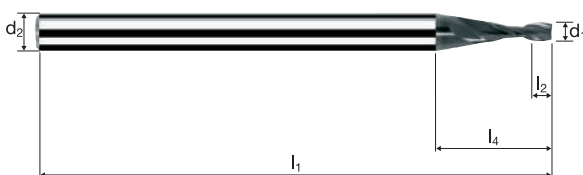
| | | | | | | | | |
|------|---|----|-------|-------|-------|------|-----|-----|
| 2.10 | 2 | 50 | 0.028 | 0.250 | 2.100 | 7580 | 425 | 0.2 |
| 2.20 | 2 | 50 | 0.028 | 0.260 | 2.200 | 7235 | 405 | 0.2 |
| 2.30 | 2 | 50 | 0.030 | 0.280 | 2.300 | 6920 | 415 | 0.3 |
| 2.40 | 2 | 50 | 0.032 | 0.290 | 2.400 | 6630 | 425 | 0.3 |
| 2.50 | 2 | 50 | 0.034 | 0.300 | 2.500 | 6365 | 435 | 0.3 |
| 3.00 | 2 | 50 | 0.040 | 0.360 | 3.000 | 5305 | 425 | 0.5 |

Frese cilindriche

Gambo ø 3mm, 3xd



HM λ 30°
MG10 γ 12°

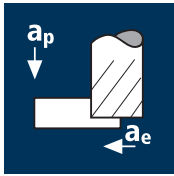


ReTool®

| | | | | | | | | | | |
|----------|-------------|--------------|--|--|--|--|--|-------------------|----------------|---------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | | | | | | Inox Stainless | Ti Titanium | Copper Aluminium |
|----------|-------------|--------------|--|--|--|--|--|-------------------|----------------|---------------------|

| | | | | | | | | | MICRO | |
|-----------------------|-------------------|-------|-------------------|-------|-----------------|------|---|-------|-------|--------|
| Esempio: N° Ordine | | | | | | | | | 5710 | M45710 |
| | Rivestimento M | | Articolo 45710 | | Codice-ø 143 | | | | EUR | EUR |
| Ø Code | d1 ±0.01 | d2 h6 | l1 | l2 | l4 | α | z | EUR | EUR | |
| 143 | 2.10 | 3.00 | 40 | 6.00 | 7.87 | 4.0° | 2 | 31.30 | 35.80 | |
| 146 | 2.20 | 3.00 | 40 | 6.00 | 7.73 | 3.5° | 2 | 31.30 | 35.80 | |
| 150 | 2.30 | 3.00 | 40 | 6.00 | 7.59 | 3.0° | 2 | 31.30 | 35.80 | |
| 155 | 2.40 | 3.00 | 40 | 6.00 | 7.45 | 2.5° | 2 | 31.30 | 35.80 | |
| 160 | 2.50 | 3.00 | 40 | 7.00 | 8.32 | 2.0° | 2 | 31.30 | 35.80 | |
| 180 | 3.00 | 4.00 | 44 | 10.00 | 12.36 | 2.5° | 2 | 31.30 | 35.80 | |
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Applicazione



Materiale

Acciaio
< 850 N/mm²



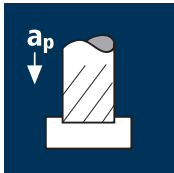
Ottone a truciolo corto
[CuZn]



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



Acciaio
< 850 N/mm²



Ottone a truciolo corto
[CuZn]



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



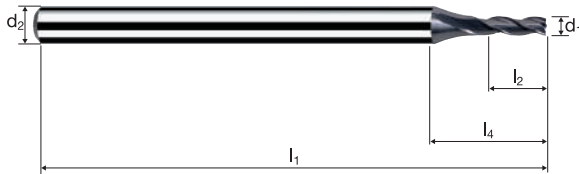
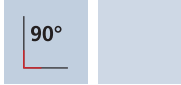
| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 0.40 | 3 | 53 | 0.004 | 0.480 | 0.040 | 42175 | 505 | 9.7 |
| 0.60 | 3 | 79 | 0.008 | 0.720 | 0.060 | 41910 | 1005 | 43.5 |
| 0.80 | 3 | 106 | 0.010 | 0.960 | 0.080 | 42175 | 1265 | 97.2 |
| 1.00 | 3 | 132 | 0.012 | 1.200 | 0.100 | 42015 | 1515 | 181.5 |
| 1.20 | 3 | 158 | 0.014 | 1.440 | 0.120 | 41910 | 1760 | 304.2 |
| 1.40 | 3 | 180 | 0.016 | 1.680 | 0.140 | 40925 | 1965 | 462.0 |
| 1.60 | 3 | 180 | 0.018 | 1.920 | 0.160 | 35810 | 1935 | 594.0 |
| 1.80 | 3 | 180 | 0.022 | 2.160 | 0.180 | 31830 | 2100 | 816.8 |
| 2.00 | 3 | 180 | 0.024 | 2.400 | 0.200 | 28650 | 2065 | 990.1 |
| 0.40 | 3 | 53 | 0.004 | 0.480 | 0.040 | 42175 | 505 | 9.7 |
| 0.60 | 3 | 79 | 0.008 | 0.720 | 0.060 | 41910 | 1005 | 43.5 |
| 0.80 | 3 | 106 | 0.012 | 0.960 | 0.080 | 42175 | 1520 | 116.6 |
| 1.00 | 3 | 132 | 0.014 | 1.200 | 0.100 | 42015 | 1765 | 211.8 |
| 1.20 | 3 | 158 | 0.016 | 1.440 | 0.120 | 41910 | 2010 | 347.6 |
| 1.40 | 3 | 185 | 0.018 | 1.680 | 0.140 | 42060 | 2270 | 534.2 |
| 1.60 | 3 | 190 | 0.020 | 1.920 | 0.160 | 37800 | 2270 | 696.7 |
| 1.80 | 3 | 190 | 0.024 | 2.160 | 0.180 | 33600 | 2420 | 940.6 |
| 2.00 | 3 | 190 | 0.026 | 2.400 | 0.200 | 30240 | 2360 | 1132.2 |
| 0.40 | 3 | 53 | 0.004 | 0.480 | 0.040 | 42175 | 505 | 9.7 |
| 0.60 | 3 | 70 | 0.006 | 0.720 | 0.060 | 37135 | 670 | 28.9 |
| 0.80 | 3 | 70 | 0.008 | 0.960 | 0.080 | 27850 | 670 | 51.3 |
| 1.00 | 3 | 70 | 0.010 | 1.200 | 0.100 | 22280 | 670 | 80.2 |
| 1.20 | 3 | 70 | 0.012 | 1.440 | 0.120 | 18570 | 670 | 115.5 |
| 1.40 | 3 | 70 | 0.012 | 1.680 | 0.140 | 15915 | 575 | 134.8 |
| 1.60 | 3 | 70 | 0.014 | 1.920 | 0.160 | 13925 | 585 | 179.7 |
| 1.80 | 3 | 70 | 0.018 | 2.160 | 0.180 | 12380 | 670 | 259.9 |
| 2.00 | 3 | 70 | 0.020 | 2.400 | 0.200 | 11140 | 670 | 320.9 |
| 0.40 | 3 | 50 | 0.002 | 0.480 | 0.040 | 39790 | 240 | 4.6 |
| 0.60 | 3 | 50 | 0.006 | 0.720 | 0.060 | 26525 | 475 | 20.6 |
| 0.80 | 3 | 50 | 0.008 | 0.960 | 0.080 | 19895 | 475 | 36.7 |
| 1.00 | 3 | 50 | 0.008 | 1.200 | 0.100 | 15915 | 380 | 45.8 |
| 1.20 | 3 | 50 | 0.010 | 1.440 | 0.120 | 13265 | 400 | 68.8 |
| 1.40 | 3 | 50 | 0.012 | 1.680 | 0.140 | 11370 | 410 | 96.3 |
| 1.60 | 3 | 50 | 0.012 | 1.920 | 0.160 | 9945 | 360 | 110.0 |
| 1.80 | 3 | 50 | 0.016 | 2.160 | 0.180 | 8840 | 425 | 165.0 |
| 2.00 | 3 | 50 | 0.016 | 2.400 | 0.200 | 7960 | 380 | 183.3 |
| 0.40 | 3 | 53 | 0.004 | 0.050 | 0.400 | 42175 | 505 | 10.1 |
| 0.60 | 3 | 79 | 0.006 | 0.070 | 0.600 | 41910 | 755 | 31.7 |
| 0.80 | 3 | 106 | 0.008 | 0.100 | 0.800 | 42175 | 1010 | 81.0 |
| 1.00 | 3 | 132 | 0.012 | 0.120 | 1.000 | 42015 | 1515 | 181.5 |
| 1.20 | 3 | 158 | 0.014 | 0.140 | 1.200 | 41910 | 1760 | 295.7 |
| 1.40 | 3 | 160 | 0.016 | 0.170 | 1.400 | 36380 | 1745 | 415.6 |
| 1.60 | 3 | 160 | 0.018 | 0.190 | 1.600 | 31830 | 1720 | 522.5 |
| 1.80 | 3 | 160 | 0.020 | 0.220 | 1.800 | 28295 | 1700 | 672.3 |
| 2.00 | 3 | 160 | 0.022 | 0.240 | 2.000 | 25465 | 1680 | 806.7 |
| 0.40 | 3 | 53 | 0.004 | 0.050 | 0.400 | 42175 | 505 | 10.1 |
| 0.60 | 3 | 79 | 0.006 | 0.070 | 0.600 | 41910 | 755 | 31.7 |
| 0.80 | 3 | 106 | 0.008 | 0.100 | 0.800 | 42175 | 1010 | 81.0 |
| 1.00 | 3 | 132 | 0.012 | 0.120 | 1.000 | 42015 | 1515 | 181.5 |
| 1.20 | 3 | 158 | 0.014 | 0.140 | 1.200 | 41910 | 1760 | 295.7 |
| 1.40 | 3 | 170 | 0.016 | 0.170 | 1.400 | 38650 | 1855 | 441.6 |
| 1.60 | 3 | 170 | 0.018 | 0.190 | 1.600 | 33820 | 1825 | 555.2 |
| 1.80 | 3 | 170 | 0.022 | 0.220 | 1.800 | 30065 | 1985 | 785.7 |
| 2.00 | 3 | 170 | 0.024 | 0.240 | 2.000 | 27055 | 1950 | 935.1 |
| 0.40 | 3 | 53 | 0.004 | 0.050 | 0.400 | 42175 | 505 | 10.1 |
| 0.60 | 3 | 60 | 0.006 | 0.070 | 0.600 | 31830 | 575 | 24.1 |
| 0.80 | 3 | 60 | 0.008 | 0.100 | 0.800 | 23875 | 575 | 45.8 |
| 1.00 | 3 | 60 | 0.010 | 0.120 | 1.000 | 19100 | 575 | 68.8 |
| 1.20 | 3 | 60 | 0.012 | 0.140 | 1.200 | 15915 | 575 | 96.3 |
| 1.40 | 3 | 60 | 0.014 | 0.170 | 1.400 | 13640 | 575 | 136.4 |
| 1.60 | 3 | 60 | 0.016 | 0.190 | 1.600 | 11935 | 575 | 174.2 |
| 1.80 | 3 | 60 | 0.018 | 0.220 | 1.800 | 10610 | 575 | 226.9 |
| 2.00 | 3 | 60 | 0.020 | 0.240 | 2.000 | 9550 | 575 | 275.0 |
| 0.40 | 3 | 40 | 0.004 | 0.050 | 0.400 | 31830 | 380 | 7.6 |
| 0.60 | 3 | 40 | 0.004 | 0.070 | 0.600 | 21220 | 255 | 10.7 |
| 0.80 | 3 | 40 | 0.006 | 0.100 | 0.800 | 15915 | 285 | 22.9 |
| 1.00 | 3 | 40 | 0.010 | 0.120 | 1.000 | 12730 | 380 | 45.8 |
| 1.20 | 3 | 40 | 0.012 | 0.140 | 1.200 | 10610 | 380 | 64.2 |
| 1.40 | 3 | 40 | 0.012 | 0.170 | 1.400 | 9095 | 325 | 77.9 |
| 1.60 | 3 | 40 | 0.014 | 0.190 | 1.600 | 7960 | 335 | 101.6 |
| 1.80 | 3 | 40 | 0.016 | 0.220 | 1.800 | 7075 | 340 | 134.5 |
| 2.00 | 3 | 40 | 0.018 | 0.240 | 2.000 | 6365 | 345 | 165.0 |

Frese cilindriche

Gambo ø 3mm, 3xd



HM
MG10 λ 30°
 γ 8°

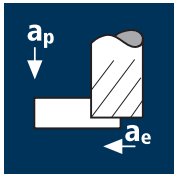


ReTool®

| | | | | | | | | | |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|---|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | | | | | Inox Stainless | Ti Titanium | CuZn Brass Gold / Platinum Copper |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|---|

| Esempio: Rivestimento Articolo Codice-ø | | | | | | | | | MICRO |
|---|-------------------------|----------------------|----------------|----------------|----------------|-------|---|-------|--------|
| N° Ordine | | | | | | | | | M45713 |
| Ø Code | d ₁ ±0.01 | d ₂ h6 | l ₁ | l ₂ | l ₄ | α | z | EUR | |
| 040 | 0.40 | 3.00 | 40 | 1.20 | 6.50 | 12.5° | 3 | 36.70 | |
| 050 | 0.50 | 3.00 | 40 | 1.50 | 6.61 | 11.5° | 3 | 36.70 | |
| 060 | 0.60 | 3.00 | 40 | 1.80 | 6.72 | 11.0° | 3 | 34.90 | |
| 070 | 0.70 | 3.00 | 40 | 2.10 | 6.84 | 10.5° | 3 | 34.90 | |
| 080 | 0.80 | 3.00 | 40 | 2.40 | 6.95 | 10.0° | 3 | 34.90 | |
| 090 | 0.90 | 3.00 | 40 | 2.70 | 7.06 | 9.0° | 3 | 34.90 | |
| 100 | 1.00 | 3.00 | 40 | 3.00 | 7.18 | 8.5° | 3 | 34.90 | |
| 104 | 1.10 | 3.00 | 40 | 3.30 | 7.34 | 8.0° | 3 | 34.90 | |
| 108 | 1.20 | 3.00 | 40 | 3.60 | 7.45 | 7.5° | 3 | 34.90 | |
| 112 | 1.30 | 3.00 | 40 | 3.90 | 7.57 | 7.0° | 3 | 34.90 | |
| 116 | 1.40 | 3.00 | 40 | 4.20 | 7.68 | 6.5° | 3 | 34.90 | |
| 120 | 1.50 | 3.00 | 40 | 4.50 | 7.79 | 6.0° | 3 | 34.90 | |
| 123 | 1.60 | 3.00 | 40 | 4.80 | 7.91 | 5.5° | 3 | 34.90 | |
| 126 | 1.70 | 3.00 | 40 | 5.10 | 8.02 | 5.0° | 3 | 34.90 | |
| 130 | 1.80 | 3.00 | 40 | 5.40 | 8.13 | 4.5° | 3 | 34.90 | |
| 135 | 1.90 | 3.00 | 40 | 5.70 | 8.25 | 4.5° | 3 | 34.90 | |
| 140 | 2.00 | 3.00 | 40 | 6.00 | 8.36 | 4.0° | 3 | 34.90 | |
| | | | | | | | | | |
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Applicazione



Materiale

Acciaio
< 850 N/mm²



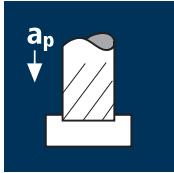
Ottone a truciolo corto
[CuZn]



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



Acciaio
< 850 N/mm²



Ottone a truciolo corto
[CuZn]



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



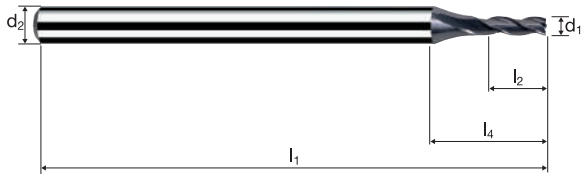
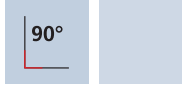
| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 2.10 | 3 | 180 | 0.024 | 2.520 | 0.210 | 27285 | 1965 | 1.0 |
| 2.20 | 3 | 180 | 0.026 | 2.640 | 0.220 | 26045 | 2030 | 1.2 |
| 2.30 | 3 | 180 | 0.028 | 2.760 | 0.230 | 24910 | 2095 | 1.3 |
| 2.40 | 3 | 180 | 0.028 | 2.880 | 0.240 | 23875 | 2005 | 1.4 |
| 2.50 | 3 | 180 | 0.030 | 3.000 | 0.250 | 22920 | 2065 | 1.5 |
| 2.60 | 3 | 180 | 0.030 | 3.120 | 0.260 | 22035 | 1985 | 1.6 |
| 2.70 | 3 | 180 | 0.032 | 3.240 | 0.270 | 21220 | 2035 | 1.8 |
| 2.80 | 3 | 180 | 0.032 | 3.360 | 0.280 | 20465 | 1965 | 1.8 |
| 2.90 | 3 | 180 | 0.034 | 3.480 | 0.290 | 19755 | 2015 | 2.0 |
| 2.10 | 3 | 190 | 0.026 | 2.520 | 0.210 | 28800 | 2245 | 1.2 |
| 2.20 | 3 | 190 | 0.028 | 2.640 | 0.220 | 27490 | 2310 | 1.3 |
| 2.30 | 3 | 190 | 0.030 | 2.760 | 0.230 | 26295 | 2365 | 1.5 |
| 2.40 | 3 | 190 | 0.030 | 2.880 | 0.240 | 25200 | 2270 | 1.6 |
| 2.50 | 3 | 190 | 0.034 | 3.000 | 0.250 | 24190 | 2470 | 1.9 |
| 2.60 | 3 | 190 | 0.034 | 3.120 | 0.260 | 23260 | 2375 | 1.9 |
| 2.70 | 3 | 190 | 0.036 | 3.240 | 0.270 | 22400 | 2420 | 2.1 |
| 2.80 | 3 | 190 | 0.036 | 3.360 | 0.280 | 21600 | 2335 | 2.2 |
| 2.90 | 3 | 190 | 0.038 | 3.480 | 0.290 | 20855 | 2375 | 2.4 |
| 2.10 | 3 | 70 | 0.020 | 2.520 | 0.210 | 10610 | 635 | 0.3 |
| 2.20 | 3 | 70 | 0.020 | 2.640 | 0.220 | 10130 | 610 | 0.4 |
| 2.30 | 3 | 70 | 0.022 | 2.760 | 0.230 | 9690 | 640 | 0.4 |
| 2.40 | 3 | 70 | 0.022 | 2.880 | 0.240 | 9285 | 615 | 0.4 |
| 2.50 | 3 | 70 | 0.024 | 3.000 | 0.250 | 8915 | 640 | 0.5 |
| 2.60 | 3 | 70 | 0.024 | 3.120 | 0.260 | 8570 | 615 | 0.5 |
| 2.70 | 3 | 70 | 0.026 | 3.240 | 0.270 | 8250 | 645 | 0.6 |
| 2.80 | 3 | 70 | 0.026 | 3.360 | 0.280 | 7960 | 620 | 0.6 |
| 2.90 | 3 | 70 | 0.028 | 3.480 | 0.290 | 7685 | 645 | 0.7 |
| 2.10 | 3 | 50 | 0.016 | 2.520 | 0.210 | 7580 | 365 | 0.2 |
| 2.20 | 3 | 50 | 0.018 | 2.640 | 0.220 | 7235 | 390 | 0.2 |
| 2.30 | 3 | 50 | 0.020 | 2.760 | 0.230 | 6920 | 415 | 0.3 |
| 2.40 | 3 | 50 | 0.020 | 2.880 | 0.240 | 6630 | 400 | 0.3 |
| 2.50 | 3 | 50 | 0.022 | 3.000 | 0.250 | 6365 | 420 | 0.3 |
| 2.60 | 3 | 50 | 0.022 | 3.120 | 0.260 | 6120 | 405 | 0.3 |
| 2.70 | 3 | 50 | 0.022 | 3.240 | 0.270 | 5895 | 390 | 0.3 |
| 2.80 | 3 | 50 | 0.022 | 3.360 | 0.280 | 5685 | 375 | 0.4 |
| 2.90 | 3 | 50 | 0.024 | 3.480 | 0.290 | 5490 | 395 | 0.4 |
| 2.10 | 3 | 160 | 0.024 | 0.250 | 2.100 | 24250 | 1745 | 0.9 |
| 2.20 | 3 | 160 | 0.024 | 0.260 | 2.200 | 23150 | 1665 | 1.0 |
| 2.30 | 3 | 160 | 0.026 | 0.280 | 2.300 | 22145 | 1725 | 1.1 |
| 2.40 | 3 | 160 | 0.026 | 0.290 | 2.400 | 21220 | 1655 | 1.2 |
| 2.50 | 3 | 160 | 0.028 | 0.300 | 2.500 | 20370 | 1710 | 1.3 |
| 2.60 | 3 | 160 | 0.028 | 0.310 | 2.600 | 19590 | 1645 | 1.3 |
| 2.70 | 3 | 160 | 0.030 | 0.320 | 2.700 | 18865 | 1700 | 1.5 |
| 2.80 | 3 | 160 | 0.032 | 0.340 | 2.800 | 18190 | 1745 | 1.7 |
| 2.90 | 3 | 160 | 0.032 | 0.350 | 2.900 | 17560 | 1685 | 1.7 |
| 2.10 | 3 | 170 | 0.026 | 0.250 | 2.100 | 25770 | 2010 | 1.1 |
| 2.20 | 3 | 170 | 0.026 | 0.260 | 2.200 | 24595 | 1920 | 1.1 |
| 2.30 | 3 | 170 | 0.028 | 0.280 | 2.300 | 23525 | 1975 | 1.3 |
| 2.40 | 3 | 170 | 0.028 | 0.290 | 2.400 | 22545 | 1895 | 1.3 |
| 2.50 | 3 | 170 | 0.030 | 0.300 | 2.500 | 21645 | 1950 | 1.5 |
| 2.60 | 3 | 170 | 0.030 | 0.310 | 2.600 | 20815 | 1875 | 1.5 |
| 2.70 | 3 | 170 | 0.032 | 0.320 | 2.700 | 20040 | 1925 | 1.7 |
| 2.80 | 3 | 170 | 0.034 | 0.340 | 2.800 | 19325 | 1970 | 1.9 |
| 2.90 | 3 | 170 | 0.034 | 0.350 | 2.900 | 18660 | 1905 | 1.9 |
| 2.10 | 3 | 60 | 0.022 | 0.250 | 2.100 | 9095 | 600 | 0.3 |
| 2.20 | 3 | 60 | 0.022 | 0.260 | 2.200 | 8680 | 575 | 0.3 |
| 2.30 | 3 | 60 | 0.022 | 0.280 | 2.300 | 8305 | 550 | 0.4 |
| 2.40 | 3 | 60 | 0.022 | 0.290 | 2.400 | 7960 | 525 | 0.4 |
| 2.50 | 3 | 60 | 0.024 | 0.300 | 2.500 | 7640 | 550 | 0.4 |
| 2.60 | 3 | 60 | 0.024 | 0.310 | 2.600 | 7345 | 530 | 0.4 |
| 2.70 | 3 | 60 | 0.026 | 0.320 | 2.700 | 7075 | 550 | 0.5 |
| 2.80 | 3 | 60 | 0.028 | 0.340 | 2.800 | 6820 | 575 | 0.5 |
| 2.90 | 3 | 60 | 0.028 | 0.350 | 2.900 | 6585 | 555 | 0.6 |
| 2.10 | 3 | 40 | 0.020 | 0.250 | 2.100 | 6065 | 365 | 0.2 |
| 2.20 | 3 | 40 | 0.020 | 0.260 | 2.200 | 5785 | 345 | 0.2 |
| 2.30 | 3 | 40 | 0.020 | 0.280 | 2.300 | 5535 | 330 | 0.2 |
| 2.40 | 3 | 40 | 0.020 | 0.290 | 2.400 | 5305 | 320 | 0.2 |
| 2.50 | 3 | 40 | 0.022 | 0.300 | 2.500 | 5095 | 335 | 0.3 |
| 2.60 | 3 | 40 | 0.022 | 0.310 | 2.600 | 4895 | 325 | 0.3 |
| 2.70 | 3 | 40 | 0.024 | 0.320 | 2.700 | 4715 | 340 | 0.3 |
| 2.80 | 3 | 40 | 0.026 | 0.340 | 2.800 | 4545 | 355 | 0.3 |
| 2.90 | 3 | 40 | 0.026 | 0.350 | 2.900 | 4390 | 340 | 0.3 |

Frese cilindriche

Gambo ø 3mm, 3xd



HM λ 30°
MG10 γ 8°

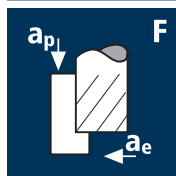


ReTool®

| | | | | | | | | |
|----------|-------------|--------------|--|--|--|----------------|-------------|---|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | | | | Inox Stainless | Ti Titanium | CuZn Brass Gold / Platinum Copper |
|----------|-------------|--------------|--|--|--|----------------|-------------|---|

| Esempio: N° Ordine | | | | | | | | MICRO |
|--------------------|----------------------|-------------------|----------------|----------------|----------------|------|---|--------|
| Rivestimento | | Articolo | | Codice-ø | | | | M45713 |
| M | | 45713 | | 143 | | | | EUR |
| Ø Code | d ₁ ±0.01 | d ₂ h6 | l ₁ | l ₂ | l ₄ | α | z | EUR |
| 143 | 2.10 | 3.00 | 40 | 6.30 | 8.47 | 3.5° | 3 | 34.90 |
| 146 | 2.20 | 3.00 | 40 | 6.60 | 8.59 | 3.0° | 3 | 34.90 |
| 150 | 2.30 | 3.00 | 40 | 6.90 | 8.70 | 2.5° | 3 | 34.90 |
| 155 | 2.40 | 3.00 | 40 | 7.20 | 8.81 | 2.5° | 3 | 34.90 |
| 160 | 2.50 | 3.00 | 40 | 7.50 | 8.93 | 2.0° | 3 | 34.90 |
| 165 | 2.60 | 3.00 | 45 | 7.80 | 9.04 | 1.5° | 3 | 34.90 |
| 170 | 2.70 | 3.00 | 45 | 8.10 | 9.15 | 1.0° | 3 | 34.90 |
| 172 | 2.80 | 3.00 | 45 | 8.40 | 9.27 | 1.0° | 3 | 34.90 |
| 176 | 2.90 | 3.00 | 45 | 8.70 | 9.38 | 0.5° | 3 | 34.90 |
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Applicazione



Materiale

Acciaio
< 850 N/mm²

Acciaio
850 - 1100 N/mm²

Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

Applicazione



Materiale

Acciaio
< 850 N/mm²

Acciaio
850 - 1100 N/mm²

Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|
| 2.00 | 3 | 120 | 0.005 | 2.000 | 0.300 | 19100 | 285 |
| 3.00 | 3 | 120 | 0.010 | 3.000 | 0.500 | 12730 | 380 |
| 4.00 | 3 | 120 | 0.015 | 4.000 | 0.600 | 9550 | 430 |
| 5.00 | 3 | 120 | 0.015 | 5.000 | 0.800 | 7640 | 345 |
| 6.00 | 3 | 120 | 0.020 | 6.000 | 0.900 | 6365 | 380 |
| 8.00 | 3 | 120 | 0.025 | 8.000 | 1.200 | 4775 | 360 |
| 10.00 | 3 | 120 | 0.035 | 10.000 | 1.500 | 3820 | 400 |

| | | | | | | | |
|-------|---|----|-------|--------|-------|-------|-----|
| 2.00 | 3 | 75 | 0.005 | 2.000 | 0.300 | 11935 | 180 |
| 3.00 | 3 | 75 | 0.010 | 3.000 | 0.500 | 7960 | 240 |
| 4.00 | 3 | 75 | 0.015 | 4.000 | 0.600 | 5970 | 270 |
| 5.00 | 3 | 75 | 0.015 | 5.000 | 0.800 | 4775 | 215 |
| 6.00 | 3 | 75 | 0.020 | 6.000 | 0.900 | 3980 | 240 |
| 8.00 | 3 | 75 | 0.025 | 8.000 | 1.200 | 2985 | 225 |
| 10.00 | 3 | 75 | 0.035 | 10.000 | 1.500 | 2385 | 250 |

| | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|
| 2.00 | 3 | 60 | 0.005 | 2.000 | 0.300 | 9550 | 145 |
| 3.00 | 3 | 60 | 0.010 | 3.000 | 0.500 | 6365 | 190 |
| 4.00 | 3 | 60 | 0.015 | 4.000 | 0.600 | 4775 | 215 |
| 5.00 | 3 | 60 | 0.015 | 5.000 | 0.800 | 3820 | 170 |
| 6.00 | 3 | 60 | 0.020 | 6.000 | 0.900 | 3185 | 190 |
| 8.00 | 3 | 60 | 0.025 | 8.000 | 1.200 | 2385 | 180 |
| 10.00 | 3 | 60 | 0.035 | 10.000 | 1.500 | 1910 | 200 |

| | | | | | | | |
|-------|---|----|-------|--------|-------|-------|-----|
| 2.00 | 3 | 80 | 0.005 | 2.000 | 0.300 | 12730 | 190 |
| 3.00 | 3 | 80 | 0.010 | 3.000 | 0.500 | 8490 | 255 |
| 4.00 | 3 | 80 | 0.015 | 4.000 | 0.600 | 6365 | 285 |
| 5.00 | 3 | 80 | 0.015 | 5.000 | 0.800 | 5095 | 230 |
| 6.00 | 3 | 80 | 0.020 | 6.000 | 0.900 | 4245 | 255 |
| 8.00 | 3 | 80 | 0.025 | 8.000 | 1.200 | 3185 | 240 |
| 10.00 | 3 | 80 | 0.035 | 10.000 | 1.500 | 2545 | 265 |

| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 2.00 | 3 | 95 | 0.005 | 1.600 | 2.000 | 15120 | 225 | 0.7 |
| 3.00 | 3 | 95 | 0.010 | 2.400 | 3.000 | 10080 | 300 | 2.2 |
| 4.00 | 3 | 95 | 0.010 | 3.200 | 4.000 | 7560 | 225 | 2.9 |
| 5.00 | 3 | 95 | 0.015 | 4.000 | 5.000 | 6050 | 270 | 5.4 |
| 6.00 | 3 | 95 | 0.015 | 4.800 | 6.000 | 5040 | 225 | 6.5 |
| 8.00 | 3 | 95 | 0.020 | 6.400 | 8.000 | 3780 | 225 | 11.6 |
| 10.00 | 3 | 95 | 0.030 | 8.000 | 10.000 | 3025 | 270 | 21.8 |

| | | | | | | | | |
|-------|---|----|-------|-------|--------|------|-----|------|
| 2.00 | 3 | 60 | 0.005 | 1.600 | 2.000 | 9550 | 145 | 0.5 |
| 3.00 | 3 | 60 | 0.010 | 2.400 | 3.000 | 6365 | 190 | 1.4 |
| 4.00 | 3 | 60 | 0.010 | 3.200 | 4.000 | 4775 | 145 | 1.8 |
| 5.00 | 3 | 60 | 0.015 | 4.000 | 5.000 | 3820 | 170 | 3.4 |
| 6.00 | 3 | 60 | 0.015 | 4.800 | 6.000 | 3185 | 145 | 4.1 |
| 8.00 | 3 | 60 | 0.020 | 6.400 | 8.000 | 2385 | 145 | 7.3 |
| 10.00 | 3 | 60 | 0.025 | 8.000 | 10.000 | 1910 | 145 | 11.5 |

| | | | | | | | | |
|-------|---|----|-------|-------|--------|------|-----|-----|
| 2.00 | 3 | 45 | 0.005 | 1.600 | 2.000 | 7160 | 105 | 0.3 |
| 3.00 | 3 | 45 | 0.010 | 2.400 | 3.000 | 4775 | 145 | 1.0 |
| 4.00 | 3 | 45 | 0.010 | 3.200 | 4.000 | 3580 | 105 | 1.4 |
| 5.00 | 3 | 45 | 0.015 | 4.000 | 5.000 | 2865 | 130 | 2.6 |
| 6.00 | 3 | 45 | 0.015 | 4.800 | 6.000 | 2385 | 105 | 3.1 |
| 8.00 | 3 | 45 | 0.020 | 6.400 | 8.000 | 1790 | 105 | 5.5 |
| 10.00 | 3 | 45 | 0.025 | 8.000 | 10.000 | 1430 | 105 | 8.6 |

| | | | | | | | | |
|-------|---|----|-------|-------|--------|------|-----|------|
| 2.00 | 3 | 55 | 0.005 | 1.600 | 2.000 | 8755 | 130 | 0.4 |
| 3.00 | 3 | 55 | 0.010 | 2.400 | 3.000 | 5835 | 175 | 1.3 |
| 4.00 | 3 | 55 | 0.010 | 3.200 | 4.000 | 4375 | 130 | 1.7 |
| 5.00 | 3 | 55 | 0.015 | 4.000 | 5.000 | 3500 | 160 | 3.2 |
| 6.00 | 3 | 55 | 0.015 | 4.800 | 6.000 | 2920 | 130 | 3.8 |
| 8.00 | 3 | 55 | 0.020 | 6.400 | 8.000 | 2190 | 130 | 6.7 |
| 10.00 | 3 | 55 | 0.025 | 8.000 | 10.000 | 1750 | 130 | 10.5 |

Frese cilindriche

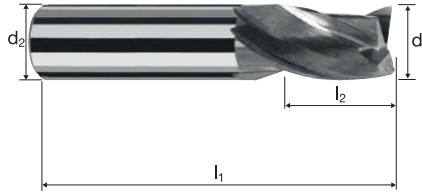
A taglienti lisci, esecuzione a gambo corto



HM λ 30°
MG10 γ 12°

90°

Vario



Sgrossatura








Finitura










ReTool®

| | | | | | | | | | | |
|-------------|----------------|-----------------|--|--|--|--|--|-------------------|----------------|-------------------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | | | | | | Inox Stainless | Ti Titanium | Nickel-Alloys Copper Platinum |
|-------------|----------------|-----------------|--|--|--|--|--|-------------------|----------------|-------------------------------------|

| | | | | | | | | | POLYCHROM | TRIBO | |
|-----------------------|----------------------|----------------------|----------------|----------------|----------------|-------|---|--|-----------|--------|-------|
| | | | | | | | | | | | |
| Esempio: N° Ordine | | | | | | | | | P15232 | T15232 | |
| | | | | | | | | | EUR | EUR | |
| Ø Code | d ₁ e8 | d ₂ h6 | l ₁ | l ₂ | l ₄ | α | z | | | | |
| 120 | 1.50 | 6.00 | 38 | 3.00 | 11.92 | 11.5° | 3 | | | 39.00 | 41.10 |
| 140 | 2.00 | 6.00 | 38 | 3.00 | 11.15 | 11.0° | 3 | | | 39.00 | 41.10 |
| 160 | 2.50 | 6.00 | 38 | 3.00 | 10.88 | 10.0° | 3 | | | 39.00 | 41.10 |
| 180 | 3.00 | 6.00 | 38 | 4.00 | 11.96 | 8.0° | 3 | | | 39.00 | 41.10 |
| 200 | 3.50 | 6.00 | 38 | 4.00 | 11.02 | 7.0° | 3 | | | 39.00 | 41.10 |
| 220 | 4.00 | 6.00 | 38 | 5.00 | 11.59 | 5.5° | 3 | | | 39.00 | 41.10 |
| 240 | 4.50 | 6.00 | 38 | 5.00 | 10.66 | 4.5° | 3 | | | 39.00 | 41.10 |
| 260 | 5.00 | 6.00 | 38 | 6.00 | 10.72 | 3.0° | 3 | | | 39.00 | 41.10 |
| 300 | 6.00 | 6.00 | 38 | 7.00 | - | 0.0° | 3 | | | 39.00 | 41.10 |
| 391 | 8.00 | 8.00 | 41 | 9.00 | - | 0.0° | 3 | | | 48.80 | 51.40 |
| 450 | 10.00 | 10.00 | 48 | 11.00 | - | 0.0° | 3 | | | 66.00 | 70.00 |
| | | | | | | | | | | | |
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| Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|---|--|---------|-----|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|
|  | Acciaio < 850 N/mm ²  | 2.00 | 3 | 60 | 0.005 | 2.000 | 0.200 | 9550 | 145 |
| | | 3.00 | 3 | 60 | 0.010 | 3.000 | 0.300 | 6365 | 190 |
| | | 4.00 | 3 | 60 | 0.015 | 4.000 | 0.400 | 4775 | 215 |
| | | 5.00 | 3 | 60 | 0.015 | 5.000 | 0.500 | 3820 | 170 |
| | | 6.00 | 3 | 60 | 0.020 | 6.000 | 0.600 | 3185 | 190 |
| | | 8.00 | 3 | 60 | 0.025 | 8.000 | 0.800 | 2385 | 180 |
| | | 10.00 | 3 | 60 | 0.035 | 10.000 | 1.000 | 1910 | 200 |
| Ottone a truciolo corto [CuZn]   | 2.00 | 3 | 140 | 0.005 | 2.000 | 0.200 | 22280 | 335 | |
| | 3.00 | 3 | 140 | 0.010 | 3.000 | 0.300 | 14855 | 445 | |
| | 4.00 | 3 | 140 | 0.010 | 4.000 | 0.400 | 11140 | 335 | |
| | 5.00 | 3 | 140 | 0.020 | 5.000 | 0.500 | 8915 | 535 | |
| | 6.00 | 3 | 140 | 0.025 | 6.000 | 0.600 | 7425 | 555 | |
| | 8.00 | 3 | 140 | 0.030 | 8.000 | 0.800 | 5570 | 500 | |
| | 10.00 | 3 | 140 | 0.040 | 10.000 | 1.000 | 4455 | 535 | |
| Oro   | 2.00 | 3 | 160 | 0.005 | 2.000 | 0.200 | 25465 | 380 | |
| | 3.00 | 3 | 160 | 0.010 | 3.000 | 0.300 | 16975 | 510 | |
| | 4.00 | 3 | 160 | 0.010 | 4.000 | 0.400 | 12730 | 380 | |
| | 5.00 | 3 | 160 | 0.020 | 5.000 | 0.500 | 10185 | 610 | |
| | 6.00 | 3 | 160 | 0.025 | 6.000 | 0.600 | 8490 | 635 | |
| | 8.00 | 3 | 160 | 0.030 | 8.000 | 0.800 | 6365 | 575 | |
| | 10.00 | 3 | 160 | 0.040 | 10.000 | 1.000 | 5095 | 610 | |
| Alluminio malleabile Costruzione integrale Al  | 2.00 | 3 | 250 | 0.005 | 2.000 | 0.200 | 39790 | 595 | |
| | 3.00 | 3 | 250 | 0.010 | 3.000 | 0.300 | 26525 | 795 | |
| | 4.00 | 3 | 250 | 0.015 | 4.000 | 0.400 | 19895 | 895 | |
| | 5.00 | 3 | 250 | 0.020 | 5.000 | 0.500 | 15915 | 955 | |
| | 6.00 | 3 | 250 | 0.025 | 6.000 | 0.600 | 13265 | 995 | |
| | 8.00 | 3 | 250 | 0.030 | 8.000 | 0.800 | 9945 | 895 | |
| | 10.00 | 3 | 250 | 0.040 | 10.000 | 1.000 | 7960 | 955 | |

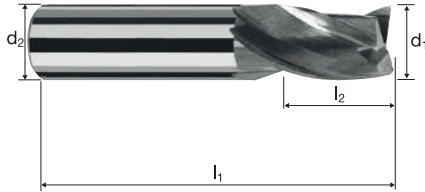
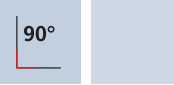
| Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---|--|---------|-----|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
|  | Acciaio < 850 N/mm ²  | 2.00 | 3 | 45 | 0.005 | 1.000 | 2.000 | 7160 | 105 | 0.2 |
| | | 3.00 | 3 | 45 | 0.010 | 1.500 | 3.000 | 4775 | 145 | 0.6 |
| | | 4.00 | 3 | 45 | 0.010 | 2.000 | 4.000 | 3580 | 105 | 0.9 |
| | | 5.00 | 3 | 45 | 0.015 | 2.500 | 5.000 | 2865 | 130 | 1.6 |
| | | 6.00 | 3 | 45 | 0.015 | 3.000 | 6.000 | 2385 | 105 | 1.9 |
| | | 8.00 | 3 | 45 | 0.020 | 4.000 | 8.000 | 1790 | 105 | 3.4 |
| | | 10.00 | 3 | 45 | 0.030 | 5.000 | 10.000 | 1430 | 130 | 6.4 |
| Ottone a truciolo corto [CuZn]   | 2.00 | 3 | 120 | 0.005 | 1.000 | 2.000 | 19100 | 285 | 0.6 | |
| | 3.00 | 3 | 120 | 0.005 | 1.500 | 3.000 | 12730 | 190 | 0.9 | |
| | 4.00 | 3 | 120 | 0.010 | 2.000 | 4.000 | 9550 | 285 | 2.3 | |
| | 5.00 | 3 | 120 | 0.015 | 2.500 | 5.000 | 7640 | 345 | 4.3 | |
| | 6.00 | 3 | 120 | 0.015 | 3.000 | 6.000 | 6365 | 285 | 5.2 | |
| | 8.00 | 3 | 120 | 0.025 | 4.000 | 8.000 | 4775 | 360 | 11.5 | |
| | 10.00 | 3 | 120 | 0.035 | 5.000 | 10.000 | 3820 | 400 | 20.1 | |
| Oro   | 2.00 | 3 | 140 | 0.005 | 1.000 | 2.000 | 22280 | 335 | 0.7 | |
| | 3.00 | 3 | 140 | 0.005 | 1.500 | 3.000 | 14855 | 225 | 1.0 | |
| | 4.00 | 3 | 140 | 0.010 | 2.000 | 4.000 | 11140 | 335 | 2.7 | |
| | 5.00 | 3 | 140 | 0.015 | 2.500 | 5.000 | 8915 | 400 | 5.0 | |
| | 6.00 | 3 | 140 | 0.015 | 3.000 | 6.000 | 7425 | 335 | 6.0 | |
| | 8.00 | 3 | 140 | 0.025 | 4.000 | 8.000 | 5570 | 420 | 13.4 | |
| | 10.00 | 3 | 140 | 0.035 | 5.000 | 10.000 | 4455 | 470 | 23.4 | |
| Alluminio malleabile Costruzione integrale Al  | 2.00 | 3 | 200 | 0.005 | 1.000 | 2.000 | 31830 | 475 | 1.0 | |
| | 3.00 | 3 | 200 | 0.005 | 1.500 | 3.000 | 21220 | 320 | 1.4 | |
| | 4.00 | 3 | 200 | 0.010 | 2.000 | 4.000 | 15915 | 475 | 3.8 | |
| | 5.00 | 3 | 200 | 0.015 | 2.500 | 5.000 | 12730 | 575 | 7.2 | |
| | 6.00 | 3 | 200 | 0.015 | 3.000 | 6.000 | 10610 | 475 | 8.6 | |
| | 8.00 | 3 | 200 | 0.025 | 4.000 | 8.000 | 7960 | 595 | 19.1 | |
| | 10.00 | 3 | 200 | 0.035 | 5.000 | 10.000 | 6365 | 670 | 33.4 | |

Frese cilindriche

A taglienti lisci, esecuzione a gambo corto



HM λ 30°
MG10 γ 12°



Rm < 850 Rm 850-1100 Aluminium Copper / CuZn Brass Gold

| Ø Code | d ₁ e8 | d ₂ h6 | l ₁ | l ₂ | l ₄ | α | z | EUR |
|--------------------------------------|----------------------|----------------------|----------------|----------------|----------------|-------|---|--------------|
| | | | | | | | | |
| Esempio: N° Ordine 15232 120 | | | | | | | | |
| Rivestimento Articolo Codice-Ø | | | | | | | | |
| | | | | | | | | 15232 |
| 120 | 1.50 | 6.00 | 38 | 3.00 | 11.92 | 11.5° | 3 | 32.70 |
| 140 | 2.00 | 6.00 | 38 | 3.00 | 11.15 | 11.0° | 3 | 32.70 |
| 160 | 2.50 | 6.00 | 38 | 3.00 | 10.88 | 10.0° | 3 | 32.70 |
| 180 | 3.00 | 6.00 | 38 | 4.00 | 11.96 | 8.0° | 3 | 32.70 |
| 200 | 3.50 | 6.00 | 38 | 4.00 | 11.02 | 7.0° | 3 | 32.70 |
| 220 | 4.00 | 6.00 | 38 | 5.00 | 11.59 | 5.5° | 3 | 32.70 |
| 240 | 4.50 | 6.00 | 38 | 5.00 | 10.66 | 4.5° | 3 | 32.70 |
| 260 | 5.00 | 6.00 | 38 | 6.00 | 10.72 | 3.0° | 3 | 32.70 |
| 300 | 6.00 | 6.00 | 38 | 7.00 | - | 0.0° | 3 | 32.70 |
| 391 | 8.00 | 8.00 | 41 | 9.00 | - | 0.0° | 3 | 40.90 |
| 450 | 10.00 | 10.00 | 48 | 11.00 | - | 0.0° | 3 | 55.70 |

| Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | | |
|--|---|--|------|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|-----|--|
| | Acciaio < 850 N/mm ² | 2.00 | 3 | 115 | 0.005 | 2.000 | 0.200 | 18305 | 275 | | |
| | | 3.00 | 3 | 115 | 0.010 | 3.000 | 0.300 | 12200 | 365 | | |
| | | 4.00 | 3 | 115 | 0.015 | 4.000 | 0.400 | 9150 | 410 | | |
| | | 5.00 | 3 | 115 | 0.015 | 5.000 | 0.500 | 7320 | 330 | | |
| | | 6.00 | 3 | 115 | 0.020 | 6.000 | 0.600 | 6100 | 365 | | |
| | | 8.00 | 3 | 115 | 0.025 | 8.000 | 0.800 | 4575 | 345 | | |
| | | 10.00 | 3 | 115 | 0.035 | 10.000 | 1.000 | 3660 | 385 | | |
| | | | | | | | | | | | |
| | | Acciaio 850 - 1100 N/mm ² | 2.00 | 3 | 75 | 0.005 | 2.000 | 0.200 | 11935 | 180 | |
| | | | 3.00 | 3 | 75 | 0.010 | 3.000 | 0.300 | 7960 | 240 | |
| 4.00 | 3 | | 75 | 0.015 | 4.000 | 0.400 | 5970 | 270 | | | |
| 5.00 | 3 | | 75 | 0.015 | 5.000 | 0.500 | 4775 | 215 | | | |
| 6.00 | 3 | | 75 | 0.020 | 6.000 | 0.600 | 3980 | 240 | | | |
| 8.00 | 3 | | 75 | 0.025 | 8.000 | 0.800 | 2985 | 225 | | | |
| 10.00 | 3 | | 75 | 0.035 | 10.000 | 1.000 | 2385 | 250 | | | |
| | | | | | | | | | | | |
| Leghe di titanio fino a 300 HB [Ti5Al2.5Sn] | 2.00 | | 3 | 40 | 0.005 | 2.000 | 0.200 | 6365 | 95 | | |
| | 3.00 | | 3 | 40 | 0.010 | 3.000 | 0.300 | 4245 | 125 | | |
| | 4.00 | 3 | 40 | 0.015 | 4.000 | 0.400 | 3185 | 145 | | | |
| | 5.00 | 3 | 40 | 0.015 | 5.000 | 0.500 | 2545 | 115 | | | |
| | 6.00 | 3 | 40 | 0.020 | 6.000 | 0.600 | 2120 | 125 | | | |
| | 8.00 | 3 | 40 | 0.025 | 8.000 | 0.800 | 1590 | 120 | | | |
| | 10.00 | 3 | 40 | 0.035 | 10.000 | 1.000 | 1275 | 135 | | | |
| | | | | | | | | | | | |
| | Inox normal [Cr-Ni/1.4301] [Cr-Ni-Mo/1.4571] | 2.00 | 3 | 80 | 0.005 | 2.000 | 0.200 | 12730 | 190 | | |
| | | 3.00 | 3 | 80 | 0.010 | 3.000 | 0.300 | 8490 | 255 | | |
| 4.00 | | 3 | 80 | 0.015 | 4.000 | 0.400 | 6365 | 285 | | | |
| 5.00 | | 3 | 80 | 0.015 | 5.000 | 0.500 | 5095 | 230 | | | |
| 6.00 | | 3 | 80 | 0.020 | 6.000 | 0.600 | 4245 | 255 | | | |
| 8.00 | | 3 | 80 | 0.025 | 8.000 | 0.800 | 3185 | 240 | | | |
| 10.00 | | 3 | 80 | 0.035 | 10.000 | 1.000 | 2545 | 265 | | | |
| | | | | | | | | | | | |

| Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | | |
|--|---|--|------|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|-----|--|
| | Acciaio < 850 N/mm ² | 2.00 | 3 | 85 | 0.005 | 1.000 | 2.000 | 13530 | 205 | 0.4 | | |
| | | 3.00 | 3 | 85 | 0.010 | 1.500 | 3.000 | 9020 | 270 | 1.2 | | |
| | | 4.00 | 3 | 85 | 0.010 | 2.000 | 4.000 | 6765 | 205 | 1.6 | | |
| | | 5.00 | 3 | 85 | 0.015 | 2.500 | 5.000 | 5410 | 245 | 3.0 | | |
| | | 6.00 | 3 | 85 | 0.015 | 3.000 | 6.000 | 4510 | 205 | 3.7 | | |
| | | 8.00 | 3 | 85 | 0.020 | 4.000 | 8.000 | 3380 | 205 | 6.5 | | |
| | | 10.00 | 3 | 85 | 0.030 | 5.000 | 10.000 | 2705 | 245 | 12.2 | | |
| | | | | | | | | | | | | |
| | | Acciaio 850 - 1100 N/mm ² | 2.00 | 3 | 60 | 0.005 | 1.000 | 2.000 | 9550 | 145 | 0.3 | |
| | | | 3.00 | 3 | 60 | 0.010 | 1.500 | 3.000 | 6365 | 190 | 0.9 | |
| 4.00 | 3 | | 60 | 0.010 | 2.000 | 4.000 | 4775 | 145 | 1.1 | | | |
| 5.00 | 3 | | 60 | 0.015 | 2.500 | 5.000 | 3820 | 170 | 2.1 | | | |
| 6.00 | 3 | | 60 | 0.015 | 3.000 | 6.000 | 3185 | 145 | 2.6 | | | |
| 8.00 | 3 | | 60 | 0.020 | 4.000 | 8.000 | 2385 | 145 | 4.6 | | | |
| 10.00 | 3 | | 60 | 0.025 | 5.000 | 10.000 | 1910 | 145 | 7.2 | | | |
| | | | | | | | | | | | | |
| Leghe di titanio fino a 300 HB [Ti5Al2.5Sn] | 2.00 | | 3 | 30 | 0.005 | 1.000 | 2.000 | 4775 | 70 | 0.1 | | |
| | 3.00 | | 3 | 30 | 0.010 | 1.500 | 3.000 | 3185 | 95 | 0.4 | | |
| | 4.00 | 3 | 30 | 0.010 | 2.000 | 4.000 | 2385 | 70 | 0.6 | | | |
| | 5.00 | 3 | 30 | 0.015 | 2.500 | 5.000 | 1910 | 85 | 1.1 | | | |
| | 6.00 | 3 | 30 | 0.015 | 3.000 | 6.000 | 1590 | 70 | 1.3 | | | |
| | 8.00 | 3 | 30 | 0.020 | 4.000 | 8.000 | 1195 | 70 | 2.3 | | | |
| | 10.00 | 3 | 30 | 0.025 | 5.000 | 10.000 | 955 | 70 | 3.6 | | | |
| | | | | | | | | | | | | |
| | Inox normal [Cr-Ni/1.4301] [Cr-Ni-Mo/1.4571] | 2.00 | 3 | 55 | 0.005 | 1.000 | 2.000 | 8755 | 130 | 0.3 | | |
| | | 3.00 | 3 | 55 | 0.010 | 1.500 | 3.000 | 5835 | 175 | 0.8 | | |
| 4.00 | | 3 | 55 | 0.010 | 2.000 | 4.000 | 4375 | 130 | 1.1 | | | |
| 5.00 | | 3 | 55 | 0.015 | 2.500 | 5.000 | 3500 | 160 | 2.0 | | | |
| 6.00 | | 3 | 55 | 0.015 | 3.000 | 6.000 | 2920 | 130 | 2.4 | | | |
| 8.00 | | 3 | 55 | 0.020 | 4.000 | 8.000 | 2190 | 130 | 4.2 | | | |
| 10.00 | | 3 | 55 | 0.025 | 5.000 | 10.000 | 1750 | 130 | 6.6 | | | |
| | | | | | | | | | | | | |

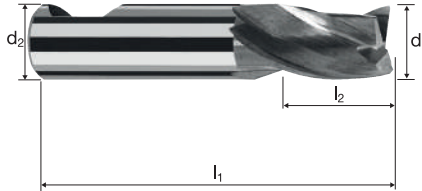
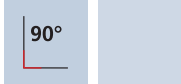
Frese cilindriche

A taglienti lisci, esecuzione a gambo corto



HM
MG10

λ 30°
 γ 12°



Sgrossatura

Finitura



ReTool®

Rm
< 850

Rm
850-1100

Rm
1100-1300

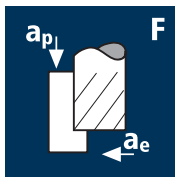
Inox
Stainless

Ti
Titanium

GG(G)
Nickel-Alloys

| Esempio: N° Ordine | Rivestimento | | Articolo | | Codice-ø | | | | POLYCHROM | TRIBO |
|-----------------------|----------------------|----------------------|----------------|----------------|----------------|-------|---|--|-----------|-------|
| | T | 5336 | 120 | | | | | | P5336 | T5336 |
| Ø Code | d ₁ e8 | d ₂ h6 | l ₁ | l ₂ | l ₄ | α | z | | EUR | EUR |
| 120 | 1.50 | 6.00 | 38 | 3.00 | 11.92 | 11.5° | 3 | | 34.80 | 36.90 |
| 140 | 2.00 | 6.00 | 38 | 3.00 | 11.15 | 11.0° | 3 | | 34.80 | 36.90 |
| 160 | 2.50 | 6.00 | 38 | 3.00 | 10.88 | 10.0° | 3 | | 34.80 | 36.90 |
| 180 | 3.00 | 6.00 | 38 | 4.00 | 11.96 | 8.0° | 3 | | 34.80 | 36.90 |
| 200 | 3.50 | 6.00 | 38 | 4.00 | 11.02 | 7.0° | 3 | | 34.80 | 36.90 |
| 220 | 4.00 | 6.00 | 38 | 5.00 | 11.59 | 5.5° | 3 | | 34.80 | 36.90 |
| 240 | 4.50 | 6.00 | 38 | 5.00 | 10.66 | 4.5° | 3 | | 34.80 | 36.90 |
| 260 | 5.00 | 6.00 | 38 | 6.00 | 10.72 | 3.0° | 3 | | 34.80 | 36.90 |
| 300 | 6.00 | 6.00 | 38 | 7.00 | - | 0.0° | 3 | | 34.80 | 36.90 |
| 331 | 7.00 | 8.00 | 41 | 8.00 | 12.72 | 2.5° | 3 | | 43.50 | 46.20 |
| 391 | 8.00 | 8.00 | 41 | 9.00 | - | 0.0° | 3 | | 43.50 | 46.20 |
| 420 | 9.00 | 10.00 | 48 | 10.00 | 14.72 | 2.5° | 3 | | 59.20 | 63.00 |
| 450 | 10.00 | 10.00 | 48 | 11.00 | - | 0.0° | 3 | | 59.20 | 63.00 |
| | | | | | | | | | | |
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| | | | | | | | | | | |

Applicazione



Materiale

Acciaio
< 850 N/mm²

Acciaio
850 - 1100 N/mm²

Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

Applicazione



Materiale

Acciaio
< 850 N/mm²

Acciaio
850 - 1100 N/mm²

Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|
| 2.00 | 3 | 115 | 0.005 | 2.000 | 0.200 | 18305 | 275 |
| 3.00 | 3 | 115 | 0.010 | 3.000 | 0.300 | 12200 | 365 |
| 4.00 | 3 | 115 | 0.015 | 4.000 | 0.400 | 9150 | 410 |
| 5.00 | 3 | 115 | 0.015 | 5.000 | 0.500 | 7320 | 330 |
| 6.00 | 3 | 115 | 0.020 | 6.000 | 0.600 | 6100 | 365 |
| 8.00 | 3 | 115 | 0.025 | 8.000 | 0.800 | 4575 | 345 |
| 10.00 | 3 | 115 | 0.035 | 10.000 | 1.000 | 3660 | 385 |

| | | | | | | | |
|-------|---|----|-------|--------|-------|-------|-----|
| 2.00 | 3 | 75 | 0.005 | 2.000 | 0.200 | 11935 | 180 |
| 3.00 | 3 | 75 | 0.010 | 3.000 | 0.300 | 7960 | 240 |
| 4.00 | 3 | 75 | 0.015 | 4.000 | 0.400 | 5970 | 270 |
| 5.00 | 3 | 75 | 0.015 | 5.000 | 0.500 | 4775 | 215 |
| 6.00 | 3 | 75 | 0.020 | 6.000 | 0.600 | 3980 | 240 |
| 8.00 | 3 | 75 | 0.025 | 8.000 | 0.800 | 2985 | 225 |
| 10.00 | 3 | 75 | 0.035 | 10.000 | 1.000 | 2385 | 250 |

| | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|
| 2.00 | 3 | 40 | 0.005 | 2.000 | 0.200 | 6365 | 95 |
| 3.00 | 3 | 40 | 0.010 | 3.000 | 0.300 | 4245 | 125 |
| 4.00 | 3 | 40 | 0.015 | 4.000 | 0.400 | 3185 | 145 |
| 5.00 | 3 | 40 | 0.015 | 5.000 | 0.500 | 2545 | 115 |
| 6.00 | 3 | 40 | 0.020 | 6.000 | 0.600 | 2120 | 125 |
| 8.00 | 3 | 40 | 0.025 | 8.000 | 0.800 | 1590 | 120 |
| 10.00 | 3 | 40 | 0.035 | 10.000 | 1.000 | 1275 | 135 |

| | | | | | | | |
|-------|---|----|-------|--------|-------|-------|-----|
| 2.00 | 3 | 80 | 0.005 | 2.000 | 0.200 | 12730 | 190 |
| 3.00 | 3 | 80 | 0.010 | 3.000 | 0.300 | 8490 | 255 |
| 4.00 | 3 | 80 | 0.015 | 4.000 | 0.400 | 6365 | 285 |
| 5.00 | 3 | 80 | 0.015 | 5.000 | 0.500 | 5095 | 230 |
| 6.00 | 3 | 80 | 0.020 | 6.000 | 0.600 | 4245 | 255 |
| 8.00 | 3 | 80 | 0.025 | 8.000 | 0.800 | 3185 | 240 |
| 10.00 | 3 | 80 | 0.035 | 10.000 | 1.000 | 2545 | 265 |

| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 2.00 | 3 | 85 | 0.005 | 1.000 | 2.000 | 13530 | 205 | 0.4 |
| 3.00 | 3 | 85 | 0.010 | 1.500 | 3.000 | 9020 | 270 | 1.2 |
| 4.00 | 3 | 85 | 0.010 | 2.000 | 4.000 | 6765 | 205 | 1.6 |
| 5.00 | 3 | 85 | 0.015 | 2.500 | 5.000 | 5410 | 245 | 3.0 |
| 6.00 | 3 | 85 | 0.015 | 3.000 | 6.000 | 4510 | 205 | 3.7 |
| 8.00 | 3 | 85 | 0.020 | 4.000 | 8.000 | 3380 | 205 | 6.5 |
| 10.00 | 3 | 85 | 0.030 | 5.000 | 10.000 | 2705 | 245 | 12.2 |

| | | | | | | | | |
|-------|---|----|-------|-------|--------|------|-----|-----|
| 2.00 | 3 | 60 | 0.005 | 1.000 | 2.000 | 9550 | 145 | 0.3 |
| 3.00 | 3 | 60 | 0.010 | 1.500 | 3.000 | 6365 | 190 | 0.9 |
| 4.00 | 3 | 60 | 0.010 | 2.000 | 4.000 | 4775 | 145 | 1.1 |
| 5.00 | 3 | 60 | 0.015 | 2.500 | 5.000 | 3820 | 170 | 2.1 |
| 6.00 | 3 | 60 | 0.015 | 3.000 | 6.000 | 3185 | 145 | 2.6 |
| 8.00 | 3 | 60 | 0.020 | 4.000 | 8.000 | 2385 | 145 | 4.6 |
| 10.00 | 3 | 60 | 0.025 | 5.000 | 10.000 | 1910 | 145 | 7.2 |

| | | | | | | | | |
|-------|---|----|-------|-------|--------|------|----|-----|
| 2.00 | 3 | 30 | 0.005 | 1.000 | 2.000 | 4775 | 70 | 0.1 |
| 3.00 | 3 | 30 | 0.010 | 1.500 | 3.000 | 3185 | 95 | 0.4 |
| 4.00 | 3 | 30 | 0.010 | 2.000 | 4.000 | 2385 | 70 | 0.6 |
| 5.00 | 3 | 30 | 0.015 | 2.500 | 5.000 | 1910 | 85 | 1.1 |
| 6.00 | 3 | 30 | 0.015 | 3.000 | 6.000 | 1590 | 70 | 1.3 |
| 8.00 | 3 | 30 | 0.020 | 4.000 | 8.000 | 1195 | 70 | 2.3 |
| 10.00 | 3 | 30 | 0.025 | 5.000 | 10.000 | 955 | 70 | 3.6 |

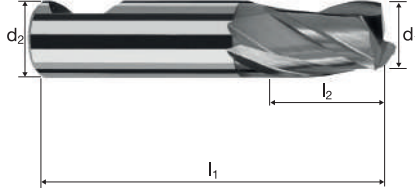
| | | | | | | | | |
|-------|---|----|-------|-------|--------|------|-----|-----|
| 2.00 | 3 | 55 | 0.005 | 1.000 | 2.000 | 8755 | 130 | 0.3 |
| 3.00 | 3 | 55 | 0.010 | 1.500 | 3.000 | 5835 | 175 | 0.8 |
| 4.00 | 3 | 55 | 0.010 | 2.000 | 4.000 | 4375 | 130 | 1.1 |
| 5.00 | 3 | 55 | 0.015 | 2.500 | 5.000 | 3500 | 160 | 2.0 |
| 6.00 | 3 | 55 | 0.015 | 3.000 | 6.000 | 2920 | 130 | 2.4 |
| 8.00 | 3 | 55 | 0.020 | 4.000 | 8.000 | 2190 | 130 | 4.2 |
| 10.00 | 3 | 55 | 0.025 | 5.000 | 10.000 | 1750 | 130 | 6.6 |

Frese cilindriche

A taglienti lisci, esecuzione a gambo corto



HM λ 30°
MG10 γ 12°



Sgrossatura

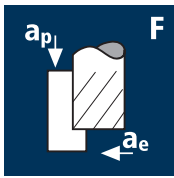
Finitura



| | | | | | | | | | |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | | | | | Inox Stainless | Ti Titanium | GG(G) Nickel-Alloys |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|------------------------|

| | | | | | | | | | | POLYCHROM | TRIBO |
|---|----------------------|----------------------|----------------|----------------|----------------|------|-------|---|--|-----------|-------|
| Esempio: Rivestimento Articolo Codice-Ø | | | | | | | | | | P5335 | T5335 |
| Ø Code | d ₁ e8 | d ₂ h6 | l ₁ | l ₂ | l ₄ | 45° | α | z | | EUR | EUR |
| 140 | 2.00 | 6.00 | 38 | 3.00 | 11.15 | 0.10 | 11.0° | 3 | | 34.80 | 36.90 |
| 180 | 3.00 | 6.00 | 38 | 4.00 | 11.96 | 0.10 | 8.0° | 3 | | 34.80 | 36.90 |
| 220 | 4.00 | 6.00 | 38 | 5.00 | 11.59 | 0.10 | 5.5° | 3 | | 34.80 | 36.90 |
| 260 | 5.00 | 6.00 | 38 | 6.00 | 10.72 | 0.15 | 3.0° | 3 | | 34.80 | 36.90 |
| 300 | 6.00 | 6.00 | 38 | 7.00 | - | 0.15 | 0.0° | 3 | | 34.80 | 36.90 |
| 391 | 8.00 | 8.00 | 41 | 9.00 | - | 0.15 | 0.0° | 3 | | 43.50 | 46.20 |
| 450 | 10.00 | 10.00 | 48 | 11.00 | - | 0.20 | 0.0° | 3 | | 59.20 | 63.00 |
| | | | | | | | | | | | |
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Applicazione



Materiale

Acciaio
< 850 N/mm²



Acciaio
850 - 1100 N/mm²



Acciaio
1100 - 1300 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Ghisa
(griglia / sferoidale)



Acciaio per lavorazione
a freddo (12% Cr)
fortemente legati
[1.2379]



Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]



Inox difficult
[Cr-Ni-Mo++/1.4529]
Acciaio resistente al calore
[1.4841]



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|
| 3.00 | 4 | 160 | 0.010 | 3.000 | 0.150 | 16975 | 680 |
| 4.00 | 4 | 160 | 0.010 | 4.000 | 0.200 | 12730 | 510 |
| 5.00 | 4 | 160 | 0.015 | 5.000 | 0.250 | 10185 | 610 |
| 6.00 | 6 | 160 | 0.015 | 6.000 | 0.300 | 8490 | 765 |
| 8.00 | 6 | 160 | 0.025 | 8.000 | 0.400 | 6365 | 955 |
| 10.00 | 6 | 160 | 0.030 | 10.000 | 0.500 | 5095 | 915 |

| | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|-----|
| 3.00 | 4 | 100 | 0.010 | 3.000 | 0.150 | 10610 | 425 |
| 4.00 | 4 | 100 | 0.010 | 4.000 | 0.200 | 7960 | 320 |
| 5.00 | 4 | 100 | 0.015 | 5.000 | 0.250 | 6365 | 380 |
| 6.00 | 6 | 100 | 0.015 | 6.000 | 0.300 | 5305 | 475 |
| 8.00 | 6 | 100 | 0.025 | 8.000 | 0.400 | 3980 | 595 |
| 10.00 | 6 | 100 | 0.030 | 10.000 | 0.500 | 3185 | 575 |

| | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|
| 3.00 | 4 | 75 | 0.010 | 3.000 | 0.150 | 7960 | 320 |
| 4.00 | 4 | 75 | 0.010 | 4.000 | 0.200 | 5970 | 240 |
| 5.00 | 4 | 75 | 0.015 | 5.000 | 0.250 | 4775 | 285 |
| 6.00 | 6 | 75 | 0.015 | 6.000 | 0.300 | 3980 | 360 |
| 8.00 | 6 | 75 | 0.025 | 8.000 | 0.400 | 2985 | 450 |
| 10.00 | 6 | 75 | 0.030 | 10.000 | 0.500 | 2385 | 430 |

| | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|
| 3.00 | 4 | 90 | 0.010 | 3.000 | 0.150 | 9550 | 380 |
| 4.00 | 4 | 90 | 0.010 | 4.000 | 0.200 | 7160 | 285 |
| 5.00 | 4 | 90 | 0.015 | 5.000 | 0.250 | 5730 | 345 |
| 6.00 | 6 | 90 | 0.015 | 6.000 | 0.300 | 4775 | 430 |
| 8.00 | 6 | 90 | 0.025 | 8.000 | 0.400 | 3580 | 535 |
| 10.00 | 6 | 90 | 0.030 | 10.000 | 0.500 | 2865 | 515 |

| | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|-----|
| 3.00 | 4 | 120 | 0.010 | 3.000 | 0.150 | 12730 | 510 |
| 4.00 | 4 | 120 | 0.010 | 4.000 | 0.200 | 9550 | 380 |
| 5.00 | 4 | 120 | 0.015 | 5.000 | 0.250 | 7640 | 460 |
| 6.00 | 6 | 120 | 0.015 | 6.000 | 0.300 | 6365 | 575 |
| 8.00 | 6 | 120 | 0.025 | 8.000 | 0.400 | 4775 | 715 |
| 10.00 | 6 | 120 | 0.030 | 10.000 | 0.500 | 3820 | 690 |

| | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|
| 3.00 | 4 | 65 | 0.010 | 3.000 | 0.150 | 6895 | 275 |
| 4.00 | 4 | 65 | 0.010 | 4.000 | 0.200 | 5175 | 205 |
| 5.00 | 4 | 65 | 0.015 | 5.000 | 0.250 | 4140 | 250 |
| 6.00 | 6 | 65 | 0.015 | 6.000 | 0.300 | 3450 | 310 |
| 8.00 | 6 | 65 | 0.025 | 8.000 | 0.400 | 2585 | 390 |
| 10.00 | 6 | 65 | 0.030 | 10.000 | 0.500 | 2070 | 370 |

| | | | | | | | |
|-------|---|----|-------|--------|-------|-------|-----|
| 3.00 | 4 | 95 | 0.010 | 3.000 | 0.150 | 10080 | 405 |
| 4.00 | 4 | 95 | 0.010 | 4.000 | 0.200 | 7560 | 300 |
| 5.00 | 4 | 95 | 0.015 | 5.000 | 0.250 | 6050 | 365 |
| 6.00 | 6 | 95 | 0.015 | 6.000 | 0.300 | 5040 | 455 |
| 8.00 | 6 | 95 | 0.025 | 8.000 | 0.400 | 3780 | 565 |
| 10.00 | 6 | 95 | 0.030 | 10.000 | 0.500 | 3025 | 545 |

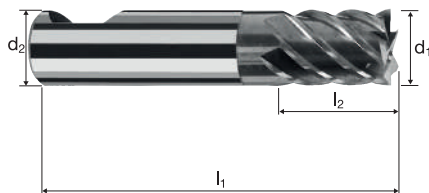
| | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|
| 3.00 | 4 | 50 | 0.010 | 3.000 | 0.150 | 5305 | 210 |
| 4.00 | 4 | 50 | 0.010 | 4.000 | 0.200 | 3980 | 160 |
| 5.00 | 4 | 50 | 0.015 | 5.000 | 0.250 | 3185 | 190 |
| 6.00 | 6 | 50 | 0.015 | 6.000 | 0.300 | 2655 | 240 |
| 8.00 | 6 | 50 | 0.025 | 8.000 | 0.400 | 1990 | 300 |
| 10.00 | 6 | 50 | 0.030 | 10.000 | 0.500 | 1590 | 285 |

Frese cilindriche

Finitura, esecuzione a gambo corto



| | |
|-------------|----------------------|
| HM | λ 45° |
| MG10 | γ 10° |



Sgrossatura



Finitura

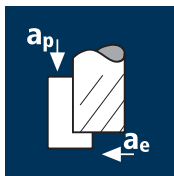


ReTool®

| | | | | | | | | | |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|---------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | | | | | Inox Stainless | Ti Titanium | GG(G) Tool Steel |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|---------------------|

| Esempio: N° Ordine | | Rivestimento T | Articolo 5337 | Codice-Ø 180 | | | | | POLYCHROM | TRIBO |
|-----------------------|----------------------|----------------------|------------------|-----------------|----------------|------|---|-------|-----------|-------|
| Ø Code | d ₁ e8 | d ₂ h6 | l ₁ | l ₂ | l ₄ | α | z | EUR | EUR | |
| 180 | 3.00 | 6.00 | 38 | 4.00 | 11.96 | 8.0° | 4 | 43.20 | 45.30 | |
| 220 | 4.00 | 6.00 | 38 | 5.00 | 11.59 | 5.5° | 4 | 43.20 | 45.30 | |
| 260 | 5.00 | 6.00 | 38 | 6.00 | 10.72 | 3.0° | 4 | 43.20 | 45.30 | |
| 300 | 6.00 | 6.00 | 38 | 7.00 | - | 0.0° | 6 | 43.20 | 45.30 | |
| 391 | 8.00 | 8.00 | 41 | 9.00 | - | 0.0° | 6 | 54.00 | 56.70 | |
| 450 | 10.00 | 10.00 | 48 | 11.00 | - | 0.0° | 6 | 73.00 | 77.00 | |
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Applicazione



Materiale

Acciaio
< 850 N/mm²

Acciaio
850 - 1100 N/mm²

Oro

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|
| 2.00 | 3 | 105 | 0.005 | 2.000 | 0.100 | 16710 | 250 |
| 3.00 | 3 | 105 | 0.010 | 3.000 | 0.150 | 11140 | 335 |
| 4.00 | 3 | 105 | 0.015 | 4.000 | 0.200 | 8355 | 375 |
| 5.00 | 3 | 105 | 0.015 | 5.000 | 0.250 | 6685 | 300 |
| 6.00 | 3 | 105 | 0.020 | 6.000 | 0.300 | 5570 | 335 |
| 7.00 | 3 | 105 | 0.025 | 7.000 | 0.350 | 4775 | 360 |
| 8.00 | 3 | 105 | 0.025 | 8.000 | 0.400 | 4180 | 315 |
| 9.00 | 3 | 105 | 0.035 | 9.000 | 0.450 | 3715 | 390 |
| 10.00 | 3 | 105 | 0.035 | 10.000 | 0.500 | 3340 | 350 |

| | | | | | | | |
|-------|---|----|-------|--------|-------|-------|-----|
| 2.00 | 3 | 65 | 0.005 | 2.000 | 0.100 | 10345 | 155 |
| 3.00 | 3 | 65 | 0.010 | 3.000 | 0.150 | 6895 | 205 |
| 4.00 | 3 | 65 | 0.015 | 4.000 | 0.200 | 5175 | 235 |
| 5.00 | 3 | 65 | 0.015 | 5.000 | 0.250 | 4140 | 185 |
| 6.00 | 3 | 65 | 0.020 | 6.000 | 0.300 | 3450 | 205 |
| 7.00 | 3 | 65 | 0.025 | 7.000 | 0.350 | 2955 | 220 |
| 8.00 | 3 | 65 | 0.025 | 8.000 | 0.400 | 2585 | 195 |
| 9.00 | 3 | 65 | 0.035 | 9.000 | 0.450 | 2300 | 240 |
| 10.00 | 3 | 65 | 0.035 | 10.000 | 0.500 | 2070 | 215 |

| | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|-----|
| 2.00 | 3 | 160 | 0.005 | 2.000 | 0.100 | 25465 | 380 |
| 3.00 | 3 | 160 | 0.010 | 3.000 | 0.150 | 16975 | 510 |
| 4.00 | 3 | 160 | 0.015 | 4.000 | 0.200 | 12730 | 575 |
| 5.00 | 3 | 160 | 0.015 | 5.000 | 0.250 | 10185 | 460 |
| 6.00 | 3 | 160 | 0.020 | 6.000 | 0.300 | 8490 | 510 |
| 7.00 | 3 | 160 | 0.020 | 7.000 | 0.350 | 7275 | 435 |
| 8.00 | 3 | 160 | 0.025 | 8.000 | 0.400 | 6365 | 475 |
| 9.00 | 3 | 160 | 0.025 | 9.000 | 0.450 | 5660 | 425 |
| 10.00 | 3 | 160 | 0.035 | 10.000 | 0.500 | 5095 | 535 |

| | | | | | | | |
|-------|---|----|-------|--------|-------|-------|-----|
| 2.00 | 3 | 65 | 0.005 | 2.000 | 0.100 | 10345 | 155 |
| 3.00 | 3 | 65 | 0.010 | 3.000 | 0.150 | 6895 | 205 |
| 4.00 | 3 | 65 | 0.015 | 4.000 | 0.200 | 5175 | 235 |
| 5.00 | 3 | 65 | 0.015 | 5.000 | 0.250 | 4140 | 185 |
| 6.00 | 3 | 65 | 0.020 | 6.000 | 0.300 | 3450 | 205 |
| 7.00 | 3 | 65 | 0.025 | 7.000 | 0.350 | 2955 | 220 |
| 8.00 | 3 | 65 | 0.025 | 8.000 | 0.400 | 2585 | 195 |
| 9.00 | 3 | 65 | 0.035 | 9.000 | 0.450 | 2300 | 240 |
| 10.00 | 3 | 65 | 0.035 | 10.000 | 0.500 | 2070 | 215 |

Applicazione



Materiale

Acciaio
< 850 N/mm²

Acciaio
850 - 1100 N/mm²

Oro

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 2.00 | 3 | 75 | 0.005 | 0.800 | 2.000 | 11935 | 180 | 0.3 |
| 3.00 | 3 | 75 | 0.010 | 1.200 | 3.000 | 7960 | 240 | 0.9 |
| 4.00 | 3 | 75 | 0.010 | 1.600 | 4.000 | 5970 | 180 | 1.1 |
| 5.00 | 3 | 75 | 0.015 | 2.000 | 5.000 | 4775 | 215 | 2.1 |
| 6.00 | 3 | 75 | 0.015 | 2.400 | 6.000 | 3980 | 180 | 2.6 |
| 7.00 | 3 | 75 | 0.020 | 2.800 | 7.000 | 3410 | 205 | 4.0 |
| 8.00 | 3 | 75 | 0.020 | 3.200 | 8.000 | 2985 | 180 | 4.6 |
| 9.00 | 3 | 75 | 0.030 | 3.600 | 9.000 | 2655 | 240 | 7.7 |
| 10.00 | 3 | 75 | 0.030 | 4.000 | 10.000 | 2385 | 215 | 8.6 |

| | | | | | | | | |
|-------|---|----|-------|-------|--------|------|-----|-----|
| 2.00 | 3 | 50 | 0.005 | 0.800 | 2.000 | 7960 | 120 | 0.2 |
| 3.00 | 3 | 50 | 0.010 | 1.200 | 3.000 | 5305 | 160 | 0.6 |
| 4.00 | 3 | 50 | 0.010 | 1.600 | 4.000 | 3980 | 120 | 0.8 |
| 5.00 | 3 | 50 | 0.015 | 2.000 | 5.000 | 3185 | 145 | 1.4 |
| 6.00 | 3 | 50 | 0.015 | 2.400 | 6.000 | 2655 | 120 | 1.7 |
| 7.00 | 3 | 50 | 0.020 | 2.800 | 7.000 | 2275 | 135 | 2.7 |
| 8.00 | 3 | 50 | 0.020 | 3.200 | 8.000 | 1990 | 120 | 3.1 |
| 9.00 | 3 | 50 | 0.025 | 3.600 | 9.000 | 1770 | 135 | 4.3 |
| 10.00 | 3 | 50 | 0.025 | 4.000 | 10.000 | 1590 | 120 | 4.8 |

| | | | | | | | | |
|-------|---|-----|-------|-------|--------|-------|-----|------|
| 2.00 | 3 | 140 | 0.005 | 0.800 | 2.000 | 22280 | 335 | 0.5 |
| 3.00 | 3 | 140 | 0.010 | 1.200 | 3.000 | 14855 | 445 | 1.6 |
| 4.00 | 3 | 140 | 0.010 | 1.600 | 4.000 | 11140 | 335 | 2.1 |
| 5.00 | 3 | 140 | 0.015 | 2.000 | 5.000 | 8915 | 400 | 4.0 |
| 6.00 | 3 | 140 | 0.020 | 2.400 | 6.000 | 7425 | 445 | 6.4 |
| 7.00 | 3 | 140 | 0.020 | 2.800 | 7.000 | 6365 | 380 | 7.5 |
| 8.00 | 3 | 140 | 0.025 | 3.200 | 8.000 | 5570 | 420 | 10.7 |
| 9.00 | 3 | 140 | 0.025 | 3.600 | 9.000 | 4950 | 370 | 12.0 |
| 10.00 | 3 | 140 | 0.030 | 4.000 | 10.000 | 4455 | 400 | 16.0 |

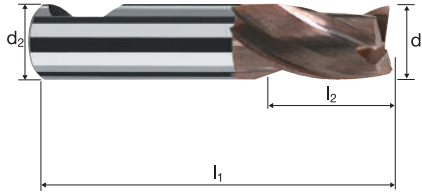
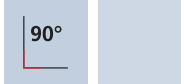
| | | | | | | | | |
|-------|---|----|-------|-------|--------|------|-----|-----|
| 2.00 | 3 | 50 | 0.005 | 0.800 | 2.000 | 7960 | 120 | 0.2 |
| 3.00 | 3 | 50 | 0.010 | 1.200 | 3.000 | 5305 | 160 | 0.6 |
| 4.00 | 3 | 50 | 0.010 | 1.600 | 4.000 | 3980 | 120 | 0.8 |
| 5.00 | 3 | 50 | 0.015 | 2.000 | 5.000 | 3185 | 145 | 1.4 |
| 6.00 | 3 | 50 | 0.015 | 2.400 | 6.000 | 2655 | 120 | 1.7 |
| 7.00 | 3 | 50 | 0.020 | 2.800 | 7.000 | 2275 | 135 | 2.7 |
| 8.00 | 3 | 50 | 0.020 | 3.200 | 8.000 | 1990 | 120 | 3.1 |
| 9.00 | 3 | 50 | 0.025 | 3.600 | 9.000 | 1770 | 135 | 4.3 |
| 10.00 | 3 | 50 | 0.025 | 4.000 | 10.000 | 1590 | 120 | 4.8 |

Frese cilindriche

A taglienti lisci, esecuzione a gambo corto



HM λ 30°
MG10 γ 12°



Sgrossatura

Finitura



Rm
< 850

Rm
850-1100

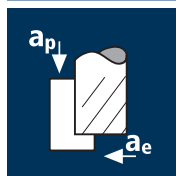
Rm
1100-1300

Inox
Stainless

Aluminium
Copper
Gold / Platinum

| Ø Code | d ₁ e8 | d ₂ h6 | l ₁ | l ₂ | l ₄ | α | z | UNICUT-4X | |
|-----------|----------------------|----------------------|----------------|----------------|----------------|-------|---|-------------|---------------|
| | | | | | | | | 5336 EUR | U45336 EUR |
| 120 | 1.50 | 6.00 | 38 | 3.00 | 11.92 | 11.5° | 3 | 21.00 | 25.20 |
| 140 | 2.00 | 6.00 | 38 | 3.00 | 11.15 | 11.0° | 3 | 21.00 | 25.20 |
| 160 | 2.50 | 6.00 | 38 | 3.00 | 10.88 | 10.0° | 3 | 21.00 | 25.20 |
| 180 | 3.00 | 6.00 | 38 | 4.00 | 11.96 | 8.0° | 3 | 21.00 | 25.20 |
| 200 | 3.50 | 6.00 | 38 | 4.00 | 11.02 | 7.0° | 3 | 21.00 | 25.20 |
| 220 | 4.00 | 6.00 | 38 | 5.00 | 11.59 | 5.5° | 3 | 21.00 | 25.20 |
| 240 | 4.50 | 6.00 | 38 | 5.00 | 10.66 | 4.5° | 3 | 21.00 | 25.20 |
| 260 | 5.00 | 6.00 | 38 | 6.00 | 10.72 | 3.0° | 3 | 21.00 | 25.20 |
| 300 | 6.00 | 6.00 | 38 | 7.00 | - | 0.0° | 3 | 21.00 | 25.20 |
| 331 | 7.00 | 8.00 | 41 | 8.00 | 12.72 | 2.5° | 3 | 26.20 | 31.50 |
| 391 | 8.00 | 8.00 | 41 | 9.00 | - | 0.0° | 3 | 26.20 | 31.50 |
| 420 | 9.00 | 10.00 | 48 | 10.00 | 14.72 | 2.5° | 3 | 35.70 | 42.80 |
| 450 | 10.00 | 10.00 | 48 | 11.00 | - | 0.0° | 3 | 35.70 | 42.80 |
| | | | | | | | | | |
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Applicazione



Materiale

Acciaio
< 850 N/mm²

| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|
| 1.00 | 3 | 60 | 0.005 | 1.000 | 0.100 | 19100 | 285 |
| 2.00 | 3 | 60 | 0.010 | 2.000 | 0.200 | 9550 | 285 |
| 2.50 | 3 | 60 | 0.010 | 2.500 | 0.250 | 7640 | 230 |
| 3.00 | 3 | 60 | 0.010 | 3.000 | 0.300 | 6365 | 190 |
| 3.50 | 3 | 60 | 0.015 | 3.500 | 0.350 | 5455 | 245 |
| 4.00 | 3 | 60 | 0.015 | 4.000 | 0.400 | 4775 | 215 |
| 5.00 | 3 | 60 | 0.020 | 5.000 | 0.500 | 3820 | 230 |
| 5.50 | 3 | 60 | 0.020 | 5.500 | 0.550 | 3470 | 210 |
| 6.00 | 3 | 60 | 0.025 | 6.000 | 0.600 | 3185 | 240 |

Acciaio
850 - 1100 N/mm²

| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|
| 1.00 | 3 | 48 | 0.005 | 1.000 | 0.100 | 15280 | 230 |
| 2.00 | 3 | 48 | 0.010 | 2.000 | 0.200 | 7640 | 230 |
| 2.50 | 3 | 48 | 0.010 | 2.500 | 0.250 | 6110 | 185 |
| 3.00 | 3 | 48 | 0.010 | 3.000 | 0.300 | 5095 | 155 |
| 3.50 | 3 | 48 | 0.015 | 3.500 | 0.350 | 4365 | 195 |
| 4.00 | 3 | 48 | 0.015 | 4.000 | 0.400 | 3820 | 170 |
| 5.00 | 3 | 48 | 0.020 | 5.000 | 0.500 | 3055 | 185 |
| 5.50 | 3 | 48 | 0.020 | 5.500 | 0.550 | 2780 | 165 |
| 6.00 | 3 | 48 | 0.025 | 6.000 | 0.600 | 2545 | 190 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|
| 1.00 | 3 | 25 | 0.005 | 1.000 | 0.100 | 7960 | 120 |
| 2.00 | 3 | 25 | 0.010 | 2.000 | 0.200 | 3980 | 120 |
| 2.50 | 3 | 25 | 0.010 | 2.500 | 0.250 | 3185 | 95 |
| 3.00 | 3 | 25 | 0.010 | 3.000 | 0.300 | 2655 | 80 |
| 3.50 | 3 | 25 | 0.015 | 3.500 | 0.350 | 2275 | 100 |
| 4.00 | 3 | 25 | 0.015 | 4.000 | 0.400 | 1990 | 90 |
| 5.00 | 3 | 25 | 0.020 | 5.000 | 0.500 | 1590 | 95 |
| 5.50 | 3 | 25 | 0.020 | 5.500 | 0.550 | 1445 | 85 |
| 6.00 | 3 | 25 | 0.025 | 6.000 | 0.600 | 1325 | 100 |

Inox medium
[Cr-Ni-Mo+/1.4539]
Acciaio duplex
[17-4 PH]

| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|
| 1.00 | 3 | 22 | 0.005 | 1.000 | 0.100 | 7005 | 105 |
| 2.00 | 3 | 22 | 0.010 | 2.000 | 0.200 | 3500 | 105 |
| 2.50 | 3 | 22 | 0.010 | 2.500 | 0.250 | 2800 | 85 |
| 3.00 | 3 | 22 | 0.010 | 3.000 | 0.300 | 2335 | 70 |
| 3.50 | 3 | 22 | 0.015 | 3.500 | 0.350 | 2000 | 90 |
| 4.00 | 3 | 22 | 0.015 | 4.000 | 0.400 | 1750 | 80 |
| 5.00 | 3 | 22 | 0.020 | 5.000 | 0.500 | 1400 | 85 |
| 5.50 | 3 | 22 | 0.020 | 5.500 | 0.550 | 1275 | 75 |
| 6.00 | 3 | 22 | 0.025 | 6.000 | 0.600 | 1165 | 90 |

Applicazione



Materiale

Acciaio
< 850 N/mm²

| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 1.00 | 3 | 55 | 0.005 | 0.500 | 1.000 | 17505 | 265 | 131.3 |
| 2.00 | 3 | 55 | 0.010 | 1.000 | 2.000 | 8755 | 265 | 525.2 |
| 2.50 | 3 | 55 | 0.010 | 1.250 | 2.500 | 7005 | 210 | 656.5 |
| 3.00 | 3 | 55 | 0.010 | 1.500 | 3.000 | 5835 | 175 | 787.8 |
| 3.50 | 3 | 55 | 0.015 | 1.750 | 3.500 | 5000 | 225 | 1378.7 |
| 4.00 | 3 | 55 | 0.015 | 2.000 | 4.000 | 4375 | 195 | 1575.6 |
| 5.00 | 3 | 55 | 0.020 | 2.500 | 5.000 | 3500 | 210 | 2626.1 |
| 5.50 | 3 | 55 | 0.020 | 2.750 | 5.500 | 3185 | 190 | 2888.7 |
| 6.00 | 3 | 55 | 0.025 | 3.000 | 6.000 | 2920 | 220 | 3939.1 |

Acciaio
850 - 1100 N/mm²

| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 1.00 | 3 | 45 | 0.005 | 0.500 | 1.000 | 14325 | 215 | 107.4 |
| 2.00 | 3 | 45 | 0.010 | 1.000 | 2.000 | 7160 | 215 | 429.7 |
| 2.50 | 3 | 45 | 0.010 | 1.250 | 2.500 | 5730 | 170 | 537.1 |
| 3.00 | 3 | 45 | 0.010 | 1.500 | 3.000 | 4775 | 145 | 644.6 |
| 3.50 | 3 | 45 | 0.015 | 1.750 | 3.500 | 4095 | 185 | 1128.0 |
| 4.00 | 3 | 45 | 0.015 | 2.000 | 4.000 | 3580 | 160 | 1289.2 |
| 5.00 | 3 | 45 | 0.020 | 2.500 | 5.000 | 2865 | 170 | 2148.6 |
| 5.50 | 3 | 45 | 0.020 | 2.750 | 5.500 | 2605 | 155 | 2363.5 |
| 6.00 | 3 | 45 | 0.025 | 3.000 | 6.000 | 2385 | 180 | 3222.9 |

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 1.00 | 3 | 22 | 0.005 | 0.500 | 1.000 | 7005 | 105 | 52.5 |
| 2.00 | 3 | 22 | 0.010 | 1.000 | 2.000 | 3500 | 105 | 210.1 |
| 2.50 | 3 | 22 | 0.010 | 1.250 | 2.500 | 2800 | 85 | 262.6 |
| 3.00 | 3 | 22 | 0.010 | 1.500 | 3.000 | 2335 | 70 | 315.1 |
| 3.50 | 3 | 22 | 0.015 | 1.750 | 3.500 | 2000 | 90 | 551.5 |
| 4.00 | 3 | 22 | 0.015 | 2.000 | 4.000 | 1750 | 80 | 630.3 |
| 5.00 | 3 | 22 | 0.020 | 2.500 | 5.000 | 1400 | 85 | 1050.4 |
| 5.50 | 3 | 22 | 0.020 | 2.750 | 5.500 | 1275 | 75 | 1155.5 |
| 6.00 | 3 | 22 | 0.025 | 3.000 | 6.000 | 1165 | 90 | 1575.6 |

Inox medium
[Cr-Ni-Mo+/1.4539]
Acciaio duplex
[17-4 PH]

| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 1.00 | 3 | 20 | 0.005 | 0.500 | 1.000 | 6365 | 95 | 47.7 |
| 2.00 | 3 | 20 | 0.010 | 1.000 | 2.000 | 3185 | 95 | 191.0 |
| 2.50 | 3 | 20 | 0.010 | 1.250 | 2.500 | 2545 | 75 | 238.7 |
| 3.00 | 3 | 20 | 0.010 | 1.500 | 3.000 | 2120 | 65 | 286.5 |
| 3.50 | 3 | 20 | 0.015 | 1.750 | 3.500 | 1820 | 80 | 501.3 |
| 4.00 | 3 | 20 | 0.015 | 2.000 | 4.000 | 1590 | 70 | 573.0 |
| 5.00 | 3 | 20 | 0.020 | 2.500 | 5.000 | 1275 | 75 | 954.9 |
| 5.50 | 3 | 20 | 0.020 | 2.750 | 5.500 | 1155 | 70 | 1050.4 |
| 6.00 | 3 | 20 | 0.025 | 3.000 | 6.000 | 1060 | 80 | 1432.4 |

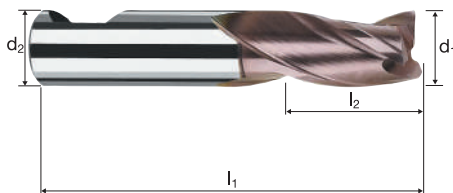
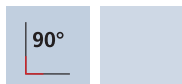
Frese cilindriche

A taglienti lisci, esecuzione a gambo corto

HSS

HSS
PM/F

λ 30°
 γ 15°



Sgrossatura

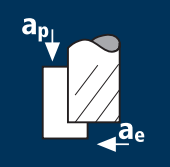
















Finitura



ReTool®

| | | | | | | | | | |
|-------------|----------------|--|--|--|--|--|-------------------|--|--------|
| Rm < 850 | Rm 850-1100 | | | | | | Inox Stainless | | Copper |
|-------------|----------------|--|--|--|--|--|-------------------|--|--------|

| Esempio: N° Ordine | | Rivestimento U | Articolo 0400 | Codice-Ø 100 | | | | | UNICUT-4X |
|-----------------------|----------------------|----------------------|------------------|-----------------|----------------|-------|---|-------|-----------|
| Ø Code | d ₁ f8 | d ₂ h6 | l ₁ | l ₂ | l ₄ | α | z | EUR | |
| 100 | 1.00 | 6.00 | 34 | 3.00 | 10.48 | 14.0° | 3 | 16.80 | |
| 120 | 1.50 | 6.00 | 34 | 3.00 | 9.99 | 13.0° | 3 | 16.80 | |
| 130 | 1.80 | 6.00 | 35 | 4.00 | 10.78 | 11.5° | 3 | 16.80 | |
| 140 | 2.00 | 6.00 | 35 | 4.00 | 10.61 | 11.0° | 3 | 16.80 | |
| 150 | 2.30 | 6.00 | 36 | 5.00 | 12.00 | 9.0° | 3 | 16.80 | |
| 160 | 2.50 | 6.00 | 36 | 5.00 | 12.00 | 8.5° | 3 | 16.80 | |
| 170 | 2.80 | 6.00 | 36 | 5.00 | 12.00 | 8.0° | 3 | 16.80 | |
| 180 | 3.00 | 6.00 | 36 | 5.00 | 12.00 | 7.5° | 3 | 16.80 | |
| 190 | 3.30 | 6.00 | 37 | 6.00 | 13.00 | 6.0° | 3 | 16.80 | |
| 200 | 3.50 | 6.00 | 37 | 6.00 | 13.00 | 5.5° | 3 | 16.80 | |
| 210 | 3.80 | 6.00 | 38 | 7.00 | 14.00 | 4.5° | 3 | 16.80 | |
| 220 | 4.00 | 6.00 | 38 | 7.00 | 14.00 | 4.5° | 3 | 16.80 | |
| 230 | 4.30 | 6.00 | 38 | 7.00 | 14.00 | 3.5° | 3 | 16.80 | |
| 240 | 4.50 | 6.00 | 38 | 7.00 | 14.00 | 3.5° | 3 | 16.80 | |
| 250 | 4.80 | 6.00 | 39 | 8.00 | 15.00 | 2.5° | 3 | 16.80 | |
| 260 | 5.00 | 6.00 | 39 | 8.00 | 15.00 | 2.0° | 3 | 16.80 | |
| 270 | 5.30 | 6.00 | 39 | 8.00 | 15.00 | 1.5° | 3 | 16.80 | |
| 280 | 5.50 | 6.00 | 39 | 8.00 | 15.00 | 1.0° | 3 | 16.80 | |
| 290 | 5.75 | 6.00 | 39 | 8.00 | 15.00 | 0.0° | 3 | 16.80 | |
| 300 | 6.00 | 6.00 | 39 | 8.00 | - | 0.0° | 3 | 16.80 | |

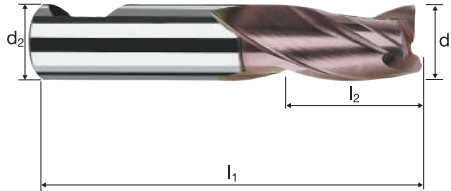
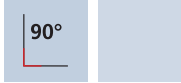
| Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | |
|---|---|--|------|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----|
|  | Acciaio < 850 N/mm ²   | 6.50 | 3 | 60 | 0.025 | 6.500 | 0.650 | 2940 | 220 | |
| | | 7.00 | 3 | 60 | 0.030 | 7.000 | 0.700 | 2730 | 245 | |
| | | 7.50 | 3 | 60 | 0.030 | 7.500 | 0.750 | 2545 | 230 | |
| | | 8.00 | 3 | 60 | 0.030 | 8.000 | 0.800 | 2385 | 215 | |
| | | 8.50 | 3 | 60 | 0.035 | 8.500 | 0.850 | 2245 | 235 | |
| | | 9.00 | 3 | 60 | 0.035 | 9.000 | 0.900 | 2120 | 225 | |
| | | 9.50 | 3 | 60 | 0.040 | 9.500 | 0.950 | 2010 | 240 | |
| | | 10.00 | 3 | 60 | 0.040 | 10.000 | 1.000 | 1910 | 230 | |
| | | Acciaio 850 - 1100 N/mm ²   | 6.50 | 3 | 48 | 0.025 | 6.500 | 0.650 | 2350 | 175 |
| | | | 7.00 | 3 | 48 | 0.030 | 7.000 | 0.700 | 2185 | 195 |
| 7.50 | 3 | | 48 | 0.030 | 7.500 | 0.750 | 2035 | 185 | | |
| 8.00 | 3 | | 48 | 0.030 | 8.000 | 0.800 | 1910 | 170 | | |
| 8.50 | 3 | | 48 | 0.035 | 8.500 | 0.850 | 1800 | 190 | | |
| 9.00 | 3 | | 48 | 0.035 | 9.000 | 0.900 | 1700 | 180 | | |
| 9.50 | 3 | | 48 | 0.040 | 9.500 | 0.950 | 1610 | 195 | | |
| 10.00 | 3 | | 48 | 0.040 | 10.000 | 1.000 | 1530 | 185 | | |
| Inox normal [Cr-Ni/1.4301] [Cr-Ni-Mo/1.4571]   | 6.50 | | 3 | 25 | 0.025 | 6.500 | 0.650 | 1225 | 90 | |
| | 7.00 | | 3 | 25 | 0.030 | 7.000 | 0.700 | 1135 | 100 | |
| | 7.50 | 3 | 25 | 0.030 | 7.500 | 0.750 | 1060 | 95 | | |
| | 8.00 | 3 | 25 | 0.030 | 8.000 | 0.800 | 995 | 90 | | |
| | 8.50 | 3 | 25 | 0.035 | 8.500 | 0.850 | 935 | 100 | | |
| | 9.00 | 3 | 25 | 0.035 | 9.000 | 0.900 | 885 | 95 | | |
| | 9.50 | 3 | 25 | 0.040 | 9.500 | 0.950 | 840 | 100 | | |
| | 10.00 | 3 | 25 | 0.040 | 10.000 | 1.000 | 795 | 95 | | |
| | Inox medium [Cr-Ni-Mo+/1.4539] Acciaio duplex [17-4 PH]   | 6.50 | 3 | 22 | 0.025 | 6.500 | 0.650 | 1075 | 80 | |
| | | 7.00 | 3 | 22 | 0.030 | 7.000 | 0.700 | 1000 | 90 | |
| 7.50 | | 3 | 22 | 0.030 | 7.500 | 0.750 | 935 | 85 | | |
| 8.00 | | 3 | 22 | 0.030 | 8.000 | 0.800 | 875 | 80 | | |
| 8.50 | | 3 | 22 | 0.035 | 8.500 | 0.850 | 825 | 85 | | |
| 9.00 | | 3 | 22 | 0.035 | 9.000 | 0.900 | 780 | 80 | | |
| 9.50 | | 3 | 22 | 0.040 | 9.500 | 0.950 | 735 | 90 | | |
| 10.00 | | 3 | 22 | 0.040 | 10.000 | 1.000 | 700 | 85 | | |
| Acciaio < 850 N/mm ²   | | 6.50 | 3 | 55 | 0.025 | 3.250 | 6.500 | 2695 | 200 | 4.3 |
| | | 7.00 | 3 | 55 | 0.030 | 3.500 | 7.000 | 2500 | 225 | 5.5 |
| | 7.50 | 3 | 55 | 0.030 | 3.750 | 7.500 | 2335 | 210 | 5.9 | |
| | 8.00 | 3 | 55 | 0.030 | 4.000 | 8.000 | 2190 | 195 | 6.3 | |
| | 8.50 | 3 | 55 | 0.035 | 4.250 | 8.500 | 2060 | 215 | 7.8 | |
| | 9.00 | 3 | 55 | 0.035 | 4.500 | 9.000 | 1945 | 205 | 8.3 | |
| | 9.50 | 3 | 55 | 0.040 | 4.750 | 9.500 | 1845 | 220 | 10.0 | |
| | 10.00 | 3 | 55 | 0.040 | 5.000 | 10.000 | 1750 | 210 | 10.5 | |
| | Acciaio 850 - 1100 N/mm ²   | 6.50 | 3 | 45 | 0.025 | 3.250 | 6.500 | 2205 | 165 | 3.5 |
| | | 7.00 | 3 | 45 | 0.030 | 3.500 | 7.000 | 2045 | 185 | 4.5 |
| 7.50 | | 3 | 45 | 0.030 | 3.750 | 7.500 | 1910 | 170 | 4.8 | |
| 8.00 | | 3 | 45 | 0.030 | 4.000 | 8.000 | 1790 | 160 | 5.2 | |
| 8.50 | | 3 | 45 | 0.035 | 4.250 | 8.500 | 1685 | 175 | 6.4 | |
| 9.00 | | 3 | 45 | 0.035 | 4.500 | 9.000 | 1590 | 165 | 6.8 | |
| 9.50 | | 3 | 45 | 0.040 | 4.750 | 9.500 | 1510 | 180 | 8.2 | |
| 10.00 | | 3 | 45 | 0.040 | 5.000 | 10.000 | 1430 | 170 | 8.6 | |
| Inox normal [Cr-Ni/1.4301] [Cr-Ni-Mo/1.4571]   | | 6.50 | 3 | 22 | 0.025 | 3.250 | 6.500 | 1075 | 80 | 1.7 |
| | | 7.00 | 3 | 22 | 0.030 | 3.500 | 7.000 | 1000 | 90 | 2.2 |
| | 7.50 | 3 | 22 | 0.030 | 3.750 | 7.500 | 935 | 85 | 2.4 | |
| | 8.00 | 3 | 22 | 0.030 | 4.000 | 8.000 | 875 | 80 | 2.5 | |
| | 8.50 | 3 | 22 | 0.035 | 4.250 | 8.500 | 825 | 85 | 3.1 | |
| | 9.00 | 3 | 22 | 0.035 | 4.500 | 9.000 | 780 | 80 | 3.3 | |
| | 9.50 | 3 | 22 | 0.040 | 4.750 | 9.500 | 735 | 90 | 4.0 | |
| | 10.00 | 3 | 22 | 0.040 | 5.000 | 10.000 | 700 | 85 | 4.2 | |
| | Inox medium [Cr-Ni-Mo+/1.4539] Acciaio duplex [17-4 PH]   | 6.50 | 3 | 20 | 0.025 | 3.250 | 6.500 | 980 | 75 | 1.6 |
| | | 7.00 | 3 | 20 | 0.030 | 3.500 | 7.000 | 910 | 80 | 2.0 |
| 7.50 | | 3 | 20 | 0.030 | 3.750 | 7.500 | 850 | 75 | 2.1 | |
| 8.00 | | 3 | 20 | 0.030 | 4.000 | 8.000 | 795 | 70 | 2.3 | |
| 8.50 | | 3 | 20 | 0.035 | 4.250 | 8.500 | 750 | 80 | 2.8 | |
| 9.00 | | 3 | 20 | 0.035 | 4.500 | 9.000 | 705 | 75 | 3.0 | |
| 9.50 | | 3 | 20 | 0.040 | 4.750 | 9.500 | 670 | 80 | 3.6 | |
| 10.00 | | 3 | 20 | 0.040 | 5.000 | 10.000 | 635 | 75 | 3.8 | |

Frese cilindriche

A taglienti lisci, esecuzione a gambo corto

HSS

HSS-E λ 30°
Co8 γ 15°



Sgrossatura

Finitura



ReTool®

Rm
< 850

Rm
850-1100

Inox
Stainless

Copper

| Esempio: N° Ordine | | | | | | | | | UNICUT-4X |
|--------------------------------|----------------------|----------------------|----------------|----------------|----------------|------|---|-------|------------|
| Rivestimento Articolo Codice-Ø | | | | | | | | | U 0400 311 |
| Ø Code | d ₁ f8 | d ₂ h6 | l ₁ | l ₂ | l ₄ | α | z | EUR | |
| 311 | 6.50 | 8.00 | 42 | 10.00 | 17.50 | 2.5° | 3 | 23.60 | |
| 331 | 7.00 | 8.00 | 42 | 10.00 | 17.50 | 2.0° | 3 | 23.60 | |
| 351 | 7.50 | 8.00 | 42 | 10.00 | 17.50 | 1.0° | 3 | 23.60 | |
| 391 | 8.00 | 8.00 | 43 | 11.00 | - | 0.0° | 3 | 23.60 | |
| 410 | 8.50 | 10.00 | 48 | 11.00 | 20.50 | 2.5° | 3 | 25.20 | |
| 420 | 9.00 | 10.00 | 48 | 11.00 | 20.50 | 1.5° | 3 | 25.20 | |
| 430 | 9.50 | 10.00 | 48 | 11.00 | 20.50 | 1.0° | 3 | 25.20 | |
| 450 | 10.00 | 10.00 | 50 | 13.00 | - | 0.0° | 3 | 25.20 | |
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| Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|--------------|--|------------|--|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|
| | Acciaio < 850 N/mm ² | 2.00 | 3 | 60 | 0.005 | 3.000 | 0.200 | 9550 | 145 |
| | | 3.00 | 3 | 60 | 0.010 | 4.500 | 0.300 | 6365 | 190 |
| | | 4.00 | 3 | 60 | 0.015 | 6.000 | 0.400 | 4775 | 215 |
| | | 5.00 | 3 | 60 | 0.015 | 7.500 | 0.500 | 3820 | 170 |
| | | 6.00 | 3 | 60 | 0.020 | 9.000 | 0.600 | 3185 | 190 |
| | | 7.00 | 3 | 60 | 0.025 | 10.500 | 0.700 | 2730 | 205 |
| | | 8.00 | 3 | 60 | 0.025 | 12.000 | 0.800 | 2385 | 180 |
| | | 9.00 | 3 | 60 | 0.030 | 13.500 | 0.900 | 2120 | 190 |
| | | 10.00 | 3 | 60 | 0.035 | 15.000 | 1.000 | 1910 | 200 |
| | | | Acciaio 850 - 1100 N/mm ² | 2.00 | 3 | 48 | 0.005 | 3.000 | 0.200 |
| 3.00 | 3 | | | 48 | 0.010 | 4.500 | 0.300 | 5095 | 155 |
| 4.00 | 3 | | | 48 | 0.015 | 6.000 | 0.400 | 3820 | 170 |
| 5.00 | 3 | | | 48 | 0.015 | 7.500 | 0.500 | 3055 | 140 |
| 6.00 | 3 | | | 48 | 0.020 | 9.000 | 0.600 | 2545 | 155 |
| 7.00 | 3 | | | 48 | 0.025 | 10.500 | 0.700 | 2185 | 165 |
| 8.00 | 3 | | | 48 | 0.025 | 12.000 | 0.800 | 1910 | 145 |
| 9.00 | 3 | | | 48 | 0.030 | 13.500 | 0.900 | 1700 | 155 |
| 10.00 | 3 | | | 48 | 0.035 | 15.000 | 1.000 | 1530 | 160 |
| | Inox normal [Cr-Ni/1.4301] [Cr-Ni-Mo/1.4571] | | | 2.00 | 3 | 25 | 0.005 | 3.000 | 0.200 |
| | | 3.00 | 3 | 25 | 0.010 | 4.500 | 0.300 | 2655 | 80 |
| | | 4.00 | 3 | 25 | 0.015 | 6.000 | 0.400 | 1990 | 90 |
| | | 5.00 | 3 | 25 | 0.015 | 7.500 | 0.500 | 1590 | 70 |
| | | 6.00 | 3 | 25 | 0.020 | 9.000 | 0.600 | 1325 | 80 |
| | | 7.00 | 3 | 25 | 0.025 | 10.500 | 0.700 | 1135 | 85 |
| | | 8.00 | 3 | 25 | 0.025 | 12.000 | 0.800 | 995 | 75 |
| | | 9.00 | 3 | 25 | 0.030 | 13.500 | 0.900 | 885 | 80 |
| | | 10.00 | 3 | 25 | 0.035 | 15.000 | 1.000 | 795 | 85 |
| | | | Inox medium [Cr-Ni-Mo+/1.4539] Acciaio duplex [17-4 PH] | 2.00 | 3 | 22 | 0.005 | 3.000 | 0.200 |
| 3.00 | 3 | | | 22 | 0.010 | 4.500 | 0.300 | 2335 | 70 |
| 4.00 | 3 | | | 22 | 0.015 | 6.000 | 0.400 | 1750 | 80 |
| 5.00 | 3 | | | 22 | 0.015 | 7.500 | 0.500 | 1400 | 65 |
| 6.00 | 3 | | | 22 | 0.020 | 9.000 | 0.600 | 1165 | 70 |
| 7.00 | 3 | | | 22 | 0.025 | 10.500 | 0.700 | 1000 | 75 |
| 8.00 | 3 | | | 22 | 0.025 | 12.000 | 0.800 | 875 | 65 |
| 9.00 | 3 | | | 22 | 0.030 | 13.500 | 0.900 | 780 | 70 |
| 10.00 | 3 | | | 22 | 0.035 | 15.000 | 1.000 | 700 | 75 |

| Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|--------------|--|------------|--|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| | Acciaio < 850 N/mm ² | 2.00 | 3 | 55 | 0.005 | 1.000 | 2.000 | 8755 | 130 | 0.3 |
| | | 3.00 | 3 | 55 | 0.010 | 1.500 | 3.000 | 5835 | 175 | 0.8 |
| | | 4.00 | 3 | 55 | 0.010 | 2.000 | 4.000 | 4375 | 130 | 1.1 |
| | | 5.00 | 3 | 55 | 0.015 | 2.500 | 5.000 | 3500 | 160 | 2.0 |
| | | 6.00 | 3 | 55 | 0.015 | 3.000 | 6.000 | 2920 | 130 | 2.4 |
| | | 7.00 | 3 | 55 | 0.020 | 3.500 | 7.000 | 2500 | 150 | 3.7 |
| | | 8.00 | 3 | 55 | 0.025 | 4.000 | 8.000 | 2190 | 165 | 5.3 |
| | | 9.00 | 3 | 55 | 0.025 | 4.500 | 9.000 | 1945 | 145 | 5.9 |
| | | 10.00 | 3 | 55 | 0.030 | 5.000 | 10.000 | 1750 | 160 | 7.9 |
| | | | Acciaio 850 - 1100 N/mm ² | 2.00 | 3 | 45 | 0.005 | 1.000 | 2.000 | 7160 |
| 3.00 | 3 | | | 45 | 0.010 | 1.500 | 3.000 | 4775 | 145 | 0.6 |
| 4.00 | 3 | | | 45 | 0.010 | 2.000 | 4.000 | 3580 | 105 | 0.9 |
| 5.00 | 3 | | | 45 | 0.015 | 2.500 | 5.000 | 2865 | 130 | 1.6 |
| 6.00 | 3 | | | 45 | 0.015 | 3.000 | 6.000 | 2385 | 105 | 1.9 |
| 7.00 | 3 | | | 45 | 0.020 | 3.500 | 7.000 | 2045 | 125 | 3.0 |
| 8.00 | 3 | | | 45 | 0.025 | 4.000 | 8.000 | 1790 | 135 | 4.3 |
| 9.00 | 3 | | | 45 | 0.025 | 4.500 | 9.000 | 1590 | 120 | 4.8 |
| 10.00 | 3 | | | 45 | 0.030 | 5.000 | 10.000 | 1430 | 130 | 6.4 |
| | Inox normal [Cr-Ni/1.4301] [Cr-Ni-Mo/1.4571] | | | 2.00 | 3 | 22 | 0.005 | 1.000 | 2.000 | 3500 |
| | | 3.00 | 3 | 22 | 0.010 | 1.500 | 3.000 | 2335 | 70 | 0.3 |
| | | 4.00 | 3 | 22 | 0.010 | 2.000 | 4.000 | 1750 | 55 | 0.4 |
| | | 5.00 | 3 | 22 | 0.015 | 2.500 | 5.000 | 1400 | 65 | 0.8 |
| | | 6.00 | 3 | 22 | 0.015 | 3.000 | 6.000 | 1165 | 55 | 0.9 |
| | | 7.00 | 3 | 22 | 0.020 | 3.500 | 7.000 | 1000 | 60 | 1.5 |
| | | 8.00 | 3 | 22 | 0.025 | 4.000 | 8.000 | 875 | 65 | 2.1 |
| | | 9.00 | 3 | 22 | 0.025 | 4.500 | 9.000 | 780 | 60 | 2.4 |
| | | 10.00 | 3 | 22 | 0.030 | 5.000 | 10.000 | 700 | 65 | 3.2 |
| | | | Inox medium [Cr-Ni-Mo+/1.4539] Acciaio duplex [17-4 PH] | 2.00 | 3 | 20 | 0.005 | 1.000 | 2.000 | 3185 |
| 3.00 | 3 | | | 20 | 0.010 | 1.500 | 3.000 | 2120 | 65 | 0.3 |
| 4.00 | 3 | | | 20 | 0.010 | 2.000 | 4.000 | 1590 | 50 | 0.4 |
| 5.00 | 3 | | | 20 | 0.015 | 2.500 | 5.000 | 1275 | 55 | 0.7 |
| 6.00 | 3 | | | 20 | 0.015 | 3.000 | 6.000 | 1060 | 50 | 0.9 |
| 7.00 | 3 | | | 20 | 0.020 | 3.500 | 7.000 | 910 | 55 | 1.3 |
| 8.00 | 3 | | | 20 | 0.025 | 4.000 | 8.000 | 795 | 60 | 1.9 |
| 9.00 | 3 | | | 20 | 0.025 | 4.500 | 9.000 | 705 | 55 | 2.1 |
| 10.00 | 3 | | | 20 | 0.030 | 5.000 | 10.000 | 635 | 55 | 2.9 |

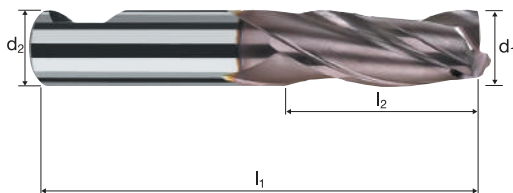
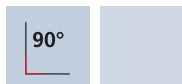
Frese cilindriche

A taglienti lisci, esecuzione a gambo corto

HSS

HSS
PM/F

λ 30°
 γ 15°



Sgrossatura

Finitura



ReTool®

| | | | | | | | | | |
|-------------|----------------|--|--|--|--|--|-------------------|--|--------|
| Rm < 850 | Rm 850-1100 | | | | | | Inox Stainless | | Copper |
|-------------|----------------|--|--|--|--|--|-------------------|--|--------|

| Esempio: N° Ordine | | Rivestimento U | Articolo 0410 | Codice-Ø 140 | | | | | UNICUT-4X |
|-----------------------|----------------------|----------------------|------------------|-----------------|----------------|------|---|-------|-----------|
| Ø Code | d ₁ f8 | d ₂ h6 | l ₁ | l ₂ | l ₄ | α | z | EUR | |
| 140 | 2.00 | 6.00 | 38 | 7.00 | 13.61 | 8.5° | 3 | 19.30 | |
| 160 | 2.50 | 6.00 | 39 | 8.00 | 15.00 | 7.0° | 3 | 19.30 | |
| 180 | 3.00 | 6.00 | 39 | 8.00 | 15.00 | 6.0° | 3 | 19.30 | |
| 200 | 3.50 | 6.00 | 41 | 10.00 | 17.00 | 4.5° | 3 | 19.30 | |
| 220 | 4.00 | 6.00 | 42 | 11.00 | 18.00 | 3.5° | 3 | 19.30 | |
| 240 | 4.50 | 6.00 | 42 | 11.00 | 18.00 | 2.5° | 3 | 19.30 | |
| 260 | 5.00 | 6.00 | 44 | 13.00 | 20.00 | 1.5° | 3 | 19.30 | |
| 280 | 5.50 | 6.00 | 44 | 13.00 | 20.00 | 1.0° | 3 | 19.30 | |
| 300 | 6.00 | 6.00 | 44 | 13.00 | - | 0.0° | 3 | 19.30 | |
| 311 | 6.50 | 8.00 | 48 | 16.00 | 23.50 | 2.0° | 3 | 27.00 | |
| 331 | 7.00 | 8.00 | 48 | 16.00 | 23.50 | 1.5° | 3 | 27.00 | |
| 351 | 7.50 | 8.00 | 48 | 16.00 | 23.50 | 1.0° | 3 | 27.00 | |
| 391 | 8.00 | 8.00 | 51 | 19.00 | - | 0.0° | 3 | 27.00 | |
| 410 | 8.50 | 10.00 | 56 | 19.00 | 28.50 | 2.0° | 3 | 28.90 | |
| 420 | 9.00 | 10.00 | 56 | 19.00 | 28.50 | 1.5° | 3 | 28.90 | |
| 430 | 9.50 | 10.00 | 56 | 19.00 | 28.50 | 1.0° | 3 | 28.90 | |
| 450 | 10.00 | 10.00 | 59 | 22.00 | - | 0.0° | 3 | 28.90 | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |












Frese per lavorazioni in 3D

Estremità emisferica

Tolleranza r ±0.003







| | | | | | | | | | | |
|---------|--|----------------------------|--------------|----------|-------------|-----------|------------------------|-----------------------|-----------------------|-----|
| N° 7500 |  | SpheroX (Sphero-XP) | X-Generation | X | 3xd F SF | d, 1 – 12 | Rm 1100-1500 | HRC 48- >60 | Ti Titanium | 335 |
|---------|--|----------------------------|--------------|----------|-------------|-----------|------------------------|-----------------------|-----------------------|-----|

Tolleranza r ±0.005

| | | | | | | | | | | |
|---------|--|----------------------------------|--------------|----------|------------------|-----------|------------------------------|--------------------------|-------------------------------|-----|
| N° 7470 |  | SpheroX | X-Generation | X | 3xd R F | d, 1 – 16 | Rm 1300-1500 | HRC 48- >60 | HSS Ti | 337 |
| N° 7490 |  | SpheroX new! | X-Generation | X | 3xd HDC R/F | d, 1 – 16 | Rm 1300-1500 | HRC 48- >60 | HSS Ti | 339 |
| N° 7400 |  | SpheroX (Sphero-XF) | X-Generation | X | 3xd R F | d, 1 – 12 | Rm 1100-1500 | HRC 48- >60 | Ti Titanium | 341 |
| N° 7460 |  | SpheroX (Sphero-XF Multi) | X-Generation | X | 3xd F SF | d, 6 – 12 | Rm 1100-1500 | HRC 48- >60 | Ti Titanium | 343 |
| N° 7540 |  | Sphericut (Sphero-SB) | Base-X | B | 3xd PF F | d, 1 – 16 | Rm <850-1500 | Inox Stainless | | 345 |
| N° 7550 |  | Sphericut (Sphero-Alu) | Base-X | B | 3xd HDC R/F | d, 2 – 20 | Al Aluminium Alloy | Cu Copper | Plastic Thermoplast | 347 |
| N° 7472 |  | SpheroX | X-Generation | X | 4.5xd R F | d, 1 – 16 | Rm 1300-1500 | HRC 48- >60 | HSS Ti | 349 |
| N° 7492 |  | SpheroX new! | X-Generation | X | 4.5xd HDC R/F | d, 1 – 16 | Rm 1300-1500 | HRC 48- >60 | HSS Ti | 351 |
| N° 7402 |  | SpheroX (Sphero-XF) | X-Generation | X | 4.5xd R F | d, 1 – 12 | Rm 1100-1500 | HRC 48- >60 | Ti Titanium | 353 |

Frese per lavorazioni in 3D



Estremità emisferica

| Tolleranza $r \pm 0.005$ | | | | | | | | | | |
|--------------------------|--|----------------------------------|--------------|----------|----------------|--------------|-----------------------|-------------------|------------------------|-----|
| N° 7474 |  | SpheroX | X-Generation | X | 6xd R F | $d_1 1 - 16$ | Rm 1300-1500 | HRC 48- >60 | HSS Ti | 355 |
| N° 7494 |  | SpheroX new! | X-Generation | X | 6xd HDC R/F | $d_1 1 - 16$ | Rm 1300-1500 | HRC 48- >60 | HSS Ti | 357 |
| N° 7404 |  | SpheroX (Sphero-XF) | X-Generation | X | 6xd R F | $d_1 1 - 12$ | Rm 1100-1500 | HRC 48- >60 | Ti Titanium | 359 |
| N° 7464 |  | SpheroX (Sphero-XF Multi) | X-Generation | X | 6xd F SF | $d_1 6 - 12$ | Rm 1100-1500 | HRC 48- >60 | Ti Titanium | 361 |
| N° 7544 |  | Sphericut (Sphero-SB) | Base-X | B | 6xd PF F | $d_1 1 - 16$ | Rm <850-1500 | Inox Stainless | | 363 |
| N° 7554 |  | Sphericut (Sphero-Alu) | Base-X | B | 6xd HDC R/F | $d_1 3 - 16$ | Al Aluminium Alloy | Cu Copper | Plastic Thermoplast | 365 |
| N° 7478 |  | SpheroX | X-Generation | X | 9xd F SF | $d_1 1 - 16$ | Rm 1300-1500 | HRC 48- >60 | HSS Ti | 367 |
| N° 7408 |  | SpheroX (Sphero-XF) | X-Generation | X | 9xd F SF | $d_1 1 - 12$ | Rm 1100-1500 | HRC 48- >60 | Ti Titanium | 369 |

Frese per lavorazioni in 3D

Estremità emisferica

Tolleranza r ±0.01

| | | | | | | | | | | |
|---------|---|-------------------------------|--------|----------|-----|-----------|------------------------|---------------------|--|-----|
| N° 7450 |  | Sphericut (Sphero-XR4) | Base-X | B | 3xd | d, 3 – 12 | Rm 1300-1500 | HRC 48-60 | | 371 |
| | | | | | R | PF | | | | |
| N° 7454 |  | Sphericut (Sphero-XR4) | Base-X | B | 6xd | d, 3 – 12 | Rm 1300-1500 | HRC 48-60 | | 373 |
| | | | | | R | PF | | | | |
| N° 7458 | | Sphericut (Sphero-XR4) | Base-X | B | 9xd | d, 3 – 12 | Rm 1300-1500 | HRC 48-60 | | 375 |
| | | | | | PF | | | | | |

Tolleranza r f8 (-/-)

| | | | | | | | | | | |
|----------|--|------------------|---------|----------|-----|-----------|------------------------|---------------------|--|-----|
| N° 5286 | | Sphericut | Base-X | B | 3xd | d, 1 – 16 | Rm 1100-1500 | HRC 48-56 | | 377 |
| | | | | | PF | F | | | | |
| N° 45298 | | | Favora® | F | 3xd | d, 3 – 12 | Rm 850-1300 | | | 379 |
| | | | | | PF | F | | | | |
| N° 5288 | | Sphericut | Base-X | B | 3xd | d, 1 – 16 | Rm 1100-1500 | HRC 48-56 | | 381 |
| | | | | | PF | F | | | | |
| N° 5289 | | Sphericut | Base-X | B | 5xd | d, 3 – 12 | Rm 1100-1500 | HRC 48-56 | | 383 |
| | | | | | PF | F | | | | |



Frese per lavorazioni in 3D

Fresa ad arco

Sferica

N° 8530



ArCutX



r_1 2, 3, 4
 r_2 750, 1000

HRC
<48-56

Inox
Ti

Al
Aluminium
Alloy

385

Sferica, micro

N° 8535



ArCutX



r_1 0.5, 1, 2
 r_2 250, 350

HRC
<48-56

Inox
Ti

Al
Aluminium
Alloy

387

Torica

N° 8540



ArCutX



r_1 1.25, 2, 3.5
 r_2 30, 40, 50

HRC
<48-56

Inox
Ti

Al
Aluminium
Alloy

389

Torica, integrale

N° 8545



ArCutX



r_1 0.8, 1
 r_2 200, 350

HRC
<48-56

Inox
Ti

Al
Aluminium
Alloy

391

Aree piatte

N° 8550



ArCutX



r_1 1
 r_2 250






HRC
<48-56





Inox
Ti





Al
Aluminium
Alloy

393









Frese per lavorazioni in 3D Torico

| Tolleranza r 0/+0.015 | | | | | | | | | |
|-----------------------|--|-----------------|--------------------------|----------------|-------------------------|------------------------|---------------------|--|-----|
| N° 7210 |  | XSpeed-H | X-Generation X | 3xd HDC R/F | r 0,2, 0,5 | HRC 56- >60 | HSS | | 395 |
| N° 7200 |  | XSpeed | X-Generation X | 3xd PF F | r 0,5, 1,0 | Rm 1100-1500 | HRC 48-60 | | 397 |
| N° 7100 |  | ToroX | X-Generation X | 3xd R PF | r 0,2, 0,5, 1,0, 2,0 | Rm 1100-1500 | HRC 48-60 | | 401 |
| N° 7204 |  | XSpeed | X-Generation X | 6xd PF F | r 0,5, 1,0 | Rm 1100-1500 | HRC 48-60 | | 405 |
| N° 7104 |  | ToroX | X-Generation X | 6xd R PF | r 0,2, 0,5, 1,0, 2,0 | Rm 1100-1500 | HRC 48-60 | | 409 |

| Tolleranza r 0/+0.03 | | | | | | | | | |
|----------------------|--|--------------------------|--------------------------|-------------|---------------------------------|------------------------|--------------------------|--|-----|
| N° 5250 |  | Multispeed | X-Generation X | 3xd PF F | r 0,5, 0,8, 1,0, 1,5 | Rm <850-1300 | Inox Stainless | | 413 |
| N° 7340 |  | Torocut (Toro-SB) | Base-X B | 3xd R PF | r 0,2, 0,5, 1,0, 1,5, 2,0 | Rm <850-1500 | Inox Stainless | | 415 |
| N° 5252 |  | Multispeed | X-Generation X | 5xd PF F | r 0,8, 1,0, 1,5 | Rm <850-1300 | Inox Stainless | | 419 |
| N° 7344 |  | Torocut (Toro-SB) | Base-X B | 6xd R PF | r 0,2, 0,5, 1,0 | Rm <850-1500 | Inox Stainless | | 421 |

| | | | | | | | | | |
|----------------|--|---------------------|--------------------------|---|---|------------------------|---------------------|--------------------------|-----|
| N° 8507 / 8607 |  | HX (HX-RNVS) | X-Generation X | Sgrossatura HPC <input type="checkbox"/> Sgrossatura HDC <input type="checkbox"/> Finitura <input type="checkbox"/> | r 0,2, 0,5, 1,0, 1,5, 2,0, 2,5 3,0 | HRC 48- >60 | HSS | | 151 |
| N° 8107 / 8207 |  | MFC (MFC-R) | Base-X B | Sgrossatura HPC <input type="checkbox"/> Sgrossatura HDC <input type="checkbox"/> Finitura <input type="checkbox"/> | r 0,2, 0,5, 1,0, 1,5, 2,0, 2,5 | Rm <850-1500 | HRC 48-56 | Inox Ti | 165 |
| N° 8517 / 8617 |  | HX new! | X-Generation X | Sgrossatura HPC <input type="checkbox"/> Sgrossatura HDC <input type="checkbox"/> Finitura <input type="checkbox"/> | r 0,2, 0,5, 1,0, 1,5, 2,0, 2,5 3,0 | HRC 48- >60 | HSS | | 181 |
| N° 8117 / 8217 |  | MFC new! | Base-X B | Sgrossatura HPC <input type="checkbox"/> Sgrossatura HDC <input type="checkbox"/> Finitura <input type="checkbox"/> | r 0,2, 0,5, 1,0, 1,5, 2,0, 2,5 | Rm <850-1500 | HRC 48-56 | Inox Ti | 185 |

Frese per lavorazioni in 3D HFC

| Scarico cilindrico | | | | | | | | |
|--------------------|--|------------------------|--------------|----------|-----------------------------|------------------------|-----------------------|-----|
| N° 7610 |  | XFeed-H new! | X-Generation | X | 3xd d, 1 – 16 R | HRC 56- >60 | HSS | 425 |
| N° 7600 |  | XFeed | X-Generation | X | 3xd d, 1 – 16 R | Rm 850-1500 | HRC 48- >60 | 427 |
| N° 7620 |  | XFeed (XFeed-R) | X-Generation | X | 3xd d, 6 – 16 R | Rm 1100-1500 | HRC 48-56 | 429 |
| N° 7612 |  | XFeed-H new! | X-Generation | X | 4.5xd d, 1 – 16 R | HRC 56- >60 | HSS | 431 |
| N° 7614 |  | XFeed-H new! | X-Generation | X | 6xd d, 3 – 16 R | HRC 56- >60 | HSS | 433 |
| N° 7604 |  | XFeed | X-Generation | X | 6xd d, 3 – 16 R | Rm 850-1500 | HRC 48- >60 | 435 |
| N° 7624 |  | XFeed (XFeed-R) | X-Generation | X | 6xd d, 6 – 16 R | Rm 1100-1500 | HRC 48-56 | 437 |
| N° 7608 |  | XFeed | X-Generation | X | 9xd d, 3 – 16 R | Rm 850-1500 | HRC 48- >60 | 439 |



Frese per lavorazioni in 3D

Lavorazione di metallo duro

Estremità emisferica

N° 5580



| | | | | | | | | |
|--------------|----------|------------|-----------|-----------------------|-----------|-----------|--|-----|
| X-Generation | X | 3xd | | d ₁ 1 – 12 | HM | HM | | 441 |
| | | F | SF | | <1200 HV | <1600 HV | | |
| X-Generation | X | 3xd | | d ₁ 6 – 12 | HM | HM | | 443 |
| | | R | F | | <1200 HV | <1600 HV | | |

N° 35700



Torico

N° 35400



| | | | | | | | | |
|--------------|----------|------------|----------|-------|-----------|-----------|--|-----|
| X-Generation | X | 3xd | | r 0.5 | HM | HM | | 445 |
| | | R | F | | <1200 HV | <1600 HV | | |

Frese per lavorazioni in 3D

CBN

Estremità emisferica

N° 31700



| | | | | | | | |
|--------------|----------|------------|-----------|-----------------------|--|--|-----|
| X-Generation | X | 3xd | d, 4 - 12 | HRC 56- >60 | | | 447 |
| | | SF | | | | | |

Torico

N° 31420



| | | | | | | | |
|--------------|----------|------------|-------|-----------------------|--|--|-----|
| X-Generation | X | 3xd | r 0.5 | HRC 56- >60 | | | 449 |
| | | SF | | | | | |









N° 31410



| | | | | | | | |
|--------------|----------|------------|---------------------------------------|-----------------------|--|--|-----|
| X-Generation | X | 3xd | r 1.0, 1.25, 1.5, 2.0, 2.5, 3.0 | HRC 56- >60 | | | 451 |
| | | SF | | | | | |














Frese per lavorazioni in 3D

Micro con estremità emisferica


| Gambo ø 6mm | | | | | | | | | |
|-------------|--|---------|--------------------------|--------------|-----------------|------------------------|-----------------------|------------|-----|
| N° 6460 |  | MicroHX | X-Generation X | 1xd | d_1 0,4 – 2,0 | Rm 1300-1500 | HRC 48- >60 | HSS | 453 |
| N° 6461 |  | MicroHX | X-Generation X | 2xd | d_1 0,4 – 2,0 | Rm 1300-1500 | HRC 48- >60 | HSS | 455 |
| N° 6481 |  | MicroHX | X-Generation X | 2.5xd | d_1 0,4 – 1,0 | Rm 1300-1500 | HRC 48- >60 | HSS | 457 |
| N° 6462 |  | MicroHX | X-Generation X | 3xd | d_1 0,4 – 3,0 | Rm 1300-1500 | HRC 48- >60 | HSS | 459 |
| N° 6482 |  | MicroHX | X-Generation X | 3.5xd | d_1 0,4 – 1,0 | Rm 1300-1500 | HRC 48- >60 | HSS | 461 |
| N° 6463 |  | MicroHX | X-Generation X | 4xd | d_1 0,4 – 2,0 | Rm 1300-1500 | HRC 48- >60 | HSS | 463 |
| N° 6483 |  | MicroHX | X-Generation X | 4.5xd | d_1 0,4 – 1,0 | Rm 1300-1500 | HRC 48- >60 | HSS | 465 |
| N° 6464 |  | MicroHX | X-Generation X | 5xd | d_1 0,4 – 3,0 | Rm 1300-1500 | HRC 48- >60 | HSS | 467 |

Frese per lavorazioni in 3D

Micro con estremità emisferica













| Gambo ø 6mm | | | | | | | | | |
|-------------|--|--------|--------------|--------------|--------------|----------------|--------------|------------|-----|
| N° 6560 |  | MicroX | X-Generation | 1xd | d, 0,1 – 2,0 | Rm 850-1500 | HRC 48-60 | Inox Ti | 469 |
| N° 6561 |  | MicroX | X-Generation | 2xd | d, 0,1 – 2,0 | Rm 850-1500 | HRC 48-60 | Inox Ti | 471 |
| N° 6581 |  | MicroX | X-Generation | 2.5xd | d, 0,1 – 1,0 | Rm 850-1500 | HRC 48-60 | Inox Ti | 473 |
| N° 6562 |  | MicroX | X-Generation | 3xd | d, 0,1 – 3,0 | Rm 850-1500 | HRC 48-60 | Inox Ti | 475 |
| N° 6582 |  | MicroX | X-Generation | 3.5xd | d, 0,1 – 1,0 | Rm 850-1500 | HRC 48-60 | Inox Ti | 477 |
| N° 6563 |  | MicroX | X-Generation | 4xd | d, 0,1 – 2,0 | Rm 850-1500 | HRC 48-60 | Inox Ti | 479 |
| N° 6583 |  | MicroX | X-Generation | 4.5xd | d, 0,1 – 1,0 | Rm 850-1500 | HRC 48-60 | Inox Ti | 481 |
| N° 6564 |  | MicroX | X-Generation | 5xd | d, 0,1 – 3,0 | Rm 850-1500 | HRC 48-60 | Inox Ti | 483 |
| N° 6565 |  | MicroX | X-Generation | 6xd | d, 0,2 – 2,0 | Rm 850-1500 | HRC 48-60 | Inox Ti | 485 |
| N° 6579 |  | MicroX | X-Generation | 7xd | d, 0,2 – 2,0 | Rm 850-1500 | HRC 48-60 | Inox Ti | 487 |
| N° 6566 |  | MicroX | X-Generation | 8xd | d, 0,2 – 3,0 | Rm 850-1500 | HRC 48-60 | Inox Ti | 489 |
| N° 6567 |  | MicroX | X-Generation | 9xd | d, 0,2 – 2,0 | Rm 850-1500 | HRC 48-60 | Inox Ti | 491 |
| N° 6568 |  | MicroX | X-Generation | 10xd | d, 0,2 – 3,0 | Rm 850-1500 | HRC 48-60 | Inox Ti | 493 |

Frese per lavorazioni in 3D Micro con estremità emisferica

| Gambo ø 6mm, scarico conico 0.9° | | | | | | | | | |
|----------------------------------|--|--------|--------------------------|-------------|--------------------------|-----------------------|---------------------|-------------------|-----|
| N° 6765 |  | MicroX | X-Generation X | 6xd | d _i 0.5 – 2.0 | Rm 850-1500 | HRC 48-60 | Inox Ti | 495 |
| N° 6766 |  | MicroX | X-Generation X | 8xd | d _i 0.5 – 3.0 | Rm 850-1500 | HRC 48-60 | Inox Ti | 497 |
| N° 6768 |  | MicroX | X-Generation X | 10xd | d _i 0.5 – 3.0 | Rm 850-1500 | HRC 48-60 | Inox Ti | 499 |
| N° 6770 |  | MicroX | X-Generation X | 12xd | d _i 0.5 – 3.0 | Rm 850-1500 | HRC 48-60 | Inox Ti | 501 |
| N° 6772 |  | MicroX | X-Generation X | 15xd | d _i 0.5 – 3.0 | Rm 850-1500 | HRC 48-60 | Inox Ti | 503 |
| N° 6774 |  | MicroX | X-Generation X | 20xd | d _i 0.5 – 3.0 | Rm 850-1500 | HRC 48-60 | Inox Ti | 505 |








Frese per lavorazioni in 3D







Micro con estremità emisferica

| Gambo ø 3mm | | | | | | | | | |
|-------------|--|------------------------------|--------------------------|-------------|--------------|------------------------|--------------------------|-----------------------|-----|
| N° 15781 |  | MicroX (Microcut-B1H) | X-Generation X | 1xd | d, 0,2 – 3,0 | Rm 1100-1500 | HRC 48-60 | | 507 |
| N° 5792 |  | MicroX (Microcut-B3H) | X-Generation X | 3xd | d, 0,5 – 3,0 | Rm 1100-1500 | HRC 48-60 | | 509 |
| N° 5794 |  | MicroX (Microcut-B5H) | X-Generation X | 5xd | d, 0,5 – 3,0 | Rm 1100-1500 | HRC 48-60 | | 511 |
| N° 5796 |  | MicroX (Microcut-B8H) | X-Generation X | 8xd | d, 0,5 – 3,0 | Rm 1100-1500 | HRC 48-60 | | 513 |
| N° 5782 |  | Microcut | Base-X B | 3xd | d, 0,2 – 3,0 | Rm <850-1300 | Inox Stainless | Ti Titanium | 515 |
| N° 5784 |  | Microcut | Base-X B | 5xd | d, 0,5 – 3,0 | Rm <850-1300 | Inox Stainless | Ti Titanium | 517 |
| N° 5786 |  | Microcut | Base-X B | 8xd | d, 0,5 – 3,0 | Rm <850-1300 | Inox Stainless | Ti Titanium | 519 |
| N° 5787 |  | Microcut | Base-X B | 10xd | d, 0,5 – 3,0 | Rm <850-1300 | | | 521 |
| N° 5791 |  | Microcut | Base-X B | 12xd | d, 1,0 – 3,0 | Rm <850-1300 | | | 523 |
| N° 5793 |  | Microcut | Base-X B | 15xd | d, 1,0 – 3,0 | Rm <850-1300 | | | 525 |
| N° 15795 |  | Microcut | Base-X B | 20xd | d, 1,0 – 3,0 | Rm <850-1100 | | | 527 |
| N° 45785 |  | | Favora® F | 3xd | d, 0,3 – 3,0 | Rm <850-1100 | | | 529 |

Frese per lavorazioni in 3D

Micro torico



| Gambo ø 6mm | | | | | | | | | |
|-------------|--|--------|----------------|------|----------------------------|----------------|--------------|------------|-----|
| N° 6531 |  | MicroX | X-Generation X | 2xd | r 0.05, 0.1, 0.2, 0.3, 0.5 | Rm 850-1500 | HRC 48-60 | Inox Ti | 531 |
| N° 6532 |  | MicroX | X-Generation X | 3xd | r 0.05, 0.1, 0.2, 0.3, 0.5 | Rm 850-1500 | HRC 48-60 | Inox Ti | 533 |
| N° 6533 |  | MicroX | X-Generation X | 4xd | r 0.05, 0.1, 0.2, 0.3, 0.5 | Rm 850-1500 | HRC 48-60 | Inox Ti | 537 |
| N° 6534 |  | MicroX | X-Generation X | 5xd | r 0.05, 0.1, 0.2, 0.3, 0.5 | Rm 850-1500 | HRC 48-60 | Inox Ti | 539 |
| N° 6535 |  | MicroX | X-Generation X | 6xd | r 0.05, 0.1, 0.2, 0.3, 0.5 | Rm 850-1500 | HRC 48-60 | Inox Ti | 543 |
| N° 6536 |  | MicroX | X-Generation X | 8xd | r 0.05, 0.1, 0.2, 0.3, 0.5 | Rm 850-1500 | HRC 48-60 | Inox Ti | 545 |
| N° 6538 |  | MicroX | X-Generation X | 10xd | r 0.05, 0.1, 0.2, 0.3, 0.5 | Rm 850-1500 | HRC 48-60 | Inox Ti | 549 |

| Gambo ø 6mm, scarico conico 0.9° | | | | | | | | | |
|----------------------------------|--|--------|----------------|------|-----------------|----------------|--------------|------------|-----|
| N° 6735 |  | MicroX | X-Generation X | 6xd | r 0.1, 0.2, 0.5 | Rm 850-1500 | HRC 48-60 | Inox Ti | 553 |
| N° 6736 |  | MicroX | X-Generation X | 8xd | r 0.1, 0.2, 0.5 | Rm 850-1500 | HRC 48-60 | Inox Ti | 555 |
| N° 6738 |  | MicroX | X-Generation X | 10xd | r 0.1, 0.2, 0.5 | Rm 850-1500 | HRC 48-60 | Inox Ti | 557 |
| N° 6740 |  | MicroX | X-Generation X | 12xd | r 0.1, 0.2, 0.5 | Rm 850-1500 | HRC 48-60 | Inox Ti | 559 |
| N° 6742 |  | MicroX | X-Generation X | 15xd | r 0.1, 0.2, 0.5 | Rm 850-1500 | HRC 48-60 | Inox Ti | 561 |
| N° 6744 |  | MicroX | X-Generation X | 20xd | r 0.1, 0.2, 0.5 | Rm 850-1500 | HRC 48-60 | Inox Ti | 563 |






Frese per lavorazioni in 3D

Micro torico

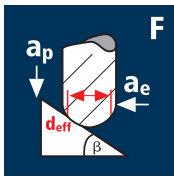
Gambo ø 6mm, Z4

| | | | | | | | | | |
|---------|--|---------------|---------------------------------|------------|-----------------|------------------------|---------------------|--|------------|
| N° 6632 |  | MicroX | X-Generation X | 3xd | r 0.1, 0.2, 0.5 | Rm 1100-1500 | HRC 48-60 | | 565 |
| N° 6634 |  | MicroX | X-Generation X | 5xd | r 0.1, 0.2, 0.5 | Rm 1100-1500 | HRC 48-60 | | 567 |

Gambo ø 3mm

| | | | | | | | | | |
|---------|--|------------------------------|---------------------------------|------------|-------|------------------------|--------------------------|-----------------------|------------|
| N° 5762 |  | MicroX (Microcut-T3H) | X-Generation X | 3xd | r 0.2 | Rm 1100-1500 | HRC 48-60 | | 569 |
| N° 5764 |  | MicroX (Microcut-T5H) | X-Generation X | 5xd | r 0.2 | Rm 1100-1500 | HRC 48-60 | | 571 |
| N° 5752 |  | Microcut | Base-X B | 3xd | r 0.2 | Rm <850-1300 | Inox Stainless | Ti Titanium | 573 |
| N° 5754 |  | Microcut | Base-X B | 5xd | r 0.2 | Rm <850-1300 | Inox Stainless | Ti Titanium | 575 |
| N° 5756 |  | Microcut | Base-X B | 8xd | r 0.2 | Rm <850-1300 | Inox Stainless | Ti Titanium | 577 |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



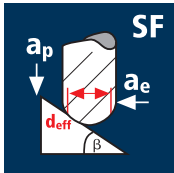
Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



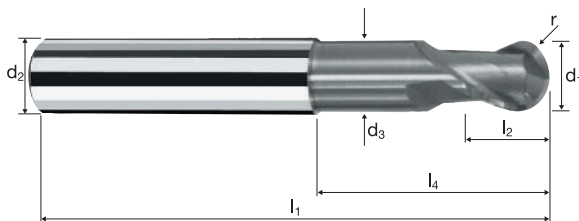
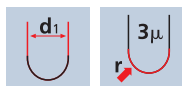
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _s [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|----------|
| 1.00 | 2 | 120 | 0.026 | 0.030 | 0.090 | 0.91 | 41975 | 2185 | 45° |
| 2.00 | 2 | 226 | 0.038 | 0.030 | 0.120 | 1.72 | 41825 | 3180 | 45° |
| 3.00 | 2 | 300 | 0.058 | 0.050 | 0.150 | 2.59 | 36870 | 4275 | 45° |
| 4.00 | 2 | 300 | 0.074 | 0.050 | 0.180 | 3.39 | 28170 | 4170 | 45° |
| 5.00 | 2 | 300 | 0.084 | 0.050 | 0.210 | 4.17 | 22900 | 3845 | 45° |
| 6.00 | 2 | 300 | 0.090 | 0.050 | 0.230 | 4.94 | 19330 | 3480 | 45° |
| 8.00 | 2 | 300 | 0.098 | 0.080 | 0.280 | 6.67 | 14315 | 2805 | 45° |
| 10.00 | 2 | 300 | 0.106 | 0.080 | 0.310 | 8.22 | 11615 | 2465 | 45° |
| 12.00 | 2 | 300 | 0.116 | 0.100 | 0.340 | 9.89 | 9655 | 2240 | 45° |
| 1.00 | 2 | 120 | 0.018 | 0.030 | 0.090 | 0.91 | 41975 | 1510 | 45° |
| 2.00 | 2 | 200 | 0.028 | 0.030 | 0.120 | 1.72 | 37015 | 2075 | 45° |
| 3.00 | 2 | 250 | 0.042 | 0.050 | 0.150 | 2.59 | 30725 | 2580 | 45° |
| 4.00 | 2 | 250 | 0.052 | 0.050 | 0.180 | 3.39 | 23475 | 2440 | 45° |
| 5.00 | 2 | 250 | 0.058 | 0.050 | 0.210 | 4.17 | 19085 | 2215 | 45° |
| 6.00 | 2 | 250 | 0.064 | 0.050 | 0.230 | 4.94 | 16110 | 2060 | 45° |
| 8.00 | 2 | 250 | 0.068 | 0.080 | 0.280 | 6.67 | 11930 | 1625 | 45° |
| 10.00 | 2 | 250 | 0.074 | 0.080 | 0.310 | 8.22 | 9680 | 1435 | 45° |
| 12.00 | 2 | 250 | 0.082 | 0.100 | 0.340 | 9.89 | 8045 | 1320 | 45° |
| 1.00 | 2 | 120 | 0.018 | 0.030 | 0.090 | 0.91 | 41975 | 1510 | 45° |
| 2.00 | 2 | 160 | 0.028 | 0.030 | 0.120 | 1.72 | 29610 | 1660 | 45° |
| 3.00 | 2 | 200 | 0.042 | 0.050 | 0.150 | 2.59 | 24580 | 2065 | 45° |
| 4.00 | 2 | 200 | 0.052 | 0.050 | 0.180 | 3.39 | 18780 | 1955 | 45° |
| 5.00 | 2 | 200 | 0.058 | 0.050 | 0.210 | 4.17 | 15265 | 1770 | 45° |
| 6.00 | 2 | 200 | 0.064 | 0.050 | 0.230 | 4.94 | 12885 | 1650 | 45° |
| 8.00 | 2 | 200 | 0.068 | 0.080 | 0.280 | 6.67 | 9545 | 1300 | 45° |
| 10.00 | 2 | 200 | 0.074 | 0.080 | 0.310 | 8.22 | 7745 | 1145 | 45° |
| 12.00 | 2 | 200 | 0.082 | 0.100 | 0.340 | 9.89 | 6435 | 1055 | 45° |
| 1.00 | 2 | 120 | 0.018 | 0.030 | 0.090 | 0.91 | 41975 | 1510 | 45° |
| 2.00 | 2 | 120 | 0.028 | 0.030 | 0.120 | 1.72 | 22210 | 1245 | 45° |
| 3.00 | 2 | 150 | 0.042 | 0.050 | 0.150 | 2.59 | 18435 | 1550 | 45° |
| 4.00 | 2 | 150 | 0.052 | 0.050 | 0.180 | 3.39 | 14085 | 1465 | 45° |
| 5.00 | 2 | 150 | 0.058 | 0.050 | 0.210 | 4.17 | 11450 | 1330 | 45° |
| 6.00 | 2 | 150 | 0.064 | 0.050 | 0.230 | 4.94 | 9665 | 1235 | 45° |
| 8.00 | 2 | 150 | 0.068 | 0.080 | 0.280 | 6.67 | 7160 | 975 | 45° |
| 10.00 | 2 | 150 | 0.074 | 0.080 | 0.310 | 8.22 | 5810 | 860 | 45° |
| 12.00 | 2 | 150 | 0.082 | 0.100 | 0.340 | 9.89 | 4830 | 790 | 45° |
| 1.00 | 2 | 116 | 0.030 | 0.020 | 0.040 | 0.88 | 41960 | 2520 | 45° |
| 2.00 | 2 | 220 | 0.040 | 0.020 | 0.050 | 1.67 | 41935 | 3355 | 45° |
| 3.00 | 2 | 329 | 0.045 | 0.030 | 0.060 | 2.50 | 41890 | 3770 | 45° |
| 4.00 | 2 | 360 | 0.050 | 0.030 | 0.060 | 3.27 | 35045 | 3505 | 45° |
| 5.00 | 2 | 360 | 0.050 | 0.030 | 0.070 | 4.04 | 28365 | 2835 | 45° |
| 6.00 | 2 | 360 | 0.055 | 0.030 | 0.070 | 4.80 | 23875 | 2625 | 45° |
| 8.00 | 2 | 360 | 0.060 | 0.050 | 0.080 | 6.48 | 17685 | 2120 | 45° |
| 10.00 | 2 | 360 | 0.060 | 0.050 | 0.080 | 8.00 | 14325 | 1720 | 45° |
| 12.00 | 2 | 360 | 0.065 | 0.050 | 0.080 | 9.51 | 12050 | 1565 | 45° |
| 1.00 | 2 | 116 | 0.020 | 0.020 | 0.040 | 0.88 | 41960 | 1680 | 45° |
| 2.00 | 2 | 220 | 0.025 | 0.020 | 0.050 | 1.67 | 41935 | 2095 | 45° |
| 3.00 | 2 | 300 | 0.030 | 0.030 | 0.060 | 2.50 | 38195 | 2290 | 45° |
| 4.00 | 2 | 300 | 0.030 | 0.030 | 0.060 | 3.27 | 29205 | 1750 | 45° |
| 5.00 | 2 | 300 | 0.035 | 0.030 | 0.070 | 4.04 | 23635 | 1655 | 45° |
| 6.00 | 2 | 300 | 0.035 | 0.030 | 0.070 | 4.80 | 19895 | 1395 | 45° |
| 8.00 | 2 | 300 | 0.040 | 0.050 | 0.080 | 6.48 | 14735 | 1180 | 45° |
| 10.00 | 2 | 300 | 0.040 | 0.050 | 0.080 | 8.00 | 11935 | 955 | 45° |
| 12.00 | 2 | 300 | 0.040 | 0.050 | 0.080 | 9.51 | 10040 | 805 | 45° |
| 1.00 | 2 | 116 | 0.020 | 0.020 | 0.040 | 0.88 | 41960 | 1680 | 45° |
| 2.00 | 2 | 190 | 0.025 | 0.020 | 0.050 | 1.67 | 36215 | 1810 | 45° |
| 3.00 | 2 | 240 | 0.030 | 0.030 | 0.060 | 2.50 | 30560 | 1835 | 45° |
| 4.00 | 2 | 240 | 0.030 | 0.030 | 0.060 | 3.27 | 23360 | 1400 | 45° |
| 5.00 | 2 | 240 | 0.035 | 0.030 | 0.070 | 4.04 | 18910 | 1325 | 45° |
| 6.00 | 2 | 240 | 0.035 | 0.030 | 0.070 | 4.80 | 15915 | 1115 | 45° |
| 8.00 | 2 | 240 | 0.040 | 0.050 | 0.080 | 6.48 | 11790 | 945 | 45° |
| 10.00 | 2 | 240 | 0.040 | 0.050 | 0.080 | 8.00 | 9550 | 765 | 45° |
| 12.00 | 2 | 240 | 0.040 | 0.050 | 0.080 | 9.51 | 8035 | 645 | 45° |
| 1.00 | 2 | 116 | 0.020 | 0.020 | 0.040 | 0.88 | 41960 | 1680 | 45° |
| 2.00 | 2 | 140 | 0.025 | 0.020 | 0.050 | 1.67 | 26685 | 1335 | 45° |
| 3.00 | 2 | 180 | 0.030 | 0.030 | 0.060 | 2.50 | 22920 | 1375 | 45° |
| 4.00 | 2 | 180 | 0.030 | 0.030 | 0.060 | 3.27 | 17520 | 1050 | 45° |
| 5.00 | 2 | 180 | 0.035 | 0.030 | 0.070 | 4.04 | 14180 | 995 | 45° |
| 6.00 | 2 | 180 | 0.035 | 0.030 | 0.070 | 4.80 | 11935 | 835 | 45° |
| 8.00 | 2 | 180 | 0.040 | 0.050 | 0.080 | 6.48 | 8840 | 705 | 45° |
| 10.00 | 2 | 180 | 0.040 | 0.050 | 0.080 | 8.00 | 7160 | 575 | 45° |
| 12.00 | 2 | 180 | 0.040 | 0.050 | 0.080 | 9.51 | 6025 | 480 | 45° |

Frese con estremità emisferica SpheroX (Sphero-XP)

Tolleranza $r \pm 0.003$, 3xd



HM
XA λ 30°
 γ -10°

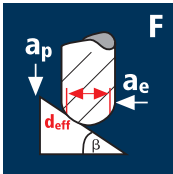


ReTool®

| | | | | | | | |
|----------------|-----------------|-----------------|--------------|--------------|-------------|----------------|------------------|
| Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Ti Titanium | HSS ToolSteel |
|----------------|-----------------|-----------------|--------------|--------------|-------------|----------------|------------------|

| Ø Code | Esempio: N° Ordine | | | Rivestimento | | Articolo | | Codice-ø | | r ±0.003 | α | z | X-AL |
|-----------|--------------------|----------------------------------|----------------|--------------|-------|----------|-------|----------|-------|-------------|--------|-----|------|
| | d ₁ | d ₂ h ₄ | d ₃ | X | 7500 | 100 | | | X7500 | | | | |
| 100 | 1.00 | 6.00 | 0.95 | 57 | 1.50 | 3.00 | 13.08 | 0.500 | 11.8° | 2 | 107.00 | EUR | |
| 140 | 2.00 | 6.00 | 1.90 | 57 | 3.00 | 6.00 | 14.31 | 1.000 | 9.0° | 2 | 107.00 | EUR | |
| 180 | 3.00 | 6.00 | 2.80 | 57 | 4.00 | 9.00 | 15.63 | 1.500 | 6.4° | 2 | 107.00 | EUR | |
| 220 | 4.00 | 6.00 | 3.70 | 57 | 5.00 | 12.00 | 16.95 | 2.000 | 4.0° | 2 | 107.00 | EUR | |
| 260 | 5.00 | 6.00 | 4.60 | 57 | 6.00 | 15.00 | 18.27 | 2.500 | 2.0° | 2 | 107.00 | EUR | |
| 300 | 6.00 | 6.00 | 5.50 | 57 | 7.00 | 19.34 | 20.00 | 3.000 | 0.0° | 2 | 107.00 | EUR | |
| 391 | 8.00 | 8.00 | 7.40 | 63 | 9.00 | 25.29 | 26.00 | 4.000 | 0.0° | 2 | 134.00 | EUR | |
| 450 | 10.00 | 10.00 | 9.20 | 72 | 11.00 | 30.20 | 31.00 | 5.000 | 0.0° | 2 | 182.00 | EUR | |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 13.00 | 36.13 | 37.00 | 6.000 | 0.0° | 2 | 225.00 | EUR | |
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Applicazione



Materiale

Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



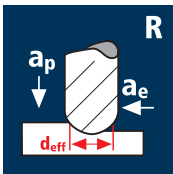
Acciaio da
utensile temprato
> 60 HRC



Acciaio rapido temprato
64 - 70 HRC



Applicazione



Materiale

Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



Acciaio da
utensile temprato
> 60 HRC



Acciaio rapido temprato
64 - 70 HRC



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _t [mm/min] | β [°] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|----------|
| 1.00 | 2 | 120 | 0.018 | 0.030 | 0.090 | 0.91 | 41975 | 1510 | 45° |
| 2.00 | 2 | 160 | 0.028 | 0.030 | 0.120 | 1.72 | 29610 | 1660 | 45° |
| 3.00 | 2 | 200 | 0.042 | 0.050 | 0.150 | 2.59 | 24580 | 2065 | 45° |
| 4.00 | 2 | 200 | 0.052 | 0.050 | 0.180 | 3.39 | 18780 | 1955 | 45° |
| 5.00 | 2 | 200 | 0.058 | 0.050 | 0.210 | 4.17 | 15265 | 1770 | 45° |
| 6.00 | 2 | 200 | 0.064 | 0.050 | 0.230 | 4.94 | 12885 | 1650 | 45° |
| 8.00 | 2 | 200 | 0.068 | 0.080 | 0.280 | 6.67 | 9545 | 1300 | 45° |
| 10.00 | 2 | 200 | 0.074 | 0.080 | 0.310 | 8.22 | 7745 | 1145 | 45° |
| 12.00 | 2 | 200 | 0.082 | 0.100 | 0.340 | 9.89 | 6435 | 1055 | 45° |

| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|------|-------|------|-----|
| 1.00 | 2 | 120 | 0.018 | 0.030 | 0.090 | 0.91 | 41975 | 1510 | 45° |
| 2.00 | 2 | 120 | 0.028 | 0.030 | 0.120 | 1.72 | 22210 | 1245 | 45° |
| 3.00 | 2 | 150 | 0.042 | 0.050 | 0.150 | 2.59 | 18435 | 1550 | 45° |
| 4.00 | 2 | 150 | 0.052 | 0.050 | 0.180 | 3.39 | 14085 | 1465 | 45° |
| 5.00 | 2 | 150 | 0.058 | 0.050 | 0.210 | 4.17 | 11450 | 1330 | 45° |
| 6.00 | 2 | 150 | 0.064 | 0.050 | 0.230 | 4.94 | 9665 | 1235 | 45° |
| 8.00 | 2 | 150 | 0.068 | 0.080 | 0.280 | 6.67 | 7160 | 975 | 45° |
| 10.00 | 2 | 150 | 0.074 | 0.080 | 0.310 | 8.22 | 5810 | 860 | 45° |
| 12.00 | 2 | 150 | 0.082 | 0.100 | 0.340 | 9.89 | 4830 | 790 | 45° |

| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|------|-------|------|-----|
| 1.00 | 2 | 80 | 0.018 | 0.030 | 0.090 | 0.91 | 27985 | 1005 | 45° |
| 2.00 | 2 | 80 | 0.028 | 0.030 | 0.120 | 1.72 | 14805 | 830 | 45° |
| 3.00 | 2 | 100 | 0.042 | 0.050 | 0.150 | 2.59 | 12290 | 1030 | 45° |
| 4.00 | 2 | 100 | 0.052 | 0.050 | 0.180 | 3.39 | 9390 | 975 | 45° |
| 5.00 | 2 | 100 | 0.058 | 0.050 | 0.210 | 4.17 | 7635 | 885 | 45° |
| 6.00 | 2 | 100 | 0.064 | 0.050 | 0.230 | 4.94 | 6445 | 825 | 45° |
| 8.00 | 2 | 100 | 0.068 | 0.080 | 0.280 | 6.67 | 4770 | 650 | 45° |
| 10.00 | 2 | 100 | 0.074 | 0.080 | 0.310 | 8.22 | 3870 | 575 | 45° |
| 12.00 | 2 | 100 | 0.082 | 0.100 | 0.340 | 9.89 | 3220 | 530 | 45° |

| | | | | | | | | | |
|-------|---|----|-------|-------|-------|------|-------|-----|-----|
| 1.00 | 2 | 50 | 0.018 | 0.030 | 0.090 | 0.91 | 17490 | 630 | 45° |
| 2.00 | 2 | 50 | 0.028 | 0.030 | 0.120 | 1.72 | 9255 | 520 | 45° |
| 3.00 | 2 | 60 | 0.042 | 0.050 | 0.150 | 2.59 | 7375 | 620 | 45° |
| 4.00 | 2 | 60 | 0.052 | 0.050 | 0.180 | 3.39 | 5635 | 585 | 45° |
| 5.00 | 2 | 60 | 0.058 | 0.050 | 0.210 | 4.17 | 4580 | 530 | 45° |
| 6.00 | 2 | 60 | 0.064 | 0.050 | 0.230 | 4.94 | 3865 | 495 | 45° |
| 8.00 | 2 | 60 | 0.068 | 0.080 | 0.280 | 6.67 | 2865 | 390 | 45° |
| 10.00 | 2 | 60 | 0.074 | 0.080 | 0.310 | 8.22 | 2325 | 345 | 45° |
| 12.00 | 2 | 60 | 0.082 | 0.100 | 0.340 | 9.89 | 1930 | 315 | 45° |

| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _t [mm/min] | Q [mm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|-----------------------------|
| 1.00 | 2 | 100 | 0.028 | 0.180 | 0.200 | 0.77 | 41340 | 2315 | 83.3 |
| 2.00 | 2 | 111 | 0.048 | 0.280 | 0.400 | 1.39 | 25420 | 2440 | 273.3 |
| 3.00 | 2 | 111 | 0.060 | 0.360 | 0.600 | 1.95 | 18120 | 2175 | 469.6 |
| 4.00 | 2 | 111 | 0.072 | 0.480 | 0.800 | 2.60 | 13590 | 1955 | 751.4 |
| 5.00 | 2 | 111 | 0.080 | 0.600 | 1.000 | 3.25 | 10870 | 1740 | 1043.7 |
| 6.00 | 2 | 111 | 0.086 | 0.720 | 1.200 | 3.90 | 9060 | 1560 | 1346.3 |
| 8.00 | 2 | 111 | 0.106 | 0.960 | 1.600 | 5.20 | 6795 | 1440 | 2212.6 |
| 10.00 | 2 | 111 | 0.120 | 1.200 | 2.000 | 6.50 | 5435 | 1305 | 3131.0 |
| 12.00 | 2 | 111 | 0.125 | 1.440 | 2.400 | 7.80 | 4530 | 1130 | 3913.7 |

| | | | | | | | | | |
|-------|---|----|-------|-------|-------|------|-------|-----|--------|
| 1.00 | 2 | 68 | 0.017 | 0.160 | 0.200 | 0.74 | 29250 | 995 | 31.8 |
| 2.00 | 2 | 68 | 0.029 | 0.250 | 0.400 | 1.33 | 16275 | 945 | 94.4 |
| 3.00 | 2 | 68 | 0.036 | 0.320 | 0.600 | 1.86 | 11635 | 840 | 160.9 |
| 4.00 | 2 | 68 | 0.043 | 0.430 | 0.800 | 2.48 | 8730 | 750 | 258.2 |
| 5.00 | 2 | 68 | 0.048 | 0.540 | 1.000 | 3.10 | 6980 | 670 | 362.0 |
| 6.00 | 2 | 68 | 0.052 | 0.650 | 1.200 | 3.72 | 5820 | 605 | 472.0 |
| 8.00 | 2 | 68 | 0.063 | 0.860 | 1.600 | 4.97 | 4355 | 550 | 755.1 |
| 10.00 | 2 | 68 | 0.072 | 1.080 | 2.000 | 6.21 | 3485 | 500 | 1084.1 |
| 12.00 | 2 | 68 | 0.075 | 1.300 | 2.400 | 7.45 | 2905 | 435 | 1359.7 |

| | | | | | | | | | |
|-------|---|----|-------|-------|-------|------|-------|-----|-------|
| 1.00 | 2 | 51 | 0.014 | 0.130 | 0.200 | 0.66 | 24595 | 690 | 17.9 |
| 2.00 | 2 | 51 | 0.023 | 0.200 | 0.400 | 1.19 | 13640 | 630 | 50.2 |
| 3.00 | 2 | 51 | 0.029 | 0.250 | 0.600 | 1.66 | 9780 | 565 | 85.1 |
| 4.00 | 2 | 51 | 0.035 | 0.340 | 0.800 | 2.22 | 7315 | 510 | 139.2 |
| 5.00 | 2 | 51 | 0.038 | 0.420 | 1.000 | 2.77 | 5860 | 445 | 187.1 |
| 6.00 | 2 | 51 | 0.041 | 0.500 | 1.200 | 3.33 | 4875 | 400 | 239.9 |
| 8.00 | 2 | 51 | 0.051 | 0.670 | 1.600 | 4.44 | 3655 | 375 | 399.8 |
| 10.00 | 2 | 51 | 0.058 | 0.840 | 2.000 | 5.55 | 2925 | 340 | 570.0 |
| 12.00 | 2 | 51 | 0.060 | 1.010 | 2.400 | 6.66 | 2440 | 295 | 709.0 |

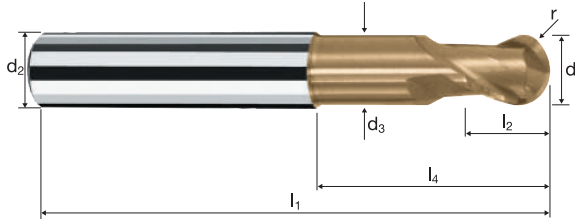
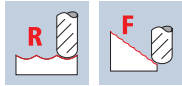
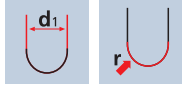
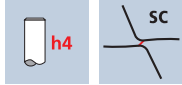
| | | | | | | | | | |
|-------|---|----|-------|-------|-------|------|-------|-----|-------|
| 1.00 | 2 | 34 | 0.011 | 0.130 | 0.200 | 0.66 | 16400 | 360 | 9.4 |
| 2.00 | 2 | 34 | 0.018 | 0.200 | 0.400 | 1.19 | 9095 | 325 | 26.2 |
| 3.00 | 2 | 34 | 0.023 | 0.250 | 0.600 | 1.66 | 6520 | 300 | 45.0 |
| 4.00 | 2 | 34 | 0.028 | 0.340 | 0.800 | 2.22 | 4875 | 275 | 74.3 |
| 5.00 | 2 | 34 | 0.031 | 0.420 | 1.000 | 2.77 | 3905 | 240 | 101.7 |
| 6.00 | 2 | 34 | 0.033 | 0.500 | 1.200 | 3.33 | 3250 | 215 | 128.7 |
| 8.00 | 2 | 34 | 0.041 | 0.670 | 1.600 | 4.44 | 2440 | 200 | 214.3 |
| 10.00 | 2 | 34 | 0.046 | 0.840 | 2.000 | 5.55 | 1950 | 180 | 301.4 |
| 12.00 | 2 | 34 | 0.048 | 1.010 | 2.400 | 6.66 | 1625 | 155 | 378.1 |

Frese con estremità emisferica SpheroX

Tolleranza $r \pm 0.005, 3xd$



HM
XA $\lambda 30^\circ$
 $\gamma -10^\circ$



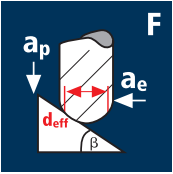
ReTool®

| | | | | | | | | | |
|--|--|-----------------|-----------------|--------------|--------------|-------------|--|----------------|------------------|
| | | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | | Ti Titanium | HSS ToolSteel |
|--|--|-----------------|-----------------|--------------|--------------|-------------|--|----------------|------------------|

| Esempio: N° Ordine | Rivestimento | | Articolo | | Codice-Ø | | | | | | | DURO-V |
|-----------------------|----------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------------|-------|---|--------|--------|
| | V | 7470 | 100 | | | | | | | | V7470 | |
| Ø Code | d ₁ | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.005 | α | z | EUR | |
| 100 | 1.00 | 6.00 | 0.95 | 57 | 1.50 | 3.00 | 13.08 | 0.500 | 11.8° | 2 | 98.00 | |
| 140 | 2.00 | 6.00 | 1.90 | 57 | 3.00 | 6.00 | 14.31 | 1.000 | 9.0° | 2 | 98.00 | |
| 180 | 3.00 | 6.00 | 2.80 | 57 | 4.00 | 9.00 | 15.63 | 1.500 | 6.4° | 2 | 98.00 | |
| 220 | 4.00 | 6.00 | 3.70 | 57 | 5.00 | 12.00 | 16.95 | 2.000 | 4.0° | 2 | 98.00 | |
| 260 | 5.00 | 6.00 | 4.60 | 57 | 6.00 | 15.00 | 18.27 | 2.500 | 2.0° | 2 | 98.00 | |
| 300 | 6.00 | 6.00 | 5.50 | 57 | 7.00 | 19.34 | 20.00 | 3.000 | 0.0° | 2 | 98.00 | |
| 391 | 8.00 | 8.00 | 7.40 | 63 | 9.00 | 25.29 | 26.00 | 4.000 | 0.0° | 2 | 122.00 | |
| 450 | 10.00 | 10.00 | 9.20 | 72 | 11.00 | 30.20 | 31.00 | 5.000 | 0.0° | 2 | 166.00 | |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 13.00 | 36.13 | 37.00 | 6.000 | 0.0° | 2 | 205.00 | |
| 610 | 16.00 | 16.00 | 15.00 | 92 | 17.00 | 42.13 | 43.00 | 8.000 | 0.0° | 2 | 321.00 | |
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Applicazione

Materiale



Acciaio da
utensile temprato
52 - 56 HRC



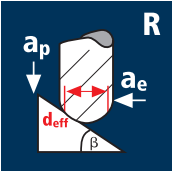
Acciaio da
utensile temprato
56 - 60 HRC



Acciaio da
utensile temprato
> 60 HRC



Acciaio rapido temprato
64 - 70 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



Acciaio da
utensile temprato
> 60 HRC



Acciaio rapido temprato
64 - 70 HRC



| d1 [mm] | z | v_c [m/min] | f_z [mm] | a_p [mm] | a_e [mm] | d_{eff} [mm] | n [min ⁻¹] | v_r [mm/min] | β [°] |
|------------|---|------------------|---------------|---------------|---------------|-------------------|---------------------------|-------------------|----------------|
| 1.00 | 4 | 120 | 0.014 | 0.030 | 0.090 | 0.91 | 41975 | 2350 | 45° |
| 2.00 | 4 | 160 | 0.022 | 0.030 | 0.120 | 1.72 | 29610 | 2605 | 45° |
| 3.00 | 4 | 200 | 0.034 | 0.050 | 0.150 | 2.59 | 24580 | 3345 | 45° |
| 4.00 | 4 | 200 | 0.042 | 0.050 | 0.180 | 3.39 | 18780 | 3155 | 45° |
| 5.00 | 4 | 200 | 0.048 | 0.050 | 0.210 | 4.17 | 15265 | 2930 | 45° |
| 6.00 | 4 | 200 | 0.052 | 0.050 | 0.230 | 4.94 | 12885 | 2680 | 45° |
| 8.00 | 4 | 200 | 0.056 | 0.080 | 0.280 | 6.67 | 9545 | 2140 | 45° |
| 10.00 | 4 | 200 | 0.060 | 0.080 | 0.310 | 8.22 | 7745 | 1860 | 45° |
| 12.00 | 4 | 200 | 0.066 | 0.100 | 0.340 | 9.89 | 6435 | 1700 | 45° |
| 1.00 | 4 | 120 | 0.014 | 0.030 | 0.090 | 0.91 | 41975 | 2350 | 45° |
| 2.00 | 4 | 120 | 0.022 | 0.030 | 0.120 | 1.72 | 22210 | 1955 | 45° |
| 3.00 | 4 | 150 | 0.034 | 0.050 | 0.150 | 2.59 | 18435 | 2505 | 45° |
| 4.00 | 4 | 150 | 0.042 | 0.050 | 0.180 | 3.39 | 14085 | 2365 | 45° |
| 5.00 | 4 | 150 | 0.048 | 0.050 | 0.210 | 4.17 | 11450 | 2200 | 45° |
| 6.00 | 4 | 150 | 0.052 | 0.050 | 0.230 | 4.94 | 9665 | 2010 | 45° |
| 8.00 | 4 | 150 | 0.056 | 0.080 | 0.280 | 6.67 | 7160 | 1605 | 45° |
| 10.00 | 4 | 150 | 0.060 | 0.080 | 0.310 | 8.22 | 5810 | 1395 | 45° |
| 12.00 | 4 | 150 | 0.066 | 0.100 | 0.340 | 9.89 | 4830 | 1275 | 45° |
| 1.00 | 4 | 80 | 0.014 | 0.030 | 0.090 | 0.91 | 27985 | 1565 | 45° |
| 2.00 | 4 | 80 | 0.022 | 0.030 | 0.120 | 1.72 | 14805 | 1305 | 45° |
| 3.00 | 4 | 100 | 0.034 | 0.050 | 0.150 | 2.59 | 12290 | 1670 | 45° |
| 4.00 | 4 | 100 | 0.042 | 0.050 | 0.180 | 3.39 | 9390 | 1575 | 45° |
| 5.00 | 4 | 100 | 0.048 | 0.050 | 0.210 | 4.17 | 7635 | 1465 | 45° |
| 6.00 | 4 | 100 | 0.052 | 0.050 | 0.230 | 4.94 | 6445 | 1340 | 45° |
| 8.00 | 4 | 100 | 0.056 | 0.080 | 0.280 | 6.67 | 4770 | 1070 | 45° |
| 10.00 | 4 | 100 | 0.060 | 0.080 | 0.310 | 8.22 | 3870 | 930 | 45° |
| 12.00 | 4 | 100 | 0.066 | 0.100 | 0.340 | 9.89 | 3220 | 850 | 45° |
| 1.00 | 4 | 50 | 0.014 | 0.030 | 0.090 | 0.91 | 17490 | 980 | 45° |
| 2.00 | 4 | 50 | 0.022 | 0.030 | 0.120 | 1.72 | 9255 | 815 | 45° |
| 3.00 | 4 | 60 | 0.034 | 0.050 | 0.150 | 2.59 | 7375 | 1005 | 45° |
| 4.00 | 4 | 60 | 0.042 | 0.050 | 0.180 | 3.39 | 5635 | 945 | 45° |
| 5.00 | 4 | 60 | 0.048 | 0.050 | 0.210 | 4.17 | 4580 | 880 | 45° |
| 6.00 | 4 | 60 | 0.052 | 0.050 | 0.230 | 4.94 | 3865 | 805 | 45° |
| 8.00 | 4 | 60 | 0.056 | 0.080 | 0.280 | 6.67 | 2865 | 640 | 45° |
| 10.00 | 4 | 60 | 0.060 | 0.080 | 0.310 | 8.22 | 2325 | 560 | 45° |
| 12.00 | 4 | 60 | 0.066 | 0.100 | 0.340 | 9.89 | 1930 | 510 | 45° |
| 1.00 | 4 | 130 | 0.023 | 0.180 | 0.180 | 0.99 | 41800 | 3845 | 30° |
| 2.00 | 4 | 130 | 0.039 | 0.280 | 0.280 | 1.92 | 21550 | 3360 | 30° |
| 3.00 | 4 | 130 | 0.049 | 0.360 | 0.360 | 2.83 | 14620 | 2865 | 30° |
| 4.00 | 4 | 130 | 0.058 | 0.480 | 0.480 | 3.77 | 10975 | 2545 | 30° |
| 5.00 | 4 | 130 | 0.065 | 0.600 | 0.600 | 4.71 | 8785 | 2285 | 30° |
| 6.00 | 4 | 130 | 0.070 | 0.720 | 0.720 | 5.66 | 7310 | 2045 | 30° |
| 8.00 | 4 | 130 | 0.086 | 0.960 | 0.960 | 7.54 | 5490 | 1890 | 30° |
| 10.00 | 4 | 130 | 0.098 | 1.200 | 1.200 | 9.43 | 4390 | 1720 | 30° |
| 12.00 | 4 | 130 | 0.101 | 1.440 | 1.440 | 11.31 | 3660 | 1480 | 30° |
| 1.00 | 4 | 80 | 0.014 | 0.160 | 0.160 | 0.97 | 26250 | 1470 | 30° |
| 2.00 | 4 | 80 | 0.023 | 0.250 | 0.250 | 1.90 | 13405 | 1235 | 30° |
| 3.00 | 4 | 80 | 0.029 | 0.320 | 0.320 | 2.78 | 9160 | 1065 | 30° |
| 4.00 | 4 | 80 | 0.035 | 0.430 | 0.430 | 3.72 | 6845 | 960 | 30° |
| 5.00 | 4 | 80 | 0.039 | 0.540 | 0.540 | 4.65 | 5475 | 855 | 30° |
| 6.00 | 4 | 80 | 0.042 | 0.650 | 0.650 | 5.58 | 4565 | 765 | 30° |
| 8.00 | 4 | 80 | 0.051 | 0.860 | 0.860 | 7.43 | 3425 | 700 | 30° |
| 10.00 | 4 | 80 | 0.058 | 1.080 | 1.080 | 9.30 | 2740 | 635 | 30° |
| 12.00 | 4 | 80 | 0.061 | 1.300 | 1.300 | 11.16 | 2280 | 555 | 30° |
| 1.00 | 4 | 60 | 0.011 | 0.130 | 0.130 | 0.95 | 20105 | 885 | 30° |
| 2.00 | 4 | 60 | 0.019 | 0.200 | 0.200 | 1.84 | 10380 | 790 | 30° |
| 3.00 | 4 | 60 | 0.023 | 0.250 | 0.250 | 2.69 | 7100 | 655 | 30° |
| 4.00 | 4 | 60 | 0.028 | 0.340 | 0.340 | 3.59 | 5320 | 595 | 30° |
| 5.00 | 4 | 60 | 0.031 | 0.420 | 0.420 | 4.48 | 4265 | 530 | 30° |
| 6.00 | 4 | 60 | 0.034 | 0.500 | 0.500 | 5.37 | 3555 | 485 | 30° |
| 8.00 | 4 | 60 | 0.041 | 0.670 | 0.670 | 7.17 | 2665 | 435 | 30° |
| 10.00 | 4 | 60 | 0.047 | 0.840 | 0.840 | 8.96 | 2130 | 400 | 30° |
| 12.00 | 4 | 60 | 0.049 | 1.010 | 1.010 | 10.76 | 1775 | 350 | 30° |
| 1.00 | 4 | 40 | 0.009 | 0.130 | 0.130 | 0.95 | 13405 | 480 | 30° |
| 2.00 | 4 | 40 | 0.015 | 0.200 | 0.200 | 1.84 | 6920 | 415 | 30° |
| 3.00 | 4 | 40 | 0.019 | 0.250 | 0.250 | 2.69 | 4735 | 360 | 30° |
| 4.00 | 4 | 40 | 0.023 | 0.340 | 0.340 | 3.59 | 3545 | 325 | 30° |
| 5.00 | 4 | 40 | 0.025 | 0.420 | 0.420 | 4.48 | 2840 | 285 | 30° |
| 6.00 | 4 | 40 | 0.027 | 0.500 | 0.500 | 5.37 | 2370 | 255 | 30° |
| 8.00 | 4 | 40 | 0.033 | 0.670 | 0.670 | 7.17 | 1775 | 235 | 30° |
| 10.00 | 4 | 40 | 0.037 | 0.840 | 0.840 | 8.96 | 1420 | 210 | 30° |
| 12.00 | 4 | 40 | 0.039 | 1.010 | 1.010 | 10.76 | 1185 | 185 | 30° |

Frese con estremità emisferica SpheroX

Tolleranza $r \pm 0.005, 3xd$

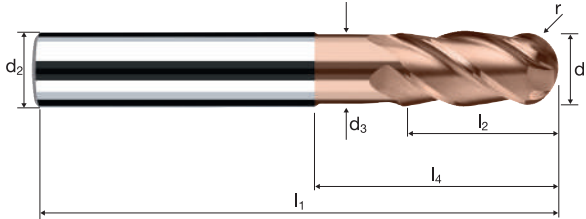


HM
XA

λ 40°
 γ 0°

Vario

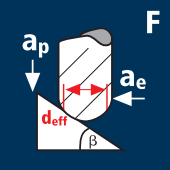
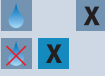



new!

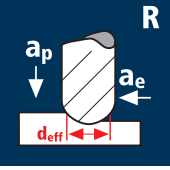






ReTool®

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|--|--|------------------------|------------------------|---------------------|---------------------|--------------------|--|-----------------------|------------|
| | | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | | Ti Titanium | HSS |
|--|--|------------------------|------------------------|---------------------|---------------------|--------------------|--|-----------------------|------------|

| Ø Code | Esempio: N° Ordine | | | | | | | | | | | DURO-Si |
|------------|--|----------------------------------|----------------|----------------|----------------|----------------|----------------|-------------|-------|---|--|--------------|
| | d ₁ | d ₂ h ₄ | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.005 | α | z | | |
| | Rivestimento H Articolo 7490 Codice-Ø 100 | | | | | | | | | | | |
| | | | | | | | | | | | | H7490 |
| | | | | | | | | | | | | EUR |
| 100 | 1.00 | 6.00 | 0.95 | 57 | 2.00 | 3.00 | 13.08 | 0.500 | 11.8° | 4 | | 98.00 |
| 140 | 2.00 | 6.00 | 1.90 | 57 | 4.00 | 6.00 | 14.31 | 1.000 | 9.0° | 4 | | 98.00 |
| 180 | 3.00 | 6.00 | 2.80 | 57 | 6.00 | 9.00 | 15.63 | 1.500 | 6.4° | 4 | | 98.00 |
| 220 | 4.00 | 6.00 | 3.70 | 57 | 8.00 | 12.00 | 16.95 | 2.000 | 4.0° | 4 | | 98.00 |
| 260 | 5.00 | 6.00 | 4.60 | 57 | 10.00 | 15.00 | 18.27 | 2.500 | 2.0° | 4 | | 98.00 |
| 300 | 6.00 | 6.00 | 5.50 | 57 | 12.00 | 19.34 | 20.00 | 3.000 | 0.0° | 4 | | 98.00 |
| 391 | 8.00 | 8.00 | 7.40 | 63 | 16.00 | 25.29 | 26.00 | 4.000 | 0.0° | 4 | | 122.00 |
| 450 | 10.00 | 10.00 | 9.20 | 72 | 20.00 | 30.20 | 31.00 | 5.000 | 0.0° | 4 | | 166.00 |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 24.00 | 36.13 | 37.00 | 6.000 | 0.0° | 4 | | 205.00 |
| 610 | 16.00 | 16.00 | 15.00 | 92 | 32.00 | 42.13 | 43.00 | 8.000 | 0.0° | 4 | | 321.00 |
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| Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] | |
|---|---|---|------|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|-----|
|  | Acciaio da utensile temprato 42-48 HRC  | 1.00 | 2 | 120 | 0.026 | 0.030 | 0.090 | 0.91 | 41975 | 2185 | 45° | |
| | | 2.00 | 2 | 226 | 0.038 | 0.030 | 0.120 | 1.72 | 41825 | 3180 | 45° | |
| | | 3.00 | 2 | 300 | 0.058 | 0.050 | 0.150 | 2.59 | 36870 | 4275 | 45° | |
| | | 4.00 | 2 | 300 | 0.074 | 0.050 | 0.180 | 3.39 | 28170 | 4170 | 45° | |
| | | 5.00 | 2 | 300 | 0.084 | 0.050 | 0.210 | 4.17 | 22900 | 3845 | 45° | |
| | | 6.00 | 2 | 300 | 0.090 | 0.050 | 0.230 | 4.94 | 19330 | 3480 | 45° | |
| | | 8.00 | 2 | 300 | 0.098 | 0.080 | 0.280 | 6.67 | 14315 | 2805 | 45° | |
| | | 10.00 | 2 | 300 | 0.106 | 0.080 | 0.310 | 8.22 | 11615 | 2465 | 45° | |
| | | 12.00 | 2 | 300 | 0.116 | 0.100 | 0.340 | 9.89 | 9655 | 2240 | 45° | |
| | | Acciaio da utensile temprato 48-52 HRC  | 1.00 | 2 | 120 | 0.018 | 0.030 | 0.090 | 0.91 | 41975 | 1510 | 45° |
| | | | 2.00 | 2 | 200 | 0.028 | 0.030 | 0.120 | 1.72 | 37015 | 2075 | 45° |
| | | | 3.00 | 2 | 250 | 0.042 | 0.050 | 0.150 | 2.59 | 30725 | 2580 | 45° |
| 4.00 | 2 | | 250 | 0.052 | 0.050 | 0.180 | 3.39 | 23475 | 2440 | 45° | | |
| 5.00 | 2 | | 250 | 0.058 | 0.050 | 0.210 | 4.17 | 19085 | 2215 | 45° | | |
| 6.00 | 2 | | 250 | 0.064 | 0.050 | 0.230 | 4.94 | 16110 | 2060 | 45° | | |
| 8.00 | 2 | | 250 | 0.068 | 0.080 | 0.280 | 6.67 | 11930 | 1625 | 45° | | |
| 10.00 | 2 | | 250 | 0.074 | 0.080 | 0.310 | 8.22 | 9680 | 1435 | 45° | | |
| 12.00 | 2 | | 250 | 0.082 | 0.100 | 0.340 | 9.89 | 8045 | 1320 | 45° | | |
| Acciaio da utensile temprato 52-56 HRC  | 1.00 | | 2 | 120 | 0.018 | 0.030 | 0.090 | 0.91 | 41975 | 1510 | 45° | |
| | 2.00 | | 2 | 160 | 0.028 | 0.030 | 0.120 | 1.72 | 29610 | 1660 | 45° | |
| | 3.00 | | 2 | 200 | 0.042 | 0.050 | 0.150 | 2.59 | 24580 | 2065 | 45° | |
| | 4.00 | 2 | 200 | 0.052 | 0.050 | 0.180 | 3.39 | 18780 | 1955 | 45° | | |
| | 5.00 | 2 | 200 | 0.058 | 0.050 | 0.210 | 4.17 | 15265 | 1770 | 45° | | |
| | 6.00 | 2 | 200 | 0.064 | 0.050 | 0.230 | 4.94 | 12885 | 1650 | 45° | | |
| | 8.00 | 2 | 200 | 0.068 | 0.080 | 0.280 | 6.67 | 9545 | 1300 | 45° | | |
| | 10.00 | 2 | 200 | 0.074 | 0.080 | 0.310 | 8.22 | 7745 | 1145 | 45° | | |
| | 12.00 | 2 | 200 | 0.082 | 0.100 | 0.340 | 9.89 | 6435 | 1055 | 45° | | |
| | Leghe di titanio indurite > 300 HB [Ti6Al4V]  | 1.00 | 2 | 120 | 0.026 | 0.030 | 0.090 | 0.91 | 41975 | 2185 | 45° | |
| | | 2.00 | 2 | 120 | 0.038 | 0.030 | 0.120 | 1.72 | 22210 | 1690 | 45° | |
| | | 3.00 | 2 | 150 | 0.058 | 0.050 | 0.150 | 2.59 | 18435 | 2140 | 45° | |
| 4.00 | | 2 | 150 | 0.074 | 0.050 | 0.180 | 3.39 | 14085 | 2085 | 45° | | |
| 5.00 | | 2 | 150 | 0.084 | 0.050 | 0.210 | 4.17 | 11450 | 1925 | 45° | | |
| 6.00 | | 2 | 150 | 0.090 | 0.050 | 0.230 | 4.94 | 9665 | 1740 | 45° | | |
| 8.00 | | 2 | 150 | 0.098 | 0.080 | 0.280 | 6.67 | 7160 | 1405 | 45° | | |
| 10.00 | | 2 | 150 | 0.106 | 0.080 | 0.310 | 8.22 | 5810 | 1230 | 45° | | |
| 12.00 | | 2 | 150 | 0.116 | 0.100 | 0.340 | 9.89 | 4830 | 1120 | 45° | | |

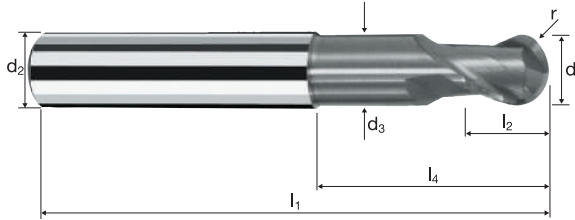
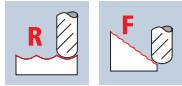
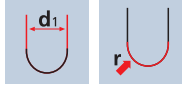
| Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] | |
|---|---|---|------|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|--------------------------|-------|
|  | Acciaio da utensile temprato 42-48 HRC  | 1.00 | 2 | 100 | 0.034 | 0.180 | 0.200 | 0.77 | 41340 | 2810 | 101.2 | |
| | | 2.00 | 2 | 170 | 0.058 | 0.280 | 0.400 | 1.39 | 38930 | 4515 | 505.8 | |
| | | 3.00 | 2 | 170 | 0.073 | 0.360 | 0.600 | 1.95 | 27750 | 4050 | 875.1 | |
| | | 4.00 | 2 | 170 | 0.087 | 0.480 | 0.800 | 2.60 | 20815 | 3620 | 1390.6 | |
| | | 5.00 | 2 | 170 | 0.097 | 0.600 | 1.000 | 3.25 | 16650 | 3230 | 1938.1 | |
| | | 6.00 | 2 | 170 | 0.105 | 0.720 | 1.200 | 3.90 | 13875 | 2915 | 2517.5 | |
| | | 8.00 | 2 | 170 | 0.128 | 0.960 | 1.600 | 5.20 | 10405 | 2665 | 4091.9 | |
| | | 10.00 | 2 | 170 | 0.145 | 1.200 | 2.000 | 6.50 | 8325 | 2415 | 5794.2 | |
| | | 12.00 | 2 | 170 | 0.151 | 1.440 | 2.400 | 7.80 | 6940 | 2095 | 7240.8 | |
| | | Acciaio da utensile temprato 48-52 HRC  | 1.00 | 2 | 100 | 0.031 | 0.180 | 0.200 | 0.77 | 41340 | 2565 | 92.3 |
| | | | 2.00 | 2 | 136 | 0.053 | 0.280 | 0.400 | 1.39 | 31145 | 3300 | 369.7 |
| | | | 3.00 | 2 | 136 | 0.066 | 0.360 | 0.600 | 1.95 | 22200 | 2930 | 633.0 |
| 4.00 | 2 | | 136 | 0.079 | 0.480 | 0.800 | 2.60 | 16650 | 2630 | 1010.2 | | |
| 5.00 | 2 | | 136 | 0.088 | 0.600 | 1.000 | 3.25 | 13320 | 2345 | 1406.6 | | |
| 6.00 | 2 | | 136 | 0.095 | 0.720 | 1.200 | 3.90 | 11100 | 2110 | 1822.2 | | |
| 8.00 | 2 | | 136 | 0.116 | 0.960 | 1.600 | 5.20 | 8325 | 1930 | 2966.6 | | |
| 10.00 | 2 | | 136 | 0.132 | 1.200 | 2.000 | 6.50 | 6660 | 1760 | 4219.8 | | |
| 12.00 | 2 | | 136 | 0.137 | 1.440 | 2.400 | 7.80 | 5550 | 1520 | 5255.6 | | |
| Acciaio da utensile temprato 52-56 HRC  | 1.00 | | 2 | 100 | 0.028 | 0.180 | 0.200 | 0.77 | 41340 | 2315 | 83.3 | |
| | 2.00 | | 2 | 111 | 0.048 | 0.280 | 0.400 | 1.39 | 25420 | 2440 | 273.3 | |
| | 3.00 | | 2 | 111 | 0.060 | 0.360 | 0.600 | 1.95 | 18120 | 2175 | 469.6 | |
| | 4.00 | 2 | 111 | 0.072 | 0.480 | 0.800 | 2.60 | 13590 | 1955 | 751.4 | | |
| | 5.00 | 2 | 111 | 0.080 | 0.600 | 1.000 | 3.25 | 10870 | 1740 | 1043.7 | | |
| | 6.00 | 2 | 111 | 0.086 | 0.720 | 1.200 | 3.90 | 9060 | 1560 | 1346.3 | | |
| | 8.00 | 2 | 111 | 0.106 | 0.960 | 1.600 | 5.20 | 6795 | 1440 | 2212.6 | | |
| | 10.00 | 2 | 111 | 0.120 | 1.200 | 2.000 | 6.50 | 5435 | 1305 | 3131.0 | | |
| | 12.00 | 2 | 111 | 0.125 | 1.440 | 2.400 | 7.80 | 4530 | 1130 | 3913.7 | | |
| | Leghe di titanio indurite > 300 HB [Ti6Al4V]  | 1.00 | 2 | 85 | 0.031 | 0.180 | 0.200 | 0.77 | 35140 | 2180 | 78.4 | |
| | | 2.00 | 2 | 85 | 0.053 | 0.280 | 0.400 | 1.39 | 19465 | 2065 | 231.1 | |
| | | 3.00 | 2 | 85 | 0.066 | 0.360 | 0.600 | 1.95 | 13875 | 1830 | 395.6 | |
| 4.00 | | 2 | 85 | 0.079 | 0.480 | 0.800 | 2.60 | 10405 | 1645 | 631.4 | | |
| 5.00 | | 2 | 85 | 0.088 | 0.600 | 1.000 | 3.25 | 8325 | 1465 | 879.1 | | |
| 6.00 | | 2 | 85 | 0.095 | 0.720 | 1.200 | 3.90 | 6940 | 1320 | 1138.9 | | |
| 8.00 | | 2 | 85 | 0.116 | 0.960 | 1.600 | 5.20 | 5205 | 1205 | 1854.2 | | |
| 10.00 | | 2 | 85 | 0.132 | 1.200 | 2.000 | 6.50 | 4165 | 1100 | 2637.4 | | |
| 12.00 | | 2 | 85 | 0.137 | 1.440 | 2.400 | 7.80 | 3470 | 950 | 3284.7 | | |

Frese con estremità emisferica SpheroX (Sphero-XF)

Tolleranza $r \pm 0.005$, 3xd



HM λ 30°
XA γ -10°



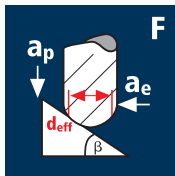
ReTool®

| | | | | | | | |
|----------|-----------|-----------|-------|-------|------|----------|-----------|
| Rm | Rm | Rm | HRC | HRC | HRC | Ti | HSS |
| 850-1100 | 1100-1300 | 1300-1500 | 48-56 | 56-60 | > 60 | Titanium | ToolSteel |

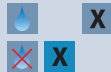
| Ø Code | Esempio: N° Ordine | | | Rivestimento | Articolo | Codice-Ø | | | | | | X-AL | | |
|-----------|-----------------------|----------|-------|--------------|----------|----------|----|-------|-------|-------|-------------|-------|---|--------------|
| | d1 | d2 h4 | d3 | X | 7400 | 100 | l1 | l2 | l3 | l4 | r ±0.005 | α | z | X7400 |
| 100 | 1.00 | 6.00 | 0.95 | | | | 57 | 1.50 | 3.00 | 13.08 | 0.500 | 11.8° | 2 | EUR 98.00 |
| 140 | 2.00 | 6.00 | 1.90 | | | | 57 | 3.00 | 6.00 | 14.31 | 1.000 | 9.0° | 2 | 98.00 |
| 180 | 3.00 | 6.00 | 2.80 | | | | 57 | 4.00 | 9.00 | 15.63 | 1.500 | 6.4° | 2 | 98.00 |
| 220 | 4.00 | 6.00 | 3.70 | | | | 57 | 5.00 | 12.00 | 16.95 | 2.000 | 4.0° | 2 | 98.00 |
| 260 | 5.00 | 6.00 | 4.60 | | | | 57 | 6.00 | 15.00 | 18.27 | 2.500 | 2.0° | 2 | 98.00 |
| 300 | 6.00 | 6.00 | 5.50 | | | | 57 | 7.00 | 19.34 | 20.00 | 3.000 | 0.0° | 2 | 98.00 |
| 391 | 8.00 | 8.00 | 7.40 | | | | 63 | 9.00 | 25.29 | 26.00 | 4.000 | 0.0° | 2 | 122.00 |
| 450 | 10.00 | 10.00 | 9.20 | | | | 72 | 11.00 | 30.20 | 31.00 | 5.000 | 0.0° | 2 | 166.00 |
| 501 | 12.00 | 12.00 | 11.00 | | | | 83 | 13.00 | 36.13 | 37.00 | 6.000 | 0.0° | 2 | 205.00 |
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Applicazione

Materiale



Acciaio da utensile temprato
42 - 48 HRC



| d1 [mm] | z | v _c [m/min] | f _z [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|------------|----|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|----------|
| 6.00 | 8 | 300 | 0.055 | 0.120 | 0.120 | 5.26 | 18155 | 7990 | 45° |
| 8.00 | 10 | 300 | 0.060 | 0.140 | 0.140 | 6.94 | 13760 | 8255 | 45° |
| 10.00 | 12 | 300 | 0.065 | 0.160 | 0.160 | 8.62 | 11080 | 8640 | 45° |
| 12.00 | 16 | 300 | 0.070 | 0.180 | 0.180 | 10.29 | 9280 | 10395 | 45° |
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Acciaio da utensile temprato
48 - 52 HRC



| | | | | | | | | | |
|-------|----|-----|-------|-------|-------|-------|-------|------|-----|
| 6.00 | 8 | 250 | 0.050 | 0.120 | 0.120 | 5.26 | 15130 | 6050 | 45° |
| 8.00 | 10 | 250 | 0.055 | 0.140 | 0.140 | 6.94 | 11465 | 6305 | 45° |
| 10.00 | 12 | 250 | 0.060 | 0.160 | 0.160 | 8.62 | 9230 | 6645 | 45° |
| 12.00 | 16 | 250 | 0.065 | 0.180 | 0.180 | 10.29 | 7735 | 8045 | 45° |
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Acciaio da utensile temprato
52 - 56 HRC

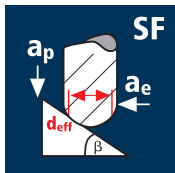


| | | | | | | | | | |
|-------|----|-----|-------|-------|-------|-------|-------|------|-----|
| 6.00 | 8 | 200 | 0.050 | 0.120 | 0.120 | 5.26 | 12105 | 4840 | 45° |
| 8.00 | 10 | 200 | 0.055 | 0.140 | 0.140 | 6.94 | 9175 | 5045 | 45° |
| 10.00 | 12 | 200 | 0.060 | 0.160 | 0.160 | 8.62 | 7385 | 5315 | 45° |
| 12.00 | 16 | 200 | 0.065 | 0.180 | 0.180 | 10.29 | 6185 | 6435 | 45° |
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Acciaio da utensile temprato
56 - 60 HRC



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|-------|----|-----|-------|-------|-------|-------|------|------|-----|
| 6.00 | 8 | 150 | 0.045 | 0.120 | 0.120 | 5.26 | 9075 | 3270 | 45° |
| 8.00 | 10 | 150 | 0.050 | 0.140 | 0.140 | 6.94 | 6880 | 3440 | 45° |
| 10.00 | 12 | 150 | 0.055 | 0.160 | 0.160 | 8.62 | 5540 | 3655 | 45° |
| 12.00 | 16 | 150 | 0.060 | 0.180 | 0.180 | 10.29 | 4640 | 4455 | 45° |
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Acciaio da utensile temprato
42 - 48 HRC



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|-------|----|-----|-------|-------|-------|------|-------|------|-----|
| 6.00 | 8 | 400 | 0.030 | 0.030 | 0.030 | 4.80 | 26525 | 6365 | 45° |
| 8.00 | 10 | 400 | 0.035 | 0.030 | 0.030 | 6.31 | 20180 | 7060 | 45° |
| 10.00 | 12 | 400 | 0.035 | 0.040 | 0.040 | 7.91 | 16095 | 6760 | 45° |
| 12.00 | 16 | 400 | 0.040 | 0.040 | 0.040 | 9.41 | 13530 | 8660 | 45° |
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Acciaio da utensile temprato
48 - 52 HRC



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|-------|----|-----|-------|-------|-------|------|-------|------|-----|
| 6.00 | 8 | 350 | 0.030 | 0.030 | 0.030 | 4.80 | 23210 | 5570 | 45° |
| 8.00 | 10 | 350 | 0.035 | 0.030 | 0.030 | 6.31 | 17655 | 6180 | 45° |
| 10.00 | 12 | 350 | 0.035 | 0.040 | 0.040 | 7.91 | 14085 | 5915 | 45° |
| 12.00 | 16 | 350 | 0.040 | 0.040 | 0.040 | 9.41 | 11840 | 7575 | 45° |
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Acciaio da utensile temprato
52 - 56 HRC



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|-------|----|-----|-------|-------|-------|------|-------|------|-----|
| 6.00 | 8 | 280 | 0.025 | 0.030 | 0.030 | 4.80 | 18570 | 3715 | 45° |
| 8.00 | 10 | 280 | 0.030 | 0.030 | 0.030 | 6.31 | 14125 | 4235 | 45° |
| 10.00 | 12 | 280 | 0.030 | 0.040 | 0.040 | 7.91 | 11270 | 4055 | 45° |
| 12.00 | 16 | 280 | 0.035 | 0.040 | 0.040 | 9.41 | 9470 | 5305 | 45° |
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Acciaio da utensile temprato
56 - 60 HRC



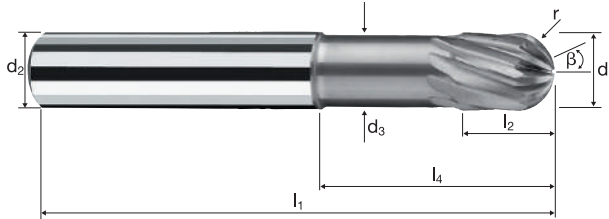
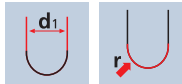
| | | | | | | | | | |
|-------|----|-----|-------|-------|-------|------|-------|------|-----|
| 6.00 | 8 | 180 | 0.025 | 0.030 | 0.030 | 4.80 | 11935 | 2385 | 45° |
| 8.00 | 10 | 180 | 0.030 | 0.030 | 0.030 | 6.31 | 9080 | 2725 | 45° |
| 10.00 | 12 | 180 | 0.030 | 0.040 | 0.040 | 7.91 | 7245 | 2610 | 45° |
| 12.00 | 16 | 180 | 0.035 | 0.040 | 0.040 | 9.41 | 6090 | 3410 | 45° |
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Frese con estremità emisferica SpheroX (Sphero-XF Multi)

Tolleranza $r \pm 0.005, 3xd$



HM
XA $\lambda \ 30^\circ$
 $\gamma \ -10^\circ$



ReTool®

Rm
850-1100

Rm
1100-1300

Rm
1300-1500

HRC
48-56

HRC
56-60

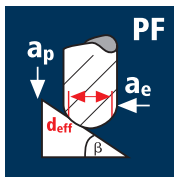
HRC
> 60

Ti
Titanium

HSS
ToolSteel

| Esempio: N° Ordine | | Rivestimento X | | Articolo 7460 | | Codice-ø 300 | | | | | X-AL |
|-----------------------|----------------|----------------------|----------------|------------------|----------------|-----------------|----------------|-------------|-----|----|--------|
| Ø Code | d ₁ | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.005 | β | z | X7460 |
| | | | | | | | | | | | EUR |
| 300 | 6.00 | 6.00 | 5.50 | 57 | 7.00 | 19.34 | 20.00 | 3.000 | 25° | 8 | 110.00 |
| 391 | 8.00 | 8.00 | 7.40 | 63 | 9.00 | 25.29 | 26.00 | 4.000 | 25° | 10 | 138.00 |
| 450 | 10.00 | 10.00 | 9.20 | 72 | 11.00 | 30.20 | 31.00 | 5.000 | 25° | 12 | 188.00 |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 13.00 | 36.13 | 37.00 | 6.000 | 25° | 16 | 232.00 |
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Applicazione



Materiale

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
| 1.00 | 2 | 100 | 0.030 | 0.110 | 0.110 | 0.99 | 32155 | 1930 | 45° |
| 2.00 | 2 | 100 | 0.055 | 0.220 | 0.220 | 1.99 | 15995 | 1760 | 45° |
| 3.00 | 2 | 100 | 0.060 | 0.330 | 0.330 | 2.98 | 10680 | 1280 | 45° |
| 4.00 | 2 | 100 | 0.070 | 0.440 | 0.440 | 3.98 | 8000 | 1120 | 45° |
| 5.00 | 2 | 100 | 0.080 | 0.550 | 0.550 | 4.97 | 6405 | 1025 | 45° |
| 6.00 | 2 | 100 | 0.085 | 0.660 | 0.660 | 5.96 | 5340 | 910 | 45° |
| 8.00 | 2 | 100 | 0.100 | 0.880 | 0.880 | 7.95 | 4005 | 800 | 45° |
| 10.00 | 2 | 100 | 0.115 | 1.100 | 1.100 | 9.94 | 3200 | 735 | 45° |
| 12.00 | 2 | 100 | 0.120 | 1.320 | 1.320 | 11.93 | 2670 | 640 | 45° |

Inox medium
[Cr-Ni-Mo+/1.4539]
Acciaio duplex
[17-4 PH]



| | | | | | | | | | |
|-------|---|----|-------|-------|-------|-------|-------|------|-----|
| 1.00 | 2 | 90 | 0.028 | 0.110 | 0.110 | 0.99 | 28935 | 1620 | 45° |
| 2.00 | 2 | 90 | 0.050 | 0.220 | 0.220 | 1.99 | 14395 | 1440 | 45° |
| 3.00 | 2 | 90 | 0.054 | 0.330 | 0.330 | 2.98 | 9615 | 1040 | 45° |
| 4.00 | 2 | 90 | 0.064 | 0.440 | 0.440 | 3.98 | 7200 | 920 | 45° |
| 5.00 | 2 | 90 | 0.072 | 0.550 | 0.550 | 4.97 | 5765 | 830 | 45° |
| 6.00 | 2 | 90 | 0.076 | 0.660 | 0.660 | 5.96 | 4805 | 730 | 45° |
| 8.00 | 2 | 90 | 0.090 | 0.880 | 0.880 | 7.95 | 3605 | 650 | 45° |
| 10.00 | 2 | 90 | 0.104 | 1.100 | 1.100 | 9.94 | 2880 | 600 | 45° |
| 12.00 | 2 | 90 | 0.108 | 1.320 | 1.320 | 11.93 | 2400 | 520 | 45° |

Inox difficile
[Cr-Ni-Mo+/1.4529]
Acciaio resistente al calore
[1.4841]

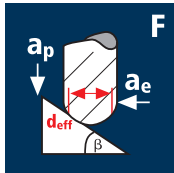


| | | | | | | | | | |
|-------|---|----|-------|-------|-------|-------|-------|-----|-----|
| 1.00 | 2 | 60 | 0.025 | 0.110 | 0.110 | 0.99 | 19290 | 965 | 45° |
| 2.00 | 2 | 60 | 0.045 | 0.220 | 0.220 | 1.99 | 9595 | 865 | 45° |
| 3.00 | 2 | 60 | 0.050 | 0.330 | 0.330 | 2.98 | 6410 | 640 | 45° |
| 4.00 | 2 | 60 | 0.060 | 0.440 | 0.440 | 3.98 | 4800 | 575 | 45° |
| 5.00 | 2 | 60 | 0.070 | 0.550 | 0.550 | 4.97 | 3845 | 540 | 45° |
| 6.00 | 2 | 60 | 0.070 | 0.660 | 0.660 | 5.96 | 3205 | 450 | 45° |
| 8.00 | 2 | 60 | 0.085 | 0.880 | 0.880 | 7.95 | 2400 | 410 | 45° |
| 10.00 | 2 | 60 | 0.100 | 1.100 | 1.100 | 9.94 | 1920 | 385 | 45° |
| 12.00 | 2 | 60 | 0.100 | 1.320 | 1.320 | 11.93 | 1600 | 320 | 45° |

Acciaio
< 850 N/mm²



| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|-----|
| 1.00 | 2 | 132 | 0.040 | 0.120 | 0.120 | 1.00 | 42015 | 3360 | 45° |
| 2.00 | 2 | 240 | 0.070 | 0.240 | 0.240 | 1.99 | 38390 | 5375 | 45° |
| 3.00 | 2 | 240 | 0.075 | 0.360 | 0.360 | 2.99 | 25550 | 3830 | 45° |
| 4.00 | 2 | 240 | 0.090 | 0.480 | 0.480 | 3.99 | 19145 | 3445 | 45° |
| 5.00 | 2 | 240 | 0.100 | 0.600 | 0.600 | 4.98 | 15340 | 3070 | 45° |
| 6.00 | 2 | 240 | 0.105 | 0.720 | 0.720 | 5.98 | 12775 | 2685 | 45° |
| 8.00 | 2 | 240 | 0.125 | 0.960 | 0.960 | 7.98 | 9575 | 2395 | 45° |
| 10.00 | 2 | 240 | 0.145 | 1.200 | 1.200 | 9.97 | 7660 | 2220 | 45° |
| 12.00 | 2 | 240 | 0.150 | 1.440 | 1.440 | 11.96 | 6385 | 1915 | 45° |



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|-----|
| 1.00 | 2 | 124 | 0.025 | 0.050 | 0.050 | 0.94 | 41990 | 2100 | 45° |
| 2.00 | 2 | 140 | 0.030 | 0.070 | 0.070 | 1.84 | 24220 | 1455 | 45° |
| 3.00 | 2 | 140 | 0.035 | 0.090 | 0.090 | 2.72 | 16385 | 1145 | 45° |
| 4.00 | 2 | 140 | 0.055 | 0.110 | 0.110 | 3.60 | 12380 | 1360 | 45° |
| 5.00 | 2 | 140 | 0.060 | 0.130 | 0.130 | 4.48 | 9945 | 1195 | 45° |
| 6.00 | 2 | 140 | 0.065 | 0.150 | 0.150 | 5.36 | 8315 | 1080 | 45° |
| 8.00 | 2 | 140 | 0.075 | 0.170 | 0.170 | 7.05 | 6320 | 950 | 45° |
| 10.00 | 2 | 140 | 0.080 | 0.200 | 0.200 | 8.77 | 5080 | 815 | 45° |
| 12.00 | 2 | 140 | 0.085 | 0.250 | 0.250 | 10.56 | 4220 | 715 | 45° |

Inox medium
[Cr-Ni-Mo+/1.4539]
Acciaio duplex
[17-4 PH]



| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|-----|
| 1.00 | 2 | 124 | 0.022 | 0.050 | 0.050 | 0.94 | 41990 | 1850 | 45° |
| 2.00 | 2 | 125 | 0.028 | 0.070 | 0.070 | 1.84 | 21625 | 1210 | 45° |
| 3.00 | 2 | 125 | 0.032 | 0.090 | 0.090 | 2.72 | 14630 | 935 | 45° |
| 4.00 | 2 | 125 | 0.050 | 0.110 | 0.110 | 3.60 | 11050 | 1105 | 45° |
| 5.00 | 2 | 125 | 0.054 | 0.130 | 0.130 | 4.48 | 8880 | 960 | 45° |
| 6.00 | 2 | 125 | 0.058 | 0.150 | 0.150 | 5.36 | 7425 | 860 | 45° |
| 8.00 | 2 | 125 | 0.068 | 0.170 | 0.170 | 7.05 | 5645 | 770 | 45° |
| 10.00 | 2 | 125 | 0.072 | 0.200 | 0.200 | 8.77 | 4535 | 655 | 45° |
| 12.00 | 2 | 125 | 0.076 | 0.250 | 0.250 | 10.56 | 3770 | 575 | 45° |

Inox difficile
[Cr-Ni-Mo+/1.4529]
Acciaio resistente al calore
[1.4841]



| | | | | | | | | | |
|-------|---|----|-------|-------|-------|-------|-------|------|-----|
| 1.00 | 2 | 70 | 0.025 | 0.050 | 0.050 | 0.94 | 23705 | 1185 | 45° |
| 2.00 | 2 | 70 | 0.025 | 0.070 | 0.070 | 1.84 | 12110 | 605 | 45° |
| 3.00 | 2 | 70 | 0.030 | 0.090 | 0.090 | 2.72 | 8190 | 490 | 45° |
| 4.00 | 2 | 70 | 0.050 | 0.110 | 0.110 | 3.60 | 6190 | 620 | 45° |
| 5.00 | 2 | 70 | 0.055 | 0.130 | 0.130 | 4.48 | 4975 | 545 | 45° |
| 6.00 | 2 | 70 | 0.060 | 0.150 | 0.150 | 5.36 | 4155 | 500 | 45° |
| 8.00 | 2 | 70 | 0.070 | 0.170 | 0.170 | 7.05 | 3160 | 440 | 45° |
| 10.00 | 2 | 70 | 0.070 | 0.200 | 0.200 | 8.77 | 2540 | 355 | 45° |
| 12.00 | 2 | 70 | 0.075 | 0.250 | 0.250 | 10.56 | 2110 | 315 | 45° |

Acciaio
< 850 N/mm²



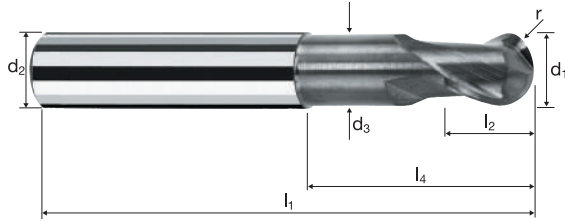
| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|-----|
| 1.00 | 2 | 124 | 0.030 | 0.050 | 0.050 | 0.94 | 41990 | 2520 | 45° |
| 2.00 | 2 | 243 | 0.035 | 0.070 | 0.070 | 1.84 | 42040 | 2945 | 45° |
| 3.00 | 2 | 359 | 0.040 | 0.090 | 0.090 | 2.72 | 42010 | 3360 | 45° |
| 4.00 | 2 | 360 | 0.065 | 0.110 | 0.110 | 3.60 | 31830 | 4140 | 45° |
| 5.00 | 2 | 360 | 0.070 | 0.130 | 0.130 | 4.48 | 25580 | 3580 | 45° |
| 6.00 | 2 | 360 | 0.080 | 0.150 | 0.150 | 5.36 | 21380 | 3420 | 45° |
| 8.00 | 2 | 360 | 0.090 | 0.170 | 0.170 | 7.05 | 16255 | 2925 | 45° |
| 10.00 | 2 | 360 | 0.095 | 0.200 | 0.200 | 8.77 | 13065 | 2485 | 45° |
| 12.00 | 2 | 360 | 0.100 | 0.250 | 0.250 | 10.56 | 10850 | 2170 | 45° |

Frese con estremità emisferica Sphericut (Sphero-SB)

Tolleranza $r \pm 0.005, 3xd$



| | |
|-------------|---------------|
| HM | λ 30° |
| MG10 | γ 5° |
| | |
| | |

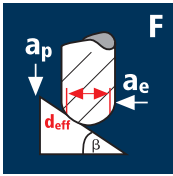


ReTool®

| | | | | | | | | |
|--------------------|-----------------------|------------------------|------------------------|---------------------|--|--------------------------|-----------------------|---|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | | Inox Stainless | Ti Titanium | GG(G) Tool Steel Nickel-Alloys |
|--------------------|-----------------------|------------------------|------------------------|---------------------|--|--------------------------|-----------------------|---|

| Esempio: N° Ordine | | | | | | | | | | | | POLYCHROM | |
|--|----------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------------|-------|---|--|--------------|--|
| Rivestimento P Articolo 7540 Codice-Ø 100 | | | | | | | | | | | | | |
| Ø Code | d ₁ | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.005 | α | z | | P7540 | |
| | | | | | | | | | | | | EUR | |
| 100 | 1.00 | 6.00 | 0.95 | 57 | 1.50 | 3.00 | 13.08 | 0.500 | 11.8° | 2 | | 80.00 | |
| 140 | 2.00 | 6.00 | 1.90 | 57 | 3.00 | 6.00 | 14.31 | 1.000 | 9.0° | 2 | | 80.00 | |
| 180 | 3.00 | 6.00 | 2.80 | 57 | 4.00 | 9.00 | 15.63 | 1.500 | 6.4° | 2 | | 80.00 | |
| 220 | 4.00 | 6.00 | 3.70 | 57 | 5.00 | 12.00 | 16.95 | 2.000 | 4.0° | 2 | | 80.00 | |
| 260 | 5.00 | 6.00 | 4.60 | 57 | 6.00 | 15.00 | 18.27 | 2.500 | 2.0° | 2 | | 80.00 | |
| 300 | 6.00 | 6.00 | 5.50 | 57 | 7.00 | 19.34 | 20.00 | 3.000 | 0.0° | 2 | | 80.00 | |
| 391 | 8.00 | 8.00 | 7.40 | 63 | 9.00 | 25.29 | 26.00 | 4.000 | 0.0° | 2 | | 100.00 | |
| 450 | 10.00 | 10.00 | 9.20 | 72 | 11.00 | 30.20 | 31.00 | 5.000 | 0.0° | 2 | | 136.00 | |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 13.00 | 36.13 | 37.00 | 6.000 | 0.0° | 2 | | 167.00 | |
| 610 | 16.00 | 16.00 | 15.00 | 92 | 17.00 | 42.13 | 43.00 | 8.000 | 0.0° | 2 | | 262.00 | |

Applicazione



Materiale

Alluminio malleabile
Costruzione integrale Al



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _s [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _c [mm/min] | β [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
| 2.00 | 2 | 250 | 0.055 | 0.120 | 0.050 | 1.92 | 41445 | 4560 | 45° |
| 3.00 | 2 | 370 | 0.060 | 0.150 | 0.050 | 2.83 | 41615 | 4995 | 45° |
| 4.00 | 2 | 490 | 0.070 | 0.180 | 0.050 | 3.75 | 41590 | 5825 | 45° |
| 5.00 | 2 | 610 | 0.075 | 0.200 | 0.050 | 4.64 | 41845 | 6275 | 45° |
| 6.00 | 2 | 730 | 0.085 | 0.230 | 0.075 | 5.55 | 41870 | 7120 | 45° |
| 8.00 | 2 | 810 | 0.090 | 0.250 | 0.075 | 7.27 | 35465 | 6385 | 45° |
| 10.00 | 2 | 810 | 0.100 | 0.300 | 0.100 | 9.06 | 28460 | 5690 | 45° |
| 12.00 | 2 | 810 | 0.105 | 0.350 | 0.100 | 10.85 | 23765 | 4990 | 45° |
| 16.00 | 2 | 810 | 0.115 | 0.400 | 0.120 | 14.28 | 18055 | 4155 | 45° |

Rame non legato



| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|-----|
| 2.00 | 2 | 250 | 0.055 | 0.120 | 0.050 | 1.92 | 41445 | 4560 | 45° |
| 3.00 | 2 | 370 | 0.060 | 0.150 | 0.050 | 2.83 | 41615 | 4995 | 45° |
| 4.00 | 2 | 490 | 0.070 | 0.180 | 0.050 | 3.75 | 41590 | 5825 | 45° |
| 5.00 | 2 | 540 | 0.075 | 0.200 | 0.050 | 4.64 | 37045 | 5555 | 45° |
| 6.00 | 2 | 540 | 0.085 | 0.230 | 0.075 | 5.55 | 30970 | 5265 | 45° |
| 8.00 | 2 | 540 | 0.090 | 0.250 | 0.075 | 7.27 | 23645 | 4255 | 45° |
| 10.00 | 2 | 540 | 0.100 | 0.300 | 0.100 | 9.06 | 18970 | 3795 | 45° |
| 12.00 | 2 | 540 | 0.105 | 0.350 | 0.100 | 10.85 | 15840 | 3325 | 45° |
| 16.00 | 2 | 540 | 0.115 | 0.400 | 0.120 | 14.28 | 12035 | 2770 | 45° |

Materiali termoplastici



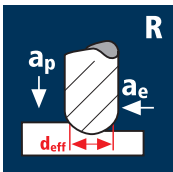
| | | | | | | | | | |
|-------|---|------|-------|-------|-------|-------|-------|------|-----|
| 2.00 | 2 | 250 | 0.055 | 0.120 | 0.050 | 1.92 | 41445 | 4560 | 45° |
| 3.00 | 2 | 370 | 0.060 | 0.150 | 0.050 | 2.83 | 41615 | 4995 | 45° |
| 4.00 | 2 | 490 | 0.070 | 0.180 | 0.050 | 3.75 | 41590 | 5825 | 45° |
| 5.00 | 2 | 610 | 0.075 | 0.200 | 0.050 | 4.64 | 41845 | 6275 | 45° |
| 6.00 | 2 | 730 | 0.085 | 0.230 | 0.075 | 5.55 | 41870 | 7120 | 45° |
| 8.00 | 2 | 955 | 0.090 | 0.250 | 0.075 | 7.27 | 41815 | 7525 | 45° |
| 10.00 | 2 | 1195 | 0.100 | 0.300 | 0.100 | 9.06 | 41985 | 8395 | 45° |
| 12.00 | 2 | 1430 | 0.105 | 0.350 | 0.100 | 10.85 | 41950 | 8810 | 45° |
| 16.00 | 2 | 1800 | 0.115 | 0.400 | 0.120 | 14.28 | 40125 | 9230 | 45° |

Lega per fonderia Al



| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|-----|
| 2.00 | 2 | 250 | 0.055 | 0.120 | 0.050 | 1.92 | 41445 | 4560 | 45° |
| 3.00 | 2 | 370 | 0.060 | 0.150 | 0.050 | 2.83 | 41615 | 4995 | 45° |
| 4.00 | 2 | 490 | 0.070 | 0.180 | 0.050 | 3.75 | 41590 | 5825 | 45° |
| 5.00 | 2 | 610 | 0.075 | 0.200 | 0.050 | 4.64 | 41845 | 6275 | 45° |
| 6.00 | 2 | 648 | 0.085 | 0.230 | 0.075 | 5.55 | 37165 | 6320 | 45° |
| 8.00 | 2 | 648 | 0.090 | 0.250 | 0.075 | 7.27 | 28370 | 5105 | 45° |
| 10.00 | 2 | 648 | 0.100 | 0.300 | 0.100 | 9.06 | 22765 | 4555 | 45° |
| 12.00 | 2 | 648 | 0.105 | 0.350 | 0.100 | 10.85 | 19010 | 3990 | 45° |
| 16.00 | 2 | 648 | 0.115 | 0.400 | 0.120 | 14.28 | 14445 | 3320 | 45° |

Applicazione



Materiale

Alluminio malleabile
Costruzione integrale Al



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _s [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _c [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|--------------------------|
| 2.00 | 2 | 210 | 0.065 | 0.400 | 0.800 | 1.60 | 41780 | 5430 | 1.7 |
| 3.00 | 2 | 315 | 0.082 | 0.600 | 1.200 | 2.40 | 41780 | 6850 | 4.9 |
| 4.00 | 2 | 405 | 0.090 | 0.800 | 1.600 | 3.20 | 40285 | 7250 | 9.3 |
| 5.00 | 2 | 405 | 0.100 | 1.000 | 2.000 | 4.00 | 32230 | 6445 | 12.9 |
| 6.00 | 2 | 405 | 0.120 | 1.200 | 2.400 | 4.80 | 26855 | 6445 | 18.6 |
| 8.00 | 2 | 405 | 0.140 | 1.600 | 3.200 | 6.40 | 20145 | 5640 | 28.9 |
| 10.00 | 2 | 405 | 0.150 | 2.000 | 4.000 | 8.00 | 16115 | 4835 | 38.7 |
| 12.00 | 2 | 405 | 0.180 | 2.400 | 4.800 | 9.60 | 13430 | 4835 | 55.7 |
| 16.00 | 2 | 405 | 0.200 | 3.200 | 6.400 | 12.80 | 10070 | 4030 | 82.5 |

Rame non legato



| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|------|
| 2.00 | 2 | 210 | 0.062 | 0.400 | 0.800 | 1.60 | 41780 | 5180 | 1.7 |
| 3.00 | 2 | 270 | 0.078 | 0.600 | 1.200 | 2.40 | 35810 | 5585 | 4.0 |
| 4.00 | 2 | 270 | 0.084 | 0.800 | 1.600 | 3.20 | 26855 | 4510 | 5.8 |
| 5.00 | 2 | 270 | 0.092 | 1.000 | 2.000 | 4.00 | 21485 | 3955 | 7.9 |
| 6.00 | 2 | 270 | 0.111 | 1.200 | 2.400 | 4.80 | 17905 | 3975 | 11.4 |
| 8.00 | 2 | 270 | 0.128 | 1.600 | 3.200 | 6.40 | 13430 | 3440 | 17.6 |
| 10.00 | 2 | 270 | 0.135 | 2.000 | 4.000 | 8.00 | 10745 | 2900 | 23.2 |
| 12.00 | 2 | 270 | 0.162 | 2.400 | 4.800 | 9.60 | 8950 | 2900 | 33.4 |
| 16.00 | 2 | 270 | 0.176 | 3.200 | 6.400 | 12.80 | 6715 | 2365 | 48.4 |

Materiali termoplastici



| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|-------|-------|
| 2.00 | 2 | 210 | 0.065 | 0.400 | 0.800 | 1.60 | 41780 | 5430 | 1.7 |
| 3.00 | 2 | 315 | 0.082 | 0.600 | 1.200 | 2.40 | 41780 | 6850 | 4.9 |
| 4.00 | 2 | 420 | 0.090 | 0.800 | 1.600 | 3.20 | 41780 | 7520 | 9.6 |
| 5.00 | 2 | 520 | 0.100 | 1.000 | 2.000 | 4.00 | 41380 | 8275 | 16.6 |
| 6.00 | 2 | 630 | 0.120 | 1.200 | 2.400 | 4.80 | 41780 | 10025 | 28.9 |
| 8.00 | 2 | 830 | 0.140 | 1.600 | 3.200 | 6.40 | 41280 | 11560 | 59.2 |
| 10.00 | 2 | 900 | 0.150 | 2.000 | 4.000 | 8.00 | 35810 | 10745 | 85.9 |
| 12.00 | 2 | 900 | 0.180 | 2.400 | 4.800 | 9.60 | 29840 | 10745 | 123.8 |
| 16.00 | 2 | 900 | 0.200 | 3.200 | 6.400 | 12.80 | 22380 | 8950 | 183.3 |

Lega per fonderia Al



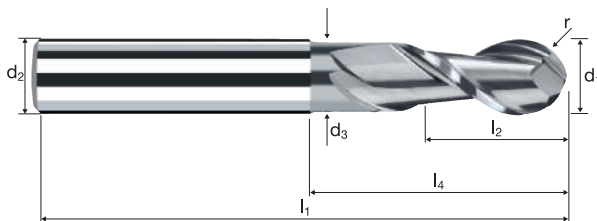
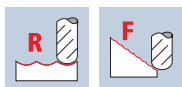
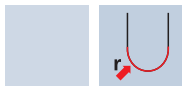
| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|------|
| 2.00 | 2 | 210 | 0.065 | 0.400 | 0.800 | 1.60 | 41780 | 5430 | 1.7 |
| 3.00 | 2 | 315 | 0.082 | 0.600 | 1.200 | 2.40 | 41780 | 6850 | 4.9 |
| 4.00 | 2 | 324 | 0.090 | 0.800 | 1.600 | 3.20 | 32230 | 5800 | 7.4 |
| 5.00 | 2 | 324 | 0.100 | 1.000 | 2.000 | 4.00 | 25785 | 5155 | 10.3 |
| 6.00 | 2 | 324 | 0.120 | 1.200 | 2.400 | 4.80 | 21485 | 5155 | 14.9 |
| 8.00 | 2 | 324 | 0.140 | 1.600 | 3.200 | 6.40 | 16115 | 4510 | 23.1 |
| 10.00 | 2 | 324 | 0.150 | 2.000 | 4.000 | 8.00 | 12890 | 3865 | 30.9 |
| 12.00 | 2 | 324 | 0.180 | 2.400 | 4.800 | 9.60 | 10745 | 3865 | 44.6 |
| 16.00 | 2 | 324 | 0.200 | 3.200 | 6.400 | 12.80 | 8055 | 3225 | 66.0 |

Frese con estremità emisferica Sphericut (Sphero-Alu)

Tolleranza $r \pm 0.005$, 3xd



HM
MG10 λ 40°
 γ 20°



ReTool®

Al
Aluminium
> 99%

Al
Aluminium
Alloy

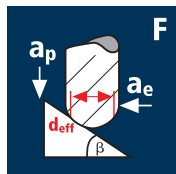
Al
Aluminium
Cast

Cu
Copper

Plastic
Thermoplast

| Ø Code | Esempio: N° Ordine | | | | | | | | | | | 7550 |
|-----------|--------------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------------|------|---|--------|------|
| | d ₁ | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.005 | α | z | EUR | |
| 140 | 2.00 | 6.00 | 1.90 | 57 | 4.00 | 6.00 | 14.31 | 1.000 | 8.2° | 2 | 75.00 | |
| 180 | 3.00 | 6.00 | 2.80 | 57 | 6.00 | 9.00 | 15.63 | 1.500 | 5.7° | 2 | 75.00 | |
| 220 | 4.00 | 6.00 | 3.70 | 57 | 8.00 | 12.00 | 16.95 | 2.000 | 3.6° | 2 | 75.00 | |
| 260 | 5.00 | 6.00 | 4.60 | 57 | 10.00 | 15.00 | 18.27 | 2.500 | 1.8° | 2 | 75.00 | |
| 300 | 6.00 | 6.00 | 5.50 | 57 | 12.00 | 19.34 | 20.00 | 3.000 | 0.0° | 2 | 75.00 | |
| 391 | 8.00 | 8.00 | 7.40 | 63 | 16.00 | 25.29 | 26.00 | 4.000 | 0.0° | 2 | 93.00 | |
| 450 | 10.00 | 10.00 | 9.20 | 72 | 20.00 | 30.20 | 31.00 | 5.000 | 0.0° | 2 | 127.00 | |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 24.00 | 36.13 | 37.00 | 6.000 | 0.0° | 2 | 157.00 | |
| 610 | 16.00 | 16.00 | 15.00 | 92 | 32.00 | 42.13 | 43.00 | 8.000 | 0.0° | 2 | 245.00 | |
| 682 | 20.00 | 20.00 | 19.00 | 104 | 40.00 | 52.13 | 53.00 | 10.000 | 0.0° | 2 | 358.00 | |

Applicazione



Materiale

Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



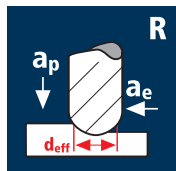
Acciaio da
utensile temprato
> 60 HRC



Acciaio rapido temprato
64 - 70 HRC



Applicazione



Materiale

Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



Acciaio da
utensile temprato
> 60 HRC



Acciaio rapido temprato
64 - 70 HRC



| d1 [mm] | z | v_c [m/min] | f_z [mm] | a_p [mm] | a_e [mm] | d_{eff} [mm] | n [min ⁻¹] | v_t [mm/min] | β [°] |
|---------|---|---------------|------------|------------|------------|----------------|------------------------|----------------|-------------|
| 1.00 | 2 | 120 | 0.018 | 0.030 | 0.090 | 0.91 | 41975 | 1510 | 45° |
| 2.00 | 2 | 140 | 0.028 | 0.030 | 0.120 | 1.72 | 25910 | 1450 | 45° |
| 3.00 | 2 | 180 | 0.042 | 0.050 | 0.150 | 2.59 | 22120 | 1860 | 45° |
| 4.00 | 2 | 180 | 0.052 | 0.050 | 0.180 | 3.39 | 16900 | 1760 | 45° |
| 5.00 | 2 | 180 | 0.058 | 0.050 | 0.210 | 4.17 | 13740 | 1595 | 45° |
| 6.00 | 2 | 180 | 0.064 | 0.050 | 0.230 | 4.94 | 11600 | 1485 | 45° |
| 8.00 | 2 | 180 | 0.068 | 0.080 | 0.280 | 6.67 | 8590 | 1170 | 45° |
| 10.00 | 2 | 180 | 0.074 | 0.080 | 0.310 | 8.22 | 6970 | 1030 | 45° |
| 12.00 | 2 | 180 | 0.082 | 0.100 | 0.340 | 9.89 | 5795 | 950 | 45° |

| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|------|-------|------|-----|
| 1.00 | 2 | 110 | 0.018 | 0.030 | 0.090 | 0.91 | 38475 | 1385 | 45° |
| 2.00 | 2 | 110 | 0.028 | 0.030 | 0.120 | 1.72 | 20355 | 1140 | 45° |
| 3.00 | 2 | 140 | 0.042 | 0.050 | 0.150 | 2.59 | 17205 | 1445 | 45° |
| 4.00 | 2 | 140 | 0.052 | 0.050 | 0.180 | 3.39 | 13145 | 1365 | 45° |
| 5.00 | 2 | 140 | 0.058 | 0.050 | 0.210 | 4.17 | 10685 | 1240 | 45° |
| 6.00 | 2 | 140 | 0.064 | 0.050 | 0.230 | 4.94 | 9020 | 1155 | 45° |
| 8.00 | 2 | 140 | 0.068 | 0.080 | 0.280 | 6.67 | 6680 | 910 | 45° |
| 10.00 | 2 | 140 | 0.074 | 0.080 | 0.310 | 8.22 | 5420 | 800 | 45° |
| 12.00 | 2 | 140 | 0.082 | 0.100 | 0.340 | 9.89 | 4505 | 740 | 45° |

| | | | | | | | | | |
|-------|---|----|-------|-------|-------|------|-------|-----|-----|
| 1.00 | 2 | 70 | 0.018 | 0.030 | 0.090 | 0.91 | 24485 | 880 | 45° |
| 2.00 | 2 | 70 | 0.028 | 0.030 | 0.120 | 1.72 | 12955 | 725 | 45° |
| 3.00 | 2 | 90 | 0.042 | 0.050 | 0.150 | 2.59 | 11060 | 930 | 45° |
| 4.00 | 2 | 90 | 0.052 | 0.050 | 0.180 | 3.39 | 8450 | 880 | 45° |
| 5.00 | 2 | 90 | 0.058 | 0.050 | 0.210 | 4.17 | 6870 | 795 | 45° |
| 6.00 | 2 | 90 | 0.064 | 0.050 | 0.230 | 4.94 | 5800 | 740 | 45° |
| 8.00 | 2 | 90 | 0.068 | 0.080 | 0.280 | 6.67 | 4295 | 585 | 45° |
| 10.00 | 2 | 90 | 0.074 | 0.080 | 0.310 | 8.22 | 3485 | 515 | 45° |
| 12.00 | 2 | 90 | 0.082 | 0.100 | 0.340 | 9.89 | 2895 | 475 | 45° |

| | | | | | | | | | |
|-------|---|----|-------|-------|-------|------|-------|-----|-----|
| 1.00 | 2 | 40 | 0.018 | 0.030 | 0.090 | 0.91 | 13990 | 505 | 45° |
| 2.00 | 2 | 40 | 0.028 | 0.030 | 0.120 | 1.72 | 7405 | 415 | 45° |
| 3.00 | 2 | 50 | 0.042 | 0.050 | 0.150 | 2.59 | 6145 | 515 | 45° |
| 4.00 | 2 | 50 | 0.052 | 0.050 | 0.180 | 3.39 | 4695 | 490 | 45° |
| 5.00 | 2 | 50 | 0.058 | 0.050 | 0.210 | 4.17 | 3815 | 445 | 45° |
| 6.00 | 2 | 50 | 0.064 | 0.050 | 0.230 | 4.94 | 3220 | 410 | 45° |
| 8.00 | 2 | 50 | 0.068 | 0.080 | 0.280 | 6.67 | 2385 | 325 | 45° |
| 10.00 | 2 | 50 | 0.074 | 0.080 | 0.310 | 8.22 | 1935 | 285 | 45° |
| 12.00 | 2 | 50 | 0.082 | 0.100 | 0.340 | 9.89 | 1610 | 265 | 45° |

| d1 [mm] | z | v_c [m/min] | f_z [mm] | a_p [mm] | a_e [mm] | d_{eff} [mm] | n [min ⁻¹] | v_t [mm/min] | Q [mm ³ /min] |
|---------|---|---------------|------------|------------|------------|----------------|------------------------|----------------|--------------------------|
| 1.00 | 2 | 100 | 0.028 | 0.180 | 0.200 | 0.77 | 41340 | 2315 | 83.3 |
| 2.00 | 2 | 100 | 0.048 | 0.280 | 0.400 | 1.39 | 22900 | 2200 | 246.2 |
| 3.00 | 2 | 100 | 0.060 | 0.360 | 0.600 | 1.95 | 16325 | 1960 | 423.1 |
| 4.00 | 2 | 100 | 0.072 | 0.480 | 0.800 | 2.60 | 12245 | 1765 | 677.0 |
| 5.00 | 2 | 100 | 0.080 | 0.600 | 1.000 | 3.25 | 9795 | 1565 | 940.2 |
| 6.00 | 2 | 100 | 0.086 | 0.720 | 1.200 | 3.90 | 8160 | 1405 | 1212.9 |
| 8.00 | 2 | 100 | 0.106 | 0.960 | 1.600 | 5.20 | 6120 | 1300 | 1993.3 |
| 10.00 | 2 | 100 | 0.120 | 1.200 | 2.000 | 6.50 | 4895 | 1175 | 2820.7 |
| 12.00 | 2 | 100 | 0.125 | 1.440 | 2.400 | 7.80 | 4080 | 1020 | 3525.9 |

| | | | | | | | | | |
|-------|---|----|-------|-------|-------|------|-------|-----|--------|
| 1.00 | 2 | 61 | 0.017 | 0.160 | 0.200 | 0.74 | 26240 | 890 | 28.5 |
| 2.00 | 2 | 61 | 0.029 | 0.250 | 0.400 | 1.33 | 14600 | 845 | 84.7 |
| 3.00 | 2 | 61 | 0.036 | 0.320 | 0.600 | 1.86 | 10440 | 750 | 144.3 |
| 4.00 | 2 | 61 | 0.043 | 0.430 | 0.800 | 2.48 | 7830 | 675 | 231.6 |
| 5.00 | 2 | 61 | 0.048 | 0.540 | 1.000 | 3.10 | 6265 | 600 | 324.7 |
| 6.00 | 2 | 61 | 0.052 | 0.650 | 1.200 | 3.72 | 5220 | 545 | 423.4 |
| 8.00 | 2 | 61 | 0.063 | 0.860 | 1.600 | 4.97 | 3905 | 490 | 677.3 |
| 10.00 | 2 | 61 | 0.072 | 1.080 | 2.000 | 6.21 | 3125 | 450 | 972.5 |
| 12.00 | 2 | 61 | 0.075 | 1.300 | 2.400 | 7.45 | 2605 | 390 | 1219.7 |

| | | | | | | | | | |
|-------|---|----|-------|-------|-------|------|-------|-----|-------|
| 1.00 | 2 | 46 | 0.014 | 0.130 | 0.200 | 0.66 | 22185 | 620 | 16.2 |
| 2.00 | 2 | 46 | 0.023 | 0.200 | 0.400 | 1.19 | 12305 | 565 | 45.3 |
| 3.00 | 2 | 46 | 0.029 | 0.250 | 0.600 | 1.66 | 8820 | 510 | 76.7 |
| 4.00 | 2 | 46 | 0.035 | 0.340 | 0.800 | 2.22 | 6595 | 460 | 125.6 |
| 5.00 | 2 | 46 | 0.038 | 0.420 | 1.000 | 2.77 | 5285 | 400 | 168.7 |
| 6.00 | 2 | 46 | 0.041 | 0.500 | 1.200 | 3.33 | 4395 | 360 | 216.3 |
| 8.00 | 2 | 46 | 0.051 | 0.670 | 1.600 | 4.44 | 3300 | 335 | 360.6 |
| 10.00 | 2 | 46 | 0.058 | 0.840 | 2.000 | 5.55 | 2640 | 305 | 514.1 |
| 12.00 | 2 | 46 | 0.060 | 1.010 | 2.400 | 6.66 | 2200 | 265 | 639.5 |

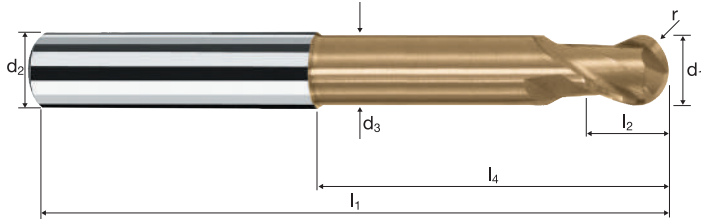
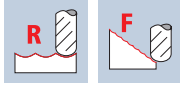
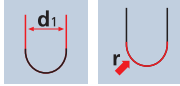
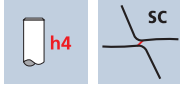
| | | | | | | | | | |
|-------|---|----|-------|-------|-------|------|-------|-----|-------|
| 1.00 | 2 | 31 | 0.011 | 0.130 | 0.200 | 0.66 | 14950 | 330 | 8.6 |
| 2.00 | 2 | 31 | 0.018 | 0.200 | 0.400 | 1.19 | 8290 | 300 | 23.9 |
| 3.00 | 2 | 31 | 0.023 | 0.250 | 0.600 | 1.66 | 5945 | 275 | 41.0 |
| 4.00 | 2 | 31 | 0.028 | 0.340 | 0.800 | 2.22 | 4445 | 250 | 67.7 |
| 5.00 | 2 | 31 | 0.031 | 0.420 | 1.000 | 2.77 | 3560 | 220 | 92.8 |
| 6.00 | 2 | 31 | 0.033 | 0.500 | 1.200 | 3.33 | 2965 | 195 | 117.3 |
| 8.00 | 2 | 31 | 0.041 | 0.670 | 1.600 | 4.44 | 2220 | 180 | 195.4 |
| 10.00 | 2 | 31 | 0.046 | 0.840 | 2.000 | 5.55 | 1780 | 165 | 274.8 |
| 12.00 | 2 | 31 | 0.048 | 1.010 | 2.400 | 6.66 | 1480 | 140 | 344.8 |

Frese con estremità emisferica SpheroX

Tolleranza $r \pm 0.005$, 4.5xd



HM
XA λ 30°
 γ -10°

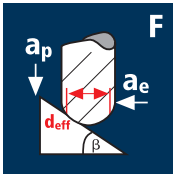


ReTool®

Rm 1100-1300 Rm 1300-1500 HRC 48-56 HRC 56-60 HRC > 60 Ti Titanium HSS ToolSteel

| | | | | | | | | | | | DURO-V | |
|-----------------------|--------------|-------------|----------|-------|---------------------|-------|-------|--------------------|----------|-----|--------|--|
| Esempio: N° Ordine | | | | | | | | | | | V7472 | |
| | | | | | | | | | | | EUR | |
| \emptyset Code | d_1 | d_2 h4 | d_3 | l_1 | l_2 | l_3 | l_4 | r ± 0.005 | α | z | | |
| | Rivestimento | | Articolo | | Codice- \emptyset | | | | | | | |
| | V | | 7472 | | 100 | | | | | | | |
| 100 | 1.00 | 6.00 | 0.95 | 61 | 1.50 | 4.50 | 14.58 | 0.500 | 10.0° | 2 | 107.00 | |
| 140 | 2.00 | 6.00 | 1.90 | 61 | 3.00 | 9.00 | 17.31 | 1.000 | 6.8° | 2 | 107.00 | |
| 180 | 3.00 | 6.00 | 2.80 | 61 | 4.00 | 13.50 | 20.13 | 1.500 | 4.5° | 2 | 107.00 | |
| 220 | 4.00 | 6.00 | 3.70 | 66 | 5.00 | 18.00 | 22.95 | 2.000 | 2.7° | 2 | 107.00 | |
| 260 | 5.00 | 6.00 | 4.60 | 66 | 6.00 | 22.50 | 25.77 | 2.500 | 1.4° | 2 | 107.00 | |
| 300 | 6.00 | 6.00 | 5.50 | 69 | 7.00 | 30.34 | 31.00 | 3.000 | 0.0° | 2 | 107.00 | |
| 391 | 8.00 | 8.00 | 7.40 | 80 | 9.00 | 39.29 | 40.00 | 4.000 | 0.0° | 2 | 134.00 | |
| 450 | 10.00 | 10.00 | 9.20 | 90 | 11.00 | 47.20 | 48.00 | 5.000 | 0.0° | 2 | 182.00 | |
| 501 | 12.00 | 12.00 | 11.00 | 105 | 13.00 | 54.13 | 55.00 | 6.000 | 0.0° | 2 | 225.00 | |
| 610 | 16.00 | 16.00 | 15.00 | 125 | 17.00 | 74.13 | 75.00 | 8.000 | 0.0° | 2 | 352.00 | |
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Applicazione



Materiale

Acciaio da
utensile temprato
52 - 56 HRC



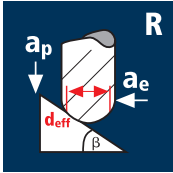
Acciaio da
utensile temprato
56 - 60 HRC



Acciaio da
utensile temprato
> 60 HRC



Acciaio rapido temprato
64 - 70 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



Acciaio da
utensile temprato
> 60 HRC



Acciaio rapido temprato
64 - 70 HRC



| d1 [mm] | z | v _c [m/min] | f _c [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|----------|
| 1.00 | 4 | 120 | 0.014 | 0.030 | 0.090 | 0.91 | 41975 | 2350 | 45° |
| 2.00 | 4 | 140 | 0.022 | 0.030 | 0.120 | 1.72 | 25910 | 2280 | 45° |
| 3.00 | 4 | 180 | 0.034 | 0.050 | 0.150 | 2.59 | 22120 | 3010 | 45° |
| 4.00 | 4 | 180 | 0.042 | 0.050 | 0.180 | 3.39 | 16900 | 2840 | 45° |
| 5.00 | 4 | 180 | 0.048 | 0.050 | 0.210 | 4.17 | 13740 | 2640 | 45° |
| 6.00 | 4 | 180 | 0.052 | 0.050 | 0.230 | 4.94 | 11600 | 2410 | 45° |
| 8.00 | 4 | 180 | 0.056 | 0.080 | 0.280 | 6.67 | 8590 | 1925 | 45° |
| 10.00 | 4 | 180 | 0.060 | 0.080 | 0.310 | 8.22 | 6970 | 1675 | 45° |
| 12.00 | 4 | 180 | 0.066 | 0.100 | 0.340 | 9.89 | 5795 | 1530 | 45° |
| 1.00 | 4 | 110 | 0.014 | 0.030 | 0.090 | 0.91 | 38475 | 2155 | 45° |
| 2.00 | 4 | 110 | 0.022 | 0.030 | 0.120 | 1.72 | 20355 | 1790 | 45° |
| 3.00 | 4 | 140 | 0.034 | 0.050 | 0.150 | 2.59 | 17205 | 2340 | 45° |
| 4.00 | 4 | 140 | 0.042 | 0.050 | 0.180 | 3.39 | 13145 | 2210 | 45° |
| 5.00 | 4 | 140 | 0.048 | 0.050 | 0.210 | 4.17 | 10685 | 2050 | 45° |
| 6.00 | 4 | 140 | 0.052 | 0.050 | 0.230 | 4.94 | 9020 | 1875 | 45° |
| 8.00 | 4 | 140 | 0.056 | 0.080 | 0.280 | 6.67 | 6680 | 1495 | 45° |
| 10.00 | 4 | 140 | 0.060 | 0.080 | 0.310 | 8.22 | 5420 | 1300 | 45° |
| 12.00 | 4 | 140 | 0.066 | 0.100 | 0.340 | 9.89 | 4505 | 1190 | 45° |
| 1.00 | 4 | 70 | 0.014 | 0.030 | 0.090 | 0.91 | 24485 | 1370 | 45° |
| 2.00 | 4 | 70 | 0.022 | 0.030 | 0.120 | 1.72 | 12955 | 1140 | 45° |
| 3.00 | 4 | 90 | 0.034 | 0.050 | 0.150 | 2.59 | 11060 | 1505 | 45° |
| 4.00 | 4 | 90 | 0.042 | 0.050 | 0.180 | 3.39 | 8450 | 1420 | 45° |
| 5.00 | 4 | 90 | 0.048 | 0.050 | 0.210 | 4.17 | 6870 | 1320 | 45° |
| 6.00 | 4 | 90 | 0.052 | 0.050 | 0.230 | 4.94 | 5800 | 1205 | 45° |
| 8.00 | 4 | 90 | 0.056 | 0.080 | 0.280 | 6.67 | 4295 | 960 | 45° |
| 10.00 | 4 | 90 | 0.060 | 0.080 | 0.310 | 8.22 | 3485 | 835 | 45° |
| 12.00 | 4 | 90 | 0.066 | 0.100 | 0.340 | 9.89 | 2895 | 765 | 45° |
| 1.00 | 4 | 40 | 0.014 | 0.030 | 0.090 | 0.91 | 13990 | 785 | 45° |
| 2.00 | 4 | 40 | 0.022 | 0.030 | 0.120 | 1.72 | 7405 | 650 | 45° |
| 3.00 | 4 | 50 | 0.034 | 0.050 | 0.150 | 2.59 | 6145 | 835 | 45° |
| 4.00 | 4 | 50 | 0.042 | 0.050 | 0.180 | 3.39 | 4695 | 790 | 45° |
| 5.00 | 4 | 50 | 0.048 | 0.050 | 0.210 | 4.17 | 3815 | 735 | 45° |
| 6.00 | 4 | 50 | 0.052 | 0.050 | 0.230 | 4.94 | 3220 | 670 | 45° |
| 8.00 | 4 | 50 | 0.056 | 0.080 | 0.280 | 6.67 | 2385 | 535 | 45° |
| 10.00 | 4 | 50 | 0.060 | 0.080 | 0.310 | 8.22 | 1935 | 465 | 45° |
| 12.00 | 4 | 50 | 0.066 | 0.100 | 0.340 | 9.89 | 1610 | 425 | 45° |
| 1.00 | 4 | 104 | 0.023 | 0.180 | 0.180 | 0.99 | 33440 | 3075 | 30° |
| 2.00 | 4 | 104 | 0.039 | 0.280 | 0.280 | 1.92 | 17240 | 2690 | 30° |
| 3.00 | 4 | 104 | 0.049 | 0.360 | 0.360 | 2.83 | 11700 | 2295 | 30° |
| 4.00 | 4 | 104 | 0.058 | 0.480 | 0.480 | 3.77 | 8780 | 2035 | 30° |
| 5.00 | 4 | 104 | 0.065 | 0.600 | 0.600 | 4.71 | 7030 | 1825 | 30° |
| 6.00 | 4 | 104 | 0.070 | 0.720 | 0.720 | 5.66 | 5850 | 1640 | 30° |
| 8.00 | 4 | 104 | 0.086 | 0.960 | 0.960 | 7.54 | 4390 | 1510 | 30° |
| 10.00 | 4 | 104 | 0.098 | 1.200 | 1.200 | 9.43 | 3510 | 1375 | 30° |
| 12.00 | 4 | 104 | 0.101 | 1.440 | 1.440 | 11.31 | 2925 | 1185 | 30° |
| 1.00 | 4 | 64 | 0.014 | 0.160 | 0.160 | 0.97 | 21000 | 1175 | 30° |
| 2.00 | 4 | 64 | 0.023 | 0.250 | 0.250 | 1.90 | 10720 | 985 | 30° |
| 3.00 | 4 | 64 | 0.029 | 0.320 | 0.320 | 2.78 | 7330 | 850 | 30° |
| 4.00 | 4 | 64 | 0.035 | 0.430 | 0.430 | 3.72 | 5475 | 765 | 30° |
| 5.00 | 4 | 64 | 0.039 | 0.540 | 0.540 | 4.65 | 4380 | 685 | 30° |
| 6.00 | 4 | 64 | 0.042 | 0.650 | 0.650 | 5.58 | 3650 | 615 | 30° |
| 8.00 | 4 | 64 | 0.051 | 0.860 | 0.860 | 7.43 | 2740 | 560 | 30° |
| 10.00 | 4 | 64 | 0.058 | 1.080 | 1.080 | 9.30 | 2190 | 510 | 30° |
| 12.00 | 4 | 64 | 0.061 | 1.300 | 1.300 | 11.16 | 1825 | 445 | 30° |
| 1.00 | 4 | 48 | 0.011 | 0.130 | 0.130 | 0.95 | 16085 | 710 | 30° |
| 2.00 | 4 | 48 | 0.019 | 0.200 | 0.200 | 1.84 | 8305 | 630 | 30° |
| 3.00 | 4 | 48 | 0.023 | 0.250 | 0.250 | 2.69 | 5680 | 525 | 30° |
| 4.00 | 4 | 48 | 0.028 | 0.340 | 0.340 | 3.59 | 4255 | 475 | 30° |
| 5.00 | 4 | 48 | 0.031 | 0.420 | 0.420 | 4.48 | 3410 | 425 | 30° |
| 6.00 | 4 | 48 | 0.034 | 0.500 | 0.500 | 5.37 | 2845 | 385 | 30° |
| 8.00 | 4 | 48 | 0.041 | 0.670 | 0.670 | 7.17 | 2130 | 350 | 30° |
| 10.00 | 4 | 48 | 0.047 | 0.840 | 0.840 | 8.96 | 1705 | 320 | 30° |
| 12.00 | 4 | 48 | 0.049 | 1.010 | 1.010 | 10.76 | 1420 | 280 | 30° |
| 1.00 | 4 | 24 | 0.007 | 0.130 | 0.130 | 0.95 | 8040 | 225 | 30° |
| 2.00 | 4 | 24 | 0.012 | 0.200 | 0.200 | 1.84 | 4150 | 200 | 30° |
| 3.00 | 4 | 24 | 0.015 | 0.250 | 0.250 | 2.69 | 2840 | 170 | 30° |
| 4.00 | 4 | 24 | 0.018 | 0.340 | 0.340 | 3.59 | 2130 | 155 | 30° |
| 5.00 | 4 | 24 | 0.020 | 0.420 | 0.420 | 4.48 | 1705 | 135 | 30° |
| 6.00 | 4 | 24 | 0.022 | 0.500 | 0.500 | 5.37 | 1425 | 125 | 30° |
| 8.00 | 4 | 24 | 0.026 | 0.670 | 0.670 | 7.17 | 1065 | 110 | 30° |
| 10.00 | 4 | 24 | 0.030 | 0.840 | 0.840 | 8.96 | 855 | 100 | 30° |
| 12.00 | 4 | 24 | 0.031 | 1.010 | 1.010 | 10.76 | 710 | 90 | 30° |

Frese con estremità emisferica SpheroX

Tolleranza $r \pm 0.005$, 4.5xd

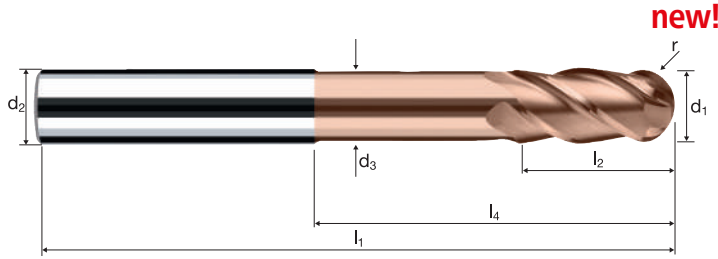


HM λ 40°
XA γ 0°

h4
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Vario
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ReTool®

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|--|--|-----------------|-----------------|--------------|--------------|-------------|--|----------------|-----|
| | | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | | Ti Titanium | HSS |
|--|--|-----------------|-----------------|--------------|--------------|-------------|--|----------------|-----|

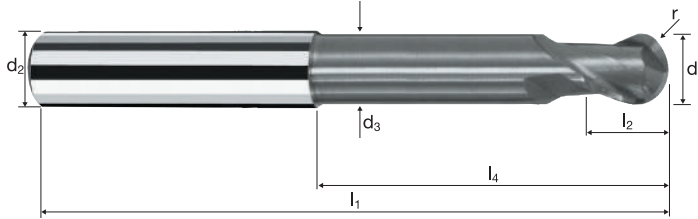
| Ø Code | d ₁ | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.005 | α | z | DURO-Si |
|--|----------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------------|-------|---|---------|
| | | | | | | | | | | | EUR |
| Esempio: N° Ordine Rivestimento H Articolo 7492 Codice-Ø 100 | | | | | | | | | | | |
| 100 | 1.00 | 6.00 | 0.95 | 61 | 2.00 | 4.50 | 14.58 | 0.500 | 10.0° | 4 | 107.00 |
| 140 | 2.00 | 6.00 | 1.90 | 61 | 4.00 | 9.00 | 17.31 | 1.000 | 6.8° | 4 | 107.00 |
| 180 | 3.00 | 6.00 | 2.80 | 61 | 6.00 | 13.50 | 20.13 | 1.500 | 4.5° | 4 | 107.00 |
| 220 | 4.00 | 6.00 | 3.70 | 66 | 8.00 | 18.00 | 22.95 | 2.000 | 2.7° | 4 | 107.00 |
| 260 | 5.00 | 6.00 | 4.60 | 66 | 10.00 | 22.50 | 25.77 | 2.500 | 1.4° | 4 | 107.00 |
| 300 | 6.00 | 6.00 | 5.50 | 69 | 12.00 | 30.34 | 31.00 | 3.000 | 0.0° | 4 | 107.00 |
| 391 | 8.00 | 8.00 | 7.40 | 80 | 16.00 | 39.29 | 40.00 | 4.000 | 0.0° | 4 | 134.00 |
| 450 | 10.00 | 10.00 | 9.20 | 90 | 20.00 | 47.20 | 48.00 | 5.000 | 0.0° | 4 | 182.00 |
| 501 | 12.00 | 12.00 | 11.00 | 105 | 24.00 | 54.13 | 55.00 | 6.000 | 0.0° | 4 | 225.00 |
| 610 | 16.00 | 16.00 | 15.00 | 125 | 32.00 | 74.13 | 75.00 | 8.000 | 0.0° | 4 | 352.00 |

Frese con estremità emisferica SpheroX (Sphero-XF)

Tolleranza $r \pm 0.005$, 4.5xd



| | |
|----------|--------------------------------|
| HM XA | λ 30° γ -10° |
| | |
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ReTool®

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|----------|-----------|-----------|-------|-------|------|----------|-----------|
| Rm | Rm | Rm | HRC | HRC | HRC | Ti | HSS |
| 850-1100 | 1100-1300 | 1300-1500 | 48-56 | 56-60 | > 60 | Titanium | ToolSteel |

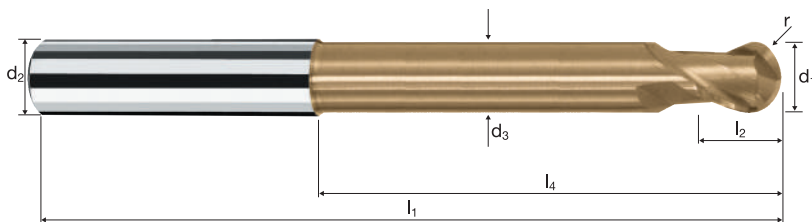
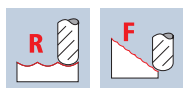
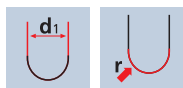
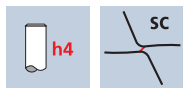
| Esempio: N° Ordine X 7402 100 | | | | | | | | | | | X-AL |
|--------------------------------------|-------|----------------|-------|-------|-------|-------|-------|--------------------|----------|-----|--------|
| | | | | | | | | | | | X7402 |
| \emptyset Code | d_1 | d_2 h_4 | d_3 | l_1 | l_2 | l_3 | l_4 | r ± 0.005 | α | z | EUR |
| 100 | 1.00 | 6.00 | 0.95 | 61 | 1.50 | 4.50 | 14.58 | 0.500 | 10.0° | 2 | 107.00 |
| 140 | 2.00 | 6.00 | 1.90 | 61 | 3.00 | 9.00 | 17.31 | 1.000 | 6.8° | 2 | 107.00 |
| 180 | 3.00 | 6.00 | 2.80 | 61 | 4.00 | 13.50 | 20.13 | 1.500 | 4.5° | 2 | 107.00 |
| 220 | 4.00 | 6.00 | 3.70 | 66 | 5.00 | 18.00 | 22.95 | 2.000 | 2.7° | 2 | 107.00 |
| 260 | 5.00 | 6.00 | 4.60 | 66 | 6.00 | 22.50 | 25.77 | 2.500 | 1.4° | 2 | 107.00 |
| 300 | 6.00 | 6.00 | 5.50 | 69 | 7.00 | 30.34 | 31.00 | 3.000 | 0.0° | 2 | 107.00 |
| 391 | 8.00 | 8.00 | 7.40 | 80 | 9.00 | 39.29 | 40.00 | 4.000 | 0.0° | 2 | 134.00 |
| 450 | 10.00 | 10.00 | 9.20 | 90 | 11.00 | 47.20 | 48.00 | 5.000 | 0.0° | 2 | 182.00 |
| 501 | 12.00 | 12.00 | 11.00 | 105 | 13.00 | 54.13 | 55.00 | 6.000 | 0.0° | 2 | 225.00 |
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Frese con estremità emisferica SpheroX

Tolleranza $r \pm 0.005$, $6xd$



HM
XA λ 30°
 γ -10°

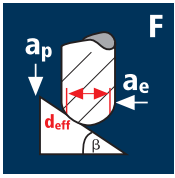


ReTool®

| | | | | | | | | |
|--|--|-----------------|-----------------|--------------|--------------|-------------|----------------|------------------|
| | | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Ti Titanium | HSS ToolSteel |
|--|--|-----------------|-----------------|--------------|--------------|-------------|----------------|------------------|

| Esempio: N° Ordine | Rivestimento | | Articolo | | Codice-Ø | | | | | | | DURO-V |
|-----------------------|----------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------------|------|-------|--------|--------|
| | V | 7474 | 100 | | | | | | | V7474 | | |
| Ø Code | d ₁ | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.005 | α | z | EUR | |
| 100 | 1.00 | 6.00 | 0.95 | 66 | 1.50 | 6.00 | 16.08 | 0.500 | 9.5° | 2 | 112.00 | |
| 140 | 2.00 | 6.00 | 1.90 | 66 | 3.00 | 12.00 | 20.31 | 1.000 | 6.1° | 2 | 112.00 | |
| 180 | 3.00 | 6.00 | 2.80 | 66 | 4.00 | 18.00 | 24.63 | 1.500 | 3.9° | 2 | 112.00 | |
| 220 | 4.00 | 6.00 | 3.70 | 69 | 5.00 | 24.00 | 28.95 | 2.000 | 2.2° | 2 | 112.00 | |
| 260 | 5.00 | 6.00 | 4.60 | 75 | 6.00 | 30.00 | 33.27 | 2.500 | 1.0° | 2 | 112.00 | |
| 300 | 6.00 | 6.00 | 5.50 | 80 | 7.00 | 42.34 | 43.00 | 3.000 | 0.0° | 2 | 112.00 | |
| 391 | 8.00 | 8.00 | 7.40 | 90 | 9.00 | 52.29 | 53.00 | 4.000 | 0.0° | 2 | 141.00 | |
| 450 | 10.00 | 10.00 | 9.20 | 105 | 11.00 | 63.20 | 64.00 | 5.000 | 0.0° | 2 | 191.00 | |
| 501 | 12.00 | 12.00 | 11.00 | 120 | 13.00 | 73.13 | 74.00 | 6.000 | 0.0° | 2 | 236.00 | |
| 610 | 16.00 | 16.00 | 15.00 | 135 | 17.00 | 85.13 | 86.00 | 8.000 | 0.0° | 2 | 370.00 | |
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Applicazione



Materiale

Acciaio da
utensile temprato
52 - 56 HRC



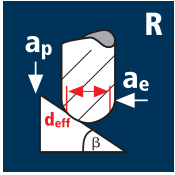
Acciaio da
utensile temprato
56 - 60 HRC



Acciaio da
utensile temprato
> 60 HRC



Acciaio rapido temprato
64 - 70 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



Acciaio da
utensile temprato
> 60 HRC



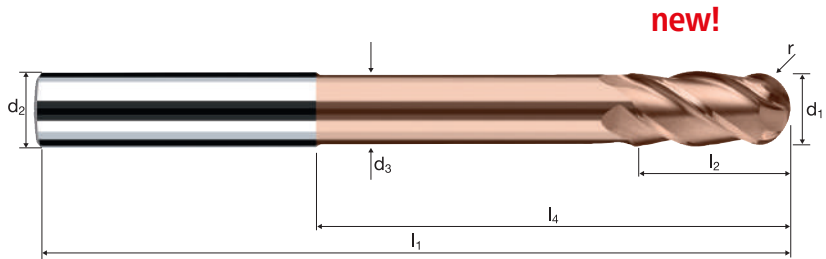
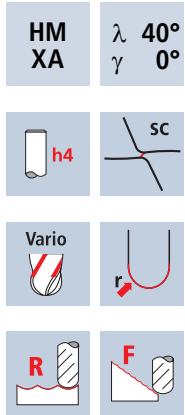
Acciaio rapido temprato
64 - 70 HRC



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|----------|
| 1.00 | 4 | 120 | 0.014 | 0.030 | 0.090 | 0.91 | 41975 | 2350 | 45° |
| 2.00 | 4 | 130 | 0.022 | 0.030 | 0.120 | 1.72 | 24060 | 2115 | 45° |
| 3.00 | 4 | 160 | 0.034 | 0.050 | 0.150 | 2.59 | 19665 | 2675 | 45° |
| 4.00 | 4 | 160 | 0.042 | 0.050 | 0.180 | 3.39 | 15025 | 2525 | 45° |
| 5.00 | 4 | 160 | 0.048 | 0.050 | 0.210 | 4.17 | 12215 | 2345 | 45° |
| 6.00 | 4 | 160 | 0.052 | 0.050 | 0.230 | 4.94 | 10310 | 2145 | 45° |
| 8.00 | 4 | 160 | 0.056 | 0.080 | 0.280 | 6.67 | 7635 | 1710 | 45° |
| 10.00 | 4 | 160 | 0.060 | 0.080 | 0.310 | 8.22 | 6195 | 1485 | 45° |
| 12.00 | 4 | 160 | 0.066 | 0.100 | 0.340 | 9.89 | 5150 | 1360 | 45° |
| 1.00 | 4 | 100 | 0.014 | 0.030 | 0.090 | 0.91 | 34980 | 1960 | 45° |
| 2.00 | 4 | 100 | 0.022 | 0.030 | 0.120 | 1.72 | 18505 | 1630 | 45° |
| 3.00 | 4 | 130 | 0.034 | 0.050 | 0.150 | 2.59 | 15975 | 2175 | 45° |
| 4.00 | 4 | 130 | 0.042 | 0.050 | 0.180 | 3.39 | 12205 | 2050 | 45° |
| 5.00 | 4 | 130 | 0.048 | 0.050 | 0.210 | 4.17 | 9925 | 1905 | 45° |
| 6.00 | 4 | 130 | 0.052 | 0.050 | 0.230 | 4.94 | 8375 | 1740 | 45° |
| 8.00 | 4 | 130 | 0.056 | 0.080 | 0.280 | 6.67 | 6205 | 1390 | 45° |
| 10.00 | 4 | 130 | 0.060 | 0.080 | 0.310 | 8.22 | 5035 | 1210 | 45° |
| 12.00 | 4 | 130 | 0.066 | 0.100 | 0.340 | 9.89 | 4185 | 1105 | 45° |
| 1.00 | 4 | 60 | 0.014 | 0.030 | 0.090 | 0.91 | 20985 | 1175 | 45° |
| 2.00 | 4 | 60 | 0.022 | 0.030 | 0.120 | 1.72 | 11105 | 975 | 45° |
| 3.00 | 4 | 80 | 0.034 | 0.050 | 0.150 | 2.59 | 9830 | 1335 | 45° |
| 4.00 | 4 | 80 | 0.042 | 0.050 | 0.180 | 3.39 | 7510 | 1260 | 45° |
| 5.00 | 4 | 80 | 0.048 | 0.050 | 0.210 | 4.17 | 6105 | 1170 | 45° |
| 6.00 | 4 | 80 | 0.052 | 0.050 | 0.230 | 4.94 | 5155 | 1070 | 45° |
| 8.00 | 4 | 80 | 0.056 | 0.080 | 0.280 | 6.67 | 3820 | 855 | 45° |
| 10.00 | 4 | 80 | 0.060 | 0.080 | 0.310 | 8.22 | 3100 | 745 | 45° |
| 12.00 | 4 | 80 | 0.066 | 0.100 | 0.340 | 9.89 | 2575 | 680 | 45° |
| 1.00 | 4 | 40 | 0.014 | 0.030 | 0.090 | 0.91 | 13990 | 785 | 45° |
| 2.00 | 4 | 40 | 0.022 | 0.030 | 0.120 | 1.72 | 7405 | 650 | 45° |
| 3.00 | 4 | 50 | 0.034 | 0.050 | 0.150 | 2.59 | 6145 | 835 | 45° |
| 4.00 | 4 | 50 | 0.042 | 0.050 | 0.180 | 3.39 | 4695 | 790 | 45° |
| 5.00 | 4 | 50 | 0.048 | 0.050 | 0.210 | 4.17 | 3815 | 735 | 45° |
| 6.00 | 4 | 50 | 0.052 | 0.050 | 0.230 | 4.94 | 3220 | 670 | 45° |
| 8.00 | 4 | 50 | 0.056 | 0.080 | 0.280 | 6.67 | 2385 | 535 | 45° |
| 10.00 | 4 | 50 | 0.060 | 0.080 | 0.310 | 8.22 | 1935 | 465 | 45° |
| 12.00 | 4 | 50 | 0.066 | 0.100 | 0.340 | 9.89 | 1610 | 425 | 45° |
| 1.00 | 4 | 52 | 0.023 | 0.130 | 0.130 | 0.95 | 17425 | 1605 | 30° |
| 2.00 | 4 | 52 | 0.039 | 0.200 | 0.200 | 1.84 | 8995 | 1405 | 30° |
| 3.00 | 4 | 52 | 0.049 | 0.250 | 0.250 | 2.69 | 6155 | 1205 | 30° |
| 4.00 | 4 | 52 | 0.058 | 0.340 | 0.340 | 3.59 | 4610 | 1070 | 30° |
| 5.00 | 4 | 52 | 0.065 | 0.420 | 0.420 | 4.48 | 3695 | 960 | 30° |
| 6.00 | 4 | 52 | 0.070 | 0.500 | 0.500 | 5.37 | 3080 | 865 | 30° |
| 8.00 | 4 | 52 | 0.086 | 0.670 | 0.670 | 7.17 | 2310 | 795 | 30° |
| 10.00 | 4 | 52 | 0.098 | 0.840 | 0.840 | 8.96 | 1845 | 725 | 30° |
| 12.00 | 4 | 52 | 0.101 | 1.010 | 1.010 | 10.76 | 1540 | 620 | 30° |
| 1.00 | 4 | 24 | 0.014 | 0.130 | 0.130 | 0.95 | 8040 | 450 | 30° |
| 2.00 | 4 | 24 | 0.023 | 0.200 | 0.200 | 1.84 | 4150 | 380 | 30° |
| 3.00 | 4 | 24 | 0.029 | 0.250 | 0.250 | 2.69 | 2840 | 330 | 30° |
| 4.00 | 4 | 24 | 0.035 | 0.340 | 0.340 | 3.59 | 2130 | 300 | 30° |
| 5.00 | 4 | 24 | 0.039 | 0.420 | 0.420 | 4.48 | 1705 | 265 | 30° |
| 6.00 | 4 | 24 | 0.042 | 0.500 | 0.500 | 5.37 | 1425 | 240 | 30° |
| 8.00 | 4 | 24 | 0.051 | 0.670 | 0.670 | 7.17 | 1065 | 215 | 30° |
| 10.00 | 4 | 24 | 0.058 | 0.840 | 0.840 | 8.96 | 855 | 200 | 30° |
| 12.00 | 4 | 24 | 0.061 | 1.010 | 1.010 | 10.76 | 710 | 175 | 30° |
| 1.00 | 4 | 18 | 0.011 | 0.130 | 0.130 | 0.95 | 6030 | 265 | 30° |
| 2.00 | 4 | 18 | 0.019 | 0.200 | 0.200 | 1.84 | 3115 | 235 | 30° |
| 3.00 | 4 | 18 | 0.023 | 0.250 | 0.250 | 2.69 | 2130 | 195 | 30° |
| 4.00 | 4 | 18 | 0.028 | 0.340 | 0.340 | 3.59 | 1595 | 180 | 30° |
| 5.00 | 4 | 18 | 0.031 | 0.420 | 0.420 | 4.48 | 1280 | 160 | 30° |
| 6.00 | 4 | 18 | 0.034 | 0.500 | 0.500 | 5.37 | 1065 | 145 | 30° |
| 8.00 | 4 | 18 | 0.041 | 0.670 | 0.670 | 7.17 | 800 | 130 | 30° |
| 10.00 | 4 | 18 | 0.047 | 0.840 | 0.840 | 8.96 | 640 | 120 | 30° |
| 12.00 | 4 | 18 | 0.049 | 1.010 | 1.010 | 10.76 | 530 | 105 | 30° |
| 1.00 | 4 | 12 | 0.007 | 0.130 | 0.130 | 0.95 | 4020 | 115 | 30° |
| 2.00 | 4 | 12 | 0.012 | 0.200 | 0.200 | 1.84 | 2075 | 100 | 30° |
| 3.00 | 4 | 12 | 0.015 | 0.250 | 0.250 | 2.69 | 1420 | 85 | 30° |
| 4.00 | 4 | 12 | 0.018 | 0.340 | 0.340 | 3.59 | 1065 | 75 | 30° |
| 5.00 | 4 | 12 | 0.020 | 0.420 | 0.420 | 4.48 | 855 | 70 | 30° |
| 6.00 | 4 | 12 | 0.022 | 0.500 | 0.500 | 5.37 | 710 | 65 | 30° |
| 8.00 | 4 | 12 | 0.026 | 0.670 | 0.670 | 7.17 | 535 | 55 | 30° |
| 10.00 | 4 | 12 | 0.030 | 0.840 | 0.840 | 8.96 | 425 | 50 | 30° |
| 12.00 | 4 | 12 | 0.031 | 1.010 | 1.010 | 10.76 | 355 | 45 | 30° |

Frese con estremità emisferica SpheroX

Tolleranza $r \pm 0.005$, 6xd



new!



| | | | | | | | | | |
|--|--|-----------------|-----------------|--------------|--------------|-------------|--|----------------|-----|
| | | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | | Ti Titanium | HSS |
|--|--|-----------------|-----------------|--------------|--------------|-------------|--|----------------|-----|

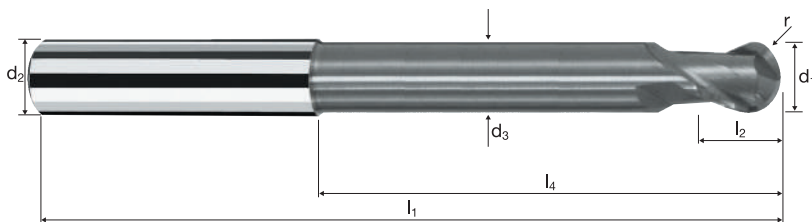
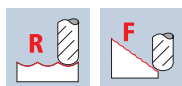
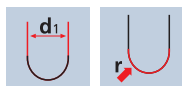
| Esempio: N° Ordine | | | | | | | | | | | DURO-Si |
|---|----------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------------|------|---|---------|
| Rivestimento: H Articolo: 7494 Codice-ø: 100 | | | | | | | | | | | H7494 |
| Ø Code | d ₁ | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.005 | α | z | EUR |
| 100 | 1.00 | 6.00 | 0.95 | 66 | 2.00 | 6.00 | 16.08 | 0.500 | 9.5° | 4 | 112.00 |
| 140 | 2.00 | 6.00 | 1.90 | 66 | 4.00 | 12.00 | 20.31 | 1.000 | 6.1° | 4 | 112.00 |
| 180 | 3.00 | 6.00 | 2.80 | 66 | 6.00 | 18.00 | 24.63 | 1.500 | 3.9° | 4 | 112.00 |
| 220 | 4.00 | 6.00 | 3.70 | 69 | 8.00 | 24.00 | 28.95 | 2.000 | 2.2° | 4 | 112.00 |
| 260 | 5.00 | 6.00 | 4.60 | 75 | 10.00 | 30.00 | 33.27 | 2.500 | 1.0° | 4 | 112.00 |
| 300 | 6.00 | 6.00 | 5.50 | 80 | 12.00 | 42.34 | 43.00 | 3.000 | 0.0° | 4 | 112.00 |
| 391 | 8.00 | 8.00 | 7.40 | 90 | 16.00 | 52.29 | 53.00 | 4.000 | 0.0° | 4 | 141.00 |
| 450 | 10.00 | 10.00 | 9.20 | 105 | 20.00 | 63.20 | 64.00 | 5.000 | 0.0° | 4 | 191.00 |
| 501 | 12.00 | 12.00 | 11.00 | 120 | 24.00 | 73.13 | 74.00 | 6.000 | 0.0° | 4 | 236.00 |
| 610 | 16.00 | 16.00 | 15.00 | 135 | 32.00 | 85.13 | 86.00 | 8.000 | 0.0° | 4 | 370.00 |
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Frese con estremità emisferica SpheroX (Sphero-XF)

Tolleranza $r \pm 0.005$, 6xd



HM $\lambda 30^\circ$
XA $\gamma -10^\circ$

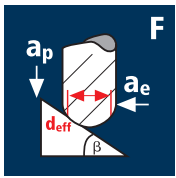


ReTool®

| | | | | | | | |
|----------------|-----------------|-----------------|--------------|--------------|-------------|----------------|------------------|
| Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Ti Titanium | HSS ToolSteel |
|----------------|-----------------|-----------------|--------------|--------------|-------------|----------------|------------------|

| Ø Code | Esempio: N° Ordine | | | Rivestimento | | Articolo | | Codice-Ø | | r ± 0.005 | α | z | X-AL |
|-----------|-----------------------|----------------------|----------------|--------------|-------|----------|-------|----------|-------|------------------|----------|-----|------|
| | d ₁ | d ₂ h4 | d ₃ | X | 7404 | 100 | | | X7404 | | | | |
| 100 | 1.00 | 6.00 | 0.95 | 66 | 1.50 | 6.00 | 16.08 | 0.500 | 9.5° | 2 | 112.00 | EUR | |
| 140 | 2.00 | 6.00 | 1.90 | 66 | 3.00 | 12.00 | 20.31 | 1.000 | 6.1° | 2 | 112.00 | EUR | |
| 180 | 3.00 | 6.00 | 2.80 | 66 | 4.00 | 18.00 | 24.63 | 1.500 | 3.9° | 2 | 112.00 | EUR | |
| 220 | 4.00 | 6.00 | 3.70 | 69 | 5.00 | 24.00 | 28.95 | 2.000 | 2.2° | 2 | 112.00 | EUR | |
| 260 | 5.00 | 6.00 | 4.60 | 75 | 6.00 | 30.00 | 33.27 | 2.500 | 1.0° | 2 | 112.00 | EUR | |
| 300 | 6.00 | 6.00 | 5.50 | 80 | 7.00 | 42.34 | 43.00 | 3.000 | 0.0° | 2 | 112.00 | EUR | |
| 391 | 8.00 | 8.00 | 7.40 | 90 | 9.00 | 52.29 | 53.00 | 4.000 | 0.0° | 2 | 141.00 | EUR | |
| 450 | 10.00 | 10.00 | 9.20 | 105 | 11.00 | 63.20 | 64.00 | 5.000 | 0.0° | 2 | 191.00 | EUR | |
| 501 | 12.00 | 12.00 | 11.00 | 120 | 13.00 | 73.13 | 74.00 | 6.000 | 0.0° | 2 | 236.00 | EUR | |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



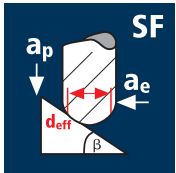
Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



| d1 [mm] | z | v _r [m/min] | f _r [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|------------|----|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|----------|
| 6.00 | 8 | 300 | 0.055 | 0.120 | 0.120 | 5.26 | 18155 | 7990 | 45° |
| 8.00 | 10 | 300 | 0.060 | 0.140 | 0.140 | 6.94 | 13760 | 8255 | 45° |
| 10.00 | 12 | 300 | 0.065 | 0.160 | 0.160 | 8.62 | 11080 | 8640 | 45° |
| 12.00 | 16 | 300 | 0.070 | 0.180 | 0.180 | 10.29 | 9280 | 10395 | 45° |
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|-------|----|-----|-------|-------|-------|-------|-------|------|-----|
| 6.00 | 8 | 250 | 0.050 | 0.120 | 0.120 | 5.26 | 15130 | 6050 | 45° |
| 8.00 | 10 | 250 | 0.055 | 0.140 | 0.140 | 6.94 | 11465 | 6305 | 45° |
| 10.00 | 12 | 250 | 0.060 | 0.160 | 0.160 | 8.62 | 9230 | 6645 | 45° |
| 12.00 | 16 | 250 | 0.065 | 0.180 | 0.180 | 10.29 | 7735 | 8045 | 45° |
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|-------|----|-----|-------|-------|-------|-------|-------|------|-----|
| 6.00 | 8 | 200 | 0.050 | 0.120 | 0.120 | 5.26 | 12105 | 4840 | 45° |
| 8.00 | 10 | 200 | 0.055 | 0.140 | 0.140 | 6.94 | 9175 | 5045 | 45° |
| 10.00 | 12 | 200 | 0.060 | 0.160 | 0.160 | 8.62 | 7385 | 5315 | 45° |
| 12.00 | 16 | 200 | 0.065 | 0.180 | 0.180 | 10.29 | 6185 | 6435 | 45° |
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|-------|----|-----|-------|-------|-------|-------|------|------|-----|
| 6.00 | 8 | 150 | 0.045 | 0.120 | 0.120 | 5.26 | 9075 | 3270 | 45° |
| 8.00 | 10 | 150 | 0.050 | 0.140 | 0.140 | 6.94 | 6880 | 3440 | 45° |
| 10.00 | 12 | 150 | 0.055 | 0.160 | 0.160 | 8.62 | 5540 | 3655 | 45° |
| 12.00 | 16 | 150 | 0.060 | 0.180 | 0.180 | 10.29 | 4640 | 4455 | 45° |
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|-------|----|-----|-------|-------|-------|------|-------|------|-----|
| 6.00 | 8 | 400 | 0.030 | 0.030 | 0.030 | 4.80 | 26525 | 6365 | 45° |
| 8.00 | 10 | 400 | 0.035 | 0.030 | 0.030 | 6.31 | 20180 | 7060 | 45° |
| 10.00 | 12 | 400 | 0.035 | 0.040 | 0.040 | 7.91 | 16095 | 6760 | 45° |
| 12.00 | 16 | 400 | 0.040 | 0.040 | 0.040 | 9.41 | 13530 | 8660 | 45° |
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|-------|----|-----|-------|-------|-------|------|-------|------|-----|
| 6.00 | 8 | 350 | 0.030 | 0.030 | 0.030 | 4.80 | 23210 | 5570 | 45° |
| 8.00 | 10 | 350 | 0.035 | 0.030 | 0.030 | 6.31 | 17655 | 6180 | 45° |
| 10.00 | 12 | 350 | 0.035 | 0.040 | 0.040 | 7.91 | 14085 | 5915 | 45° |
| 12.00 | 16 | 350 | 0.040 | 0.040 | 0.040 | 9.41 | 11840 | 7575 | 45° |
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|-------|----|-----|-------|-------|-------|------|-------|------|-----|
| 6.00 | 8 | 280 | 0.025 | 0.030 | 0.030 | 4.80 | 18570 | 3715 | 45° |
| 8.00 | 10 | 280 | 0.030 | 0.030 | 0.030 | 6.31 | 14125 | 4235 | 45° |
| 10.00 | 12 | 280 | 0.030 | 0.040 | 0.040 | 7.91 | 11270 | 4055 | 45° |
| 12.00 | 16 | 280 | 0.035 | 0.040 | 0.040 | 9.41 | 9470 | 5305 | 45° |
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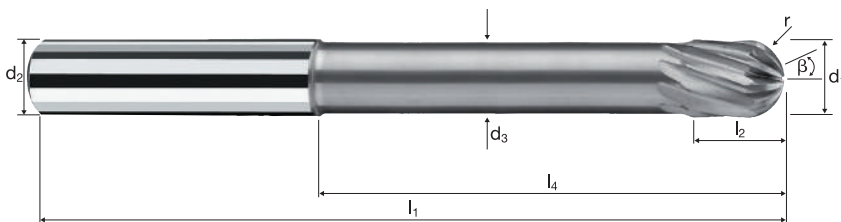
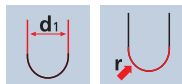
| | | | | | | | | | |
|-------|----|-----|-------|-------|-------|------|-------|------|-----|
| 6.00 | 8 | 180 | 0.025 | 0.030 | 0.030 | 4.80 | 11935 | 2385 | 45° |
| 8.00 | 10 | 180 | 0.030 | 0.030 | 0.030 | 6.31 | 9080 | 2725 | 45° |
| 10.00 | 12 | 180 | 0.030 | 0.040 | 0.040 | 7.91 | 7245 | 2610 | 45° |
| 12.00 | 16 | 180 | 0.035 | 0.040 | 0.040 | 9.41 | 6090 | 3410 | 45° |
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Frese con estremità emisferica SpheroX (Sphero-XF Multi)

Tolleranza $r \pm 0.005$, 6xd



HM λ 30°
XA γ -10°

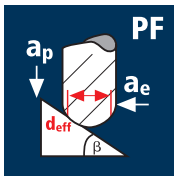


ReTool®

| | | | | | | | |
|----------|-----------|-----------|-------|-------|------|----------|---------------|
| Rm | Rm | Rm | HRC | HRC | HRC | Ti | HSS ToolSteel |
| 850-1100 | 1100-1300 | 1300-1500 | 48-56 | 56-60 | > 60 | Titanium | |

| Esempio: N° Ordine | Rivestimento | | Articolo | | Codice-Ø | | | | | X-AL |
|-----------------------|----------------|-------------------|----------------|----------------|----------------|----------------|----------|-----|----|--------|
| | X | 7464 | 300 | | | | | | | X7464 |
| Ø Code | d ₁ | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | r ±0.005 | β | z | EUR |
| 300 | 6.00 | 6.00 | 5.50 | 80 | 7.00 | 42.34 | 3.000 | 25° | 8 | 125.00 |
| 391 | 8.00 | 8.00 | 7.40 | 90 | 9.00 | 52.29 | 4.000 | 25° | 10 | 156.00 |
| 450 | 10.00 | 10.00 | 9.20 | 105 | 11.00 | 63.20 | 5.000 | 25° | 12 | 213.00 |
| 501 | 12.00 | 12.00 | 11.00 | 120 | 13.00 | 73.13 | 6.000 | 25° | 16 | 263.00 |
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Applicazione



Materiale

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _s [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _c [mm/min] | β [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
| 1.00 | 2 | 100 | 0.030 | 0.080 | 0.080 | 0.98 | 32480 | 1950 | 45° |
| 2.00 | 2 | 100 | 0.045 | 0.160 | 0.160 | 1.96 | 16240 | 1460 | 45° |
| 3.00 | 2 | 100 | 0.055 | 0.240 | 0.240 | 2.93 | 10865 | 1195 | 45° |
| 4.00 | 2 | 100 | 0.060 | 0.320 | 0.320 | 3.91 | 8140 | 975 | 45° |
| 5.00 | 2 | 100 | 0.070 | 0.400 | 0.400 | 4.89 | 6510 | 910 | 45° |
| 6.00 | 2 | 100 | 0.075 | 0.480 | 0.480 | 5.87 | 5425 | 815 | 45° |
| 8.00 | 2 | 100 | 0.085 | 0.640 | 0.640 | 7.82 | 4070 | 690 | 45° |
| 10.00 | 2 | 100 | 0.100 | 0.800 | 0.800 | 9.78 | 3255 | 650 | 45° |
| 12.00 | 2 | 100 | 0.105 | 0.960 | 0.960 | 11.73 | 2715 | 570 | 45° |

Inox medium
[Cr-Ni-Mo+/1.4539]
Acciaio duplex
[17-4 PH]



| | | | | | | | | | |
|-------|---|----|-------|-------|-------|-------|-------|------|-----|
| 1.00 | 2 | 90 | 0.028 | 0.080 | 0.080 | 0.98 | 29235 | 1635 | 45° |
| 2.00 | 2 | 90 | 0.040 | 0.160 | 0.160 | 1.96 | 14615 | 1170 | 45° |
| 3.00 | 2 | 90 | 0.050 | 0.240 | 0.240 | 2.93 | 9775 | 980 | 45° |
| 4.00 | 2 | 90 | 0.054 | 0.320 | 0.320 | 3.91 | 7325 | 790 | 45° |
| 5.00 | 2 | 90 | 0.064 | 0.400 | 0.400 | 4.89 | 5860 | 750 | 45° |
| 6.00 | 2 | 90 | 0.068 | 0.480 | 0.480 | 5.87 | 4880 | 665 | 45° |
| 8.00 | 2 | 90 | 0.076 | 0.640 | 0.640 | 7.82 | 3665 | 555 | 45° |
| 10.00 | 2 | 90 | 0.090 | 0.800 | 0.800 | 9.78 | 2930 | 525 | 45° |
| 12.00 | 2 | 90 | 0.094 | 0.960 | 0.960 | 11.73 | 2440 | 460 | 45° |

Inox difficile
[Cr-Ni-Mo+/1.4529]
Acciaio resistente al calore
[1.4841]

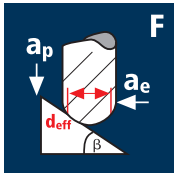


| | | | | | | | | | |
|-------|---|----|-------|-------|-------|-------|-------|-----|-----|
| 1.00 | 2 | 60 | 0.025 | 0.080 | 0.080 | 0.98 | 19490 | 975 | 45° |
| 2.00 | 2 | 60 | 0.040 | 0.160 | 0.160 | 1.96 | 9745 | 780 | 45° |
| 3.00 | 2 | 60 | 0.045 | 0.240 | 0.240 | 2.93 | 6520 | 585 | 45° |
| 4.00 | 2 | 60 | 0.050 | 0.320 | 0.320 | 3.91 | 4885 | 490 | 45° |
| 5.00 | 2 | 60 | 0.060 | 0.400 | 0.400 | 4.89 | 3905 | 470 | 45° |
| 6.00 | 2 | 60 | 0.065 | 0.480 | 0.480 | 5.87 | 3255 | 425 | 45° |
| 8.00 | 2 | 60 | 0.070 | 0.640 | 0.640 | 7.82 | 2440 | 340 | 45° |
| 10.00 | 2 | 60 | 0.085 | 0.800 | 0.800 | 9.78 | 1955 | 330 | 45° |
| 12.00 | 2 | 60 | 0.090 | 0.960 | 0.960 | 11.73 | 1630 | 295 | 45° |

Acciaio
< 850 N/mm²



| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|-----|
| 1.00 | 2 | 129 | 0.040 | 0.090 | 0.090 | 0.98 | 41900 | 3350 | 45° |
| 2.00 | 2 | 240 | 0.055 | 0.170 | 0.170 | 1.96 | 38975 | 4285 | 45° |
| 3.00 | 2 | 240 | 0.070 | 0.260 | 0.260 | 2.95 | 25895 | 3625 | 45° |
| 4.00 | 2 | 240 | 0.075 | 0.350 | 0.350 | 3.93 | 19440 | 2915 | 45° |
| 5.00 | 2 | 240 | 0.090 | 0.440 | 0.440 | 4.92 | 15525 | 2795 | 45° |
| 6.00 | 2 | 240 | 0.095 | 0.520 | 0.520 | 5.89 | 12970 | 2465 | 45° |
| 8.00 | 2 | 240 | 0.105 | 0.700 | 0.700 | 7.86 | 9720 | 2040 | 45° |
| 10.00 | 2 | 240 | 0.125 | 0.870 | 0.870 | 9.83 | 7770 | 1945 | 45° |
| 12.00 | 2 | 240 | 0.130 | 1.050 | 1.050 | 11.80 | 6475 | 1685 | 45° |



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|-----|
| 1.00 | 2 | 124 | 0.025 | 0.050 | 0.050 | 0.94 | 41990 | 2100 | 45° |
| 2.00 | 2 | 140 | 0.030 | 0.070 | 0.070 | 1.84 | 24220 | 1455 | 45° |
| 3.00 | 2 | 140 | 0.030 | 0.090 | 0.090 | 2.72 | 16385 | 985 | 45° |
| 4.00 | 2 | 140 | 0.050 | 0.110 | 0.110 | 3.60 | 12380 | 1240 | 45° |
| 5.00 | 2 | 140 | 0.055 | 0.130 | 0.130 | 4.48 | 9945 | 1095 | 45° |
| 6.00 | 2 | 140 | 0.060 | 0.150 | 0.150 | 5.36 | 8315 | 1000 | 45° |
| 8.00 | 2 | 140 | 0.065 | 0.170 | 0.170 | 7.05 | 6320 | 820 | 45° |
| 10.00 | 2 | 140 | 0.070 | 0.200 | 0.200 | 8.77 | 5080 | 710 | 45° |
| 12.00 | 2 | 140 | 0.075 | 0.250 | 0.250 | 10.56 | 4220 | 635 | 45° |

Inox medium
[Cr-Ni-Mo+/1.4539]
Acciaio duplex
[17-4 PH]



| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|-----|
| 1.00 | 2 | 124 | 0.022 | 0.050 | 0.050 | 0.94 | 41990 | 1850 | 45° |
| 2.00 | 2 | 125 | 0.028 | 0.070 | 0.070 | 1.84 | 21625 | 1210 | 45° |
| 3.00 | 2 | 125 | 0.028 | 0.090 | 0.090 | 2.72 | 14630 | 820 | 45° |
| 4.00 | 2 | 125 | 0.046 | 0.110 | 0.110 | 3.60 | 11050 | 1015 | 45° |
| 5.00 | 2 | 125 | 0.050 | 0.130 | 0.130 | 4.48 | 8880 | 890 | 45° |
| 6.00 | 2 | 125 | 0.054 | 0.150 | 0.150 | 5.36 | 7425 | 800 | 45° |
| 8.00 | 2 | 125 | 0.058 | 0.170 | 0.170 | 7.05 | 5645 | 655 | 45° |
| 10.00 | 2 | 125 | 0.064 | 0.200 | 0.200 | 8.77 | 4535 | 580 | 45° |
| 12.00 | 2 | 125 | 0.068 | 0.250 | 0.250 | 10.56 | 3770 | 510 | 45° |

Inox difficile
[Cr-Ni-Mo+/1.4529]
Acciaio resistente al calore
[1.4841]



| | | | | | | | | | |
|-------|---|----|-------|-------|-------|-------|-------|------|-----|
| 1.00 | 2 | 70 | 0.025 | 0.050 | 0.050 | 0.94 | 23705 | 1185 | 45° |
| 2.00 | 2 | 70 | 0.025 | 0.070 | 0.070 | 1.84 | 12110 | 605 | 45° |
| 3.00 | 2 | 70 | 0.025 | 0.090 | 0.090 | 2.72 | 8190 | 410 | 45° |
| 4.00 | 2 | 70 | 0.045 | 0.110 | 0.110 | 3.60 | 6190 | 555 | 45° |
| 5.00 | 2 | 70 | 0.050 | 0.130 | 0.130 | 4.48 | 4975 | 495 | 45° |
| 6.00 | 2 | 70 | 0.055 | 0.150 | 0.150 | 5.36 | 4155 | 455 | 45° |
| 8.00 | 2 | 70 | 0.060 | 0.170 | 0.170 | 7.05 | 3160 | 380 | 45° |
| 10.00 | 2 | 70 | 0.065 | 0.200 | 0.200 | 8.77 | 2540 | 330 | 45° |
| 12.00 | 2 | 70 | 0.070 | 0.250 | 0.250 | 10.56 | 2110 | 295 | 45° |

Acciaio
< 850 N/mm²



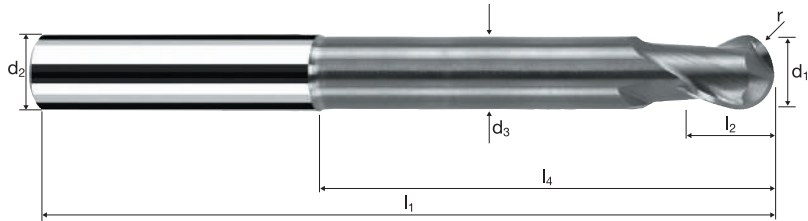
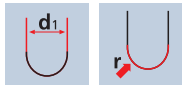
| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|-----|
| 1.00 | 2 | 124 | 0.030 | 0.050 | 0.050 | 0.94 | 41990 | 2520 | 45° |
| 2.00 | 2 | 243 | 0.035 | 0.070 | 0.070 | 1.84 | 42040 | 2945 | 45° |
| 3.00 | 2 | 359 | 0.035 | 0.090 | 0.090 | 2.72 | 42010 | 2940 | 45° |
| 4.00 | 2 | 360 | 0.060 | 0.110 | 0.110 | 3.60 | 31830 | 3820 | 45° |
| 5.00 | 2 | 360 | 0.065 | 0.130 | 0.130 | 4.48 | 25580 | 3325 | 45° |
| 6.00 | 2 | 360 | 0.070 | 0.150 | 0.150 | 5.36 | 21380 | 2995 | 45° |
| 8.00 | 2 | 360 | 0.080 | 0.170 | 0.170 | 7.05 | 16255 | 2600 | 45° |
| 10.00 | 2 | 360 | 0.085 | 0.200 | 0.200 | 8.77 | 13065 | 2220 | 45° |
| 12.00 | 2 | 360 | 0.090 | 0.250 | 0.250 | 10.56 | 10850 | 1955 | 45° |

Frese con estremità emisferica Sphericut (Sphero-SB)

Tolleranza $r \pm 0.005, 6xd$



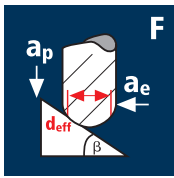
HM
MG10 λ 30°
 γ 5°



| | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--------------|--|-------------------|----------------|--------------------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | | Inox Stainless | Ti Titanium | GG(G) Tool Steel Nickel-Alloys |
|-------------|----------------|-----------------|-----------------|--------------|--|-------------------|----------------|--------------------------------------|

| Esempio: N° Ordine | | | | | | | | | | | POLYCHROM | |
|-----------------------|----------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------------|------|---|-----------|--|
| | | | | | | | | | | | P7544 | |
| | | | | | | | | | | | EUR | |
| Ø Code | d ₁ | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.005 | α | z | | |
| 100 | 1.00 | 6.00 | 0.95 | 66 | 1.50 | 6.00 | 16.08 | 0.500 | 9.5° | 2 | 94.00 | |
| 140 | 2.00 | 6.00 | 1.90 | 66 | 3.00 | 12.00 | 20.31 | 1.000 | 6.1° | 2 | 94.00 | |
| 180 | 3.00 | 6.00 | 2.80 | 66 | 4.00 | 18.00 | 24.63 | 1.500 | 3.9° | 2 | 94.00 | |
| 220 | 4.00 | 6.00 | 3.70 | 69 | 5.00 | 24.00 | 28.95 | 2.000 | 2.2° | 2 | 94.00 | |
| 260 | 5.00 | 6.00 | 4.60 | 75 | 6.00 | 30.00 | 33.27 | 2.500 | 1.0° | 2 | 94.00 | |
| 300 | 6.00 | 6.00 | 5.50 | 80 | 7.00 | 42.34 | 43.00 | 3.000 | 0.0° | 2 | 94.00 | |
| 391 | 8.00 | 8.00 | 7.40 | 90 | 9.00 | 52.29 | 53.00 | 4.000 | 0.0° | 2 | 118.00 | |
| 450 | 10.00 | 10.00 | 9.20 | 105 | 11.00 | 63.20 | 64.00 | 5.000 | 0.0° | 2 | 161.00 | |
| 501 | 12.00 | 12.00 | 11.00 | 120 | 13.00 | 73.13 | 74.00 | 6.000 | 0.0° | 2 | 198.00 | |
| 610 | 16.00 | 16.00 | 15.00 | 135 | 17.00 | 85.13 | 86.00 | 8.000 | 0.0° | 2 | 310.00 | |
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Applicazione



Materiale

Alluminio malleabile
Costruzione integrale Al



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _f [mm/min] | β [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
| 3.00 | 2 | 370 | 0.060 | 0.150 | 0.050 | 2.83 | 41615 | 4995 | 45° |
| 4.00 | 2 | 486 | 0.070 | 0.180 | 0.050 | 3.75 | 41255 | 5775 | 45° |
| 5.00 | 2 | 486 | 0.075 | 0.200 | 0.050 | 4.64 | 33340 | 5000 | 45° |
| 6.00 | 2 | 486 | 0.085 | 0.230 | 0.075 | 5.55 | 27875 | 4740 | 45° |
| 8.00 | 2 | 486 | 0.090 | 0.250 | 0.075 | 7.27 | 21280 | 3830 | 45° |
| 10.00 | 2 | 486 | 0.100 | 0.300 | 0.100 | 9.06 | 17075 | 3415 | 45° |
| 12.00 | 2 | 486 | 0.105 | 0.350 | 0.100 | 10.85 | 14260 | 2995 | 45° |
| 16.00 | 2 | 486 | 0.115 | 0.400 | 0.120 | 14.28 | 10835 | 2490 | 45° |

Rame non legato



| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|-----|
| 3.00 | 2 | 324 | 0.060 | 0.150 | 0.050 | 2.83 | 36445 | 4375 | 45° |
| 4.00 | 2 | 324 | 0.070 | 0.180 | 0.050 | 3.75 | 27500 | 3850 | 45° |
| 5.00 | 2 | 324 | 0.075 | 0.200 | 0.050 | 4.64 | 22225 | 3335 | 45° |
| 6.00 | 2 | 324 | 0.085 | 0.230 | 0.075 | 5.55 | 18580 | 3160 | 45° |
| 8.00 | 2 | 324 | 0.090 | 0.250 | 0.075 | 7.27 | 14185 | 2555 | 45° |
| 10.00 | 2 | 324 | 0.100 | 0.300 | 0.100 | 9.06 | 11385 | 2275 | 45° |
| 12.00 | 2 | 324 | 0.105 | 0.350 | 0.100 | 10.85 | 9505 | 1995 | 45° |
| 16.00 | 2 | 324 | 0.115 | 0.400 | 0.120 | 14.28 | 7220 | 1660 | 45° |

Materiali termoplastici



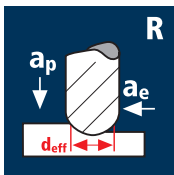
| | | | | | | | | | |
|-------|---|------|-------|-------|-------|-------|-------|------|-----|
| 3.00 | 2 | 370 | 0.060 | 0.150 | 0.050 | 2.83 | 41615 | 4995 | 45° |
| 4.00 | 2 | 490 | 0.070 | 0.180 | 0.050 | 3.75 | 41590 | 5825 | 45° |
| 5.00 | 2 | 610 | 0.075 | 0.200 | 0.050 | 4.64 | 41845 | 6275 | 45° |
| 6.00 | 2 | 730 | 0.085 | 0.230 | 0.075 | 5.55 | 41870 | 7120 | 45° |
| 8.00 | 2 | 955 | 0.090 | 0.250 | 0.075 | 7.27 | 41815 | 7525 | 45° |
| 10.00 | 2 | 1080 | 0.100 | 0.300 | 0.100 | 9.06 | 37945 | 7590 | 45° |
| 12.00 | 2 | 1080 | 0.105 | 0.350 | 0.100 | 10.85 | 31685 | 6655 | 45° |
| 16.00 | 2 | 1080 | 0.115 | 0.400 | 0.120 | 14.28 | 24075 | 5535 | 45° |

Legna per fonderia Al



| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|-----|
| 3.00 | 2 | 370 | 0.060 | 0.150 | 0.050 | 2.83 | 41615 | 4995 | 45° |
| 4.00 | 2 | 389 | 0.070 | 0.180 | 0.050 | 3.75 | 33020 | 4625 | 45° |
| 5.00 | 2 | 389 | 0.075 | 0.200 | 0.050 | 4.64 | 26685 | 4005 | 45° |
| 6.00 | 2 | 389 | 0.085 | 0.230 | 0.075 | 5.55 | 22310 | 3795 | 45° |
| 8.00 | 2 | 389 | 0.090 | 0.250 | 0.075 | 7.27 | 17030 | 3065 | 45° |
| 10.00 | 2 | 389 | 0.100 | 0.300 | 0.100 | 9.06 | 13665 | 2735 | 45° |
| 12.00 | 2 | 389 | 0.105 | 0.350 | 0.100 | 10.85 | 11410 | 2395 | 45° |
| 16.00 | 2 | 389 | 0.115 | 0.400 | 0.120 | 14.28 | 8670 | 1995 | 45° |

Applicazione



Materiale

Alluminio malleabile
Costruzione integrale Al



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _f [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|--------------------------|
| 3.00 | 2 | 227 | 0.082 | 0.450 | 0.900 | 2.14 | 33765 | 5535 | 2.2 |
| 4.00 | 2 | 227 | 0.090 | 0.600 | 1.200 | 2.86 | 25265 | 4550 | 3.3 |
| 5.00 | 2 | 227 | 0.100 | 0.750 | 1.500 | 3.57 | 20240 | 4050 | 4.6 |
| 6.00 | 2 | 227 | 0.120 | 0.900 | 1.800 | 4.28 | 16880 | 4050 | 6.6 |
| 8.00 | 2 | 227 | 0.140 | 1.200 | 2.400 | 5.71 | 12655 | 3545 | 10.2 |
| 10.00 | 2 | 227 | 0.150 | 1.500 | 3.000 | 7.14 | 10120 | 3035 | 13.7 |
| 12.00 | 2 | 227 | 0.180 | 1.800 | 3.600 | 8.57 | 8430 | 3035 | 19.7 |
| 16.00 | 2 | 227 | 0.200 | 2.400 | 4.800 | 11.43 | 6320 | 2530 | 29.1 |

Rame non legato



| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|------|
| 3.00 | 2 | 151 | 0.078 | 0.450 | 0.900 | 2.14 | 22460 | 3505 | 1.4 |
| 4.00 | 2 | 151 | 0.084 | 0.600 | 1.200 | 2.86 | 16805 | 2825 | 2.0 |
| 5.00 | 2 | 151 | 0.092 | 0.750 | 1.500 | 3.57 | 13465 | 2475 | 2.8 |
| 6.00 | 2 | 151 | 0.111 | 0.900 | 1.800 | 4.28 | 11230 | 2495 | 4.0 |
| 8.00 | 2 | 151 | 0.128 | 1.200 | 2.400 | 5.71 | 8420 | 2155 | 6.2 |
| 10.00 | 2 | 151 | 0.135 | 1.500 | 3.000 | 7.14 | 6730 | 1820 | 8.2 |
| 12.00 | 2 | 151 | 0.162 | 1.800 | 3.600 | 8.57 | 5610 | 1815 | 11.8 |
| 16.00 | 2 | 151 | 0.176 | 2.400 | 4.800 | 11.43 | 4205 | 1480 | 17.1 |

Materiali termoplastici



| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|------|
| 3.00 | 2 | 273 | 0.082 | 0.450 | 0.900 | 2.14 | 40605 | 6660 | 2.7 |
| 4.00 | 2 | 361 | 0.090 | 0.600 | 1.200 | 2.86 | 40180 | 7230 | 5.2 |
| 5.00 | 2 | 455 | 0.100 | 0.750 | 1.500 | 3.57 | 40570 | 8115 | 9.1 |
| 6.00 | 2 | 504 | 0.120 | 0.900 | 1.800 | 4.28 | 37485 | 8995 | 14.6 |
| 8.00 | 2 | 504 | 0.140 | 1.200 | 2.400 | 5.71 | 28095 | 7865 | 22.7 |
| 10.00 | 2 | 504 | 0.150 | 1.500 | 3.000 | 7.14 | 22470 | 6740 | 30.3 |
| 12.00 | 2 | 504 | 0.180 | 1.800 | 3.600 | 8.57 | 18720 | 6740 | 43.7 |
| 16.00 | 2 | 504 | 0.200 | 2.400 | 4.800 | 11.43 | 14035 | 5615 | 64.7 |

Legna per fonderia Al



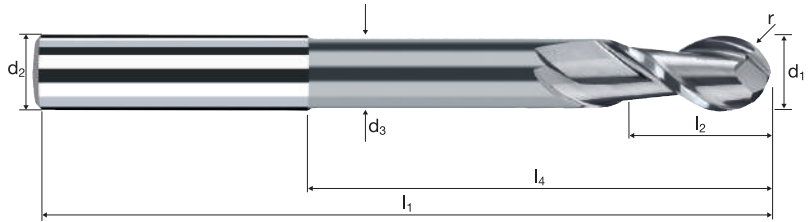
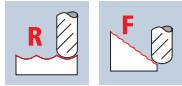
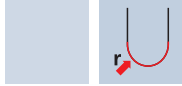
| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|------|
| 3.00 | 2 | 181 | 0.082 | 0.450 | 0.900 | 2.14 | 26920 | 4415 | 1.8 |
| 4.00 | 2 | 181 | 0.090 | 0.600 | 1.200 | 2.86 | 20145 | 3625 | 2.6 |
| 5.00 | 2 | 181 | 0.100 | 0.750 | 1.500 | 3.57 | 16140 | 3230 | 3.6 |
| 6.00 | 2 | 181 | 0.120 | 0.900 | 1.800 | 4.28 | 13460 | 3230 | 5.2 |
| 8.00 | 2 | 181 | 0.140 | 1.200 | 2.400 | 5.71 | 10090 | 2825 | 8.1 |
| 10.00 | 2 | 181 | 0.150 | 1.500 | 3.000 | 7.14 | 8070 | 2420 | 10.9 |
| 12.00 | 2 | 181 | 0.180 | 1.800 | 3.600 | 8.57 | 6725 | 2420 | 15.7 |
| 16.00 | 2 | 181 | 0.200 | 2.400 | 4.800 | 11.43 | 5040 | 2015 | 23.2 |

Frese con estremità emisferica Sphericut (Sphero-Alu)

Tolleranza $r \pm 0.005$, 6xd



HM
MG10 λ 40°
 γ 20°

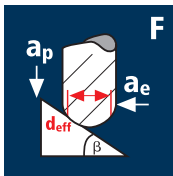


ReTool®

| | | | | | | | | | |
|--|--|--|--------------------------|--------------------------|-------------------------|--|--------------|------------------------|--|
| | | | Al Aluminium > 99% | Al Aluminium Alloy | Al Aluminium Cast | | Cu Copper | Plastic Thermoplast | |
|--|--|--|--------------------------|--------------------------|-------------------------|--|--------------|------------------------|--|

| Ø Code | Esempio: N° Ordine | | | | | | | | | | | 7554 |
|-----------|--------------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------------|------|---|--------|------|
| | d ₁ | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.005 | α | z | EUR | |
| 180 | 3.00 | 6.00 | 2.80 | 66 | 6.00 | 18.00 | 24.63 | 1.500 | 3.7° | 2 | 89.00 | |
| 220 | 4.00 | 6.00 | 3.70 | 69 | 8.00 | 24.00 | 28.95 | 2.000 | 2.2° | 2 | 89.00 | |
| 260 | 5.00 | 6.00 | 4.60 | 75 | 10.00 | 30.00 | 33.27 | 2.500 | 1.1° | 2 | 89.00 | |
| 300 | 6.00 | 6.00 | 5.50 | 80 | 12.00 | 42.34 | 43.00 | 3.000 | 0.0° | 2 | 89.00 | |
| 391 | 8.00 | 8.00 | 7.40 | 90 | 16.00 | 52.29 | 53.00 | 4.000 | 0.0° | 2 | 112.00 | |
| 450 | 10.00 | 10.00 | 9.20 | 105 | 20.00 | 63.20 | 64.00 | 5.000 | 0.0° | 2 | 152.00 | |
| 501 | 12.00 | 12.00 | 11.00 | 120 | 24.00 | 73.13 | 74.00 | 6.000 | 0.0° | 2 | 188.00 | |
| 610 | 16.00 | 16.00 | 15.00 | 135 | 32.00 | 85.13 | 86.00 | 8.000 | 0.0° | 2 | 294.00 | |
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Applicazione



Materiale

Acciaio da
utensile temprato
52 - 56 HRC



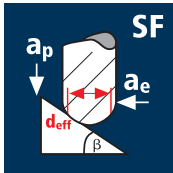
Acciaio da
utensile temprato
56 - 60 HRC



Acciaio da
utensile temprato
> 60 HRC



Acciaio rapido temprato
64 - 70 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



Acciaio da
utensile temprato
> 60 HRC



Acciaio rapido temprato
64 - 70 HRC



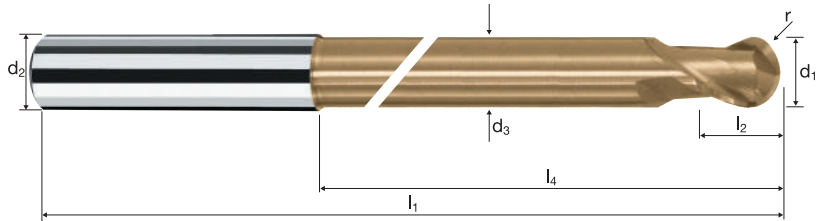
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _s [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|----------|
| 1.00 | 2 | 110 | 0.018 | 0.030 | 0.090 | 0.91 | 38475 | 1385 | 45° |
| 2.00 | 2 | 110 | 0.028 | 0.030 | 0.120 | 1.72 | 20355 | 1140 | 45° |
| 3.00 | 2 | 140 | 0.042 | 0.050 | 0.150 | 2.59 | 17205 | 1445 | 45° |
| 4.00 | 2 | 140 | 0.052 | 0.050 | 0.180 | 3.39 | 13145 | 1365 | 45° |
| 5.00 | 2 | 140 | 0.058 | 0.050 | 0.210 | 4.17 | 10685 | 1240 | 45° |
| 6.00 | 2 | 140 | 0.064 | 0.050 | 0.230 | 4.94 | 9020 | 1155 | 45° |
| 8.00 | 2 | 140 | 0.068 | 0.080 | 0.280 | 6.67 | 6680 | 910 | 45° |
| 10.00 | 2 | 140 | 0.074 | 0.080 | 0.310 | 8.22 | 5420 | 800 | 45° |
| 12.00 | 2 | 140 | 0.082 | 0.100 | 0.340 | 9.89 | 4505 | 740 | 45° |
| 1.00 | 2 | 100 | 0.018 | 0.030 | 0.090 | 0.91 | 34980 | 1260 | 45° |
| 2.00 | 2 | 100 | 0.028 | 0.030 | 0.120 | 1.72 | 18505 | 1035 | 45° |
| 3.00 | 2 | 120 | 0.042 | 0.050 | 0.150 | 2.59 | 14750 | 1240 | 45° |
| 4.00 | 2 | 120 | 0.052 | 0.050 | 0.180 | 3.39 | 11270 | 1170 | 45° |
| 5.00 | 2 | 120 | 0.058 | 0.050 | 0.210 | 4.17 | 9160 | 1065 | 45° |
| 6.00 | 2 | 120 | 0.064 | 0.050 | 0.230 | 4.94 | 7730 | 990 | 45° |
| 8.00 | 2 | 120 | 0.068 | 0.080 | 0.280 | 6.67 | 5725 | 780 | 45° |
| 10.00 | 2 | 120 | 0.074 | 0.080 | 0.310 | 8.22 | 4645 | 690 | 45° |
| 12.00 | 2 | 120 | 0.082 | 0.100 | 0.340 | 9.89 | 3860 | 635 | 45° |
| 1.00 | 2 | 60 | 0.018 | 0.030 | 0.090 | 0.91 | 20985 | 755 | 45° |
| 2.00 | 2 | 60 | 0.028 | 0.030 | 0.120 | 1.72 | 11105 | 620 | 45° |
| 3.00 | 2 | 70 | 0.042 | 0.050 | 0.150 | 2.59 | 8605 | 725 | 45° |
| 4.00 | 2 | 70 | 0.052 | 0.050 | 0.180 | 3.39 | 6575 | 685 | 45° |
| 5.00 | 2 | 70 | 0.058 | 0.050 | 0.210 | 4.17 | 5345 | 620 | 45° |
| 6.00 | 2 | 70 | 0.064 | 0.050 | 0.230 | 4.94 | 4510 | 575 | 45° |
| 8.00 | 2 | 70 | 0.068 | 0.080 | 0.280 | 6.67 | 3340 | 455 | 45° |
| 10.00 | 2 | 70 | 0.074 | 0.080 | 0.310 | 8.22 | 2710 | 400 | 45° |
| 12.00 | 2 | 70 | 0.082 | 0.100 | 0.340 | 9.89 | 2255 | 370 | 45° |
| 1.00 | 2 | 40 | 0.018 | 0.030 | 0.090 | 0.91 | 13990 | 505 | 45° |
| 2.00 | 2 | 40 | 0.028 | 0.030 | 0.120 | 1.72 | 7405 | 415 | 45° |
| 3.00 | 2 | 50 | 0.042 | 0.050 | 0.150 | 2.59 | 6145 | 515 | 45° |
| 4.00 | 2 | 50 | 0.052 | 0.050 | 0.180 | 3.39 | 4695 | 490 | 45° |
| 5.00 | 2 | 50 | 0.058 | 0.050 | 0.210 | 4.17 | 3815 | 445 | 45° |
| 6.00 | 2 | 50 | 0.064 | 0.050 | 0.230 | 4.94 | 3220 | 410 | 45° |
| 8.00 | 2 | 50 | 0.068 | 0.080 | 0.280 | 6.67 | 2385 | 325 | 45° |
| 10.00 | 2 | 50 | 0.074 | 0.080 | 0.310 | 8.22 | 1935 | 285 | 45° |
| 12.00 | 2 | 50 | 0.082 | 0.100 | 0.340 | 9.89 | 1610 | 265 | 45° |
| 1.00 | 2 | 116 | 0.020 | 0.020 | 0.040 | 0.88 | 41960 | 1680 | 45° |
| 2.00 | 2 | 140 | 0.025 | 0.020 | 0.050 | 1.67 | 26685 | 1335 | 45° |
| 3.00 | 2 | 170 | 0.030 | 0.030 | 0.060 | 2.50 | 21645 | 1300 | 45° |
| 4.00 | 2 | 170 | 0.030 | 0.030 | 0.060 | 3.27 | 16550 | 995 | 45° |
| 5.00 | 2 | 170 | 0.035 | 0.030 | 0.070 | 4.04 | 13395 | 940 | 45° |
| 6.00 | 2 | 170 | 0.035 | 0.030 | 0.070 | 4.80 | 11275 | 790 | 45° |
| 8.00 | 2 | 170 | 0.040 | 0.050 | 0.080 | 6.48 | 8350 | 670 | 45° |
| 10.00 | 2 | 170 | 0.040 | 0.050 | 0.080 | 8.00 | 6765 | 540 | 45° |
| 12.00 | 2 | 170 | 0.040 | 0.050 | 0.080 | 9.51 | 5690 | 455 | 45° |
| 1.00 | 2 | 110 | 0.020 | 0.020 | 0.040 | 0.88 | 39790 | 1590 | 45° |
| 2.00 | 2 | 110 | 0.025 | 0.020 | 0.050 | 1.67 | 20965 | 1050 | 45° |
| 3.00 | 2 | 140 | 0.030 | 0.030 | 0.060 | 2.50 | 17825 | 1070 | 45° |
| 4.00 | 2 | 140 | 0.030 | 0.030 | 0.060 | 3.27 | 13630 | 820 | 45° |
| 5.00 | 2 | 140 | 0.035 | 0.030 | 0.070 | 4.04 | 11030 | 770 | 45° |
| 6.00 | 2 | 140 | 0.035 | 0.030 | 0.070 | 4.80 | 9285 | 650 | 45° |
| 8.00 | 2 | 140 | 0.040 | 0.050 | 0.080 | 6.48 | 6875 | 550 | 45° |
| 10.00 | 2 | 140 | 0.040 | 0.050 | 0.080 | 8.00 | 5570 | 445 | 45° |
| 12.00 | 2 | 140 | 0.040 | 0.050 | 0.080 | 9.51 | 4685 | 375 | 45° |
| 1.00 | 2 | 60 | 0.020 | 0.020 | 0.040 | 0.88 | 21705 | 870 | 45° |
| 2.00 | 2 | 60 | 0.025 | 0.020 | 0.050 | 1.67 | 11435 | 570 | 45° |
| 3.00 | 2 | 80 | 0.030 | 0.030 | 0.060 | 2.50 | 10185 | 610 | 45° |
| 4.00 | 2 | 80 | 0.030 | 0.030 | 0.060 | 3.27 | 7785 | 465 | 45° |
| 5.00 | 2 | 80 | 0.035 | 0.030 | 0.070 | 4.04 | 6305 | 440 | 45° |
| 6.00 | 2 | 80 | 0.035 | 0.030 | 0.070 | 4.80 | 5305 | 370 | 45° |
| 8.00 | 2 | 80 | 0.040 | 0.050 | 0.080 | 6.48 | 3930 | 315 | 45° |
| 10.00 | 2 | 80 | 0.040 | 0.050 | 0.080 | 8.00 | 3185 | 255 | 45° |
| 12.00 | 2 | 80 | 0.040 | 0.050 | 0.080 | 9.51 | 2680 | 215 | 45° |
| 1.00 | 2 | 50 | 0.020 | 0.020 | 0.040 | 0.88 | 18085 | 725 | 45° |
| 2.00 | 2 | 50 | 0.025 | 0.020 | 0.050 | 1.67 | 9530 | 475 | 45° |
| 3.00 | 2 | 60 | 0.030 | 0.030 | 0.060 | 2.50 | 7640 | 460 | 45° |
| 4.00 | 2 | 60 | 0.030 | 0.030 | 0.060 | 3.27 | 5840 | 350 | 45° |
| 5.00 | 2 | 60 | 0.035 | 0.030 | 0.070 | 4.04 | 4725 | 330 | 45° |
| 6.00 | 2 | 60 | 0.035 | 0.030 | 0.070 | 4.80 | 3980 | 280 | 45° |
| 8.00 | 2 | 60 | 0.040 | 0.050 | 0.080 | 6.48 | 2945 | 235 | 45° |
| 10.00 | 2 | 60 | 0.040 | 0.050 | 0.080 | 8.00 | 2385 | 190 | 45° |
| 12.00 | 2 | 60 | 0.040 | 0.050 | 0.080 | 9.51 | 2010 | 160 | 45° |

Frese con estremità emisferica SpheroX

Tolleranza $r \pm 0.005$, 9xd



HM λ 30°
XA γ -10°

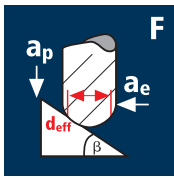


ReTool®

| | | | | | | | | | |
|--|--|------------------------|------------------------|---------------------|---------------------|--------------------|--|-----------------------|-------------------------|
| | | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | | Ti Titanium | HSS ToolSteel |
|--|--|------------------------|------------------------|---------------------|---------------------|--------------------|--|-----------------------|-------------------------|

| Esempio: N° Ordine | | | | | | | | | | | DURO-V |
|--------------------|----------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------------|------|---|--------|
| | | | | | | | | | | | V7478 |
| | | | | | | | | | | | EUR |
| Ø Code | d ₁ | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.005 | α | z | |
| 100 | 1.00 | 6.00 | 0.95 | 69 | 1.50 | 9.00 | 19.08 | 0.500 | 8.0° | 2 | 117.00 |
| 140 | 2.00 | 6.00 | 1.90 | 69 | 3.00 | 18.00 | 26.31 | 1.000 | 4.7° | 2 | 117.00 |
| 180 | 3.00 | 6.00 | 2.80 | 75 | 4.00 | 27.00 | 33.63 | 1.500 | 2.8° | 2 | 117.00 |
| 220 | 4.00 | 6.00 | 3.70 | 80 | 5.00 | 36.00 | 40.95 | 2.000 | 1.5° | 2 | 117.00 |
| 260 | 5.00 | 6.00 | 4.60 | 87 | 6.00 | 45.00 | 48.27 | 2.500 | 0.7° | 2 | 117.00 |
| 300 | 6.00 | 6.00 | 5.50 | 100 | 7.00 | 62.34 | 63.00 | 3.000 | 0.0° | 2 | 117.00 |
| 391 | 8.00 | 8.00 | 7.40 | 120 | 9.00 | 82.29 | 83.00 | 4.000 | 0.0° | 2 | 146.00 |
| 450 | 10.00 | 10.00 | 9.20 | 135 | 11.00 | 93.20 | 94.00 | 5.000 | 0.0° | 2 | 198.00 |
| 501 | 12.00 | 12.00 | 11.00 | 160 | 13.00 | 113.13 | 114.00 | 6.000 | 0.0° | 2 | 245.00 |
| 610 | 16.00 | 16.00 | 15.00 | 180 | 17.00 | 130.13 | 131.00 | 8.000 | 0.0° | 2 | 383.00 |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



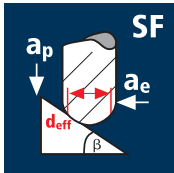
Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Leghe di titanio indurite
> 300 HB
[Ti6Al4V]



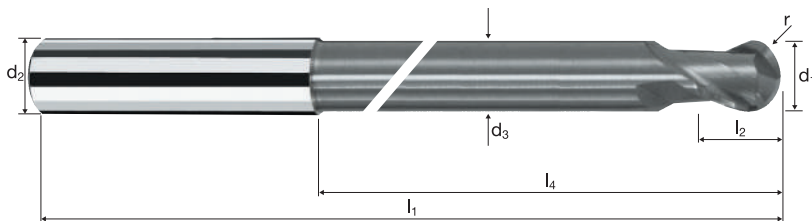
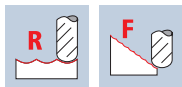
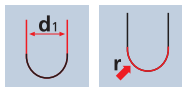
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _s [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|----------|
| 1.00 | 2 | 120 | 0.026 | 0.030 | 0.090 | 0.91 | 41975 | 2185 | 45° |
| 2.00 | 2 | 180 | 0.038 | 0.030 | 0.120 | 1.72 | 33310 | 2530 | 45° |
| 3.00 | 2 | 220 | 0.058 | 0.050 | 0.150 | 2.59 | 27040 | 3135 | 45° |
| 4.00 | 2 | 220 | 0.074 | 0.050 | 0.180 | 3.39 | 20655 | 3055 | 45° |
| 5.00 | 2 | 220 | 0.084 | 0.050 | 0.210 | 4.17 | 16795 | 2820 | 45° |
| 6.00 | 2 | 220 | 0.090 | 0.050 | 0.230 | 4.94 | 14175 | 2550 | 45° |
| 8.00 | 2 | 220 | 0.098 | 0.080 | 0.280 | 6.67 | 10500 | 2060 | 45° |
| 10.00 | 2 | 220 | 0.106 | 0.080 | 0.310 | 8.22 | 8520 | 1805 | 45° |
| 12.00 | 2 | 220 | 0.116 | 0.100 | 0.340 | 9.89 | 7080 | 1645 | 45° |
| 1.00 | 2 | 120 | 0.018 | 0.030 | 0.090 | 0.91 | 41975 | 1510 | 45° |
| 2.00 | 2 | 150 | 0.028 | 0.030 | 0.120 | 1.72 | 27760 | 1555 | 45° |
| 3.00 | 2 | 190 | 0.042 | 0.050 | 0.150 | 2.59 | 23350 | 1960 | 45° |
| 4.00 | 2 | 190 | 0.052 | 0.050 | 0.180 | 3.39 | 17840 | 1855 | 45° |
| 5.00 | 2 | 190 | 0.058 | 0.050 | 0.210 | 4.17 | 14505 | 1680 | 45° |
| 6.00 | 2 | 190 | 0.064 | 0.050 | 0.230 | 4.94 | 12245 | 1565 | 45° |
| 8.00 | 2 | 190 | 0.068 | 0.080 | 0.280 | 6.67 | 9065 | 1235 | 45° |
| 10.00 | 2 | 190 | 0.074 | 0.080 | 0.310 | 8.22 | 7360 | 1090 | 45° |
| 12.00 | 2 | 190 | 0.082 | 0.100 | 0.340 | 9.89 | 6115 | 1005 | 45° |
| 1.00 | 2 | 110 | 0.018 | 0.030 | 0.090 | 0.91 | 38475 | 1385 | 45° |
| 2.00 | 2 | 110 | 0.028 | 0.030 | 0.120 | 1.72 | 20355 | 1140 | 45° |
| 3.00 | 2 | 140 | 0.042 | 0.050 | 0.150 | 2.59 | 17205 | 1445 | 45° |
| 4.00 | 2 | 140 | 0.052 | 0.050 | 0.180 | 3.39 | 13145 | 1365 | 45° |
| 5.00 | 2 | 140 | 0.058 | 0.050 | 0.210 | 4.17 | 10685 | 1240 | 45° |
| 6.00 | 2 | 140 | 0.064 | 0.050 | 0.230 | 4.94 | 9020 | 1155 | 45° |
| 8.00 | 2 | 140 | 0.068 | 0.080 | 0.280 | 6.67 | 6680 | 910 | 45° |
| 10.00 | 2 | 140 | 0.074 | 0.080 | 0.310 | 8.22 | 5420 | 800 | 45° |
| 12.00 | 2 | 140 | 0.082 | 0.100 | 0.340 | 9.89 | 4505 | 740 | 45° |
| 1.00 | 2 | 100 | 0.026 | 0.030 | 0.090 | 0.91 | 34980 | 1820 | 45° |
| 2.00 | 2 | 100 | 0.038 | 0.030 | 0.120 | 1.72 | 18505 | 1405 | 45° |
| 3.00 | 2 | 120 | 0.058 | 0.050 | 0.150 | 2.59 | 14750 | 1710 | 45° |
| 4.00 | 2 | 120 | 0.074 | 0.050 | 0.180 | 3.39 | 11270 | 1670 | 45° |
| 5.00 | 2 | 120 | 0.084 | 0.050 | 0.210 | 4.17 | 9160 | 1540 | 45° |
| 6.00 | 2 | 120 | 0.090 | 0.050 | 0.230 | 4.94 | 7730 | 1390 | 45° |
| 8.00 | 2 | 120 | 0.098 | 0.080 | 0.280 | 6.67 | 5725 | 1120 | 45° |
| 10.00 | 2 | 120 | 0.106 | 0.080 | 0.310 | 8.22 | 4645 | 985 | 45° |
| 12.00 | 2 | 120 | 0.116 | 0.100 | 0.340 | 9.89 | 3860 | 895 | 45° |
| 1.00 | 2 | 116 | 0.030 | 0.020 | 0.040 | 0.88 | 41960 | 2520 | 45° |
| 2.00 | 2 | 210 | 0.040 | 0.020 | 0.050 | 1.67 | 40025 | 3200 | 45° |
| 3.00 | 2 | 260 | 0.045 | 0.030 | 0.060 | 2.50 | 33105 | 2980 | 45° |
| 4.00 | 2 | 260 | 0.050 | 0.030 | 0.060 | 3.27 | 25310 | 2530 | 45° |
| 5.00 | 2 | 260 | 0.050 | 0.030 | 0.070 | 4.04 | 20485 | 2050 | 45° |
| 6.00 | 2 | 260 | 0.055 | 0.030 | 0.070 | 4.80 | 17240 | 1895 | 45° |
| 8.00 | 2 | 260 | 0.060 | 0.050 | 0.080 | 6.48 | 12770 | 1535 | 45° |
| 10.00 | 2 | 260 | 0.060 | 0.050 | 0.080 | 8.00 | 10345 | 1240 | 45° |
| 12.00 | 2 | 260 | 0.065 | 0.050 | 0.080 | 9.51 | 8700 | 1130 | 45° |
| 1.00 | 2 | 116 | 0.020 | 0.020 | 0.040 | 0.88 | 41960 | 1680 | 45° |
| 2.00 | 2 | 180 | 0.025 | 0.020 | 0.050 | 1.67 | 34310 | 1715 | 45° |
| 3.00 | 2 | 230 | 0.030 | 0.030 | 0.060 | 2.50 | 29285 | 1755 | 45° |
| 4.00 | 2 | 230 | 0.030 | 0.030 | 0.060 | 3.27 | 22390 | 1345 | 45° |
| 5.00 | 2 | 230 | 0.035 | 0.030 | 0.070 | 4.04 | 18120 | 1270 | 45° |
| 6.00 | 2 | 230 | 0.035 | 0.030 | 0.070 | 4.80 | 15250 | 1070 | 45° |
| 8.00 | 2 | 230 | 0.040 | 0.050 | 0.080 | 6.48 | 11300 | 905 | 45° |
| 10.00 | 2 | 230 | 0.040 | 0.050 | 0.080 | 8.00 | 9150 | 730 | 45° |
| 12.00 | 2 | 230 | 0.040 | 0.050 | 0.080 | 9.51 | 7700 | 615 | 45° |
| 1.00 | 2 | 116 | 0.020 | 0.020 | 0.040 | 0.88 | 41960 | 1680 | 45° |
| 2.00 | 2 | 140 | 0.025 | 0.020 | 0.050 | 1.67 | 26685 | 1335 | 45° |
| 3.00 | 2 | 170 | 0.030 | 0.030 | 0.060 | 2.50 | 21645 | 1300 | 45° |
| 4.00 | 2 | 170 | 0.030 | 0.030 | 0.060 | 3.27 | 16550 | 995 | 45° |
| 5.00 | 2 | 170 | 0.035 | 0.030 | 0.070 | 4.04 | 13395 | 940 | 45° |
| 6.00 | 2 | 170 | 0.035 | 0.030 | 0.070 | 4.80 | 11275 | 790 | 45° |
| 8.00 | 2 | 170 | 0.040 | 0.050 | 0.080 | 6.48 | 8350 | 670 | 45° |
| 10.00 | 2 | 170 | 0.040 | 0.050 | 0.080 | 8.00 | 6755 | 540 | 45° |
| 12.00 | 2 | 170 | 0.040 | 0.050 | 0.080 | 9.51 | 5690 | 455 | 45° |
| 1.00 | 2 | 110 | 0.030 | 0.020 | 0.040 | 0.88 | 39790 | 2385 | 45° |
| 2.00 | 2 | 110 | 0.040 | 0.020 | 0.050 | 1.67 | 20965 | 1675 | 45° |
| 3.00 | 2 | 140 | 0.045 | 0.030 | 0.060 | 2.50 | 17825 | 1605 | 45° |
| 4.00 | 2 | 140 | 0.050 | 0.030 | 0.060 | 3.27 | 13630 | 1365 | 45° |
| 5.00 | 2 | 140 | 0.050 | 0.030 | 0.070 | 4.04 | 11030 | 1105 | 45° |
| 6.00 | 2 | 140 | 0.055 | 0.030 | 0.070 | 4.80 | 9285 | 1020 | 45° |
| 8.00 | 2 | 140 | 0.060 | 0.050 | 0.080 | 6.48 | 6875 | 825 | 45° |
| 10.00 | 2 | 140 | 0.060 | 0.050 | 0.080 | 8.00 | 5570 | 670 | 45° |
| 12.00 | 2 | 140 | 0.065 | 0.050 | 0.080 | 9.51 | 4685 | 610 | 45° |

Frese con estremità emisferica SpheroX (Sphero-XF)

Tolleranza $r \pm 0.005$, 9xd



HM
XA λ 30°
 γ -10°

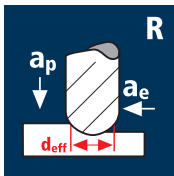


ReTool®

| | | | | | | | |
|----------------|-----------------|-----------------|--------------|--------------|-------------|----------------|------------------|
| Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Ti Titanium | HSS ToolSteel |
|----------------|-----------------|-----------------|--------------|--------------|-------------|----------------|------------------|

| Ø Code | Esempio: N° Ordine | | | | | | | | | | | X-AL |
|-----------|--------------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------------|------|---|---------------|------|
| | d ₁ | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.005 | α | z | X7408 | |
| 100 | 1.00 | 6.00 | 0.95 | 69 | 1.50 | 9.00 | 19.08 | 0.500 | 8.0° | 2 | EUR 117.00 | |
| 140 | 2.00 | 6.00 | 1.90 | 69 | 3.00 | 18.00 | 26.31 | 1.000 | 4.7° | 2 | 117.00 | |
| 180 | 3.00 | 6.00 | 2.80 | 75 | 4.00 | 27.00 | 33.63 | 1.500 | 2.8° | 2 | 117.00 | |
| 220 | 4.00 | 6.00 | 3.70 | 80 | 5.00 | 36.00 | 40.95 | 2.000 | 1.5° | 2 | 117.00 | |
| 260 | 5.00 | 6.00 | 4.60 | 87 | 6.00 | 45.00 | 48.27 | 2.500 | 0.7° | 2 | 117.00 | |
| 300 | 6.00 | 6.00 | 5.50 | 100 | 7.00 | 62.34 | 63.00 | 3.000 | 0.0° | 2 | 117.00 | |
| 391 | 8.00 | 8.00 | 7.40 | 120 | 9.00 | 82.29 | 83.00 | 4.000 | 0.0° | 2 | 146.00 | |
| 450 | 10.00 | 10.00 | 9.20 | 135 | 11.00 | 93.20 | 94.00 | 5.000 | 0.0° | 2 | 198.00 | |
| 501 | 12.00 | 12.00 | 11.00 | 160 | 13.00 | 113.13 | 114.00 | 6.000 | 0.0° | 2 | 245.00 | |
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Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



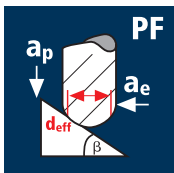
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|-----------------------------|
| 3.00 | 4 | 160 | 0.050 | 0.530 | 1.200 | 2.29 | 22240 | 4450 | 2.8 |
| 4.00 | 4 | 160 | 0.060 | 0.700 | 1.600 | 3.04 | 16755 | 4020 | 4.5 |
| 5.00 | 4 | 160 | 0.065 | 0.880 | 2.000 | 3.81 | 13365 | 3475 | 6.1 |
| 6.00 | 4 | 160 | 0.070 | 1.260 | 2.400 | 4.89 | 10415 | 2915 | 8.8 |
| 8.00 | 4 | 160 | 0.080 | 1.680 | 3.200 | 6.52 | 7810 | 2500 | 13.4 |
| 10.00 | 4 | 160 | 0.095 | 2.100 | 4.000 | 8.15 | 6250 | 2375 | 19.9 |
| 12.00 | 4 | 160 | 0.100 | 2.520 | 4.800 | 9.78 | 5210 | 2085 | 25.2 |

| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|------|-------|------|------|
| 3.00 | 4 | 130 | 0.045 | 0.530 | 1.200 | 2.29 | 18070 | 3255 | 2.1 |
| 4.00 | 4 | 130 | 0.055 | 0.700 | 1.600 | 3.04 | 13610 | 2995 | 3.4 |
| 5.00 | 4 | 130 | 0.060 | 0.880 | 2.000 | 3.81 | 10860 | 2605 | 4.6 |
| 6.00 | 4 | 130 | 0.065 | 1.050 | 2.400 | 4.56 | 9075 | 2360 | 5.9 |
| 8.00 | 4 | 130 | 0.075 | 1.400 | 3.200 | 6.08 | 6805 | 2040 | 9.1 |
| 10.00 | 4 | 130 | 0.085 | 2.100 | 4.000 | 8.15 | 5075 | 1725 | 14.5 |
| 12.00 | 4 | 130 | 0.090 | 2.520 | 4.800 | 9.78 | 4230 | 1525 | 18.4 |

| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|------|-------|------|------|
| 3.00 | 4 | 110 | 0.045 | 0.530 | 1.200 | 2.29 | 15290 | 2750 | 1.8 |
| 4.00 | 4 | 110 | 0.050 | 0.700 | 1.600 | 3.04 | 11520 | 2305 | 2.6 |
| 5.00 | 4 | 110 | 0.055 | 0.880 | 2.000 | 3.81 | 9190 | 2020 | 3.6 |
| 6.00 | 4 | 110 | 0.060 | 1.050 | 2.400 | 4.56 | 7680 | 1845 | 4.6 |
| 8.00 | 4 | 110 | 0.070 | 1.400 | 3.200 | 6.08 | 5760 | 1610 | 7.2 |
| 10.00 | 4 | 110 | 0.080 | 2.100 | 4.000 | 8.15 | 4295 | 1375 | 11.5 |
| 12.00 | 4 | 110 | 0.085 | 2.520 | 4.800 | 9.78 | 3580 | 1215 | 14.7 |

| | | | | | | | | | |
|-------|---|----|-------|-------|-------|------|------|-----|-----|
| 3.00 | 4 | 50 | 0.020 | 0.410 | 0.900 | 2.06 | 7725 | 620 | 0.2 |
| 4.00 | 4 | 50 | 0.025 | 0.550 | 1.200 | 2.75 | 5785 | 580 | 0.4 |
| 5.00 | 4 | 50 | 0.025 | 0.690 | 1.500 | 3.45 | 4615 | 460 | 0.5 |
| 6.00 | 4 | 50 | 0.030 | 0.760 | 1.440 | 3.99 | 3990 | 480 | 0.5 |
| 8.00 | 4 | 50 | 0.030 | 1.010 | 1.440 | 5.31 | 2995 | 360 | 0.5 |
| 10.00 | 4 | 50 | 0.040 | 1.260 | 1.200 | 6.64 | 2395 | 385 | 0.6 |
| 12.00 | 4 | 50 | 0.040 | 1.510 | 1.440 | 7.96 | 2000 | 320 | 0.7 |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|----------|
| 3.00 | 4 | 200 | 0.070 | 0.330 | 0.330 | 2.98 | 21365 | 5980 | 45° |
| 4.00 | 4 | 200 | 0.080 | 0.440 | 0.440 | 3.98 | 15995 | 5120 | 45° |
| 5.00 | 4 | 200 | 0.090 | 0.550 | 0.550 | 4.97 | 12810 | 4610 | 45° |
| 6.00 | 4 | 200 | 0.100 | 0.660 | 0.660 | 5.96 | 10680 | 4275 | 45° |
| 8.00 | 4 | 200 | 0.110 | 0.880 | 0.880 | 7.95 | 8010 | 3525 | 45° |
| 10.00 | 4 | 200 | 0.130 | 1.100 | 1.100 | 9.94 | 6405 | 3330 | 45° |
| 12.00 | 4 | 200 | 0.135 | 1.320 | 1.320 | 11.93 | 5335 | 2880 | 45° |

| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|-----|
| 3.00 | 4 | 160 | 0.065 | 0.150 | 0.150 | 2.83 | 17995 | 4680 | 45° |
| 4.00 | 4 | 160 | 0.075 | 0.200 | 0.200 | 3.78 | 13475 | 4040 | 45° |
| 5.00 | 4 | 160 | 0.085 | 0.250 | 0.250 | 4.72 | 10790 | 3670 | 45° |
| 6.00 | 4 | 160 | 0.090 | 0.300 | 0.300 | 5.67 | 8980 | 3235 | 45° |
| 8.00 | 4 | 160 | 0.100 | 0.400 | 0.400 | 7.56 | 6735 | 2695 | 45° |
| 10.00 | 4 | 160 | 0.120 | 0.500 | 0.500 | 9.45 | 5390 | 2585 | 45° |
| 12.00 | 4 | 160 | 0.125 | 0.600 | 0.600 | 11.34 | 4490 | 2245 | 45° |

| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|-----|
| 3.00 | 4 | 120 | 0.060 | 0.150 | 0.150 | 2.83 | 13495 | 3240 | 45° |
| 4.00 | 4 | 120 | 0.070 | 0.200 | 0.200 | 3.78 | 10105 | 2830 | 45° |
| 5.00 | 4 | 120 | 0.075 | 0.250 | 0.250 | 4.72 | 8095 | 2430 | 45° |
| 6.00 | 4 | 120 | 0.085 | 0.300 | 0.300 | 5.67 | 6735 | 2290 | 45° |
| 8.00 | 4 | 120 | 0.095 | 0.400 | 0.400 | 7.56 | 5055 | 1920 | 45° |
| 10.00 | 4 | 120 | 0.110 | 0.500 | 0.500 | 9.45 | 4040 | 1780 | 45° |
| 12.00 | 4 | 120 | 0.115 | 0.600 | 0.600 | 11.34 | 3370 | 1550 | 45° |

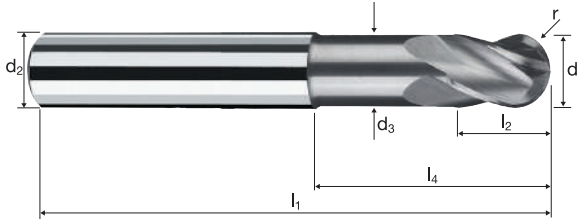
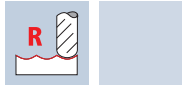
| | | | | | | | | | |
|-------|---|----|-------|-------|-------|-------|-------|------|-----|
| 3.00 | 4 | 90 | 0.055 | 0.120 | 0.120 | 2.78 | 10305 | 2265 | 45° |
| 4.00 | 4 | 90 | 0.060 | 0.160 | 0.160 | 3.71 | 7720 | 1855 | 45° |
| 5.00 | 4 | 90 | 0.070 | 0.200 | 0.200 | 4.64 | 6175 | 1730 | 45° |
| 6.00 | 4 | 90 | 0.075 | 0.240 | 0.240 | 5.57 | 5145 | 1545 | 45° |
| 8.00 | 4 | 90 | 0.085 | 0.320 | 0.320 | 7.42 | 3860 | 1315 | 45° |
| 10.00 | 4 | 90 | 0.100 | 0.400 | 0.400 | 9.28 | 3085 | 1235 | 45° |
| 12.00 | 4 | 90 | 0.100 | 0.480 | 0.480 | 11.13 | 2575 | 1030 | 45° |

Frese con estremità emisferica Sphericut (Sphero-XR4)

Tolleranza $r \pm 0.01, 3xd$



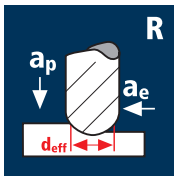
HM
XT λ 30°
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|--|--|-----------------|-----------------|--------------|--------------|-------------|--|--|--|
| | | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | | | |
|--|--|-----------------|-----------------|--------------|--------------|-------------|--|--|--|

| | | | | | | | | | | | | X-AL | |
|-----------------------|---------------------------|----------------------|------------------|-----------------|----------------|----------------|----------------|------------|------|---|--------|------|-------|
| Esempio: N° Ordine | | Rivestimento X | Articolo 7450 | Codice-ø 180 | | | | | | | | | X7450 |
| Ø Code | d ₁ 0/-0.02 | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.01 | α | z | EUR | | |
| 180 | 3.00 | 6.00 | 2.80 | 57 | 4.00 | 9.00 | 15.63 | 1.500 | 6.4° | 4 | 104.00 | | |
| 220 | 4.00 | 6.00 | 3.70 | 57 | 5.00 | 12.00 | 16.95 | 2.000 | 4.0° | 4 | 104.00 | | |
| 260 | 5.00 | 6.00 | 4.60 | 57 | 6.00 | 15.00 | 18.27 | 2.500 | 2.0° | 4 | 104.00 | | |
| 300 | 6.00 | 6.00 | 5.50 | 57 | 7.00 | 19.34 | 20.00 | 3.000 | 0.0° | 4 | 104.00 | | |
| 391 | 8.00 | 8.00 | 7.40 | 63 | 9.00 | 25.29 | 26.00 | 4.000 | 0.0° | 4 | 130.00 | | |
| 450 | 10.00 | 10.00 | 9.20 | 72 | 11.00 | 30.20 | 31.00 | 5.000 | 0.0° | 4 | 177.00 | | |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 13.00 | 36.13 | 37.00 | 6.000 | 0.0° | 4 | 219.00 | | |
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Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



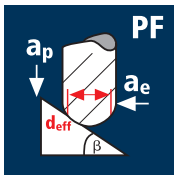
| d1 [mm] | z | v_c [m/min] | f_z [mm] | a_p [mm] | a_e [mm] | d_{eff} [mm] | n [min ⁻¹] | v_f [mm/min] | Q [cm ³ /min] |
|------------|---|------------------|---------------|---------------|---------------|-------------------|---------------------------|-------------------|-----------------------------|
| 3.00 | 4 | 160 | 0.050 | 0.390 | 0.900 | 2.02 | 25215 | 5045 | 1.8 |
| 4.00 | 4 | 160 | 0.060 | 0.520 | 1.200 | 2.69 | 18935 | 4545 | 2.8 |
| 5.00 | 4 | 160 | 0.065 | 0.650 | 1.500 | 3.36 | 15160 | 3940 | 3.8 |
| 6.00 | 4 | 160 | 0.070 | 1.020 | 1.800 | 4.51 | 11295 | 3160 | 5.8 |
| 8.00 | 4 | 160 | 0.080 | 1.360 | 2.400 | 6.01 | 8475 | 2710 | 8.9 |
| 10.00 | 4 | 160 | 0.095 | 1.700 | 3.000 | 7.51 | 6780 | 2575 | 13.1 |
| 12.00 | 4 | 160 | 0.100 | 2.040 | 3.600 | 9.02 | 5645 | 2260 | 16.6 |

| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|------|-------|------|------|
| 3.00 | 4 | 130 | 0.045 | 0.390 | 0.900 | 2.02 | 20485 | 3685 | 1.3 |
| 4.00 | 4 | 130 | 0.055 | 0.520 | 1.200 | 2.69 | 15385 | 3385 | 2.1 |
| 5.00 | 4 | 130 | 0.060 | 0.650 | 1.500 | 3.36 | 12315 | 2955 | 2.9 |
| 6.00 | 4 | 130 | 0.065 | 0.780 | 1.800 | 4.04 | 10245 | 2665 | 3.7 |
| 8.00 | 4 | 130 | 0.075 | 1.040 | 2.400 | 5.38 | 7690 | 2305 | 5.8 |
| 10.00 | 4 | 130 | 0.085 | 1.700 | 3.000 | 7.51 | 5510 | 1875 | 9.6 |
| 12.00 | 4 | 130 | 0.090 | 2.040 | 3.600 | 9.02 | 4590 | 1650 | 12.1 |

| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|------|-------|------|-----|
| 3.00 | 4 | 110 | 0.045 | 0.390 | 0.900 | 2.02 | 17335 | 3120 | 1.1 |
| 4.00 | 4 | 110 | 0.050 | 0.520 | 1.200 | 2.69 | 13015 | 2605 | 1.6 |
| 5.00 | 4 | 110 | 0.055 | 0.650 | 1.500 | 3.36 | 10420 | 2295 | 2.2 |
| 6.00 | 4 | 110 | 0.060 | 0.780 | 1.800 | 4.04 | 8665 | 2080 | 2.9 |
| 8.00 | 4 | 110 | 0.070 | 1.040 | 2.400 | 5.38 | 6510 | 1820 | 4.5 |
| 10.00 | 4 | 110 | 0.080 | 1.700 | 3.000 | 7.51 | 4660 | 1490 | 7.6 |
| 12.00 | 4 | 110 | 0.085 | 2.040 | 3.600 | 9.02 | 3880 | 1320 | 9.7 |

| | | | | | | | | | |
|-------|---|----|-------|-------|-------|------|------|-----|-----|
| 3.00 | 4 | 50 | 0.020 | 0.300 | 0.680 | 1.80 | 8840 | 705 | 0.1 |
| 4.00 | 4 | 50 | 0.025 | 0.410 | 0.900 | 2.43 | 6550 | 655 | 0.2 |
| 5.00 | 4 | 50 | 0.025 | 0.510 | 1.130 | 3.03 | 5255 | 525 | 0.3 |
| 6.00 | 4 | 50 | 0.030 | 0.610 | 1.080 | 3.63 | 4385 | 525 | 0.3 |
| 8.00 | 4 | 50 | 0.030 | 0.820 | 1.080 | 4.85 | 3280 | 395 | 0.3 |
| 10.00 | 4 | 50 | 0.040 | 1.020 | 0.900 | 6.05 | 2630 | 420 | 0.4 |
| 12.00 | 4 | 50 | 0.040 | 1.220 | 1.080 | 7.25 | 2195 | 350 | 0.5 |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



| d1 [mm] | z | v_c [m/min] | f_z [mm] | a_p [mm] | a_e [mm] | d_{eff} [mm] | n [min ⁻¹] | v_f [mm/min] | β [°] |
|------------|---|------------------|---------------|---------------|---------------|-------------------|---------------------------|-------------------|----------------|
| 3.00 | 4 | 200 | 0.070 | 0.270 | 0.270 | 2.95 | 21580 | 6040 | 45° |
| 4.00 | 4 | 200 | 0.080 | 0.360 | 0.360 | 3.94 | 16160 | 5170 | 45° |
| 5.00 | 4 | 200 | 0.090 | 0.450 | 0.450 | 4.92 | 12940 | 4660 | 45° |
| 6.00 | 4 | 200 | 0.100 | 0.540 | 0.540 | 5.91 | 10770 | 4310 | 45° |
| 8.00 | 4 | 200 | 0.110 | 0.720 | 0.720 | 7.88 | 8080 | 3555 | 45° |
| 10.00 | 4 | 200 | 0.130 | 0.900 | 0.900 | 9.85 | 6465 | 3360 | 45° |
| 12.00 | 4 | 200 | 0.135 | 1.080 | 1.080 | 11.81 | 5390 | 2910 | 45° |

| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|-----|
| 3.00 | 4 | 160 | 0.065 | 0.150 | 0.150 | 2.83 | 17995 | 4680 | 45° |
| 4.00 | 4 | 160 | 0.075 | 0.200 | 0.200 | 3.78 | 13475 | 4040 | 45° |
| 5.00 | 4 | 160 | 0.085 | 0.250 | 0.250 | 4.72 | 10790 | 3670 | 45° |
| 6.00 | 4 | 160 | 0.090 | 0.300 | 0.300 | 5.67 | 8980 | 3235 | 45° |
| 8.00 | 4 | 160 | 0.100 | 0.400 | 0.400 | 7.56 | 6735 | 2695 | 45° |
| 10.00 | 4 | 160 | 0.120 | 0.500 | 0.500 | 9.45 | 5390 | 2585 | 45° |
| 12.00 | 4 | 160 | 0.125 | 0.600 | 0.600 | 11.34 | 4490 | 2245 | 45° |

| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|-----|
| 3.00 | 4 | 120 | 0.060 | 0.150 | 0.150 | 2.83 | 13495 | 3240 | 45° |
| 4.00 | 4 | 120 | 0.070 | 0.200 | 0.200 | 3.78 | 10105 | 2830 | 45° |
| 5.00 | 4 | 120 | 0.075 | 0.250 | 0.250 | 4.72 | 8095 | 2430 | 45° |
| 6.00 | 4 | 120 | 0.085 | 0.300 | 0.300 | 5.67 | 6735 | 2290 | 45° |
| 8.00 | 4 | 120 | 0.095 | 0.400 | 0.400 | 7.56 | 5055 | 1920 | 45° |
| 10.00 | 4 | 120 | 0.110 | 0.500 | 0.500 | 9.45 | 4040 | 1780 | 45° |
| 12.00 | 4 | 120 | 0.115 | 0.600 | 0.600 | 11.34 | 3370 | 1550 | 45° |

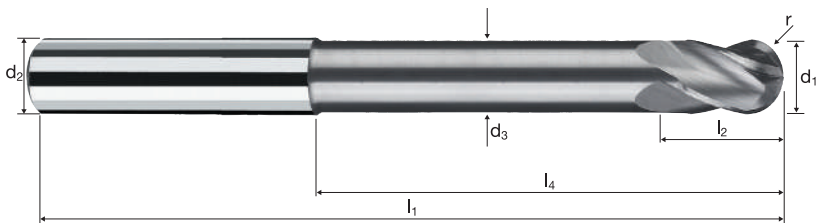
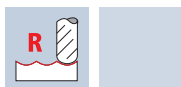
| | | | | | | | | | |
|-------|---|----|-------|-------|-------|-------|-------|------|-----|
| 3.00 | 4 | 90 | 0.055 | 0.120 | 0.120 | 2.78 | 10305 | 2265 | 45° |
| 4.00 | 4 | 90 | 0.060 | 0.160 | 0.160 | 3.71 | 7720 | 1855 | 45° |
| 5.00 | 4 | 90 | 0.070 | 0.200 | 0.200 | 4.64 | 6175 | 1730 | 45° |
| 6.00 | 4 | 90 | 0.075 | 0.240 | 0.240 | 5.57 | 5145 | 1545 | 45° |
| 8.00 | 4 | 90 | 0.085 | 0.320 | 0.320 | 7.42 | 3860 | 1315 | 45° |
| 10.00 | 4 | 90 | 0.100 | 0.400 | 0.400 | 9.28 | 3085 | 1235 | 45° |
| 12.00 | 4 | 90 | 0.100 | 0.480 | 0.480 | 11.13 | 2575 | 1030 | 45° |

Frese con estremità emisferica Sphericut (Sphero-XR4)

Tolleranza $r \pm 0.01, 6xd$



HM λ **30°**
XT γ **-10°**

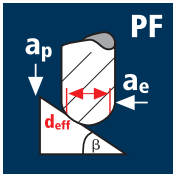


ToolSchool **ReTool®**

| | | | | | | | | |
|--|--|------------------------|------------------------|---------------------|---------------------|--------------------|--|--|
| | | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | | |
|--|--|------------------------|------------------------|---------------------|---------------------|--------------------|--|--|

| | | | | | | | | | | | X-AL |
|---|---------------------------|----------------------|----------------|----------------|----------------|----------------|----------------|------------|------|---|--------------|
| Esempio: N° Ordine | | | | | | | | | | | |
| Rivestimento: X Articolo: 7454 Codice-Ø: 180 | | | | | | | | | | | |
| | | | | | | | | | | | X7454 |
| Ø Code | d ₁ 0/-0.02 | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.01 | α | z | EUR |
| 180 | 3.00 | 6.00 | 2.80 | 66 | 4.00 | 18.00 | 24.63 | 1.500 | 3.9° | 4 | 119.00 |
| 220 | 4.00 | 6.00 | 3.70 | 69 | 5.00 | 24.00 | 28.95 | 2.000 | 2.2° | 4 | 119.00 |
| 260 | 5.00 | 6.00 | 4.60 | 75 | 6.00 | 30.00 | 33.27 | 2.500 | 1.0° | 4 | 119.00 |
| 300 | 6.00 | 6.00 | 5.50 | 80 | 7.00 | 42.34 | 43.00 | 3.000 | 0.0° | 4 | 119.00 |
| 391 | 8.00 | 8.00 | 7.40 | 90 | 9.00 | 52.29 | 53.00 | 4.000 | 0.0° | 4 | 148.00 |
| 450 | 10.00 | 10.00 | 9.20 | 105 | 11.00 | 63.20 | 64.00 | 5.000 | 0.0° | 4 | 202.00 |
| 501 | 12.00 | 12.00 | 11.00 | 120 | 13.00 | 73.13 | 74.00 | 6.000 | 0.0° | 4 | 249.00 |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
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| | | | | | | | | | | | |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



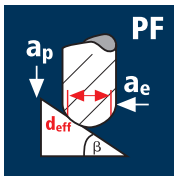
| d1 [mm] | z | v _c [m/min] | f _z [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|----------|
| 3.00 | 4 | 160 | 0.060 | 0.210 | 0.210 | 2.91 | 17500 | 4200 | 45° |
| 4.00 | 4 | 160 | 0.070 | 0.280 | 0.280 | 3.88 | 13125 | 3675 | 45° |
| 5.00 | 4 | 160 | 0.080 | 0.350 | 0.350 | 4.84 | 10525 | 3365 | 45° |
| 6.00 | 4 | 160 | 0.085 | 0.420 | 0.420 | 5.81 | 8765 | 2980 | 45° |
| 8.00 | 4 | 160 | 0.095 | 0.560 | 0.560 | 7.75 | 6570 | 2495 | 45° |
| 10.00 | 4 | 160 | 0.110 | 0.700 | 0.700 | 9.69 | 5255 | 2315 | 45° |
| 12.00 | 4 | 160 | 0.115 | 0.840 | 0.840 | 11.63 | 4380 | 2015 | 45° |

| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|-----|
| 3.00 | 4 | 120 | 0.055 | 0.150 | 0.150 | 2.83 | 13495 | 2970 | 45° |
| 4.00 | 4 | 120 | 0.065 | 0.200 | 0.200 | 3.78 | 10105 | 2625 | 45° |
| 5.00 | 4 | 120 | 0.075 | 0.250 | 0.250 | 4.72 | 8095 | 2430 | 45° |
| 6.00 | 4 | 120 | 0.080 | 0.300 | 0.300 | 5.67 | 6735 | 2155 | 45° |
| 8.00 | 4 | 120 | 0.085 | 0.400 | 0.400 | 7.56 | 5055 | 1720 | 45° |
| 10.00 | 4 | 120 | 0.100 | 0.500 | 0.500 | 9.45 | 4040 | 1615 | 45° |
| 12.00 | 4 | 120 | 0.105 | 0.600 | 0.600 | 11.34 | 3370 | 1415 | 45° |

| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|-----|
| 3.00 | 4 | 100 | 0.050 | 0.150 | 0.150 | 2.83 | 11250 | 2250 | 45° |
| 4.00 | 4 | 100 | 0.060 | 0.200 | 0.200 | 3.78 | 8420 | 2020 | 45° |
| 5.00 | 4 | 100 | 0.070 | 0.250 | 0.250 | 4.72 | 6745 | 1890 | 45° |
| 6.00 | 4 | 100 | 0.070 | 0.300 | 0.300 | 5.67 | 5615 | 1570 | 45° |
| 8.00 | 4 | 100 | 0.080 | 0.400 | 0.400 | 7.56 | 4210 | 1345 | 45° |
| 10.00 | 4 | 100 | 0.095 | 0.500 | 0.500 | 9.45 | 3370 | 1280 | 45° |
| 12.00 | 4 | 100 | 0.100 | 0.600 | 0.600 | 11.34 | 2805 | 1125 | 45° |

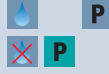
| | | | | | | | | | |
|-------|---|----|-------|-------|-------|-------|------|------|-----|
| 3.00 | 4 | 60 | 0.045 | 0.120 | 0.120 | 2.78 | 6870 | 1235 | 45° |
| 4.00 | 4 | 60 | 0.055 | 0.160 | 0.160 | 3.71 | 5150 | 1135 | 45° |
| 5.00 | 4 | 60 | 0.060 | 0.200 | 0.200 | 4.64 | 4115 | 990 | 45° |
| 6.00 | 4 | 60 | 0.065 | 0.240 | 0.240 | 5.57 | 3430 | 890 | 45° |
| 8.00 | 4 | 60 | 0.070 | 0.320 | 0.320 | 7.42 | 2575 | 720 | 45° |
| 10.00 | 4 | 60 | 0.085 | 0.400 | 0.400 | 9.28 | 2060 | 700 | 45° |
| 12.00 | 4 | 60 | 0.085 | 0.480 | 0.480 | 11.13 | 1715 | 585 | 45° |

Applicazione



Materiale

Acciaio
1100 - 1300 N/mm²



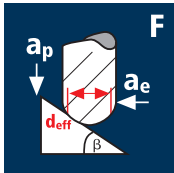
Acciaio da
utensile temprato
42 - 48 HRC



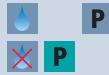
Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio
1100 - 1300 N/mm²



Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



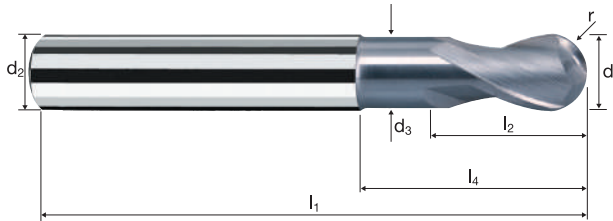
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|----------|
| 1.00 | 2 | 131 | 0.040 | 0.100 | 0.100 | 0.99 | 42120 | 3370 | 45° |
| 2.00 | 2 | 180 | 0.065 | 0.200 | 0.200 | 1.98 | 28935 | 3760 | 45° |
| 3.00 | 2 | 180 | 0.075 | 0.300 | 0.300 | 2.97 | 19290 | 2895 | 45° |
| 4.00 | 2 | 180 | 0.090 | 0.400 | 0.400 | 3.96 | 14470 | 2605 | 45° |
| 6.00 | 2 | 180 | 0.110 | 0.600 | 0.600 | 5.94 | 9645 | 2120 | 45° |
| 8.00 | 2 | 180 | 0.125 | 0.800 | 0.800 | 7.92 | 7235 | 1810 | 45° |
| 10.00 | 2 | 180 | 0.145 | 1.000 | 1.000 | 9.90 | 5785 | 1680 | 45° |
| 12.00 | 2 | 180 | 0.150 | 1.200 | 1.200 | 11.88 | 4825 | 1445 | 45° |
| 16.00 | 2 | 180 | 0.180 | 1.600 | 1.600 | 15.84 | 3615 | 1300 | 45° |
| 1.00 | 2 | 131 | 0.035 | 0.100 | 0.100 | 0.99 | 42120 | 2950 | 45° |
| 2.00 | 2 | 160 | 0.060 | 0.200 | 0.200 | 1.98 | 25720 | 3085 | 45° |
| 3.00 | 2 | 160 | 0.070 | 0.300 | 0.300 | 2.97 | 17150 | 2400 | 45° |
| 4.00 | 2 | 160 | 0.085 | 0.400 | 0.400 | 3.96 | 12860 | 2185 | 45° |
| 6.00 | 2 | 160 | 0.100 | 0.600 | 0.600 | 5.94 | 8575 | 1715 | 45° |
| 8.00 | 2 | 160 | 0.115 | 0.800 | 0.800 | 7.92 | 6430 | 1480 | 45° |
| 10.00 | 2 | 160 | 0.135 | 1.000 | 1.000 | 9.90 | 5145 | 1390 | 45° |
| 12.00 | 2 | 160 | 0.140 | 1.200 | 1.200 | 11.88 | 4285 | 1200 | 45° |
| 16.00 | 2 | 160 | 0.165 | 1.600 | 1.600 | 15.84 | 3215 | 1060 | 45° |
| 1.00 | 2 | 132 | 0.035 | 0.120 | 0.120 | 1.00 | 42015 | 2940 | 45° |
| 2.00 | 2 | 140 | 0.055 | 0.150 | 0.150 | 1.95 | 22855 | 2515 | 45° |
| 3.00 | 2 | 140 | 0.065 | 0.180 | 0.180 | 2.87 | 15525 | 2020 | 45° |
| 4.00 | 2 | 140 | 0.075 | 0.200 | 0.200 | 3.78 | 11790 | 1770 | 45° |
| 6.00 | 2 | 140 | 0.095 | 0.300 | 0.300 | 5.67 | 7860 | 1495 | 45° |
| 8.00 | 2 | 140 | 0.105 | 0.400 | 0.400 | 7.56 | 5895 | 1240 | 45° |
| 10.00 | 2 | 140 | 0.125 | 0.500 | 0.500 | 9.45 | 4715 | 1180 | 45° |
| 12.00 | 2 | 140 | 0.130 | 0.600 | 0.600 | 11.34 | 3930 | 1020 | 45° |
| 16.00 | 2 | 140 | 0.155 | 0.800 | 0.800 | 15.11 | 2950 | 915 | 45° |
| 1.00 | 2 | 100 | 0.030 | 0.120 | 0.120 | 1.00 | 31830 | 1910 | 45° |
| 2.00 | 2 | 100 | 0.050 | 0.150 | 0.150 | 1.95 | 16325 | 1630 | 45° |
| 3.00 | 2 | 100 | 0.060 | 0.180 | 0.180 | 2.87 | 11090 | 1330 | 45° |
| 4.00 | 2 | 100 | 0.070 | 0.200 | 0.200 | 3.78 | 8420 | 1180 | 45° |
| 6.00 | 2 | 100 | 0.090 | 0.300 | 0.300 | 5.67 | 5615 | 1010 | 45° |
| 8.00 | 2 | 100 | 0.100 | 0.400 | 0.400 | 7.56 | 4210 | 840 | 45° |
| 10.00 | 2 | 100 | 0.115 | 0.500 | 0.500 | 9.45 | 3370 | 775 | 45° |
| 12.00 | 2 | 100 | 0.120 | 0.600 | 0.600 | 11.34 | 2805 | 675 | 45° |
| 16.00 | 2 | 100 | 0.145 | 0.800 | 0.800 | 15.11 | 2105 | 610 | 45° |
| 1.00 | 2 | 124 | 0.025 | 0.050 | 0.050 | 0.94 | 41990 | 2100 | 45° |
| 2.00 | 2 | 243 | 0.030 | 0.070 | 0.070 | 1.84 | 42040 | 2520 | 45° |
| 3.00 | 2 | 280 | 0.035 | 0.100 | 0.100 | 2.74 | 32530 | 2275 | 45° |
| 4.00 | 2 | 280 | 0.055 | 0.120 | 0.120 | 3.62 | 24620 | 2710 | 45° |
| 6.00 | 2 | 280 | 0.065 | 0.150 | 0.150 | 5.36 | 16630 | 2160 | 45° |
| 8.00 | 2 | 280 | 0.075 | 0.170 | 0.170 | 7.05 | 12640 | 1895 | 45° |
| 10.00 | 2 | 280 | 0.080 | 0.200 | 0.200 | 8.77 | 10165 | 1625 | 45° |
| 12.00 | 2 | 280 | 0.085 | 0.250 | 0.250 | 10.56 | 8440 | 1435 | 45° |
| 16.00 | 2 | 280 | 0.100 | 0.280 | 0.280 | 13.88 | 6420 | 1285 | 45° |
| 1.00 | 2 | 124 | 0.025 | 0.050 | 0.050 | 0.94 | 41990 | 2100 | 45° |
| 2.00 | 2 | 243 | 0.030 | 0.070 | 0.070 | 1.84 | 42040 | 2520 | 45° |
| 3.00 | 2 | 250 | 0.035 | 0.100 | 0.100 | 2.74 | 29045 | 2035 | 45° |
| 4.00 | 2 | 250 | 0.050 | 0.120 | 0.120 | 3.62 | 21985 | 2200 | 45° |
| 6.00 | 2 | 250 | 0.060 | 0.150 | 0.150 | 5.36 | 14845 | 1780 | 45° |
| 8.00 | 2 | 250 | 0.070 | 0.170 | 0.170 | 7.05 | 11290 | 1580 | 45° |
| 10.00 | 2 | 250 | 0.075 | 0.200 | 0.200 | 8.77 | 9075 | 1360 | 45° |
| 12.00 | 2 | 250 | 0.080 | 0.250 | 0.250 | 10.56 | 7535 | 1205 | 45° |
| 16.00 | 2 | 250 | 0.095 | 0.280 | 0.280 | 13.88 | 5735 | 1090 | 45° |
| 1.00 | 2 | 124 | 0.025 | 0.050 | 0.050 | 0.94 | 41990 | 2100 | 45° |
| 2.00 | 2 | 200 | 0.025 | 0.070 | 0.070 | 1.84 | 34600 | 1730 | 45° |
| 3.00 | 2 | 200 | 0.030 | 0.100 | 0.100 | 2.74 | 23235 | 1395 | 45° |
| 4.00 | 2 | 200 | 0.050 | 0.120 | 0.120 | 3.62 | 17585 | 1760 | 45° |
| 6.00 | 2 | 200 | 0.060 | 0.150 | 0.150 | 5.36 | 11875 | 1425 | 45° |
| 8.00 | 2 | 200 | 0.070 | 0.170 | 0.170 | 7.05 | 9030 | 1265 | 45° |
| 10.00 | 2 | 200 | 0.070 | 0.200 | 0.200 | 8.77 | 7260 | 1015 | 45° |
| 12.00 | 2 | 200 | 0.075 | 0.250 | 0.250 | 10.56 | 6030 | 905 | 45° |
| 16.00 | 2 | 200 | 0.090 | 0.280 | 0.280 | 13.88 | 4585 | 825 | 45° |
| 1.00 | 2 | 124 | 0.020 | 0.050 | 0.050 | 0.94 | 41990 | 1680 | 45° |
| 2.00 | 2 | 150 | 0.025 | 0.070 | 0.070 | 1.84 | 25950 | 1295 | 45° |
| 3.00 | 2 | 150 | 0.030 | 0.100 | 0.100 | 2.74 | 17425 | 1045 | 45° |
| 4.00 | 2 | 150 | 0.045 | 0.120 | 0.120 | 3.62 | 13190 | 1185 | 45° |
| 6.00 | 2 | 150 | 0.055 | 0.150 | 0.150 | 5.36 | 8910 | 980 | 45° |
| 8.00 | 2 | 150 | 0.065 | 0.170 | 0.170 | 7.05 | 6775 | 880 | 45° |
| 10.00 | 2 | 150 | 0.070 | 0.200 | 0.200 | 8.77 | 5445 | 760 | 45° |
| 12.00 | 2 | 150 | 0.070 | 0.250 | 0.250 | 10.56 | 4520 | 635 | 45° |
| 16.00 | 2 | 150 | 0.085 | 0.280 | 0.280 | 13.88 | 3440 | 585 | 45° |

Frese con estremità emisferica Sphericut

Tolleranza r f8 (-/-), 3xd



HM Plus λ 30°
 γ -10°

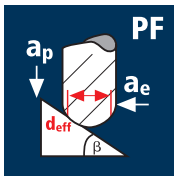


ReTool®

| | | | | | | | | | | | |
|--|--|------------------------|------------------------|---------------------|---------------------|--|--|--|--|--|--------------|
| | | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | | | | | | GG(G) |
|--|--|------------------------|------------------------|---------------------|---------------------|--|--|--|--|--|--------------|

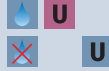
| Esempio: N° Ordine | | | | | | | | | | | POLYCHROM | |
|--------------------|-----------------------|-------------------|----------------|----------------------|----------------|----------------|---------------------|-------|-------|---|-----------|--|
| | | | | | | | | | | | P5286 | |
| | | | | | | | | | | | EUR | |
| Ø Code | d ₁ ± | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r f8 | α | z | | |
| | Rivestimento P | | | Articolo 5286 | | | Codice-Ø 100 | | | | | |
| 100 | 1.00 | 3.00 | - | 40 | 1.00 | - | 5.93 | 0.500 | 13.2° | 2 | 80.00 | |
| 120 | 1.50 | 3.00 | - | 40 | 2.00 | - | 5.99 | 0.750 | 10.4° | 2 | 80.00 | |
| 138 | 2.00 | 3.00 | - | 40 | 2.50 | - | 5.96 | 1.000 | 8.3° | 2 | 80.00 | |
| 140 | 2.00 | 6.00 | 1.90 | 57 | 3.00 | 6.00 | 14.31 | 1.000 | 9.0° | 2 | 80.00 | |
| 178 | 3.00 | 3.00 | - | 40 | 4.00 | - | - | 1.500 | 0.0° | 2 | 80.00 | |
| 180 | 3.00 | 6.00 | 2.80 | 57 | 4.00 | 9.00 | 15.63 | 1.500 | 6.4° | 2 | 80.00 | |
| 220 | 4.00 | 6.00 | 3.70 | 57 | 5.00 | 12.00 | 16.95 | 2.000 | 4.0° | 2 | 80.00 | |
| 260 | 5.00 | 6.00 | 4.60 | 57 | 6.00 | 15.00 | 18.27 | 2.500 | 2.0° | 2 | 80.00 | |
| 300 | 6.00 | 6.00 | 5.50 | 57 | 7.00 | 19.34 | 20.00 | 3.000 | 0.0° | 2 | 80.00 | |
| 391 | 8.00 | 8.00 | 7.40 | 63 | 9.00 | 25.29 | 26.00 | 4.000 | 0.0° | 2 | 100.00 | |
| 450 | 10.00 | 10.00 | 9.20 | 72 | 11.00 | 30.20 | 31.00 | 5.000 | 0.0° | 2 | 136.00 | |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 13.00 | 36.13 | 37.00 | 6.000 | 0.0° | 2 | 167.00 | |
| 610 | 16.00 | 16.00 | 15.00 | 92 | 17.00 | 42.13 | 43.00 | 8.000 | 0.0° | 2 | 262.00 | |

Applicazione



Materiale

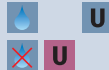
Acciaio
850 - 1100 N/mm²



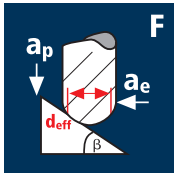
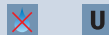
Acciaio
1100 - 1300 N/mm²



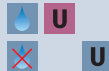
Acciaio
1300 - 1500 N/mm²



Acciaio
1500 - 1800 N/mm²



Acciaio
850 - 1100 N/mm²



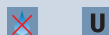
Acciaio
1100 - 1300 N/mm²



Acciaio
1300 - 1500 N/mm²



Acciaio
1500 - 1800 N/mm²



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
| 3.00 | 2 | 200 | 0.070 | 0.240 | 0.240 | 2.93 | 21730 | 3040 | 45° |
| 4.00 | 2 | 200 | 0.080 | 0.320 | 0.320 | 3.91 | 16280 | 2605 | 45° |
| 5.00 | 2 | 200 | 0.090 | 0.400 | 0.400 | 4.89 | 13020 | 2345 | 45° |
| 6.00 | 2 | 200 | 0.100 | 0.480 | 0.480 | 5.87 | 10845 | 2170 | 45° |
| 8.00 | 2 | 200 | 0.110 | 0.640 | 0.640 | 7.82 | 8140 | 1790 | 45° |
| 10.00 | 2 | 200 | 0.130 | 0.800 | 0.800 | 9.78 | 6510 | 1690 | 45° |
| 12.00 | 2 | 200 | 0.135 | 0.960 | 0.960 | 11.73 | 5425 | 1465 | 45° |

| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|-----|
| 3.00 | 2 | 160 | 0.065 | 0.240 | 0.240 | 2.93 | 17380 | 2260 | 45° |
| 4.00 | 2 | 160 | 0.075 | 0.320 | 0.320 | 3.91 | 13025 | 1955 | 45° |
| 5.00 | 2 | 160 | 0.085 | 0.400 | 0.400 | 4.89 | 10415 | 1770 | 45° |
| 6.00 | 2 | 160 | 0.090 | 0.480 | 0.480 | 5.87 | 8675 | 1560 | 45° |
| 8.00 | 2 | 160 | 0.100 | 0.640 | 0.640 | 7.82 | 6515 | 1305 | 45° |
| 10.00 | 2 | 160 | 0.120 | 0.800 | 0.800 | 9.78 | 5210 | 1250 | 45° |
| 12.00 | 2 | 160 | 0.125 | 0.960 | 0.960 | 11.73 | 4340 | 1085 | 45° |

| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|-----|
| 3.00 | 2 | 140 | 0.060 | 0.240 | 0.240 | 2.93 | 15210 | 1825 | 45° |
| 4.00 | 2 | 140 | 0.070 | 0.320 | 0.320 | 3.91 | 11395 | 1595 | 45° |
| 5.00 | 2 | 140 | 0.075 | 0.400 | 0.400 | 4.89 | 9115 | 1365 | 45° |
| 6.00 | 2 | 140 | 0.085 | 0.480 | 0.480 | 5.87 | 7590 | 1290 | 45° |
| 8.00 | 2 | 140 | 0.095 | 0.640 | 0.640 | 7.82 | 5700 | 1085 | 45° |
| 10.00 | 2 | 140 | 0.110 | 0.800 | 0.800 | 9.78 | 4555 | 1000 | 45° |
| 12.00 | 2 | 140 | 0.115 | 0.960 | 0.960 | 11.73 | 3800 | 875 | 45° |

| | | | | | | | | | |
|-------|---|----|-------|-------|-------|-------|------|-----|-----|
| 3.00 | 2 | 80 | 0.055 | 0.190 | 0.190 | 2.89 | 8810 | 970 | 45° |
| 4.00 | 2 | 80 | 0.065 | 0.260 | 0.260 | 3.86 | 6595 | 860 | 45° |
| 5.00 | 2 | 80 | 0.070 | 0.320 | 0.320 | 4.81 | 5295 | 740 | 45° |
| 6.00 | 2 | 80 | 0.080 | 0.380 | 0.380 | 5.77 | 4415 | 705 | 45° |
| 8.00 | 2 | 80 | 0.090 | 0.510 | 0.510 | 7.70 | 3305 | 595 | 45° |
| 10.00 | 2 | 80 | 0.105 | 0.640 | 0.640 | 9.63 | 2645 | 555 | 45° |
| 12.00 | 2 | 80 | 0.110 | 0.770 | 0.770 | 11.55 | 2205 | 485 | 45° |

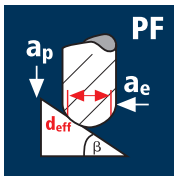
| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|-----|
| 3.00 | 2 | 300 | 0.025 | 0.100 | 0.100 | 2.74 | 34850 | 1745 | 45° |
| 4.00 | 2 | 300 | 0.050 | 0.120 | 0.120 | 3.62 | 26380 | 2640 | 45° |
| 5.00 | 2 | 300 | 0.055 | 0.130 | 0.130 | 4.48 | 21315 | 2345 | 45° |
| 6.00 | 2 | 300 | 0.060 | 0.150 | 0.150 | 5.36 | 17815 | 2140 | 45° |
| 8.00 | 2 | 300 | 0.065 | 0.170 | 0.170 | 7.05 | 13545 | 1760 | 45° |
| 10.00 | 2 | 300 | 0.070 | 0.200 | 0.200 | 8.77 | 10890 | 1525 | 45° |
| 12.00 | 2 | 300 | 0.075 | 0.250 | 0.250 | 10.56 | 9045 | 1355 | 45° |

| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|-----|
| 3.00 | 2 | 260 | 0.025 | 0.100 | 0.100 | 2.74 | 30205 | 1510 | 45° |
| 4.00 | 2 | 260 | 0.050 | 0.120 | 0.120 | 3.62 | 22860 | 2285 | 45° |
| 5.00 | 2 | 260 | 0.050 | 0.130 | 0.130 | 4.48 | 18475 | 1845 | 45° |
| 6.00 | 2 | 260 | 0.055 | 0.150 | 0.150 | 5.36 | 15440 | 1700 | 45° |
| 8.00 | 2 | 260 | 0.060 | 0.170 | 0.170 | 7.05 | 11740 | 1410 | 45° |
| 10.00 | 2 | 260 | 0.065 | 0.200 | 0.200 | 8.77 | 9435 | 1225 | 45° |
| 12.00 | 2 | 260 | 0.070 | 0.250 | 0.250 | 10.56 | 7835 | 1095 | 45° |

| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|-----|
| 3.00 | 2 | 200 | 0.025 | 0.100 | 0.100 | 2.74 | 23235 | 1160 | 45° |
| 4.00 | 2 | 200 | 0.045 | 0.120 | 0.120 | 3.62 | 17585 | 1585 | 45° |
| 5.00 | 2 | 200 | 0.050 | 0.130 | 0.130 | 4.48 | 14210 | 1420 | 45° |
| 6.00 | 2 | 200 | 0.055 | 0.150 | 0.150 | 5.36 | 11875 | 1305 | 45° |
| 8.00 | 2 | 200 | 0.060 | 0.170 | 0.170 | 7.05 | 9030 | 1085 | 45° |
| 10.00 | 2 | 200 | 0.065 | 0.200 | 0.200 | 8.77 | 7260 | 945 | 45° |
| 12.00 | 2 | 200 | 0.070 | 0.250 | 0.250 | 10.56 | 6030 | 845 | 45° |

| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|-----|-----|
| 3.00 | 2 | 100 | 0.020 | 0.080 | 0.080 | 2.69 | 11835 | 475 | 45° |
| 4.00 | 2 | 100 | 0.045 | 0.100 | 0.100 | 3.57 | 8915 | 800 | 45° |
| 5.00 | 2 | 100 | 0.045 | 0.110 | 0.110 | 4.42 | 7200 | 650 | 45° |
| 6.00 | 2 | 100 | 0.050 | 0.130 | 0.130 | 5.29 | 6015 | 600 | 45° |
| 8.00 | 2 | 100 | 0.055 | 0.150 | 0.150 | 6.98 | 4560 | 500 | 45° |
| 10.00 | 2 | 100 | 0.060 | 0.180 | 0.180 | 8.70 | 3660 | 440 | 45° |
| 12.00 | 2 | 100 | 0.065 | 0.220 | 0.220 | 10.45 | 3045 | 395 | 45° |

Applicazione



Materiale

Acciaio
1100 - 1300 N/mm²



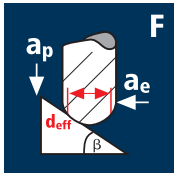
Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio
1100 - 1300 N/mm²



Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC

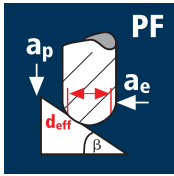


Acciaio da
utensile temprato
52 - 56 HRC



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|----------|
| 1.00 | 2 | 129 | 0.035 | 0.080 | 0.080 | 0.98 | 41900 | 2935 | 45° |
| 2.00 | 2 | 180 | 0.060 | 0.160 | 0.160 | 1.96 | 29235 | 3510 | 45° |
| 3.00 | 2 | 180 | 0.070 | 0.240 | 0.240 | 2.93 | 19555 | 2740 | 45° |
| 4.00 | 2 | 180 | 0.080 | 0.320 | 0.320 | 3.91 | 14655 | 2345 | 45° |
| 6.00 | 2 | 180 | 0.100 | 0.480 | 0.480 | 5.87 | 9760 | 1950 | 45° |
| 8.00 | 2 | 180 | 0.110 | 0.640 | 0.640 | 7.82 | 7325 | 1610 | 45° |
| 10.00 | 2 | 180 | 0.130 | 0.800 | 0.800 | 9.78 | 5860 | 1525 | 45° |
| 12.00 | 2 | 180 | 0.135 | 0.960 | 0.960 | 11.73 | 4885 | 1320 | 45° |
| 16.00 | 2 | 180 | 0.160 | 1.280 | 1.280 | 15.64 | 3665 | 1170 | 45° |
| 1.00 | 2 | 129 | 0.030 | 0.080 | 0.080 | 0.98 | 41900 | 2515 | 45° |
| 2.00 | 2 | 160 | 0.055 | 0.160 | 0.160 | 1.96 | 25985 | 2860 | 45° |
| 3.00 | 2 | 160 | 0.065 | 0.240 | 0.240 | 2.93 | 17380 | 2260 | 45° |
| 4.00 | 2 | 160 | 0.075 | 0.320 | 0.320 | 3.91 | 13025 | 1955 | 45° |
| 6.00 | 2 | 160 | 0.090 | 0.480 | 0.480 | 5.87 | 8675 | 1560 | 45° |
| 8.00 | 2 | 160 | 0.100 | 0.640 | 0.640 | 7.82 | 6515 | 1305 | 45° |
| 10.00 | 2 | 160 | 0.120 | 0.800 | 0.800 | 9.78 | 5210 | 1250 | 45° |
| 12.00 | 2 | 160 | 0.125 | 0.960 | 0.960 | 11.73 | 4340 | 1085 | 45° |
| 16.00 | 2 | 160 | 0.145 | 1.280 | 1.280 | 15.64 | 3255 | 945 | 45° |
| 1.00 | 2 | 129 | 0.030 | 0.080 | 0.080 | 0.98 | 41900 | 2515 | 45° |
| 2.00 | 2 | 140 | 0.050 | 0.120 | 0.120 | 1.92 | 23210 | 2320 | 45° |
| 3.00 | 2 | 140 | 0.060 | 0.160 | 0.160 | 2.85 | 15635 | 1875 | 45° |
| 4.00 | 2 | 140 | 0.070 | 0.200 | 0.200 | 3.78 | 11790 | 1650 | 45° |
| 6.00 | 2 | 140 | 0.085 | 0.300 | 0.300 | 5.67 | 7860 | 1335 | 45° |
| 8.00 | 2 | 140 | 0.095 | 0.400 | 0.400 | 7.56 | 5895 | 1120 | 45° |
| 10.00 | 2 | 140 | 0.110 | 0.500 | 0.500 | 9.45 | 4715 | 1035 | 45° |
| 12.00 | 2 | 140 | 0.115 | 0.600 | 0.600 | 11.34 | 3930 | 905 | 45° |
| 16.00 | 2 | 140 | 0.135 | 0.800 | 0.800 | 15.11 | 2950 | 795 | 45° |
| 1.00 | 2 | 100 | 0.030 | 0.080 | 0.080 | 0.98 | 32480 | 1950 | 45° |
| 2.00 | 2 | 100 | 0.050 | 0.120 | 0.120 | 1.92 | 16580 | 1660 | 45° |
| 3.00 | 2 | 100 | 0.055 | 0.160 | 0.160 | 2.85 | 11170 | 1230 | 45° |
| 4.00 | 2 | 100 | 0.065 | 0.200 | 0.200 | 3.78 | 8420 | 1095 | 45° |
| 6.00 | 2 | 100 | 0.080 | 0.300 | 0.300 | 5.67 | 5615 | 900 | 45° |
| 8.00 | 2 | 100 | 0.090 | 0.400 | 0.400 | 7.56 | 4210 | 760 | 45° |
| 10.00 | 2 | 100 | 0.105 | 0.500 | 0.500 | 9.45 | 3370 | 705 | 45° |
| 12.00 | 2 | 100 | 0.110 | 0.600 | 0.600 | 11.34 | 2805 | 620 | 45° |
| 16.00 | 2 | 100 | 0.130 | 0.800 | 0.800 | 15.11 | 2105 | 550 | 45° |
| 1.00 | 2 | 123 | 0.025 | 0.040 | 0.040 | 0.93 | 42100 | 2105 | 45° |
| 2.00 | 2 | 239 | 0.030 | 0.060 | 0.060 | 1.81 | 42030 | 2520 | 45° |
| 3.00 | 2 | 280 | 0.030 | 0.090 | 0.090 | 2.72 | 32765 | 1965 | 45° |
| 4.00 | 2 | 280 | 0.050 | 0.110 | 0.110 | 3.60 | 24755 | 2475 | 45° |
| 6.00 | 2 | 280 | 0.060 | 0.130 | 0.130 | 5.29 | 16850 | 2020 | 45° |
| 8.00 | 2 | 280 | 0.065 | 0.150 | 0.150 | 6.98 | 12770 | 1660 | 45° |
| 10.00 | 2 | 280 | 0.070 | 0.180 | 0.180 | 8.70 | 10245 | 1435 | 45° |
| 12.00 | 2 | 280 | 0.075 | 0.220 | 0.220 | 10.45 | 8530 | 1280 | 45° |
| 16.00 | 2 | 280 | 0.090 | 0.250 | 0.250 | 13.77 | 6475 | 1165 | 45° |
| 1.00 | 2 | 123 | 0.025 | 0.040 | 0.040 | 0.93 | 42100 | 2105 | 45° |
| 2.00 | 2 | 239 | 0.030 | 0.060 | 0.060 | 1.81 | 42030 | 2520 | 45° |
| 3.00 | 2 | 250 | 0.030 | 0.090 | 0.090 | 2.72 | 29255 | 1755 | 45° |
| 4.00 | 2 | 250 | 0.050 | 0.110 | 0.110 | 3.60 | 22105 | 2210 | 45° |
| 6.00 | 2 | 250 | 0.055 | 0.130 | 0.130 | 5.29 | 15045 | 1655 | 45° |
| 8.00 | 2 | 250 | 0.060 | 0.150 | 0.150 | 6.98 | 11400 | 1370 | 45° |
| 10.00 | 2 | 250 | 0.065 | 0.180 | 0.180 | 8.70 | 9145 | 1190 | 45° |
| 12.00 | 2 | 250 | 0.070 | 0.220 | 0.220 | 10.45 | 7615 | 1065 | 45° |
| 16.00 | 2 | 250 | 0.085 | 0.250 | 0.250 | 13.77 | 5780 | 980 | 45° |
| 1.00 | 2 | 123 | 0.025 | 0.040 | 0.040 | 0.93 | 42100 | 2105 | 45° |
| 2.00 | 2 | 200 | 0.025 | 0.090 | 0.090 | 1.87 | 34045 | 1700 | 45° |
| 3.00 | 2 | 200 | 0.045 | 0.110 | 0.110 | 2.76 | 23065 | 2075 | 45° |
| 4.00 | 2 | 200 | 0.045 | 0.110 | 0.110 | 3.60 | 17685 | 1590 | 45° |
| 6.00 | 2 | 200 | 0.055 | 0.130 | 0.130 | 5.29 | 12035 | 1325 | 45° |
| 8.00 | 2 | 200 | 0.060 | 0.150 | 0.150 | 6.98 | 9120 | 1095 | 45° |
| 10.00 | 2 | 200 | 0.065 | 0.180 | 0.180 | 8.70 | 7315 | 950 | 45° |
| 12.00 | 2 | 200 | 0.070 | 0.220 | 0.220 | 10.45 | 6090 | 855 | 45° |
| 16.00 | 2 | 200 | 0.080 | 0.250 | 0.250 | 13.77 | 4625 | 740 | 45° |
| 1.00 | 2 | 123 | 0.020 | 0.040 | 0.040 | 0.93 | 42100 | 1685 | 45° |
| 2.00 | 2 | 150 | 0.025 | 0.090 | 0.090 | 1.87 | 25535 | 1275 | 45° |
| 3.00 | 2 | 150 | 0.025 | 0.110 | 0.110 | 2.76 | 17300 | 865 | 45° |
| 4.00 | 2 | 150 | 0.045 | 0.110 | 0.110 | 3.60 | 13265 | 1195 | 45° |
| 6.00 | 2 | 150 | 0.050 | 0.130 | 0.130 | 5.29 | 9025 | 905 | 45° |
| 8.00 | 2 | 150 | 0.055 | 0.150 | 0.150 | 6.98 | 6840 | 750 | 45° |
| 10.00 | 2 | 150 | 0.060 | 0.180 | 0.180 | 8.70 | 5490 | 660 | 45° |
| 12.00 | 2 | 150 | 0.065 | 0.220 | 0.220 | 10.45 | 4570 | 595 | 45° |
| 16.00 | 2 | 150 | 0.075 | 0.250 | 0.250 | 13.77 | 3465 | 520 | 45° |

Applicazione



Materiale

Acciaio
1100 - 1300 N/mm²



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _s [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
| 3.00 | 2 | 160 | 0.060 | 0.180 | 0.180 | 2.87 | 17745 | 2130 | 45° |
| 4.00 | 2 | 160 | 0.070 | 0.240 | 0.240 | 3.83 | 13300 | 1860 | 45° |
| 5.00 | 2 | 160 | 0.080 | 0.300 | 0.300 | 4.79 | 10630 | 1700 | 45° |
| 6.00 | 2 | 160 | 0.085 | 0.360 | 0.360 | 5.75 | 8855 | 1505 | 45° |
| 8.00 | 2 | 160 | 0.100 | 0.480 | 0.480 | 7.66 | 6650 | 1330 | 45° |
| 10.00 | 2 | 160 | 0.115 | 0.600 | 0.600 | 9.58 | 5315 | 1225 | 45° |
| 12.00 | 2 | 160 | 0.120 | 0.720 | 0.720 | 11.50 | 4430 | 1065 | 45° |

Acciaio da
utensile temprato
42 - 48 HRC



| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|-----|
| 3.00 | 2 | 140 | 0.055 | 0.180 | 0.180 | 2.87 | 15525 | 1710 | 45° |
| 4.00 | 2 | 140 | 0.065 | 0.240 | 0.240 | 3.83 | 11635 | 1515 | 45° |
| 5.00 | 2 | 140 | 0.075 | 0.300 | 0.300 | 4.79 | 9305 | 1395 | 45° |
| 6.00 | 2 | 140 | 0.080 | 0.360 | 0.360 | 5.75 | 7750 | 1240 | 45° |
| 8.00 | 2 | 140 | 0.090 | 0.480 | 0.480 | 7.66 | 5820 | 1045 | 45° |
| 10.00 | 2 | 140 | 0.105 | 0.600 | 0.600 | 9.58 | 4650 | 975 | 45° |
| 12.00 | 2 | 140 | 0.110 | 0.720 | 0.720 | 11.50 | 3875 | 855 | 45° |

Acciaio da
utensile temprato
48 - 52 HRC

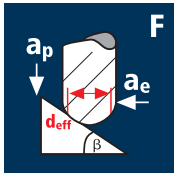


| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|-----|
| 3.00 | 2 | 120 | 0.050 | 0.150 | 0.150 | 2.83 | 13495 | 1350 | 45° |
| 4.00 | 2 | 120 | 0.060 | 0.200 | 0.200 | 3.78 | 10105 | 1215 | 45° |
| 5.00 | 2 | 120 | 0.070 | 0.250 | 0.250 | 4.72 | 8095 | 1135 | 45° |
| 6.00 | 2 | 120 | 0.070 | 0.300 | 0.300 | 5.67 | 6735 | 945 | 45° |
| 8.00 | 2 | 120 | 0.085 | 0.400 | 0.400 | 7.56 | 5055 | 860 | 45° |
| 10.00 | 2 | 120 | 0.100 | 0.500 | 0.500 | 9.45 | 4040 | 810 | 45° |
| 12.00 | 2 | 120 | 0.100 | 0.600 | 0.600 | 11.34 | 3370 | 675 | 45° |

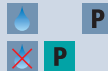
Acciaio da
utensile temprato
52 - 56 HRC



| | | | | | | | | | |
|-------|---|----|-------|-------|-------|-------|------|-----|-----|
| 3.00 | 2 | 80 | 0.050 | 0.150 | 0.150 | 2.83 | 9000 | 900 | 45° |
| 4.00 | 2 | 80 | 0.055 | 0.200 | 0.200 | 3.78 | 6735 | 740 | 45° |
| 5.00 | 2 | 80 | 0.065 | 0.250 | 0.250 | 4.72 | 5395 | 700 | 45° |
| 6.00 | 2 | 80 | 0.070 | 0.300 | 0.300 | 5.67 | 4490 | 630 | 45° |
| 8.00 | 2 | 80 | 0.080 | 0.400 | 0.400 | 7.56 | 3370 | 540 | 45° |
| 10.00 | 2 | 80 | 0.090 | 0.500 | 0.500 | 9.45 | 2695 | 485 | 45° |
| 12.00 | 2 | 80 | 0.095 | 0.600 | 0.600 | 11.34 | 2245 | 425 | 45° |



Acciaio
1100 - 1300 N/mm²



| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|-----|
| 3.00 | 2 | 250 | 0.025 | 0.040 | 0.040 | 2.55 | 31205 | 1560 | 45° |
| 4.00 | 2 | 250 | 0.045 | 0.060 | 0.060 | 3.43 | 23200 | 2090 | 45° |
| 5.00 | 2 | 250 | 0.045 | 0.090 | 0.090 | 4.35 | 18295 | 1645 | 45° |
| 6.00 | 2 | 250 | 0.045 | 0.110 | 0.110 | 5.23 | 15215 | 1370 | 45° |
| 8.00 | 2 | 250 | 0.050 | 0.130 | 0.130 | 6.90 | 11535 | 1155 | 45° |
| 10.00 | 2 | 250 | 0.055 | 0.150 | 0.150 | 8.58 | 9275 | 1020 | 45° |
| 12.00 | 2 | 250 | 0.060 | 0.180 | 0.180 | 10.29 | 7735 | 930 | 45° |

Acciaio da
utensile temprato
42 - 48 HRC



| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|-----|
| 3.00 | 2 | 220 | 0.025 | 0.040 | 0.040 | 2.55 | 27460 | 1375 | 45° |
| 4.00 | 2 | 220 | 0.045 | 0.060 | 0.060 | 3.43 | 20415 | 1835 | 45° |
| 5.00 | 2 | 220 | 0.045 | 0.090 | 0.090 | 4.35 | 16100 | 1450 | 45° |
| 6.00 | 2 | 220 | 0.045 | 0.110 | 0.110 | 5.23 | 13390 | 1205 | 45° |
| 8.00 | 2 | 220 | 0.050 | 0.130 | 0.130 | 6.90 | 10150 | 1015 | 45° |
| 10.00 | 2 | 220 | 0.050 | 0.150 | 0.150 | 8.58 | 8160 | 815 | 45° |
| 12.00 | 2 | 220 | 0.055 | 0.180 | 0.180 | 10.29 | 6805 | 750 | 45° |

Acciaio da
utensile temprato
48 - 52 HRC



| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|-----|
| 3.00 | 2 | 180 | 0.025 | 0.040 | 0.040 | 2.55 | 22470 | 1125 | 45° |
| 4.00 | 2 | 180 | 0.040 | 0.060 | 0.060 | 3.43 | 16705 | 1335 | 45° |
| 5.00 | 2 | 180 | 0.040 | 0.090 | 0.090 | 4.35 | 13170 | 1055 | 45° |
| 6.00 | 2 | 180 | 0.040 | 0.110 | 0.110 | 5.23 | 10955 | 875 | 45° |
| 8.00 | 2 | 180 | 0.045 | 0.130 | 0.130 | 6.90 | 8305 | 745 | 45° |
| 10.00 | 2 | 180 | 0.050 | 0.150 | 0.150 | 8.58 | 6680 | 670 | 45° |
| 12.00 | 2 | 180 | 0.055 | 0.180 | 0.180 | 10.29 | 5570 | 610 | 45° |

Acciaio da
utensile temprato
52 - 56 HRC



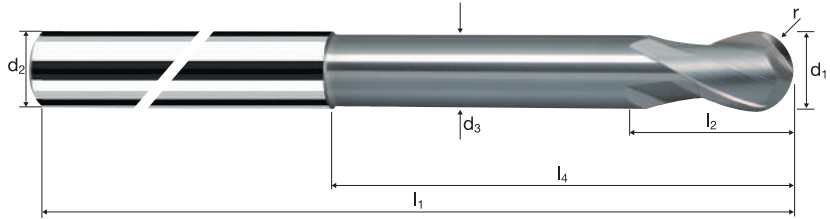
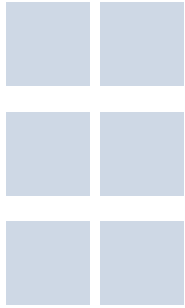
| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|-----|-----|
| 3.00 | 2 | 120 | 0.020 | 0.040 | 0.040 | 2.55 | 14980 | 600 | 45° |
| 4.00 | 2 | 120 | 0.040 | 0.060 | 0.060 | 3.43 | 11135 | 890 | 45° |
| 5.00 | 2 | 120 | 0.040 | 0.090 | 0.090 | 4.35 | 8780 | 700 | 45° |
| 6.00 | 2 | 120 | 0.040 | 0.110 | 0.110 | 5.23 | 7305 | 585 | 45° |
| 8.00 | 2 | 120 | 0.045 | 0.130 | 0.130 | 6.90 | 5535 | 500 | 45° |
| 10.00 | 2 | 120 | 0.045 | 0.150 | 0.150 | 8.58 | 4450 | 400 | 45° |
| 12.00 | 2 | 120 | 0.050 | 0.180 | 0.180 | 10.29 | 3710 | 370 | 45° |

Frese con estremità emisferica Sphericut

Tolleranza r f8 (-/-), 5xd



HM λ 30°
MG10 γ -10°

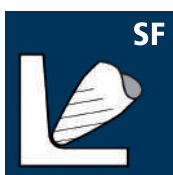


ReTool®

| | | | | | | | | | | | | |
|--|--|------------------------|------------------------|---------------------|---------------------|--|--|--|--|--|--|--------------|
| | | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | | | | | | | GG(G) |
|--|--|------------------------|------------------------|---------------------|---------------------|--|--|--|--|--|--|--------------|

| Esempio: N° Ordine | | | | | | | | | | | | POLYCHROM |
|--|-------|-------|-------|-----|-------|-------|-------|-------|------|---|--|------------------|
| Rivestimento P Articolo 5289 Codice-Ø 180 | | | | | | | | | | | | |
| Ø Code | d1 -/ | d2 h6 | d3 | l1 | l2 | l3 | l4 | r f8 | α | z | | P5289 |
| | | | | | | | | | | | | EUR |
| 180 | 3.00 | 6.00 | 2.80 | 90 | 4.00 | 24.00 | 30.63 | 1.500 | 3.1° | 2 | | 99.00 |
| 220 | 4.00 | 6.00 | 3.70 | 90 | 5.00 | 27.00 | 31.95 | 2.000 | 2.0° | 2 | | 99.00 |
| 260 | 5.00 | 6.00 | 4.60 | 110 | 6.00 | 45.00 | 48.27 | 2.500 | 0.7° | 2 | | 99.00 |
| 300 | 6.00 | 6.00 | 5.50 | 110 | 7.00 | 49.34 | 50.00 | 3.000 | 0.0° | 2 | | 99.00 |
| 391 | 8.00 | 8.00 | 7.40 | 110 | 9.00 | 45.29 | 46.00 | 4.000 | 0.0° | 2 | | 123.00 |
| 450 | 10.00 | 10.00 | 9.20 | 130 | 11.00 | 60.20 | 61.00 | 5.000 | 0.0° | 2 | | 168.00 |
| 501 | 12.00 | 12.00 | 11.00 | 140 | 13.00 | 56.13 | 57.00 | 6.000 | 0.0° | 2 | | 207.00 |
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Applicazioni



Calcolatore dei dati di taglio ArCut X

Questo rende la fresa ideale per processi di finitura da cui si pretenda un'alta qualità delle superfici: ToolExpert ArCut X

Con il programma di utensili ArCut X FRAISA offre una scelta di frese a candela coniche in versioni diverse che copre una vasta gamma applicativa di processi di finitura.

Le tecnologie abbinata alle rispettive caratteristiche degli utensili permettono l'esecuzione delle più svariate applicazioni per una moltitudine di materiali.

Ottimizza i tuoi processi di finitura con ToolExpert ArCut X.



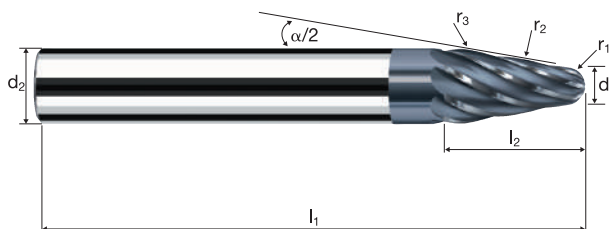
Qui si può accedere al calcolatore dei dati di taglio **ToolExpert ArCut X** o sul sito FRAISA a www.fraisa.com/it/toolexpert-arcut-x

Fresa ad arco ArCutX

Sferica, tolleranza geometrica ± 0.01



HM
MG10 λ 30°
 γ 10°



ReTool®

| | | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--------------|--|--|-------------------|----------------|----------------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | | | Inox Stainless | Ti Titanium | GG(G) Tool Steel Aluminium |
|-------------|----------------|-----------------|-----------------|--------------|--|--|-------------------|----------------|----------------------------------|

| | | | | | | | | | | | POLYCHROM | |
|-----------------------|----------------|-------|----------------------|----------------|----------------|------|------|------|---|--|-----------|--------|
| Esempio: N° Ordine | | | | | | | | | | | 8530 | P8530 |
| | | | | | | | | | | | EUR | EUR |
| Ø Code | d ₁ | α/2 | d ₂ h5 | l ₁ | l ₂ | r1 | r2 | r3 | z | | EUR | EUR |
| 220 | 4.00 | 30.0° | 16.00 | 108 | 14.50 | 2.00 | 750 | 3.00 | 4 | | 369.00 | 389.00 |
| 221 | 4.00 | 30.0° | 16.00 | 108 | 14.50 | 2.00 | 750 | 3.00 | 6 | | 396.00 | 417.00 |
| 300 | 6.00 | 20.0° | 16.00 | 108 | 18.50 | 3.00 | 1000 | 5.00 | 4 | | 369.00 | 389.00 |
| 301 | 6.00 | 20.0° | 16.00 | 108 | 18.50 | 3.00 | 1000 | 5.00 | 8 | | 396.00 | 417.00 |
| 388 | 8.00 | 10.0° | 16.00 | 108 | 28.50 | 4.00 | 1000 | 5.00 | 4 | | 369.00 | 389.00 |
| 389 | 8.00 | 10.0° | 16.00 | 108 | 28.50 | 4.00 | 1000 | 5.00 | 8 | | 396.00 | 417.00 |
| 391 | 8.00 | 6.0° | 16.00 | 123 | 44.00 | 4.00 | 1000 | 5.00 | 4 | | 387.00 | 407.00 |
| 393 | 8.00 | 6.0° | 16.00 | 123 | 44.00 | 4.00 | 1000 | 5.00 | 8 | | 414.00 | 435.00 |
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Applicazioni



Calcolatore dei dati di taglio ArCut X

Questo rende la fresa ideale per processi di finitura da cui si pretenda un'alta qualità delle superfici: ToolExpert ArCut X

Con il programma di utensili ArCut X FRAISA offre una scelta di frese a candela coniche in versioni diverse che copre una vasta gamma applicativa di processi di finitura.

Le tecnologie abbinare alle rispettive caratteristiche degli utensili permettono l'esecuzione delle più svariate applicazioni per una moltitudine di materiali.

Ottimizza i tuoi processi di finitura con ToolExpert ArCut X.



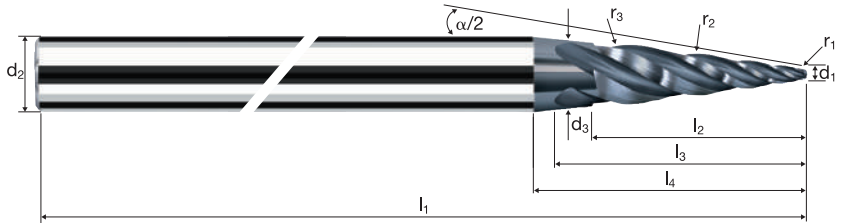
Qui si può accedere al calcolatore dei dati di taglio **ToolExpert ArCut X** o sul sito FRAISA a www.fraisa.com/it/toolexpert-arcut-x

Fresa ad arco ArCutX

Sferica, tolleranza geometrica ± 0.005



HM λ 30°
MG10 γ 10°

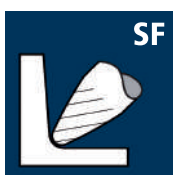


ReTool®

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|-------------|----------------|-----------------|-----------------|--------------|--|-------------------|----------------|----------------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | | Inox Stainless | Ti Titanium | GG(G) Tool Steel Aluminium |
|-------------|----------------|-----------------|-----------------|--------------|--|-------------------|----------------|----------------------------------|

| | | | | | | | | | | | | | POLYCHROM | |
|-----------------------|----------------|-------------------|----------------------------------|-----------------|----------------|----------------|----------------|----------------|------|-----|------|---|-----------|--------|
| Esempio: N° Ordine | | Rivestimento P | Articolo 8535 | Codice-Ø 100 | | | | | | | | | 8535 | P8535 |
| Ø Code | d ₁ | α/2 | d ₂ h ₅ | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r1 | r2 | r3 | z | EUR | EUR |
| 100 | 1.00 | 8.0° | 6.00 | 5.00 | 70 | 16.00 | 17.50 | 22.50 | 0.50 | 350 | 1.00 | 4 | 119.00 | 125.00 |
| 140 | 2.00 | 15.0° | 8.00 | 7.00 | 80 | 11.50 | 17.50 | 22.50 | 1.00 | 350 | 1.00 | 4 | 148.00 | 156.00 |
| 145 | 2.00 | 30.0° | 8.00 | - | 80 | 8.00 | - | - | 1.00 | 250 | 1.00 | 4 | 147.00 | 155.00 |
| 220 | 4.00 | 14.0° | 12.00 | 9.00 | 97 | 13.50 | 17.50 | 22.50 | 2.00 | 350 | 1.00 | 4 | 237.00 | 251.00 |
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Applicazioni



Calcolatore dei dati di taglio ArCut X

Questo rende la fresa ideale per processi di finitura da cui si pretenda un'alta qualità delle superfici: ToolExpert ArCut X

Con il programma di utensili ArCut X FRAISA offre una scelta di frese a candela coniche in versioni diverse che copre una vasta gamma applicativa di processi di finitura.

Le tecnologie abbinare alle rispettive caratteristiche degli utensili permettono l'esecuzione delle più svariate applicazioni per una moltitudine di materiali.

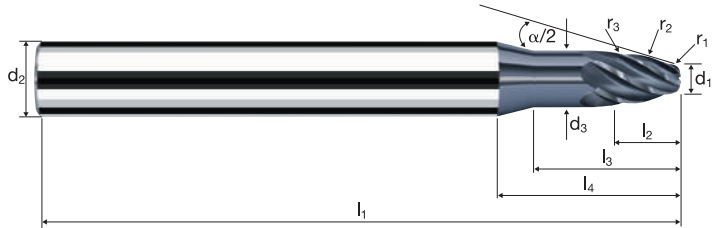
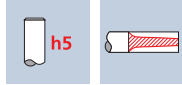
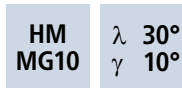
Ottimizza i tuoi processi di finitura con ToolExpert ArCut X.



Qui si può accedere al calcolatore dei dati di taglio **ToolExpert ArCut X** o sul sito FRAISA a www.fraisa.com/it/toolexpert-arcut-x

Fresa ad arco ArCutX

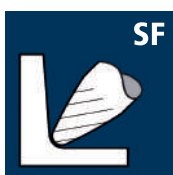
Torica, tolleranza geometrica ± 0.010



| | | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--------------|--|--|-------------------|----------------|----------------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | | | Inox Stainless | Ti Titanium | GG(G) Tool Steel Aluminium |
|-------------|----------------|-----------------|-----------------|--------------|--|--|-------------------|----------------|----------------------------------|

| Esempio: N° Ordine | Rivestimento P | Articolo 8540 | Codice-Ø 220 | | | | | | | | | | POLYCHROM | |
|-----------------------|-------------------|------------------|----------------------|----------------|----------------|----------------|----------------|----------------|------|----|------|---|-----------|--------|
| | | | | 8540 | P8540 | | | | | | | | | |
| Ø Code | d ₁ | α/2 | d ₂ h5 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r1 | r2 | r3 | z | EUR | EUR |
| 220 | 4.00 | 12.5° | 10.00 | 7.50 | 84 | 11.00 | 20.00 | 25.00 | 1.25 | 30 | 1.00 | 4 | 192.00 | 203.00 |
| 221 | 4.00 | 12.5° | 10.00 | 7.50 | 84 | 11.00 | 20.00 | 25.00 | 1.25 | 30 | 1.00 | 6 | 207.00 | 217.00 |
| 300 | 6.00 | 15.0° | 12.00 | - | 97 | 15.00 | - | - | 2.00 | 40 | 2.00 | 4 | 236.00 | 249.00 |
| 301 | 6.00 | 15.0° | 12.00 | - | 97 | 15.00 | - | - | 2.00 | 40 | 2.00 | 6 | 253.00 | 267.00 |
| 450 | 10.00 | 17.5° | 16.00 | - | 108 | 15.00 | - | - | 3.50 | 50 | 2.00 | 4 | 369.00 | 389.00 |
| 453 | 10.00 | 17.5° | 16.00 | - | 108 | 15.00 | - | - | 3.50 | 50 | 2.00 | 8 | 396.00 | 417.00 |
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Applicazioni



Calcolatore dei dati di taglio ArCut X

Questo rende la fresa ideale per processi di finitura da cui si pretenda un'alta qualità delle superfici: ToolExpert ArCut X

Con il programma di utensili ArCut X FRAISA offre una scelta di frese a candela coniche in versioni diverse che copre una vasta gamma applicativa di processi di finitura.

Le tecnologie abbinata alle rispettive caratteristiche degli utensili permettono l'esecuzione delle più svariate applicazioni per una moltitudine di materiali.

Ottimizza i tuoi processi di finitura con ToolExpert ArCut X.



Qui si può accedere al calcolatore dei dati di taglio **ToolExpert ArCut X** o sul sito FRAISA a www.fraisa.com/it/toolexpert-arcut-x

Applicazioni



Calcolatore dei dati di taglio ArCut X

Questo rende la fresa ideale per processi di finitura da cui si pretenda un'alta qualità delle superfici: ToolExpert ArCut X

Con il programma di utensili ArCut X FRAISA offre una scelta di frese a candela coniche in versioni diverse che copre una vasta gamma applicativa di processi di finitura.

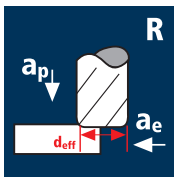
Le tecnologie abbinare alle rispettive caratteristiche degli utensili permettono l'esecuzione delle più svariate applicazioni per una moltitudine di materiali.

Ottimizza i tuoi processi di finitura con ToolExpert ArCut X.



Qui si può accedere al calcolatore dei dati di taglio **ToolExpert ArCut X** o sul sito FRAISA a www.fraisa.com/it/toolexpert-arcut-x

Applicazione



Materiale

Acciaio da utensile temprato 56 - 60 HRC

H

Acciaio da utensile temprato > 60 HRC

H

Acciaio rapido temprato 64 - 70 HRC

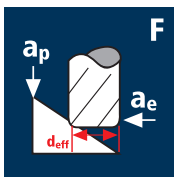
H

| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _f [mm/min] | r [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|--------|
| 2.00 | 6 | 60 | 0.014 | 0.200 | 1.200 | 1.80 | 10610 | 890 | 0.50 |
| 3.00 | 6 | 60 | 0.021 | 0.250 | 1.800 | 2.87 | 6655 | 840 | 0.50 |
| 4.00 | 6 | 60 | 0.028 | 0.250 | 2.400 | 3.87 | 4935 | 830 | 0.50 |
| 5.00 | 6 | 60 | 0.035 | 0.250 | 3.000 | 4.87 | 3920 | 825 | 0.50 |
| 6.00 | 8 | 60 | 0.042 | 0.200 | 3.600 | 5.80 | 3295 | 1105 | 0.50 |
| 8.00 | 8 | 60 | 0.056 | 0.200 | 4.800 | 7.80 | 2450 | 1095 | 0.50 |
| 10.00 | 8 | 60 | 0.070 | 0.200 | 6.000 | 9.80 | 1950 | 1090 | 0.50 |
| 12.00 | 8 | 60 | 0.084 | 0.200 | 7.200 | 11.80 | 1620 | 1090 | 0.50 |

| | | | | | | | | | |
|-------|---|----|-------|-------|-------|-------|------|-----|------|
| 2.00 | 6 | 50 | 0.007 | 0.200 | 1.200 | 1.80 | 8840 | 370 | 0.50 |
| 3.00 | 6 | 50 | 0.011 | 0.250 | 1.800 | 2.87 | 5545 | 365 | 0.50 |
| 4.00 | 6 | 50 | 0.014 | 0.250 | 2.400 | 3.87 | 4115 | 345 | 0.50 |
| 5.00 | 6 | 50 | 0.018 | 0.250 | 3.000 | 4.87 | 3270 | 355 | 0.50 |
| 6.00 | 8 | 50 | 0.021 | 0.200 | 3.600 | 5.80 | 2745 | 460 | 0.50 |
| 8.00 | 8 | 50 | 0.028 | 0.200 | 4.800 | 7.80 | 2040 | 455 | 0.50 |
| 10.00 | 8 | 50 | 0.035 | 0.200 | 6.000 | 9.80 | 1625 | 455 | 0.50 |
| 12.00 | 8 | 50 | 0.042 | 0.200 | 7.200 | 11.80 | 1350 | 455 | 0.50 |

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|-------|---|----|-------|-------|-------|-------|------|-----|------|
| 2.00 | 6 | 20 | 0.004 | 0.200 | 1.200 | 1.80 | 3535 | 85 | 0.50 |
| 3.00 | 6 | 20 | 0.006 | 0.250 | 1.800 | 2.87 | 2220 | 80 | 0.50 |
| 4.00 | 6 | 20 | 0.008 | 0.250 | 2.400 | 3.87 | 1645 | 80 | 0.50 |
| 5.00 | 6 | 20 | 0.010 | 0.250 | 3.000 | 4.87 | 1305 | 80 | 0.50 |
| 6.00 | 8 | 20 | 0.012 | 0.200 | 3.600 | 5.80 | 1100 | 105 | 0.50 |
| 8.00 | 8 | 20 | 0.016 | 0.200 | 4.800 | 7.80 | 815 | 105 | 0.50 |
| 10.00 | 8 | 20 | 0.020 | 0.200 | 6.000 | 9.80 | 650 | 105 | 0.50 |
| 12.00 | 8 | 20 | 0.024 | 0.200 | 7.200 | 11.80 | 540 | 105 | 0.50 |

Applicazione



Materiale

Acciaio da utensile temprato 56 - 60 HRC

H

Acciaio da utensile temprato > 60 HRC

H

Acciaio rapido temprato 64 - 70 HRC

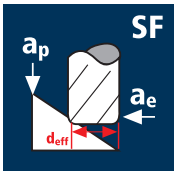
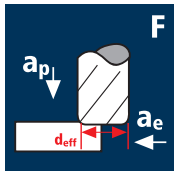
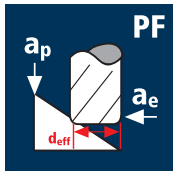
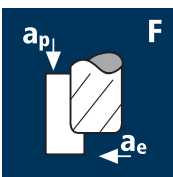
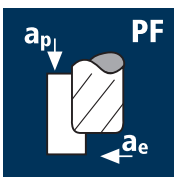
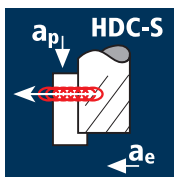
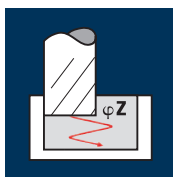
H

| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _f [mm/min] | β [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
| 2.00 | 6 | 180 | 0.020 | 0.090 | 0.030 | 1.98 | 28935 | 3470 | 45° |
| 3.00 | 6 | 180 | 0.028 | 0.090 | 0.030 | 2.98 | 19225 | 3230 | 45° |
| 4.00 | 6 | 180 | 0.035 | 0.090 | 0.050 | 3.98 | 14395 | 3025 | 45° |
| 5.00 | 6 | 180 | 0.041 | 0.090 | 0.050 | 4.98 | 11505 | 2830 | 45° |
| 6.00 | 8 | 180 | 0.042 | 0.090 | 0.075 | 5.98 | 9580 | 3220 | 45° |
| 8.00 | 8 | 180 | 0.048 | 0.090 | 0.075 | 7.98 | 7180 | 2755 | 45° |
| 10.00 | 8 | 180 | 0.050 | 0.090 | 0.100 | 9.98 | 5740 | 2295 | 45° |
| 12.00 | 8 | 180 | 0.048 | 0.090 | 0.100 | 11.98 | 4785 | 1835 | 45° |

| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|-----|
| 2.00 | 6 | 120 | 0.020 | 0.090 | 0.030 | 1.98 | 19290 | 2315 | 45° |
| 3.00 | 6 | 120 | 0.028 | 0.090 | 0.030 | 2.98 | 12820 | 2155 | 45° |
| 4.00 | 6 | 120 | 0.035 | 0.090 | 0.050 | 3.98 | 9595 | 2015 | 45° |
| 5.00 | 6 | 120 | 0.041 | 0.090 | 0.050 | 4.98 | 7670 | 1885 | 45° |
| 6.00 | 8 | 120 | 0.042 | 0.090 | 0.075 | 5.98 | 6385 | 2145 | 45° |
| 8.00 | 8 | 120 | 0.048 | 0.090 | 0.075 | 7.98 | 4785 | 1840 | 45° |
| 10.00 | 8 | 120 | 0.050 | 0.090 | 0.100 | 9.98 | 3825 | 1530 | 45° |
| 12.00 | 8 | 120 | 0.048 | 0.090 | 0.100 | 11.98 | 3190 | 1225 | 45° |

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|-------|---|----|-------|-------|-------|-------|-------|------|-----|
| 2.00 | 6 | 80 | 0.020 | 0.090 | 0.030 | 1.98 | 12860 | 1545 | 45° |
| 3.00 | 6 | 80 | 0.028 | 0.090 | 0.030 | 2.98 | 8545 | 1435 | 45° |
| 4.00 | 6 | 80 | 0.035 | 0.090 | 0.050 | 3.98 | 6400 | 1345 | 45° |
| 5.00 | 6 | 80 | 0.041 | 0.090 | 0.050 | 4.98 | 5115 | 1260 | 45° |
| 6.00 | 8 | 80 | 0.042 | 0.090 | 0.075 | 5.98 | 4260 | 1430 | 45° |
| 8.00 | 8 | 80 | 0.048 | 0.090 | 0.075 | 7.98 | 3190 | 1225 | 45° |
| 10.00 | 8 | 80 | 0.050 | 0.090 | 0.100 | 9.98 | 2550 | 1020 | 45° |
| 12.00 | 8 | 80 | 0.048 | 0.090 | 0.100 | 11.98 | 2125 | 815 | 45° |

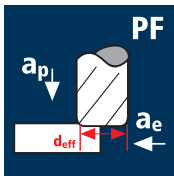
Dati di applicazione precisi per ulteriori applicazioni e materiali si trovano nel calcolatore dei parametri di taglio ToolExpert 2.0



| Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | r [mm] |
|--------------|--|--|------|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|--------|
| | Acciaio da utensile temprato 48 - 52 HRC | 2.00 | 4 | 150 | 0.020 | 0.050 | 0.700 | 1.44 | 33155 | 2655 | 0.50 |
| | | 3.00 | 4 | 150 | 0.025 | 0.050 | 1.050 | 2.44 | 19570 | 1955 | 0.50 |
| | | 4.00 | 4 | 150 | 0.030 | 0.060 | 1.400 | 3.47 | 13760 | 1650 | 0.50 |
| | | 5.00 | 4 | 150 | 0.035 | 0.060 | 1.750 | 4.47 | 10680 | 1495 | 0.50 |
| | | 6.00 | 6 | 150 | 0.040 | 0.080 | 2.100 | 5.54 | 8620 | 2070 | 0.50 |
| | | 8.00 | 6 | 150 | 0.045 | 0.080 | 2.800 | 7.54 | 6330 | 1710 | 0.50 |
| | | 10.00 | 6 | 150 | 0.050 | 0.100 | 3.500 | 9.60 | 4975 | 1490 | 0.50 |
| | | 12.00 | 6 | 150 | 0.055 | 0.100 | 4.200 | 11.60 | 4115 | 1360 | 0.50 |
| | | 16.00 | 6 | 150 | 0.065 | 0.120 | 5.600 | 15.65 | 3050 | 1190 | 0.50 |
| | | Acciaio da utensile temprato 52 - 56 HRC | 2.00 | 4 | 120 | 0.020 | 0.050 | 0.700 | 1.44 | 26525 | 2120 |
| | | 3.00 | 4 | 120 | 0.025 | 0.050 | 1.050 | 2.44 | 15655 | 1565 | 0.50 |
| | | 4.00 | 4 | 120 | 0.030 | 0.060 | 1.400 | 3.47 | 11010 | 1320 | 0.50 |
| | | 5.00 | 4 | 120 | 0.035 | 0.060 | 1.750 | 4.47 | 8545 | 1195 | 0.50 |
| | | 6.00 | 6 | 120 | 0.040 | 0.080 | 2.100 | 5.54 | 6895 | 1655 | 0.50 |
| | | 8.00 | 6 | 120 | 0.045 | 0.080 | 2.800 | 7.54 | 5065 | 1370 | 0.50 |
| | | 10.00 | 6 | 120 | 0.050 | 0.100 | 3.500 | 9.60 | 3980 | 1195 | 0.50 |
| | | 12.00 | 6 | 120 | 0.055 | 0.100 | 4.200 | 11.60 | 3295 | 1085 | 0.50 |
| | | 16.00 | 6 | 120 | 0.065 | 0.120 | 5.600 | 15.65 | 2440 | 950 | 0.50 |
| | Acciaio da utensile temprato 56 - 60 HRC | 2.00 | 4 | 80 | 0.015 | 0.050 | 0.700 | 1.44 | 17685 | 1060 | 0.50 |
| | | 3.00 | 4 | 80 | 0.020 | 0.050 | 1.050 | 2.44 | 10435 | 835 | 0.50 |
| | | 4.00 | 4 | 80 | 0.025 | 0.060 | 1.400 | 3.47 | 7340 | 735 | 0.50 |
| | | 5.00 | 4 | 80 | 0.030 | 0.060 | 1.750 | 4.47 | 5695 | 685 | 0.50 |
| | | 6.00 | 6 | 80 | 0.030 | 0.080 | 2.100 | 5.54 | 4595 | 825 | 0.50 |
| | | 8.00 | 6 | 80 | 0.035 | 0.080 | 2.800 | 7.54 | 3375 | 710 | 0.50 |
| | | 10.00 | 6 | 80 | 0.040 | 0.100 | 3.500 | 9.60 | 2655 | 635 | 0.50 |
| | | 12.00 | 6 | 80 | 0.045 | 0.100 | 4.200 | 11.60 | 2195 | 595 | 0.50 |
| | | 16.00 | 6 | 80 | 0.050 | 0.120 | 5.600 | 15.65 | 1625 | 490 | 0.50 |
| | Acciaio da utensile temprato > 60 HRC | 2.00 | 4 | 40 | 0.015 | 0.050 | 0.700 | 1.44 | 8840 | 530 | 0.50 |
| | | 3.00 | 4 | 40 | 0.020 | 0.050 | 1.050 | 2.44 | 5220 | 415 | 0.50 |
| | | 4.00 | 4 | 40 | 0.025 | 0.060 | 1.400 | 3.47 | 3670 | 365 | 0.50 |
| | | 5.00 | 4 | 40 | 0.030 | 0.060 | 1.750 | 4.47 | 2850 | 340 | 0.50 |
| | | 6.00 | 6 | 40 | 0.030 | 0.080 | 2.100 | 5.54 | 2300 | 415 | 0.50 |
| | | 8.00 | 6 | 40 | 0.035 | 0.080 | 2.800 | 7.54 | 1690 | 355 | 0.50 |
| | | 10.00 | 6 | 40 | 0.040 | 0.100 | 3.500 | 9.60 | 1325 | 320 | 0.50 |
| | | 12.00 | 6 | 40 | 0.045 | 0.100 | 4.200 | 11.60 | 1100 | 295 | 0.50 |
| | | 16.00 | 6 | 40 | 0.050 | 0.120 | 5.600 | 15.65 | 815 | 245 | 0.50 |

| Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] | |
|--------------|--|--|-------|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|-----|
| | Acciaio da utensile temprato 48 - 52 HRC | 2.00 | 4 | 256 | 0.020 | 0.050 | 0.050 | 1.94 | 42005 | 3360 | 45° | |
| | | 3.00 | 4 | 300 | 0.025 | 0.050 | 0.050 | 2.94 | 32480 | 3250 | 45° | |
| | | 4.00 | 4 | 300 | 0.030 | 0.060 | 0.060 | 3.96 | 24115 | 2895 | 45° | |
| | | 5.00 | 4 | 300 | 0.035 | 0.060 | 0.060 | 4.96 | 19255 | 2695 | 45° | |
| | | 6.00 | 6 | 300 | 0.040 | 0.080 | 0.080 | 5.98 | 15970 | 3830 | 45° | |
| | | | 8.00 | 6 | 300 | 0.045 | 0.080 | 0.080 | 7.98 | 11965 | 3230 | 45° |
| | | | 10.00 | 6 | 300 | 0.050 | 0.100 | 0.100 | 9.99 | 9560 | 2870 | 45° |
| | | | 12.00 | 6 | 300 | 0.055 | 0.100 | 0.100 | 11.99 | 7965 | 2630 | 45° |
| | | | 16.00 | 6 | 300 | 0.065 | 0.120 | 0.120 | 16.00 | 5970 | 2330 | 45° |
| | | Acciaio da utensile temprato 52 - 56 HRC | 2.00 | 4 | 250 | 0.020 | 0.050 | 0.050 | 1.94 | 41020 | 3280 | 45° |
| | | 3.00 | 4 | 250 | 0.025 | 0.050 | 0.050 | 2.94 | 27065 | 2705 | 45° | |
| | | 4.00 | 4 | 250 | 0.030 | 0.060 | 0.060 | 3.96 | 20095 | 2410 | 45° | |
| | | 5.00 | 4 | 250 | 0.035 | 0.060 | 0.060 | 4.96 | 16045 | 2245 | 45° | |
| | | 6.00 | 6 | 250 | 0.040 | 0.080 | 0.080 | 5.98 | 13305 | 3195 | 45° | |
| | | 8.00 | 6 | 250 | 0.045 | 0.080 | 0.080 | 7.98 | 9970 | 2690 | 45° | |
| | | 10.00 | 6 | 250 | 0.050 | 0.100 | 0.100 | 9.99 | 7965 | 2390 | 45° | |
| | | 12.00 | 6 | 250 | 0.050 | 0.100 | 0.100 | 11.99 | 6635 | 1990 | 45° | |
| | | 16.00 | 6 | 250 | 0.060 | 0.120 | 0.120 | 16.00 | 4975 | 1790 | 45° | |
| | Acciaio da utensile temprato 56 - 60 HRC | 2.00 | 4 | 180 | 0.015 | 0.050 | 0.050 | 1.94 | 29535 | 1770 | 45° | |
| | | 3.00 | 4 | 180 | 0.020 | 0.050 | 0.050 | 2.94 | 19490 | 1560 | 45° | |
| | | 4.00 | 4 | 180 | 0.025 | 0.060 | 0.060 | 3.96 | 14470 | 1445 | 45° | |
| | | 5.00 | 4 | 180 | 0.030 | 0.060 | 0.060 | 4.96 | 11550 | 1385 | 45° | |
| | | 6.00 | 6 | 180 | 0.035 | 0.080 | 0.080 | 5.98 | 9580 | 2010 | 45° | |
| | | 8.00 | 6 | 180 | 0.040 | 0.080 | 0.080 | 7.98 | 7180 | 1725 | 45° | |
| | | 10.00 | 6 | 180 | 0.045 | 0.100 | 0.100 | 9.99 | 5735 | 1550 | 45° | |
| | | 12.00 | 6 | 180 | 0.045 | 0.100 | 0.100 | 11.99 | 4780 | 1290 | 45° | |
| | | 16.00 | 6 | 180 | 0.055 | 0.120 | 0.120 | 16.00 | 3580 | 1180 | 45° | |
| | Acciaio da utensile temprato > 60 HRC | 2.00 | 4 | 100 | 0.010 | 0.050 | 0.050 | 1.94 | 16410 | 655 | 45° | |
| | | 3.00 | 4 | 100 | 0.015 | 0.050 | 0.050 | 2.94 | 10825 | 650 | 45° | |
| | | 4.00 | 4 | 100 | 0.015 | 0.060 | 0.060 | 3.96 | 8040 | 480 | 45° | |
| | | 5.00 | 4 | 100 | 0.020 | 0.060 | 0.060 | 4.96 | 6420 | 515 | 45° | |
| | | 6.00 | 6 | 100 | 0.020 | 0.080 | 0.080 | 5.98 | 5325 | 640 | 45° | |
| | | 8.00 | 6 | 100 | 0.025 | 0.080 | 0.080 | 7.98 | 3990 | 600 | 45° | |
| | | 10.00 | 6 | 100 | 0.025 | 0.100 | 0.100 | 9.99 | 3185 | 480 | 45° | |
| | | 12.00 | 6 | 100 | 0.030 | 0.100 | 0.100 | 11.99 | 2655 | 480 | 45° | |
| | | 16.00 | 6 | 100 | 0.035 | 0.120 | 0.120 | 16.00 | 1990 | 420 | 45° | |

Applicazione



Materiale

Acciaio da
utensile temprato
48 - 52 HRC



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | r [mm] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|-----------|
| 4.00 | 4 | 150 | 0.045 | 0.340 | 1.400 | 3.50 | 13640 | 2455 | 1.00 |
| 5.00 | 4 | 150 | 0.050 | 0.380 | 1.750 | 4.57 | 10450 | 2090 | 1.00 |
| 6.00 | 6 | 150 | 0.055 | 0.400 | 2.100 | 5.60 | 8525 | 2815 | 1.00 |
| 8.00 | 6 | 150 | 0.070 | 0.440 | 2.800 | 7.66 | 6235 | 2620 | 1.00 |
| 10.00 | 6 | 150 | 0.085 | 0.480 | 3.500 | 9.71 | 4915 | 2510 | 1.00 |
| 12.00 | 6 | 150 | 0.105 | 0.500 | 4.200 | 11.73 | 4070 | 2565 | 1.00 |
| 16.00 | 6 | 150 | 0.130 | 0.560 | 5.600 | 15.80 | 3020 | 2355 | 1.00 |

Acciaio da
utensile temprato
52 - 56 HRC



| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|------|
| 4.00 | 4 | 120 | 0.040 | 0.340 | 1.400 | 3.50 | 10915 | 1745 | 1.00 |
| 5.00 | 4 | 120 | 0.045 | 0.380 | 1.750 | 4.57 | 8360 | 1505 | 1.00 |
| 6.00 | 6 | 120 | 0.050 | 0.400 | 2.100 | 5.60 | 6820 | 2045 | 1.00 |
| 8.00 | 6 | 120 | 0.065 | 0.440 | 2.800 | 7.66 | 4985 | 1945 | 1.00 |
| 10.00 | 6 | 120 | 0.075 | 0.480 | 3.500 | 9.71 | 3935 | 1770 | 1.00 |
| 12.00 | 6 | 120 | 0.095 | 0.500 | 4.200 | 11.73 | 3255 | 1855 | 1.00 |
| 16.00 | 6 | 120 | 0.115 | 0.560 | 5.600 | 15.80 | 2420 | 1670 | 1.00 |

Acciaio da
utensile temprato
56 - 60 HRC



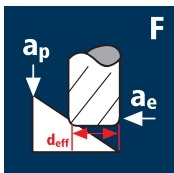
| | | | | | | | | | |
|-------|---|----|-------|-------|-------|-------|------|------|------|
| 4.00 | 4 | 80 | 0.035 | 0.340 | 1.400 | 3.50 | 7275 | 1020 | 1.00 |
| 5.00 | 4 | 80 | 0.040 | 0.380 | 1.750 | 4.57 | 5570 | 890 | 1.00 |
| 6.00 | 6 | 80 | 0.045 | 0.400 | 2.100 | 5.60 | 4545 | 1230 | 1.00 |
| 8.00 | 6 | 80 | 0.055 | 0.440 | 2.800 | 7.66 | 3325 | 1095 | 1.00 |
| 10.00 | 6 | 80 | 0.070 | 0.480 | 3.500 | 9.71 | 2625 | 1100 | 1.00 |
| 12.00 | 6 | 80 | 0.085 | 0.500 | 4.200 | 11.73 | 2170 | 1105 | 1.00 |
| 16.00 | 6 | 80 | 0.105 | 0.560 | 5.600 | 15.80 | 1610 | 1015 | 1.00 |

Acciaio da
utensile temprato
> 60 HRC



| | | | | | | | | | |
|-------|---|----|-------|-------|-------|-------|------|-----|------|
| 4.00 | 4 | 40 | 0.025 | 0.340 | 1.400 | 3.50 | 3640 | 365 | 1.00 |
| 5.00 | 4 | 40 | 0.030 | 0.380 | 1.750 | 4.57 | 2785 | 335 | 1.00 |
| 6.00 | 6 | 40 | 0.030 | 0.400 | 2.100 | 5.60 | 2275 | 410 | 1.00 |
| 8.00 | 6 | 40 | 0.040 | 0.440 | 2.800 | 7.66 | 1660 | 400 | 1.00 |
| 10.00 | 6 | 40 | 0.050 | 0.480 | 3.500 | 9.71 | 1310 | 395 | 1.00 |
| 12.00 | 6 | 40 | 0.060 | 0.500 | 4.200 | 11.73 | 1085 | 390 | 1.00 |
| 16.00 | 6 | 40 | 0.075 | 0.560 | 5.600 | 15.80 | 805 | 365 | 1.00 |

Applicazione



Materiale

Acciaio da
utensile temprato
48 - 52 HRC



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|----------|
| 4.00 | 4 | 300 | 0.030 | 0.080 | 0.080 | 3.86 | 24740 | 2970 | 45° |
| 5.00 | 4 | 300 | 0.035 | 0.080 | 0.080 | 4.86 | 19650 | 2750 | 45° |
| 6.00 | 6 | 300 | 0.040 | 0.110 | 0.110 | 5.90 | 16185 | 3885 | 45° |
| 8.00 | 6 | 300 | 0.045 | 0.110 | 0.110 | 7.90 | 12090 | 3265 | 45° |
| 10.00 | 6 | 300 | 0.050 | 0.140 | 0.140 | 9.94 | 9605 | 2880 | 45° |
| 12.00 | 6 | 300 | 0.055 | 0.140 | 0.140 | 11.94 | 8000 | 2640 | 45° |
| 16.00 | 6 | 300 | 0.065 | 0.160 | 0.160 | 15.96 | 5985 | 2335 | 45° |

Acciaio da
utensile temprato
52 - 56 HRC



| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|-----|
| 4.00 | 4 | 250 | 0.030 | 0.080 | 0.080 | 3.86 | 20615 | 2475 | 45° |
| 5.00 | 4 | 250 | 0.035 | 0.080 | 0.080 | 4.86 | 16375 | 2290 | 45° |
| 6.00 | 6 | 250 | 0.040 | 0.110 | 0.110 | 5.90 | 13490 | 3235 | 45° |
| 8.00 | 6 | 250 | 0.045 | 0.110 | 0.110 | 7.90 | 10075 | 2720 | 45° |
| 10.00 | 6 | 250 | 0.050 | 0.140 | 0.140 | 9.94 | 8005 | 2400 | 45° |
| 12.00 | 6 | 250 | 0.050 | 0.140 | 0.140 | 11.94 | 6665 | 2000 | 45° |
| 16.00 | 6 | 250 | 0.060 | 0.160 | 0.160 | 15.96 | 4985 | 1795 | 45° |

Acciaio da
utensile temprato
56 - 60 HRC



| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|-----|
| 4.00 | 4 | 180 | 0.025 | 0.080 | 0.080 | 3.86 | 14845 | 1485 | 45° |
| 5.00 | 4 | 180 | 0.030 | 0.080 | 0.080 | 4.86 | 11790 | 1415 | 45° |
| 6.00 | 6 | 180 | 0.035 | 0.110 | 0.110 | 5.90 | 9710 | 2040 | 45° |
| 8.00 | 6 | 180 | 0.040 | 0.110 | 0.110 | 7.90 | 7255 | 1740 | 45° |
| 10.00 | 6 | 180 | 0.045 | 0.140 | 0.140 | 9.94 | 5765 | 1555 | 45° |
| 12.00 | 6 | 180 | 0.045 | 0.140 | 0.140 | 11.94 | 4800 | 1295 | 45° |
| 16.00 | 6 | 180 | 0.055 | 0.160 | 0.160 | 15.96 | 3590 | 1185 | 45° |

Acciaio da
utensile temprato
> 60 HRC



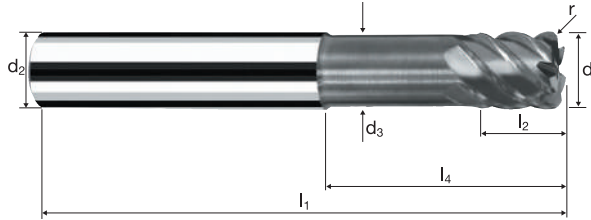
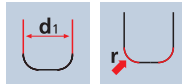
| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|------|-----|-----|
| 4.00 | 4 | 100 | 0.015 | 0.080 | 0.080 | 3.86 | 8245 | 495 | 45° |
| 5.00 | 4 | 100 | 0.020 | 0.080 | 0.080 | 4.86 | 6550 | 525 | 45° |
| 6.00 | 6 | 100 | 0.020 | 0.110 | 0.110 | 5.90 | 5395 | 645 | 45° |
| 8.00 | 6 | 100 | 0.025 | 0.110 | 0.110 | 7.90 | 4030 | 605 | 45° |
| 10.00 | 6 | 100 | 0.025 | 0.140 | 0.140 | 9.94 | 3200 | 480 | 45° |
| 12.00 | 6 | 100 | 0.030 | 0.140 | 0.140 | 11.94 | 2665 | 480 | 45° |
| 16.00 | 6 | 100 | 0.035 | 0.160 | 0.160 | 15.96 | 1995 | 420 | 45° |

Frese toriche XSpeed

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ReTool®

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|-----------------------|------------------------|------------------------|---------------------|---------------------|--------------------|-----------------------|-------------------------------------|
| Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Ti Titanium | GG(G) Tool Steel HSS |
|-----------------------|------------------------|------------------------|---------------------|---------------------|--------------------|-----------------------|-------------------------------------|

| Esempio: N° Ordine | | | | | | | | | | | Rivestimento | | Articolo | | Codice-Ø | | | | | | X-AL |
|-----------------------|---------------------------|----------------------|----------------|----------------|----------------|----------------|----------------|---------------|------|---|--------------|--|-------------|--|------------|--|------------|--|--|--|--------------|
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| 218 | 4.00 | 6.00 | 3.70 | 57 | 5.00 | 12.00 | 16.95 | 1.000 | 3.8° | 4 | | | | | | | 94.00 | | | | |
| 258 | 5.00 | 6.00 | 4.60 | 57 | 6.00 | 15.00 | 18.27 | 1.000 | 1.8° | 4 | | | | | | | 94.00 | | | | |
| 293 | 6.00 | 6.00 | 5.50 | 57 | 7.00 | 19.34 | 20.00 | 1.000 | 0.0° | 4 | | | | | | | 94.00 | | | | |
| 297 | 6.00 | 6.00 | 5.50 | 57 | 7.00 | 19.34 | 20.00 | 1.000 | 0.0° | 6 | | | | | | | 94.00 | | | | |
| 384 | 8.00 | 8.00 | 7.40 | 63 | 9.00 | 25.29 | 26.00 | 1.000 | 0.0° | 4 | | | | | | | 117.00 | | | | |
| 388 | 8.00 | 8.00 | 7.40 | 63 | 9.00 | 25.29 | 26.00 | 1.000 | 0.0° | 6 | | | | | | | 117.00 | | | | |
| 435 | 10.00 | 10.00 | 9.20 | 72 | 11.00 | 30.20 | 31.00 | 1.000 | 0.0° | 4 | | | | | | | 159.00 | | | | |
| 445 | 10.00 | 10.00 | 9.20 | 72 | 11.00 | 30.20 | 31.00 | 1.000 | 0.0° | 6 | | | | | | | 159.00 | | | | |
| 486 | 12.00 | 12.00 | 11.00 | 83 | 13.00 | 36.13 | 37.00 | 1.000 | 0.0° | 4 | | | | | | | 197.00 | | | | |
| 496 | 12.00 | 12.00 | 11.00 | 83 | 13.00 | 36.13 | 37.00 | 1.000 | 0.0° | 6 | | | | | | | 197.00 | | | | |
| 608 | 16.00 | 16.00 | 15.00 | 92 | 17.00 | 42.13 | 43.00 | 1.000 | 0.0° | 6 | | | | | | | 307.00 | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
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| Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | r [mm] |
|--------------|---|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------|
| | Acciaio da utensile temprato 42 - 48 HRC | 2.00 | 4 | 180 | 0.030 | 0.600 | 1.200 | 28650 | 3440 | 0.50 |
| | | 3.00 | 4 | 180 | 0.045 | 0.600 | 1.800 | 19100 | 3440 | 0.50 |
| | | 4.00 | 4 | 180 | 0.050 | 0.600 | 2.400 | 14325 | 2865 | 0.50 |
| | | 5.00 | 4 | 180 | 0.055 | 0.600 | 3.000 | 11460 | 2520 | 0.50 |
| | | 6.00 | 4 | 180 | 0.060 | 0.600 | 3.600 | 9550 | 2290 | 0.50 |
| | | 8.00 | 4 | 180 | 0.075 | 0.600 | 4.800 | 7160 | 2150 | 0.50 |
| | | 10.00 | 4 | 180 | 0.095 | 0.600 | 6.000 | 5730 | 2175 | 0.50 |
| | | 12.00 | 4 | 180 | 0.115 | 0.600 | 7.200 | 4775 | 2195 | 0.50 |

| | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|------|------|
| 2.00 | 4 | 140 | 0.025 | 0.600 | 1.200 | 22280 | 2230 | 0.50 |
| 3.00 | 4 | 140 | 0.040 | 0.600 | 1.800 | 14855 | 2375 | 0.50 |
| 4.00 | 4 | 140 | 0.045 | 0.600 | 2.400 | 11140 | 2005 | 0.50 |
| 5.00 | 4 | 140 | 0.050 | 0.600 | 3.000 | 8915 | 1785 | 0.50 |
| 6.00 | 4 | 140 | 0.055 | 0.600 | 3.600 | 7425 | 1635 | 0.50 |
| 8.00 | 4 | 140 | 0.070 | 0.600 | 4.800 | 5570 | 1560 | 0.50 |
| 10.00 | 4 | 140 | 0.085 | 0.600 | 6.000 | 4455 | 1515 | 0.50 |
| 12.00 | 4 | 140 | 0.105 | 0.600 | 7.200 | 3715 | 1560 | 0.50 |

| | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|------|------|
| 2.00 | 4 | 100 | 0.025 | 0.600 | 1.200 | 15915 | 1590 | 0.50 |
| 3.00 | 4 | 100 | 0.035 | 0.600 | 1.800 | 10610 | 1485 | 0.50 |
| 4.00 | 4 | 100 | 0.040 | 0.600 | 2.400 | 7960 | 1275 | 0.50 |
| 5.00 | 4 | 100 | 0.045 | 0.600 | 3.000 | 6365 | 1145 | 0.50 |
| 6.00 | 4 | 100 | 0.050 | 0.600 | 3.600 | 5305 | 1060 | 0.50 |
| 8.00 | 4 | 100 | 0.060 | 0.600 | 4.800 | 3980 | 955 | 0.50 |
| 10.00 | 4 | 100 | 0.080 | 0.600 | 6.000 | 3185 | 1020 | 0.50 |
| 12.00 | 4 | 100 | 0.095 | 0.600 | 7.200 | 2655 | 1010 | 0.50 |

| | | | | | | | | |
|-------|---|----|-------|-------|-------|-------|-----|------|
| 2.00 | 4 | 70 | 0.015 | 0.600 | 0.800 | 11140 | 670 | 0.50 |
| 3.00 | 4 | 70 | 0.025 | 0.600 | 1.200 | 7425 | 745 | 0.50 |
| 4.00 | 4 | 70 | 0.030 | 0.600 | 1.600 | 5570 | 670 | 0.50 |
| 5.00 | 4 | 70 | 0.030 | 0.600 | 2.000 | 4455 | 535 | 0.50 |
| 6.00 | 4 | 70 | 0.035 | 0.600 | 2.400 | 3715 | 520 | 0.50 |
| 8.00 | 4 | 70 | 0.045 | 0.600 | 3.200 | 2785 | 500 | 0.50 |
| 10.00 | 4 | 70 | 0.055 | 0.600 | 4.000 | 2230 | 490 | 0.50 |
| 12.00 | 4 | 70 | 0.065 | 0.600 | 4.800 | 1855 | 485 | 0.50 |

| Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|--------------|---|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
| | Acciaio da utensile temprato 42 - 48 HRC | 2.00 | 4 | 263 | 0.045 | 0.100 | 0.100 | 1.99 | 42070 | 7570 | 45° |
| | | 3.00 | 4 | 360 | 0.065 | 0.120 | 0.120 | 3.00 | 38195 | 9930 | 45° |
| | | 4.00 | 4 | 360 | 0.085 | 0.120 | 0.120 | 4.00 | 28650 | 9740 | 45° |
| | | 5.00 | 4 | 360 | 0.100 | 0.160 | 0.160 | 5.00 | 22920 | 9165 | 45° |
| | | 6.00 | 4 | 360 | 0.135 | 0.180 | 0.180 | 6.00 | 19100 | 10315 | 45° |
| | | 8.00 | 4 | 360 | 0.150 | 0.200 | 0.200 | 7.99 | 14340 | 8605 | 45° |
| | | 10.00 | 4 | 360 | 0.200 | 0.240 | 0.240 | 9.97 | 11495 | 9195 | 45° |
| | | 12.00 | 4 | 360 | 0.170 | 0.260 | 0.260 | 11.96 | 9580 | 6515 | 45° |

| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|-----|
| 2.00 | 4 | 250 | 0.045 | 0.100 | 0.100 | 1.99 | 39990 | 7200 | 45° |
| 3.00 | 4 | 250 | 0.060 | 0.120 | 0.120 | 3.00 | 26525 | 6365 | 45° |
| 4.00 | 4 | 250 | 0.080 | 0.120 | 0.120 | 4.00 | 19895 | 6365 | 45° |
| 5.00 | 4 | 250 | 0.095 | 0.160 | 0.160 | 5.00 | 15915 | 6050 | 45° |
| 6.00 | 4 | 250 | 0.130 | 0.180 | 0.180 | 6.00 | 13265 | 6895 | 45° |
| 8.00 | 4 | 250 | 0.145 | 0.200 | 0.200 | 7.99 | 9960 | 5775 | 45° |
| 10.00 | 4 | 250 | 0.190 | 0.240 | 0.240 | 9.97 | 7980 | 6065 | 45° |
| 12.00 | 4 | 250 | 0.160 | 0.260 | 0.260 | 11.96 | 6655 | 4260 | 45° |

| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|-----|
| 2.00 | 4 | 180 | 0.040 | 0.100 | 0.100 | 1.99 | 28790 | 4605 | 45° |
| 3.00 | 4 | 180 | 0.055 | 0.120 | 0.120 | 3.00 | 19100 | 4200 | 45° |
| 4.00 | 4 | 180 | 0.075 | 0.120 | 0.120 | 4.00 | 14325 | 4295 | 45° |
| 5.00 | 4 | 180 | 0.085 | 0.160 | 0.160 | 5.00 | 11460 | 3895 | 45° |
| 6.00 | 4 | 180 | 0.115 | 0.180 | 0.180 | 6.00 | 9550 | 4395 | 45° |
| 8.00 | 4 | 180 | 0.130 | 0.200 | 0.200 | 7.99 | 7170 | 3730 | 45° |
| 10.00 | 4 | 180 | 0.170 | 0.240 | 0.240 | 9.97 | 5745 | 3910 | 45° |
| 12.00 | 4 | 180 | 0.145 | 0.260 | 0.260 | 11.96 | 4790 | 2780 | 45° |

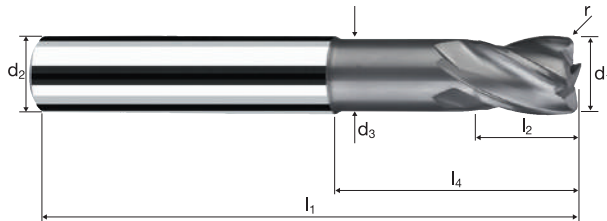
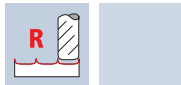
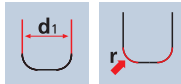
| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|-----|
| 2.00 | 4 | 100 | 0.025 | 0.100 | 0.100 | 1.99 | 15995 | 1600 | 45° |
| 3.00 | 4 | 100 | 0.035 | 0.120 | 0.120 | 3.00 | 10610 | 1485 | 45° |
| 4.00 | 4 | 100 | 0.045 | 0.120 | 0.120 | 4.00 | 7960 | 1430 | 45° |
| 5.00 | 4 | 100 | 0.050 | 0.160 | 0.160 | 5.00 | 6365 | 1275 | 45° |
| 6.00 | 4 | 100 | 0.070 | 0.180 | 0.180 | 6.00 | 5305 | 1485 | 45° |
| 8.00 | 4 | 100 | 0.075 | 0.200 | 0.200 | 7.99 | 3985 | 1195 | 45° |
| 10.00 | 4 | 100 | 0.100 | 0.240 | 0.240 | 9.97 | 3195 | 1275 | 45° |
| 12.00 | 4 | 100 | 0.085 | 0.260 | 0.260 | 11.96 | 2660 | 905 | 45° |

Frese toriche ToroX

Tolleranza r 0/+0.015, 3xd



HM
XT λ 30°
 γ -5°

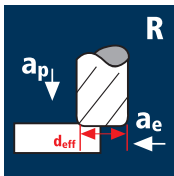


ReTool®

| | | | | | | | |
|----------------|-----------------|-----------------|--------------|--------------|-------------|----------------|----------------------------|
| Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Ti Titanium | GG(G) Tool Steel HSS |
|----------------|-----------------|-----------------|--------------|--------------|-------------|----------------|----------------------------|

| Ø Code | d ₁ 0/-0.01 | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r 0/+0.015 | α | z | X-AL |
|---|---------------------------|----------------------|----------------|----------------|----------------|----------------|----------------|---------------|------|---|--------|
| | | | | | | | | | | | EUR |
| Esempio: N° Ordine Rivestimento X Articolo 7100 Codice-ø 138 | | | | | | | | | | | |
| 138 | 2.00 | 6.00 | 1.90 | 57 | 3.00 | 6.00 | 14.31 | 0.200 | 8.5° | 4 | 89.00 |
| 178 | 3.00 | 6.00 | 2.80 | 57 | 4.00 | 9.00 | 15.63 | 0.200 | 5.8° | 4 | 89.00 |
| 218 | 4.00 | 6.00 | 3.70 | 57 | 5.00 | 12.00 | 16.95 | 0.200 | 3.6° | 4 | 89.00 |
| 258 | 5.00 | 6.00 | 4.60 | 57 | 6.00 | 15.00 | 18.27 | 0.200 | 1.7° | 4 | 89.00 |
| 297 | 6.00 | 6.00 | 5.50 | 57 | 7.00 | 19.34 | 20.00 | 0.200 | 0.0° | 4 | 89.00 |
| 385 | 8.00 | 8.00 | 7.40 | 63 | 9.00 | 25.29 | 26.00 | 0.200 | 0.0° | 4 | 112.00 |
| 445 | 10.00 | 10.00 | 9.20 | 72 | 11.00 | 30.20 | 31.00 | 0.200 | 0.0° | 4 | 152.00 |
| 496 | 12.00 | 12.00 | 11.00 | 83 | 13.00 | 36.13 | 37.00 | 0.200 | 0.0° | 4 | 188.00 |
| 140 | 2.00 | 6.00 | 1.90 | 57 | 3.00 | 6.00 | 14.31 | 0.500 | 8.7° | 4 | 89.00 |
| 180 | 3.00 | 6.00 | 2.80 | 57 | 4.00 | 9.00 | 15.63 | 0.500 | 6.0° | 4 | 89.00 |
| 220 | 4.00 | 6.00 | 3.70 | 57 | 5.00 | 12.00 | 16.95 | 0.500 | 3.7° | 4 | 89.00 |
| 260 | 5.00 | 6.00 | 4.60 | 57 | 6.00 | 15.00 | 18.27 | 0.500 | 1.7° | 4 | 89.00 |
| 300 | 6.00 | 6.00 | 5.50 | 57 | 7.00 | 19.34 | 20.00 | 0.500 | 0.0° | 4 | 89.00 |
| 388 | 8.00 | 8.00 | 7.40 | 63 | 9.00 | 25.29 | 26.00 | 0.500 | 0.0° | 4 | 112.00 |
| 448 | 10.00 | 10.00 | 9.20 | 72 | 11.00 | 30.20 | 31.00 | 0.500 | 0.0° | 4 | 152.00 |
| 498 | 12.00 | 12.00 | 11.00 | 83 | 13.00 | 36.13 | 37.00 | 0.500 | 0.0° | 4 | 188.00 |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



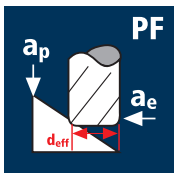
| d1 [mm] | z | v _c [m/min] | f _i [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | r [mm] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|-----------|
| 4.00 | 4 | 200 | 0.055 | 0.600 | 2.400 | 3.83 | 16620 | 3655 | 1.00 |
| 5.00 | 4 | 200 | 0.060 | 0.600 | 3.000 | 4.83 | 13180 | 3165 | 1.00 |
| 6.00 | 4 | 200 | 0.065 | 0.600 | 3.600 | 5.83 | 10920 | 2840 | 1.00 |
| 8.00 | 4 | 200 | 0.080 | 0.600 | 4.800 | 7.83 | 8130 | 2600 | 1.00 |
| 10.00 | 4 | 200 | 0.105 | 0.600 | 6.000 | 9.83 | 6475 | 2720 | 1.00 |
| 12.00 | 4 | 200 | 0.125 | 0.600 | 7.200 | 11.83 | 5380 | 2690 | 1.00 |

| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|------|
| 4.00 | 4 | 160 | 0.050 | 0.600 | 2.400 | 3.83 | 13300 | 2660 | 1.00 |
| 5.00 | 4 | 160 | 0.055 | 0.600 | 3.000 | 4.83 | 10545 | 2320 | 1.00 |
| 6.00 | 4 | 160 | 0.060 | 0.600 | 3.600 | 5.83 | 8735 | 2095 | 1.00 |
| 8.00 | 4 | 160 | 0.070 | 0.600 | 4.800 | 7.83 | 6505 | 1820 | 1.00 |
| 10.00 | 4 | 160 | 0.095 | 0.600 | 6.000 | 9.83 | 5180 | 1970 | 1.00 |
| 12.00 | 4 | 160 | 0.115 | 0.600 | 7.200 | 11.83 | 4305 | 1980 | 1.00 |

| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|------|
| 4.00 | 4 | 150 | 0.045 | 0.600 | 2.400 | 3.83 | 12465 | 2245 | 1.00 |
| 5.00 | 4 | 150 | 0.050 | 0.600 | 3.000 | 4.83 | 9885 | 1975 | 1.00 |
| 6.00 | 4 | 150 | 0.055 | 0.600 | 3.600 | 5.83 | 8190 | 1800 | 1.00 |
| 8.00 | 4 | 150 | 0.065 | 0.600 | 4.800 | 7.83 | 6100 | 1585 | 1.00 |
| 10.00 | 4 | 150 | 0.085 | 0.600 | 6.000 | 9.83 | 4855 | 1650 | 1.00 |
| 12.00 | 4 | 150 | 0.105 | 0.600 | 7.200 | 11.83 | 4035 | 1695 | 1.00 |

| | | | | | | | | | |
|-------|---|----|-------|-------|-------|-------|------|-----|------|
| 4.00 | 4 | 70 | 0.030 | 0.600 | 1.600 | 3.83 | 5820 | 700 | 1.00 |
| 5.00 | 4 | 70 | 0.035 | 0.600 | 2.000 | 4.83 | 4615 | 645 | 1.00 |
| 6.00 | 4 | 70 | 0.040 | 0.600 | 2.400 | 5.83 | 3820 | 610 | 1.00 |
| 8.00 | 4 | 70 | 0.045 | 0.600 | 3.200 | 7.83 | 2845 | 510 | 1.00 |
| 10.00 | 4 | 70 | 0.060 | 0.600 | 4.000 | 9.83 | 2265 | 545 | 1.00 |
| 12.00 | 4 | 70 | 0.075 | 0.600 | 4.800 | 11.83 | 1885 | 565 | 1.00 |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



| d1 [mm] | z | v _c [m/min] | f _i [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|----------|
| 4.00 | 4 | 300 | 0.065 | 0.180 | 0.180 | 3.97 | 24055 | 6255 | 45° |
| 5.00 | 4 | 300 | 0.075 | 0.240 | 0.240 | 4.99 | 19135 | 5740 | 45° |
| 6.00 | 4 | 300 | 0.090 | 0.270 | 0.270 | 6.00 | 15915 | 5730 | 45° |
| 8.00 | 4 | 300 | 0.125 | 0.300 | 0.300 | 8.00 | 11935 | 5970 | 45° |
| 10.00 | 4 | 300 | 0.145 | 0.360 | 0.360 | 9.99 | 9560 | 5545 | 45° |
| 12.00 | 4 | 300 | 0.170 | 0.390 | 0.390 | 11.98 | 7970 | 5420 | 45° |

| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|-----|
| 4.00 | 4 | 220 | 0.060 | 0.180 | 0.180 | 3.97 | 17640 | 4235 | 45° |
| 5.00 | 4 | 220 | 0.070 | 0.240 | 0.240 | 4.99 | 14035 | 3930 | 45° |
| 6.00 | 4 | 220 | 0.085 | 0.270 | 0.270 | 6.00 | 11670 | 3970 | 45° |
| 8.00 | 4 | 220 | 0.120 | 0.300 | 0.300 | 8.00 | 8755 | 4200 | 45° |
| 10.00 | 4 | 220 | 0.140 | 0.360 | 0.360 | 9.99 | 7010 | 3925 | 45° |
| 12.00 | 4 | 220 | 0.160 | 0.390 | 0.390 | 11.98 | 5845 | 3740 | 45° |

| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|-----|
| 4.00 | 4 | 160 | 0.055 | 0.180 | 0.180 | 3.97 | 12830 | 2820 | 45° |
| 5.00 | 4 | 160 | 0.065 | 0.240 | 0.240 | 4.99 | 10205 | 2655 | 45° |
| 6.00 | 4 | 160 | 0.075 | 0.270 | 0.270 | 6.00 | 8490 | 2545 | 45° |
| 8.00 | 4 | 160 | 0.110 | 0.300 | 0.300 | 8.00 | 6365 | 2800 | 45° |
| 10.00 | 4 | 160 | 0.125 | 0.360 | 0.360 | 9.99 | 5100 | 2550 | 45° |
| 12.00 | 4 | 160 | 0.145 | 0.390 | 0.390 | 11.98 | 4250 | 2465 | 45° |

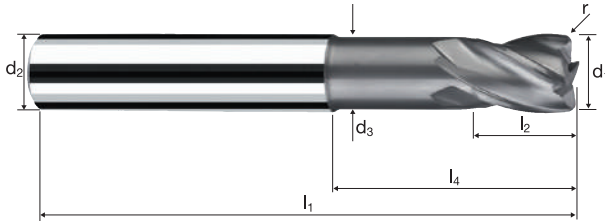
| | | | | | | | | | |
|-------|---|----|-------|-------|-------|-------|------|-----|-----|
| 4.00 | 4 | 80 | 0.035 | 0.180 | 0.180 | 3.97 | 6415 | 900 | 45° |
| 5.00 | 4 | 80 | 0.040 | 0.240 | 0.240 | 4.99 | 5105 | 815 | 45° |
| 6.00 | 4 | 80 | 0.045 | 0.270 | 0.270 | 6.00 | 4245 | 765 | 45° |
| 8.00 | 4 | 80 | 0.065 | 0.300 | 0.300 | 8.00 | 3185 | 830 | 45° |
| 10.00 | 4 | 80 | 0.075 | 0.360 | 0.360 | 9.99 | 2550 | 765 | 45° |
| 12.00 | 4 | 80 | 0.085 | 0.390 | 0.390 | 11.98 | 2125 | 725 | 45° |

Frese toriche ToroX

Tolleranza r 0/+0.015, 3xd



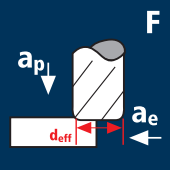
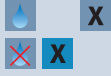



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|------------------|-------------------------------|
| HM XT | λ 30° γ -5° |
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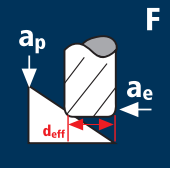






ReTool®

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|-----------------------|------------------------|------------------------|---------------------|---------------------|--------------------|-----------------------|-----------------------------------|
| Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Ti Titanium | GG(G) Tool Steel HSS |
|-----------------------|------------------------|------------------------|---------------------|---------------------|--------------------|-----------------------|-----------------------------------|

| Esempio: N° Ordine | | | | | | | | | | | X-AL |
|--|---------------|----------|-------|----|-------|-------|-------|---------------|------|---|--------|
| Rivestimento X Articolo 7100 Codice-ø 222 | | | | | | | | | | | X7100 |
| Ø Code | d1 0/-0.01 | d2 h4 | d3 | l1 | l2 | l3 | l4 | r 0/+0.015 | α | z | EUR |
| 222 | 4.00 | 6.00 | 3.70 | 57 | 5.00 | 12.00 | 16.95 | 1.000 | 3.8° | 4 | 89.00 |
| 262 | 5.00 | 6.00 | 4.60 | 57 | 6.00 | 15.00 | 18.27 | 1.000 | 1.8° | 4 | 89.00 |
| 302 | 6.00 | 6.00 | 5.50 | 57 | 7.00 | 19.34 | 20.00 | 1.000 | 0.0° | 4 | 89.00 |
| 391 | 8.00 | 8.00 | 7.40 | 63 | 9.00 | 25.29 | 26.00 | 1.000 | 0.0° | 4 | 112.00 |
| 450 | 10.00 | 10.00 | 9.20 | 72 | 11.00 | 30.20 | 31.00 | 1.000 | 0.0° | 4 | 152.00 |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 13.00 | 36.13 | 37.00 | 1.000 | 0.0° | 4 | 188.00 |
| 395 | 8.00 | 8.00 | 7.40 | 63 | 9.00 | 25.29 | 26.00 | 2.000 | 0.0° | 4 | 112.00 |
| 455 | 10.00 | 10.00 | 9.20 | 72 | 11.00 | 30.20 | 31.00 | 2.000 | 0.0° | 4 | 152.00 |
| 505 | 12.00 | 12.00 | 11.00 | 83 | 13.00 | 36.13 | 37.00 | 2.000 | 0.0° | 4 | 188.00 |
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| Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | r [mm] |
|---|---|---|------|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|--------|
|  | Acciaio da utensile temprato 48 - 52 HRC  | 2.00 | 4 | 150 | 0.020 | 0.050 | 0.440 | 1.44 | 33155 | 2655 | 0.50 |
| | | 3.00 | 4 | 150 | 0.025 | 0.050 | 0.660 | 2.44 | 19570 | 1955 | 0.50 |
| | | 4.00 | 4 | 150 | 0.030 | 0.060 | 0.880 | 3.47 | 13760 | 1650 | 0.50 |
| | | 5.00 | 4 | 150 | 0.030 | 0.060 | 1.100 | 4.47 | 10680 | 1280 | 0.50 |
| | | 6.00 | 6 | 150 | 0.035 | 0.080 | 1.320 | 5.54 | 8620 | 1810 | 0.50 |
| | | 8.00 | 6 | 150 | 0.040 | 0.080 | 1.760 | 7.54 | 6330 | 1520 | 0.50 |
| | | 10.00 | 6 | 150 | 0.045 | 0.100 | 2.200 | 9.60 | 4975 | 1345 | 0.50 |
| | | 12.00 | 6 | 150 | 0.050 | 0.100 | 2.640 | 11.60 | 4115 | 1235 | 0.50 |
| | | 16.00 | 6 | 150 | 0.060 | 0.120 | 3.520 | 15.65 | 3050 | 1100 | 0.50 |
| | | Acciaio da utensile temprato 52 - 56 HRC  | 2.00 | 4 | 120 | 0.020 | 0.050 | 0.440 | 1.44 | 26525 | 2120 |
| 3.00 | 4 | | 120 | 0.025 | 0.050 | 0.660 | 2.44 | 15655 | 1565 | 0.50 | |
| 4.00 | 4 | | 120 | 0.030 | 0.060 | 0.880 | 3.47 | 11010 | 1320 | 0.50 | |
| 5.00 | 4 | | 120 | 0.030 | 0.060 | 1.100 | 4.47 | 8545 | 1025 | 0.50 | |
| 6.00 | 6 | | 120 | 0.035 | 0.080 | 1.320 | 5.54 | 6895 | 1450 | 0.50 | |
| 8.00 | 6 | | 120 | 0.040 | 0.080 | 1.760 | 7.54 | 5065 | 1215 | 0.50 | |
| 10.00 | 6 | | 120 | 0.045 | 0.100 | 2.200 | 9.60 | 3980 | 1075 | 0.50 | |
| 12.00 | 6 | | 120 | 0.050 | 0.100 | 2.640 | 11.60 | 3295 | 990 | 0.50 | |
| 16.00 | 6 | | 120 | 0.060 | 0.120 | 3.520 | 15.65 | 2440 | 880 | 0.50 | |
| Acciaio da utensile temprato 56 - 60 HRC  | 2.00 | | 4 | 80 | 0.015 | 0.050 | 0.440 | 1.44 | 17685 | 1060 | 0.50 |
| | 3.00 | 4 | 80 | 0.020 | 0.050 | 0.660 | 2.44 | 10435 | 835 | 0.50 | |
| | 4.00 | 4 | 80 | 0.025 | 0.060 | 0.880 | 3.47 | 7340 | 735 | 0.50 | |
| | 5.00 | 4 | 80 | 0.025 | 0.060 | 1.100 | 4.47 | 5695 | 570 | 0.50 | |
| | 6.00 | 6 | 80 | 0.030 | 0.080 | 1.320 | 5.54 | 4595 | 825 | 0.50 | |
| | 8.00 | 6 | 80 | 0.030 | 0.080 | 1.760 | 7.54 | 3375 | 610 | 0.50 | |
| | 10.00 | 6 | 80 | 0.035 | 0.100 | 2.200 | 9.60 | 2655 | 555 | 0.50 | |
| | 12.00 | 6 | 80 | 0.040 | 0.100 | 2.640 | 11.60 | 2195 | 525 | 0.50 | |
| | 16.00 | 6 | 80 | 0.050 | 0.120 | 3.520 | 15.65 | 1625 | 490 | 0.50 | |
| | Acciaio da utensile temprato > 60 HRC  | 2.00 | 4 | 40 | 0.015 | 0.050 | 0.440 | 1.44 | 8840 | 530 | 0.50 |
| 3.00 | | 4 | 40 | 0.020 | 0.050 | 0.660 | 2.44 | 5220 | 415 | 0.50 | |
| 4.00 | | 4 | 40 | 0.025 | 0.060 | 0.880 | 3.47 | 3670 | 365 | 0.50 | |
| 5.00 | | 4 | 40 | 0.025 | 0.060 | 1.100 | 4.47 | 2850 | 285 | 0.50 | |
| 6.00 | | 6 | 40 | 0.030 | 0.080 | 1.320 | 5.54 | 2300 | 415 | 0.50 | |
| 8.00 | | 6 | 40 | 0.030 | 0.080 | 1.760 | 7.54 | 1690 | 305 | 0.50 | |
| 10.00 | | 6 | 40 | 0.035 | 0.100 | 2.200 | 9.60 | 1325 | 280 | 0.50 | |
| 12.00 | | 6 | 40 | 0.040 | 0.100 | 2.640 | 11.60 | 1100 | 265 | 0.50 | |
| 16.00 | | 6 | 40 | 0.050 | 0.120 | 3.520 | 15.65 | 815 | 245 | 0.50 | |

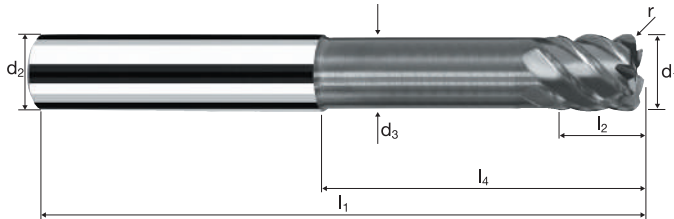
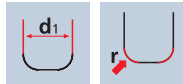
| Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|---|--|---|------|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
|  | Acciaio da utensile temprato 48 - 52 HRC  | 2.00 | 4 | 256 | 0.020 | 0.050 | 0.050 | 1.94 | 42005 | 3360 | 45° |
| | | 3.00 | 4 | 300 | 0.025 | 0.050 | 0.050 | 2.94 | 32480 | 3250 | 45° |
| | | 4.00 | 4 | 300 | 0.030 | 0.060 | 0.060 | 3.96 | 24115 | 2895 | 45° |
| | | 5.00 | 4 | 300 | 0.035 | 0.060 | 0.060 | 4.96 | 19255 | 2695 | 45° |
| | | 6.00 | 6 | 300 | 0.040 | 0.080 | 0.080 | 5.98 | 15970 | 3830 | 45° |
| | | 8.00 | 6 | 300 | 0.045 | 0.080 | 0.080 | 7.98 | 11965 | 3230 | 45° |
| | | 10.00 | 6 | 300 | 0.050 | 0.100 | 0.100 | 9.99 | 9560 | 2870 | 45° |
| | | 12.00 | 6 | 300 | 0.055 | 0.100 | 0.100 | 11.99 | 7965 | 2630 | 45° |
| | | 16.00 | 6 | 300 | 0.065 | 0.120 | 0.120 | 16.00 | 5970 | 2330 | 45° |
| | | Acciaio da utensile temprato 52 - 56 HRC  | 2.00 | 4 | 250 | 0.020 | 0.050 | 0.050 | 1.94 | 41020 | 3280 |
| 3.00 | 4 | | 250 | 0.025 | 0.050 | 0.050 | 2.94 | 27065 | 2705 | 45° | |
| 4.00 | 4 | | 250 | 0.030 | 0.060 | 0.060 | 3.96 | 20095 | 2410 | 45° | |
| 5.00 | 4 | | 250 | 0.035 | 0.060 | 0.060 | 4.96 | 16045 | 2245 | 45° | |
| 6.00 | 6 | | 250 | 0.040 | 0.080 | 0.080 | 5.98 | 13305 | 3195 | 45° | |
| 8.00 | 6 | | 250 | 0.045 | 0.080 | 0.080 | 7.98 | 9970 | 2690 | 45° | |
| 10.00 | 6 | | 250 | 0.050 | 0.100 | 0.100 | 9.99 | 7965 | 2390 | 45° | |
| 12.00 | 6 | | 250 | 0.050 | 0.100 | 0.100 | 11.99 | 6635 | 1990 | 45° | |
| 16.00 | 6 | | 250 | 0.060 | 0.120 | 0.120 | 16.00 | 4975 | 1790 | 45° | |
| Acciaio da utensile temprato 56 - 60 HRC  | 2.00 | | 4 | 180 | 0.015 | 0.050 | 0.050 | 1.94 | 29535 | 1770 | 45° |
| | 3.00 | 4 | 180 | 0.020 | 0.050 | 0.050 | 2.94 | 19490 | 1560 | 45° | |
| | 4.00 | 4 | 180 | 0.025 | 0.060 | 0.060 | 3.96 | 14470 | 1445 | 45° | |
| | 5.00 | 4 | 180 | 0.030 | 0.060 | 0.060 | 4.96 | 11550 | 1385 | 45° | |
| | 6.00 | 6 | 180 | 0.035 | 0.080 | 0.080 | 5.98 | 9580 | 2010 | 45° | |
| | 8.00 | 6 | 180 | 0.040 | 0.080 | 0.080 | 7.98 | 7180 | 1725 | 45° | |
| | 10.00 | 6 | 180 | 0.045 | 0.100 | 0.100 | 9.99 | 5735 | 1550 | 45° | |
| | 12.00 | 6 | 180 | 0.045 | 0.100 | 0.100 | 11.99 | 4780 | 1290 | 45° | |
| | 16.00 | 6 | 180 | 0.055 | 0.120 | 0.120 | 16.00 | 3580 | 1180 | 45° | |
| | Acciaio da utensile temprato > 60 HRC  | 2.00 | 4 | 100 | 0.010 | 0.050 | 0.050 | 1.94 | 16410 | 655 | 45° |
| 3.00 | | 4 | 100 | 0.015 | 0.050 | 0.050 | 2.94 | 10825 | 650 | 45° | |
| 4.00 | | 4 | 100 | 0.015 | 0.060 | 0.060 | 3.96 | 8040 | 480 | 45° | |
| 5.00 | | 4 | 100 | 0.020 | 0.060 | 0.060 | 4.96 | 6420 | 515 | 45° | |
| 6.00 | | 6 | 100 | 0.020 | 0.080 | 0.080 | 5.98 | 5325 | 640 | 45° | |
| 8.00 | | 6 | 100 | 0.025 | 0.080 | 0.080 | 7.98 | 3990 | 600 | 45° | |
| 10.00 | | 6 | 100 | 0.025 | 0.100 | 0.100 | 9.99 | 3185 | 480 | 45° | |
| 12.00 | | 6 | 100 | 0.030 | 0.100 | 0.100 | 11.99 | 2655 | 480 | 45° | |
| 16.00 | | 6 | 100 | 0.035 | 0.120 | 0.120 | 16.00 | 1990 | 420 | 45° | |

Frese toriche XSpeed

Tolleranza r 0/+0.015, 6xd



HM
XT λ 55°
 γ -10°

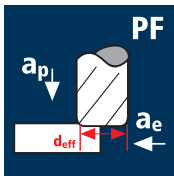


ReTool®

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|----------|-----------|-----------|-------|-------|------|----------|----------------------------|
| Rm | Rm | Rm | HRC | HRC | HRC | Ti | GG(G) Tool Steel HSS |
| 850-1100 | 1100-1300 | 1300-1500 | 48-56 | 56-60 | > 60 | Titanium | |

| Ø Code | d ₁ 0/-0.01 | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r 0/+0.015 | α | z | X-AL |
|--|---------------------------|----------------------|----------------|----------------|----------------|----------------|----------------|---------------|------|---|--------------|
| | | | | | | | | | | | EUR |
| Esempio: N° Ordine X 7204 140 | | | | | | | | | | | |
| Rivestimento Articolo Codice-ø | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | X7204 |
| | | | | | | | | | | | EUR |
| 140 | 2.00 | 6.00 | 1.90 | 66 | 3.00 | 12.00 | 20.31 | 0.500 | 6.0° | 4 | 108.00 |
| 180 | 3.00 | 6.00 | 2.80 | 66 | 4.00 | 18.00 | 24.63 | 0.500 | 3.7° | 4 | 108.00 |
| 220 | 4.00 | 6.00 | 3.70 | 69 | 5.00 | 24.00 | 28.95 | 0.500 | 2.1° | 4 | 108.00 |
| 260 | 5.00 | 6.00 | 4.60 | 75 | 6.00 | 30.00 | 33.27 | 0.500 | 0.9° | 4 | 108.00 |
| 295 | 6.00 | 6.00 | 5.50 | 80 | 7.00 | 42.34 | 43.00 | 0.500 | 0.0° | 4 | 108.00 |
| 300 | 6.00 | 6.00 | 5.50 | 80 | 7.00 | 42.34 | 43.00 | 0.500 | 0.0° | 6 | 108.00 |
| 386 | 8.00 | 8.00 | 7.40 | 90 | 9.00 | 52.29 | 53.00 | 0.500 | 0.0° | 4 | 135.00 |
| 391 | 8.00 | 8.00 | 7.40 | 90 | 9.00 | 52.29 | 53.00 | 0.500 | 0.0° | 6 | 135.00 |
| 440 | 10.00 | 10.00 | 9.20 | 105 | 11.00 | 63.20 | 64.00 | 0.500 | 0.0° | 4 | 184.00 |
| 450 | 10.00 | 10.00 | 9.20 | 105 | 11.00 | 63.20 | 64.00 | 0.500 | 0.0° | 6 | 184.00 |
| 491 | 12.00 | 12.00 | 11.00 | 120 | 13.00 | 73.13 | 74.00 | 0.500 | 0.0° | 4 | 227.00 |
| 501 | 12.00 | 12.00 | 11.00 | 120 | 13.00 | 73.13 | 74.00 | 0.500 | 0.0° | 6 | 227.00 |
| 606 | 16.00 | 16.00 | 15.00 | 135 | 17.00 | 85.13 | 86.00 | 0.500 | 0.0° | 6 | 356.00 |
| | | | | | | | | | | | |
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Applicazione



Materiale

Acciaio da
utensile temprato
48 - 52 HRC



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | r [mm] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|-----------|
| 4.00 | 4 | 150 | 0.040 | 0.180 | 0.880 | 3.14 | 15205 | 2435 | 1.00 |
| 5.00 | 4 | 150 | 0.045 | 0.220 | 1.100 | 4.25 | 11235 | 2020 | 1.00 |
| 6.00 | 6 | 150 | 0.050 | 0.260 | 1.320 | 5.35 | 8925 | 2675 | 1.00 |
| 8.00 | 6 | 150 | 0.060 | 0.320 | 1.760 | 7.47 | 6390 | 2300 | 1.00 |
| 10.00 | 6 | 150 | 0.080 | 0.380 | 2.200 | 9.57 | 4990 | 2395 | 1.00 |
| 12.00 | 6 | 150 | 0.095 | 0.450 | 2.640 | 11.67 | 4090 | 2330 | 1.00 |
| 16.00 | 6 | 150 | 0.105 | 0.500 | 3.520 | 15.73 | 3035 | 1910 | 1.00 |

Acciaio da
utensile temprato
52 - 56 HRC



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | r [mm] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|-----------|
| 4.00 | 4 | 120 | 0.035 | 0.180 | 0.880 | 3.14 | 12165 | 1705 | 1.00 |
| 5.00 | 4 | 120 | 0.040 | 0.220 | 1.100 | 4.25 | 8990 | 1440 | 1.00 |
| 6.00 | 6 | 120 | 0.045 | 0.260 | 1.320 | 5.35 | 7140 | 1930 | 1.00 |
| 8.00 | 6 | 120 | 0.055 | 0.320 | 1.760 | 7.47 | 5115 | 1685 | 1.00 |
| 10.00 | 6 | 120 | 0.070 | 0.380 | 2.200 | 9.57 | 3990 | 1675 | 1.00 |
| 12.00 | 6 | 120 | 0.085 | 0.450 | 2.640 | 11.67 | 3275 | 1670 | 1.00 |
| 16.00 | 6 | 120 | 0.095 | 0.500 | 3.520 | 15.73 | 2430 | 1385 | 1.00 |

Acciaio da
utensile temprato
56 - 60 HRC



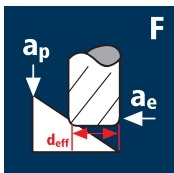
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | r [mm] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|-----------|
| 4.00 | 4 | 80 | 0.035 | 0.180 | 0.880 | 3.14 | 8110 | 1135 | 1.00 |
| 5.00 | 4 | 80 | 0.035 | 0.220 | 1.100 | 4.25 | 5990 | 840 | 1.00 |
| 6.00 | 6 | 80 | 0.040 | 0.260 | 1.320 | 5.35 | 4760 | 1140 | 1.00 |
| 8.00 | 6 | 80 | 0.050 | 0.320 | 1.760 | 7.47 | 3410 | 1025 | 1.00 |
| 10.00 | 6 | 80 | 0.065 | 0.380 | 2.200 | 9.57 | 2660 | 1040 | 1.00 |
| 12.00 | 6 | 80 | 0.080 | 0.450 | 2.640 | 11.67 | 2180 | 1045 | 1.00 |
| 16.00 | 6 | 80 | 0.085 | 0.500 | 3.520 | 15.73 | 1620 | 825 | 1.00 |

Acciaio da
utensile temprato
> 60 HRC



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | r [mm] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|-----------|
| 4.00 | 4 | 40 | 0.025 | 0.180 | 0.880 | 3.14 | 4055 | 405 | 1.00 |
| 5.00 | 4 | 40 | 0.025 | 0.220 | 1.100 | 4.25 | 2995 | 300 | 1.00 |
| 6.00 | 6 | 40 | 0.030 | 0.260 | 1.320 | 5.35 | 2380 | 430 | 1.00 |
| 8.00 | 6 | 40 | 0.035 | 0.320 | 1.760 | 7.47 | 1705 | 360 | 1.00 |
| 10.00 | 6 | 40 | 0.045 | 0.380 | 2.200 | 9.57 | 1330 | 360 | 1.00 |
| 12.00 | 6 | 40 | 0.055 | 0.450 | 2.640 | 11.67 | 1090 | 360 | 1.00 |
| 16.00 | 6 | 40 | 0.060 | 0.500 | 3.520 | 15.73 | 810 | 290 | 1.00 |

Applicazione



Materiale

Acciaio da
utensile temprato
48 - 52 HRC



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|----------|
| 4.00 | 4 | 300 | 0.030 | 0.080 | 0.080 | 3.86 | 24740 | 2970 | 45° |
| 5.00 | 4 | 300 | 0.035 | 0.080 | 0.080 | 4.86 | 19650 | 2750 | 45° |
| 6.00 | 6 | 300 | 0.040 | 0.110 | 0.110 | 5.90 | 16185 | 3885 | 45° |
| 8.00 | 6 | 300 | 0.045 | 0.110 | 0.110 | 7.90 | 12090 | 3265 | 45° |
| 10.00 | 6 | 300 | 0.050 | 0.140 | 0.140 | 9.94 | 9605 | 2880 | 45° |
| 12.00 | 6 | 300 | 0.055 | 0.140 | 0.140 | 11.94 | 8000 | 2640 | 45° |
| 16.00 | 6 | 300 | 0.065 | 0.160 | 0.160 | 15.96 | 5985 | 2335 | 45° |

Acciaio da
utensile temprato
52 - 56 HRC



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|----------|
| 4.00 | 4 | 250 | 0.030 | 0.080 | 0.080 | 3.86 | 20615 | 2475 | 45° |
| 5.00 | 4 | 250 | 0.035 | 0.080 | 0.080 | 4.86 | 16375 | 2290 | 45° |
| 6.00 | 6 | 250 | 0.040 | 0.110 | 0.110 | 5.90 | 13490 | 3235 | 45° |
| 8.00 | 6 | 250 | 0.045 | 0.110 | 0.110 | 7.90 | 10075 | 2720 | 45° |
| 10.00 | 6 | 250 | 0.050 | 0.140 | 0.140 | 9.94 | 8005 | 2400 | 45° |
| 12.00 | 6 | 250 | 0.050 | 0.140 | 0.140 | 11.94 | 6665 | 2000 | 45° |
| 16.00 | 6 | 250 | 0.060 | 0.160 | 0.160 | 15.96 | 4985 | 1795 | 45° |

Acciaio da
utensile temprato
56 - 60 HRC



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|----------|
| 4.00 | 4 | 180 | 0.025 | 0.080 | 0.080 | 3.86 | 14845 | 1485 | 45° |
| 5.00 | 4 | 180 | 0.030 | 0.080 | 0.080 | 4.86 | 11790 | 1415 | 45° |
| 6.00 | 6 | 180 | 0.035 | 0.110 | 0.110 | 5.90 | 9710 | 2040 | 45° |
| 8.00 | 6 | 180 | 0.040 | 0.110 | 0.110 | 7.90 | 7255 | 1740 | 45° |
| 10.00 | 6 | 180 | 0.045 | 0.140 | 0.140 | 9.94 | 5765 | 1555 | 45° |
| 12.00 | 6 | 180 | 0.045 | 0.140 | 0.140 | 11.94 | 4800 | 1295 | 45° |
| 16.00 | 6 | 180 | 0.055 | 0.160 | 0.160 | 15.96 | 3590 | 1185 | 45° |

Acciaio da
utensile temprato
> 60 HRC



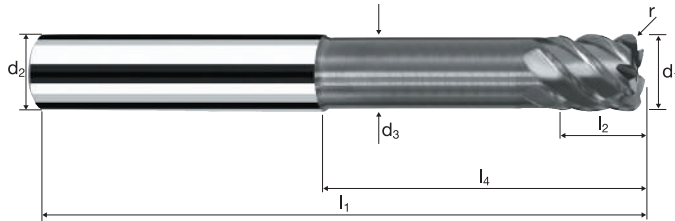
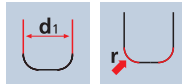
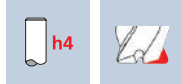
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|----------|
| 4.00 | 4 | 100 | 0.015 | 0.080 | 0.080 | 3.86 | 8245 | 495 | 45° |
| 5.00 | 4 | 100 | 0.020 | 0.080 | 0.080 | 4.86 | 6550 | 525 | 45° |
| 6.00 | 6 | 100 | 0.020 | 0.110 | 0.110 | 5.90 | 5395 | 645 | 45° |
| 8.00 | 6 | 100 | 0.025 | 0.110 | 0.110 | 7.90 | 4030 | 605 | 45° |
| 10.00 | 6 | 100 | 0.025 | 0.140 | 0.140 | 9.94 | 3200 | 480 | 45° |
| 12.00 | 6 | 100 | 0.030 | 0.140 | 0.140 | 11.94 | 2665 | 480 | 45° |
| 16.00 | 6 | 100 | 0.035 | 0.160 | 0.160 | 15.96 | 1995 | 420 | 45° |

Frese toriche XSpeed

Tolleranza r 0/+0.015, 6xd



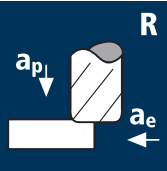







HM
XT λ 55°
 γ -10°

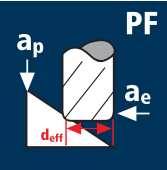









ReTool®

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|----------------|-----------------|-----------------|--------------|--------------|-------------|----------------|----------------------------|
| Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Ti Titanium | GG(G) Tool Steel HSS |
|----------------|-----------------|-----------------|--------------|--------------|-------------|----------------|----------------------------|

| Ø Code | d ₁ 0/-0.01 | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r 0/+0.015 | α | z | X-AL |
|---|---------------------------|----------------------|----------------|----------------|----------------|----------------|----------------|---------------|------|---|--------|
| | | | | | | | | | | | EUR |
| Esempio: N° Ordine Rivestimento X Articolo 7204 Codice-Ø 218 | | | | | | | | | | | |
| 218 | 4.00 | 6.00 | 3.70 | 69 | 5.00 | 24.00 | 28.95 | 1.000 | 2.1° | 4 | 108.00 |
| 258 | 5.00 | 6.00 | 4.60 | 75 | 6.00 | 30.00 | 33.27 | 1.000 | 1.0° | 4 | 108.00 |
| 293 | 6.00 | 6.00 | 5.50 | 80 | 7.00 | 42.34 | 43.00 | 1.000 | 0.0° | 4 | 108.00 |
| 297 | 6.00 | 6.00 | 5.50 | 80 | 7.00 | 42.34 | 43.00 | 1.000 | 0.0° | 6 | 108.00 |
| 384 | 8.00 | 8.00 | 7.40 | 90 | 9.00 | 52.29 | 53.00 | 1.000 | 0.0° | 4 | 135.00 |
| 388 | 8.00 | 8.00 | 7.40 | 90 | 9.00 | 52.29 | 53.00 | 1.000 | 0.0° | 6 | 135.00 |
| 435 | 10.00 | 10.00 | 9.20 | 105 | 11.00 | 63.20 | 64.00 | 1.000 | 0.0° | 4 | 184.00 |
| 445 | 10.00 | 10.00 | 9.20 | 105 | 11.00 | 63.20 | 64.00 | 1.000 | 0.0° | 6 | 184.00 |
| 486 | 12.00 | 12.00 | 11.00 | 120 | 13.00 | 73.13 | 74.00 | 1.000 | 0.0° | 4 | 227.00 |
| 496 | 12.00 | 12.00 | 11.00 | 120 | 13.00 | 73.13 | 74.00 | 1.000 | 0.0° | 6 | 227.00 |
| 608 | 16.00 | 16.00 | 15.00 | 135 | 17.00 | 85.13 | 86.00 | 1.000 | 0.0° | 6 | 356.00 |
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| Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _f [mm/min] | r [mm] |
|--|--|---------|-------|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------|
|  <p>R</p> | Acciaio da utensile temprato 42 - 48 HRC  | 2.00 | 4 | 180 | 0.025 | 0.600 | 0.800 | 28650 | 2865 | 0.50 |
| | | 3.00 | 4 | 180 | 0.035 | 0.600 | 1.200 | 19100 | 2675 | 0.50 |
| | | 4.00 | 4 | 180 | 0.045 | 0.600 | 1.600 | 14325 | 2580 | 0.50 |
| | | 5.00 | 4 | 180 | 0.045 | 0.600 | 2.000 | 11460 | 2065 | 0.50 |
| | | 6.00 | 4 | 180 | 0.050 | 0.600 | 2.400 | 9550 | 1910 | 0.50 |
| | | 8.00 | 4 | 180 | 0.060 | 0.600 | 3.200 | 7160 | 1720 | 0.50 |
| | | 10.00 | 4 | 180 | 0.080 | 0.600 | 4.000 | 5730 | 1835 | 0.50 |
| 12.00 | 4 | 180 | 0.095 | 0.600 | 4.800 | 4775 | 1815 | 0.50 | | |
|  | Acciaio da utensile temprato 48 - 52 HRC  | 2.00 | 4 | 140 | 0.025 | 0.600 | 0.800 | 22280 | 2230 | 0.50 |
| | | 3.00 | 4 | 140 | 0.030 | 0.600 | 1.200 | 14855 | 1785 | 0.50 |
| | | 4.00 | 4 | 140 | 0.040 | 0.600 | 1.600 | 11140 | 1785 | 0.50 |
| | | 5.00 | 4 | 140 | 0.040 | 0.600 | 2.000 | 8915 | 1425 | 0.50 |
| | | 6.00 | 4 | 140 | 0.045 | 0.600 | 2.400 | 7425 | 1335 | 0.50 |
| | | 8.00 | 4 | 140 | 0.055 | 0.600 | 3.200 | 5570 | 1225 | 0.50 |
| | | 10.00 | 4 | 140 | 0.070 | 0.600 | 4.000 | 4455 | 1250 | 0.50 |
| 12.00 | 4 | 140 | 0.085 | 0.600 | 4.800 | 3715 | 1265 | 0.50 | | |
|  | Acciaio da utensile temprato 52 - 56 HRC  | 2.00 | 4 | 100 | 0.020 | 0.600 | 0.800 | 15915 | 1275 | 0.50 |
| | | 3.00 | 4 | 100 | 0.030 | 0.600 | 1.200 | 10610 | 1275 | 0.50 |
| | | 4.00 | 4 | 100 | 0.035 | 0.600 | 1.600 | 7960 | 1115 | 0.50 |
| | | 5.00 | 4 | 100 | 0.035 | 0.600 | 2.000 | 6365 | 890 | 0.50 |
| | | 6.00 | 4 | 100 | 0.040 | 0.600 | 2.400 | 5305 | 850 | 0.50 |
| | | 8.00 | 4 | 100 | 0.050 | 0.600 | 3.200 | 3980 | 795 | 0.50 |
| | | 10.00 | 4 | 100 | 0.065 | 0.600 | 4.000 | 3185 | 830 | 0.50 |
| 12.00 | 4 | 100 | 0.080 | 0.600 | 4.800 | 2655 | 850 | 0.50 | | |
|  | Acciaio da utensile temprato 56 - 60 HRC  | 2.00 | 4 | 70 | 0.015 | 0.600 | 0.800 | 11140 | 670 | 0.50 |
| | | 3.00 | 4 | 70 | 0.020 | 0.600 | 1.200 | 7425 | 595 | 0.50 |
| | | 4.00 | 4 | 70 | 0.025 | 0.600 | 1.600 | 5570 | 555 | 0.50 |
| | | 5.00 | 4 | 70 | 0.025 | 0.600 | 2.000 | 4455 | 445 | 0.50 |
| | | 6.00 | 4 | 70 | 0.030 | 0.600 | 2.400 | 3715 | 445 | 0.50 |
| | | 8.00 | 4 | 70 | 0.035 | 0.600 | 3.200 | 2785 | 390 | 0.50 |
| | | 10.00 | 4 | 70 | 0.045 | 0.600 | 4.000 | 2230 | 400 | 0.50 |
| 12.00 | 4 | 70 | 0.055 | 0.600 | 4.800 | 1855 | 410 | 0.50 | | |

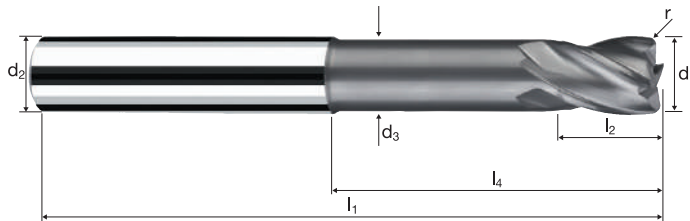
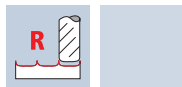
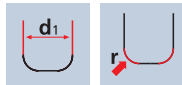
| Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _f [mm/min] | β [°] |
|--|--|---------|-------|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
|  <p>PF</p> | Acciaio da utensile temprato 42 - 48 HRC  | 2.00 | 4 | 263 | 0.045 | 0.100 | 0.100 | 1.99 | 42070 | 7570 | 45° |
| | | 3.00 | 4 | 360 | 0.065 | 0.120 | 0.120 | 3.00 | 38195 | 9930 | 45° |
| | | 4.00 | 4 | 360 | 0.085 | 0.120 | 0.120 | 4.00 | 28650 | 9740 | 45° |
| | | 5.00 | 4 | 360 | 0.100 | 0.160 | 0.160 | 5.00 | 22920 | 9165 | 45° |
| | | 6.00 | 4 | 360 | 0.135 | 0.180 | 0.180 | 6.00 | 19100 | 10315 | 45° |
| | | 8.00 | 4 | 360 | 0.150 | 0.200 | 0.200 | 7.99 | 14340 | 8605 | 45° |
| | | 10.00 | 4 | 360 | 0.200 | 0.240 | 0.240 | 9.97 | 11495 | 9195 | 45° |
| 12.00 | 4 | 360 | 0.170 | 0.260 | 0.260 | 11.96 | 9580 | 6515 | 45° | | |
|  | Acciaio da utensile temprato 48 - 52 HRC  | 2.00 | 4 | 250 | 0.045 | 0.100 | 0.100 | 1.99 | 39990 | 7200 | 45° |
| | | 3.00 | 4 | 250 | 0.060 | 0.120 | 0.120 | 3.00 | 26525 | 6365 | 45° |
| | | 4.00 | 4 | 250 | 0.080 | 0.120 | 0.120 | 4.00 | 19895 | 6365 | 45° |
| | | 5.00 | 4 | 250 | 0.095 | 0.160 | 0.160 | 5.00 | 15915 | 6050 | 45° |
| | | 6.00 | 4 | 250 | 0.130 | 0.180 | 0.180 | 6.00 | 13265 | 6895 | 45° |
| | | 8.00 | 4 | 250 | 0.145 | 0.200 | 0.200 | 7.99 | 9960 | 5775 | 45° |
| | | 10.00 | 4 | 250 | 0.190 | 0.240 | 0.240 | 9.97 | 7980 | 6065 | 45° |
| 12.00 | 4 | 250 | 0.160 | 0.260 | 0.260 | 11.96 | 6655 | 4260 | 45° | | |
|  | Acciaio da utensile temprato 52 - 56 HRC  | 2.00 | 4 | 180 | 0.040 | 0.100 | 0.100 | 1.99 | 28790 | 4605 | 45° |
| | | 3.00 | 4 | 180 | 0.055 | 0.120 | 0.120 | 3.00 | 19100 | 4200 | 45° |
| | | 4.00 | 4 | 180 | 0.075 | 0.120 | 0.120 | 4.00 | 14325 | 4295 | 45° |
| | | 5.00 | 4 | 180 | 0.085 | 0.160 | 0.160 | 5.00 | 11460 | 3895 | 45° |
| | | 6.00 | 4 | 180 | 0.115 | 0.180 | 0.180 | 6.00 | 9550 | 4395 | 45° |
| | | 8.00 | 4 | 180 | 0.130 | 0.200 | 0.200 | 7.99 | 7170 | 3730 | 45° |
| | | 10.00 | 4 | 180 | 0.170 | 0.240 | 0.240 | 9.97 | 5745 | 3910 | 45° |
| 12.00 | 4 | 180 | 0.145 | 0.260 | 0.260 | 11.96 | 4790 | 2780 | 45° | | |
|  | Acciaio da utensile temprato 56 - 60 HRC  | 2.00 | 4 | 100 | 0.025 | 0.100 | 0.100 | 1.99 | 15995 | 1600 | 45° |
| | | 3.00 | 4 | 100 | 0.035 | 0.120 | 0.120 | 3.00 | 10610 | 1485 | 45° |
| | | 4.00 | 4 | 100 | 0.045 | 0.120 | 0.120 | 4.00 | 7960 | 1430 | 45° |
| | | 5.00 | 4 | 100 | 0.050 | 0.160 | 0.160 | 5.00 | 6365 | 1275 | 45° |
| | | 6.00 | 4 | 100 | 0.070 | 0.180 | 0.180 | 6.00 | 5305 | 1485 | 45° |
| | | 8.00 | 4 | 100 | 0.075 | 0.200 | 0.200 | 7.99 | 3985 | 1195 | 45° |
| | | 10.00 | 4 | 100 | 0.100 | 0.240 | 0.240 | 9.97 | 3195 | 1275 | 45° |
| 12.00 | 4 | 100 | 0.085 | 0.260 | 0.260 | 11.96 | 2660 | 905 | 45° | | |

Frese toriche ToroX

Tolleranza r 0/+0.015, 6xd



HM
XT λ 30°
 γ -5°

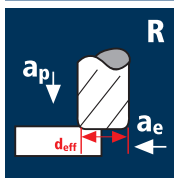


ReTool®

| | | | | | | | |
|----------------|-----------------|-----------------|--------------|--------------|-------------|----------------|----------------------------|
| Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Ti Titanium | GG(G) Tool Steel HSS |
|----------------|-----------------|-----------------|--------------|--------------|-------------|----------------|----------------------------|

| Esempio: N° Ordine | | | | | | | | | | | X-AL |
|--------------------------------------|---------------------------|----------------------|----------------|----------------|----------------|----------------|----------------|---------------|------|---|--------|
| Rivestimento Articolo Codice-ø | | | | | | | | | | | |
| X 7104 138 | | | | | | | | | | | X7104 |
| Ø Code | d ₁ 0/-0.01 | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r 0/+0.015 | α | z | EUR |
| 138 | 2.00 | 6.00 | 1.90 | 66 | 3.00 | 12.00 | 20.31 | 0.200 | 5.9° | 4 | 104.00 |
| 178 | 3.00 | 6.00 | 2.80 | 66 | 4.00 | 18.00 | 24.63 | 0.200 | 3.7° | 4 | 104.00 |
| 218 | 4.00 | 6.00 | 3.70 | 69 | 5.00 | 24.00 | 28.95 | 0.200 | 2.1° | 4 | 104.00 |
| 258 | 5.00 | 6.00 | 4.60 | 75 | 6.00 | 30.00 | 33.27 | 0.200 | 0.9° | 4 | 104.00 |
| 297 | 6.00 | 6.00 | 5.50 | 80 | 7.00 | 42.34 | 43.00 | 0.200 | 0.0° | 4 | 104.00 |
| 385 | 8.00 | 8.00 | 7.40 | 90 | 9.00 | 52.29 | 53.00 | 0.200 | 0.0° | 4 | 130.00 |
| 445 | 10.00 | 10.00 | 9.20 | 105 | 11.00 | 63.20 | 64.00 | 0.200 | 0.0° | 4 | 177.00 |
| 496 | 12.00 | 12.00 | 11.00 | 120 | 13.00 | 73.13 | 74.00 | 0.200 | 0.0° | 4 | 219.00 |
| 140 | 2.00 | 6.00 | 1.90 | 66 | 3.00 | 12.00 | 20.31 | 0.500 | 6.0° | 4 | 104.00 |
| 180 | 3.00 | 6.00 | 2.80 | 66 | 4.00 | 18.00 | 24.63 | 0.500 | 3.7° | 4 | 104.00 |
| 220 | 4.00 | 6.00 | 3.70 | 69 | 5.00 | 24.00 | 28.95 | 0.500 | 2.1° | 4 | 104.00 |
| 260 | 5.00 | 6.00 | 4.60 | 75 | 6.00 | 30.00 | 33.27 | 0.500 | 0.9° | 4 | 104.00 |
| 300 | 6.00 | 6.00 | 5.50 | 80 | 7.00 | 42.34 | 43.00 | 0.500 | 0.0° | 4 | 104.00 |
| 388 | 8.00 | 8.00 | 7.40 | 90 | 9.00 | 52.29 | 53.00 | 0.500 | 0.0° | 4 | 130.00 |
| 448 | 10.00 | 10.00 | 9.20 | 105 | 11.00 | 63.20 | 64.00 | 0.500 | 0.0° | 4 | 177.00 |
| 498 | 12.00 | 12.00 | 11.00 | 120 | 13.00 | 73.13 | 74.00 | 0.500 | 0.0° | 4 | 219.00 |

Applicazione



Materiale

Acciaio da utensile temprato 42 - 48 HRC

Acciaio da utensile temprato 48 - 52 HRC

Acciaio da utensile temprato 52 - 56 HRC

Acciaio da utensile temprato 56 - 60 HRC

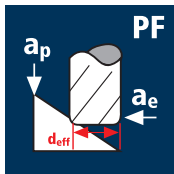
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | r [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|--------|
| 4.00 | 4 | 200 | 0.045 | 0.600 | 2.400 | 3.83 | 16620 | 2990 | 1.00 |
| 5.00 | 4 | 200 | 0.050 | 0.600 | 3.000 | 4.83 | 13180 | 2635 | 1.00 |
| 6.00 | 4 | 200 | 0.055 | 0.600 | 3.600 | 5.83 | 10920 | 2400 | 1.00 |
| 8.00 | 4 | 200 | 0.070 | 0.600 | 4.800 | 7.83 | 8130 | 2275 | 1.00 |
| 10.00 | 4 | 200 | 0.090 | 0.600 | 6.000 | 9.83 | 6475 | 2330 | 1.00 |
| 12.00 | 4 | 200 | 0.105 | 0.600 | 7.200 | 11.83 | 5380 | 2260 | 1.00 |

| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|------|
| 4.00 | 4 | 160 | 0.040 | 0.600 | 2.400 | 3.83 | 13300 | 2130 | 1.00 |
| 5.00 | 4 | 160 | 0.045 | 0.600 | 3.000 | 4.83 | 10545 | 1900 | 1.00 |
| 6.00 | 4 | 160 | 0.050 | 0.600 | 3.600 | 5.83 | 8735 | 1745 | 1.00 |
| 8.00 | 4 | 160 | 0.065 | 0.600 | 4.800 | 7.83 | 6505 | 1690 | 1.00 |
| 10.00 | 4 | 160 | 0.080 | 0.600 | 6.000 | 9.83 | 5180 | 1660 | 1.00 |
| 12.00 | 4 | 160 | 0.095 | 0.600 | 7.200 | 11.83 | 4305 | 1635 | 1.00 |

| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|------|
| 4.00 | 4 | 150 | 0.035 | 0.600 | 2.400 | 3.83 | 12465 | 1745 | 1.00 |
| 5.00 | 4 | 150 | 0.040 | 0.600 | 3.000 | 4.83 | 9885 | 1580 | 1.00 |
| 6.00 | 4 | 150 | 0.045 | 0.600 | 3.600 | 5.83 | 8190 | 1475 | 1.00 |
| 8.00 | 4 | 150 | 0.055 | 0.600 | 4.800 | 7.83 | 6100 | 1340 | 1.00 |
| 10.00 | 4 | 150 | 0.075 | 0.600 | 6.000 | 9.83 | 4855 | 1455 | 1.00 |
| 12.00 | 4 | 150 | 0.085 | 0.600 | 7.200 | 11.83 | 4035 | 1370 | 1.00 |

| | | | | | | | | | |
|-------|---|----|-------|-------|-------|-------|------|-----|------|
| 4.00 | 4 | 70 | 0.025 | 0.600 | 1.600 | 3.83 | 5820 | 580 | 1.00 |
| 5.00 | 4 | 70 | 0.030 | 0.600 | 2.000 | 4.83 | 4615 | 555 | 1.00 |
| 6.00 | 4 | 70 | 0.030 | 0.600 | 2.400 | 5.83 | 3820 | 460 | 1.00 |
| 8.00 | 4 | 70 | 0.040 | 0.600 | 3.200 | 7.83 | 2845 | 455 | 1.00 |
| 10.00 | 4 | 70 | 0.050 | 0.600 | 4.000 | 9.83 | 2265 | 455 | 1.00 |
| 12.00 | 4 | 70 | 0.060 | 0.600 | 4.800 | 11.83 | 1885 | 450 | 1.00 |

Applicazione



Materiale

Acciaio da utensile temprato 42 - 48 HRC

Acciaio da utensile temprato 48 - 52 HRC

Acciaio da utensile temprato 52 - 56 HRC

Acciaio da utensile temprato 56 - 60 HRC

| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
| 4.00 | 4 | 300 | 0.065 | 0.180 | 0.180 | 3.97 | 24055 | 6255 | 45° |
| 5.00 | 4 | 300 | 0.075 | 0.240 | 0.240 | 4.99 | 19135 | 5740 | 45° |
| 6.00 | 4 | 300 | 0.090 | 0.270 | 0.270 | 6.00 | 15915 | 5730 | 45° |
| 8.00 | 4 | 300 | 0.125 | 0.300 | 0.300 | 8.00 | 11935 | 5970 | 45° |
| 10.00 | 4 | 300 | 0.145 | 0.360 | 0.360 | 9.99 | 9560 | 5545 | 45° |
| 12.00 | 4 | 300 | 0.170 | 0.390 | 0.390 | 11.98 | 7970 | 5420 | 45° |

| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|-----|
| 4.00 | 4 | 220 | 0.060 | 0.180 | 0.180 | 3.97 | 17640 | 4235 | 45° |
| 5.00 | 4 | 220 | 0.070 | 0.240 | 0.240 | 4.99 | 14035 | 3930 | 45° |
| 6.00 | 4 | 220 | 0.085 | 0.270 | 0.270 | 6.00 | 11670 | 3970 | 45° |
| 8.00 | 4 | 220 | 0.120 | 0.300 | 0.300 | 8.00 | 8755 | 4200 | 45° |
| 10.00 | 4 | 220 | 0.140 | 0.360 | 0.360 | 9.99 | 7010 | 3925 | 45° |
| 12.00 | 4 | 220 | 0.160 | 0.390 | 0.390 | 11.98 | 5845 | 3740 | 45° |

| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|-----|
| 4.00 | 4 | 160 | 0.055 | 0.180 | 0.180 | 3.97 | 12830 | 2820 | 45° |
| 5.00 | 4 | 160 | 0.065 | 0.240 | 0.240 | 4.99 | 10205 | 2655 | 45° |
| 6.00 | 4 | 160 | 0.075 | 0.270 | 0.270 | 6.00 | 8490 | 2545 | 45° |
| 8.00 | 4 | 160 | 0.110 | 0.300 | 0.300 | 8.00 | 6365 | 2800 | 45° |
| 10.00 | 4 | 160 | 0.125 | 0.360 | 0.360 | 9.99 | 5100 | 2550 | 45° |
| 12.00 | 4 | 160 | 0.145 | 0.390 | 0.390 | 11.98 | 4250 | 2465 | 45° |

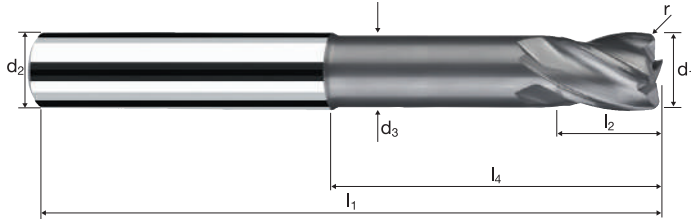
| | | | | | | | | | |
|-------|---|----|-------|-------|-------|-------|------|-----|-----|
| 4.00 | 4 | 80 | 0.035 | 0.180 | 0.180 | 3.97 | 6415 | 900 | 45° |
| 5.00 | 4 | 80 | 0.040 | 0.240 | 0.240 | 4.99 | 5105 | 815 | 45° |
| 6.00 | 4 | 80 | 0.045 | 0.270 | 0.270 | 6.00 | 4245 | 765 | 45° |
| 8.00 | 4 | 80 | 0.065 | 0.300 | 0.300 | 8.00 | 3185 | 830 | 45° |
| 10.00 | 4 | 80 | 0.075 | 0.360 | 0.360 | 9.99 | 2550 | 765 | 45° |
| 12.00 | 4 | 80 | 0.085 | 0.390 | 0.390 | 11.98 | 2125 | 725 | 45° |

Frese toriche ToroX

Tolleranza r 0/+0.015, 6xd



HM λ 30°
XT γ -5°

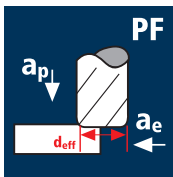


ReTool®

| | | | | | | | |
|----------|-----------|-----------|-------|-------|------|----------|----------------------------|
| Rm | Rm | Rm | HRC | HRC | HRC | Ti | GG(G) Tool Steel HSS |
| 850-1100 | 1100-1300 | 1300-1500 | 48-56 | 56-60 | > 60 | Titanium | |

| Esempio: N° Ordine | | | | | | | | | | | X-AL |
|--------------------|---------------------------|----------------------|----------------|----------------|----------------|----------------|----------------|---------------|------|---|--------|
| | | | | | | | | | | | X7104 |
| | | | | | | | | | | | EUR |
| Ø Code | d ₁ 0/-0.01 | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r 0/+0.015 | α | z | EUR |
| 222 | 4.00 | 6.00 | 3.70 | 69 | 5.00 | 24.00 | 28.95 | 1.000 | 2.1° | 4 | 104.00 |
| 262 | 5.00 | 6.00 | 4.60 | 75 | 6.00 | 30.00 | 33.27 | 1.000 | 1.0° | 4 | 104.00 |
| 302 | 6.00 | 6.00 | 5.50 | 80 | 7.00 | 42.34 | 43.00 | 1.000 | 0.0° | 4 | 104.00 |
| 391 | 8.00 | 8.00 | 7.40 | 90 | 9.00 | 52.29 | 53.00 | 1.000 | 0.0° | 4 | 130.00 |
| 450 | 10.00 | 10.00 | 9.20 | 105 | 11.00 | 63.20 | 64.00 | 1.000 | 0.0° | 4 | 177.00 |
| 501 | 12.00 | 12.00 | 11.00 | 120 | 13.00 | 73.13 | 74.00 | 1.000 | 0.0° | 4 | 219.00 |
| 395 | 8.00 | 8.00 | 7.40 | 90 | 9.00 | 52.29 | 53.00 | 2.000 | 0.0° | 4 | 130.00 |
| 455 | 10.00 | 10.00 | 9.20 | 105 | 11.00 | 63.20 | 64.00 | 2.000 | 0.0° | 4 | 177.00 |
| 505 | 12.00 | 12.00 | 11.00 | 120 | 13.00 | 73.13 | 74.00 | 2.000 | 0.0° | 4 | 219.00 |

Applicazione



Materiale

Acciaio
< 850 N/mm²



Acciaio
850 - 1100 N/mm²

Acciaio
1100 - 1300 N/mm²

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

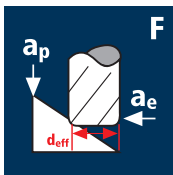
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | r [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|--------|
| 3.00 | 4 | 200 | 0.040 | 0.150 | 0.900 | 2.71 | 23490 | 3760 | 0.50 |
| 4.00 | 4 | 200 | 0.050 | 0.180 | 1.200 | 3.77 | 16885 | 3375 | 0.50 |
| 5.00 | 4 | 200 | 0.055 | 0.200 | 1.500 | 4.80 | 13265 | 2920 | 0.50 |
| 6.00 | 6 | 200 | 0.060 | 0.220 | 1.800 | 5.83 | 10920 | 2930 | 0.50 |
| 8.00 | 6 | 200 | 0.075 | 0.250 | 2.400 | 7.87 | 8090 | 3640 | 0.50 |
| 10.00 | 6 | 200 | 0.090 | 0.280 | 3.000 | 9.90 | 6430 | 3470 | 0.50 |
| 12.00 | 6 | 200 | 0.110 | 0.300 | 3.600 | 11.92 | 5340 | 3525 | 0.50 |
| 16.00 | 6 | 200 | 0.120 | 0.650 | 4.800 | 15.47 | 4115 | 2965 | 1.50 |

| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|------|
| 3.00 | 4 | 180 | 0.040 | 0.150 | 0.900 | 2.71 | 21140 | 3385 | 0.50 |
| 4.00 | 4 | 180 | 0.050 | 0.180 | 1.200 | 3.77 | 15200 | 3040 | 0.50 |
| 5.00 | 4 | 180 | 0.050 | 0.200 | 1.500 | 4.80 | 11935 | 2385 | 0.50 |
| 6.00 | 6 | 180 | 0.055 | 0.220 | 1.800 | 5.83 | 9830 | 3245 | 0.50 |
| 8.00 | 6 | 180 | 0.070 | 0.250 | 2.400 | 7.87 | 7280 | 3060 | 0.50 |
| 10.00 | 6 | 180 | 0.085 | 0.280 | 3.000 | 9.90 | 5785 | 2950 | 0.50 |
| 12.00 | 6 | 180 | 0.105 | 0.300 | 3.600 | 11.92 | 4805 | 3030 | 0.50 |
| 16.00 | 6 | 180 | 0.115 | 0.650 | 4.800 | 15.47 | 3705 | 2555 | 1.50 |

| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|------|
| 3.00 | 4 | 150 | 0.035 | 0.150 | 0.900 | 2.71 | 17620 | 2465 | 0.50 |
| 4.00 | 4 | 150 | 0.045 | 0.180 | 1.200 | 3.77 | 12665 | 2280 | 0.50 |
| 5.00 | 4 | 150 | 0.050 | 0.200 | 1.500 | 4.80 | 9945 | 1990 | 0.50 |
| 6.00 | 6 | 150 | 0.055 | 0.220 | 1.800 | 5.83 | 8190 | 2705 | 0.50 |
| 8.00 | 6 | 150 | 0.065 | 0.250 | 2.400 | 7.87 | 6065 | 2365 | 0.50 |
| 10.00 | 6 | 150 | 0.080 | 0.280 | 3.000 | 9.90 | 4825 | 2315 | 0.50 |
| 12.00 | 6 | 150 | 0.095 | 0.300 | 3.600 | 11.92 | 4005 | 2285 | 0.50 |
| 16.00 | 6 | 150 | 0.105 | 0.650 | 4.800 | 15.47 | 3085 | 1945 | 1.50 |


| | | | | | | | | | |
|-------|---|----|-------|-------|-------|-------|------|-----|------|
| 3.00 | 4 | 60 | 0.025 | 0.150 | 0.700 | 2.71 | 7045 | 705 | 0.50 |
| 4.00 | 4 | 60 | 0.030 | 0.180 | 1.000 | 3.77 | 5065 | 610 | 0.50 |
| 5.00 | 4 | 60 | 0.035 | 0.200 | 1.200 | 4.80 | 3980 | 555 | 0.50 |
| 6.00 | 6 | 60 | 0.040 | 0.220 | 1.400 | 5.83 | 3275 | 785 | 0.50 |
| 8.00 | 6 | 60 | 0.050 | 0.250 | 1.900 | 7.87 | 2425 | 730 | 0.50 |
| 10.00 | 6 | 60 | 0.055 | 0.280 | 2.400 | 9.90 | 1930 | 635 | 0.50 |
| 12.00 | 6 | 60 | 0.070 | 0.300 | 2.900 | 11.92 | 1600 | 675 | 0.50 |
| 16.00 | 6 | 60 | 0.075 | 0.650 | 3.800 | 15.47 | 1235 | 555 | 1.50 |

Applicazione



Materiale

Acciaio
< 850 N/mm²



Acciaio
850 - 1100 N/mm²

Acciaio
1100 - 1300 N/mm²

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
| 3.00 | 4 | 388 | 0.025 | 0.050 | 0.050 | 2.94 | 42010 | 4200 | 45° |
| 4.00 | 4 | 420 | 0.030 | 0.060 | 0.060 | 3.96 | 33760 | 4050 | 45° |
| 5.00 | 4 | 420 | 0.035 | 0.060 | 0.060 | 4.96 | 26955 | 3775 | 45° |
| 6.00 | 6 | 420 | 0.040 | 0.080 | 0.080 | 5.98 | 22355 | 5365 | 45° |
| 8.00 | 6 | 420 | 0.045 | 0.080 | 0.080 | 7.98 | 16755 | 4525 | 45° |
| 10.00 | 6 | 420 | 0.050 | 0.100 | 0.100 | 9.99 | 13380 | 4015 | 45° |
| 12.00 | 6 | 420 | 0.055 | 0.100 | 0.100 | 11.99 | 11150 | 3680 | 45° |
| 16.00 | 6 | 420 | 0.065 | 0.180 | 0.180 | 15.87 | 8425 | 3285 | 45° |

| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|-----|
| 3.00 | 4 | 360 | 0.025 | 0.050 | 0.050 | 2.94 | 38975 | 3900 | 45° |
| 4.00 | 4 | 360 | 0.030 | 0.060 | 0.060 | 3.96 | 28935 | 3470 | 45° |
| 5.00 | 4 | 360 | 0.035 | 0.060 | 0.060 | 4.96 | 23105 | 3235 | 45° |
| 6.00 | 6 | 360 | 0.040 | 0.080 | 0.080 | 5.98 | 19160 | 4600 | 45° |
| 8.00 | 6 | 360 | 0.045 | 0.080 | 0.080 | 7.98 | 14360 | 3875 | 45° |
| 10.00 | 6 | 360 | 0.050 | 0.100 | 0.100 | 9.99 | 11470 | 3440 | 45° |
| 12.00 | 6 | 360 | 0.050 | 0.100 | 0.100 | 11.99 | 9555 | 2865 | 45° |
| 16.00 | 6 | 360 | 0.060 | 0.180 | 0.180 | 15.87 | 7220 | 2600 | 45° |

| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|-----|
| 3.00 | 4 | 320 | 0.020 | 0.050 | 0.050 | 2.94 | 34645 | 2770 | 45° |
| 4.00 | 4 | 320 | 0.025 | 0.060 | 0.060 | 3.96 | 25720 | 2570 | 45° |
| 5.00 | 4 | 320 | 0.030 | 0.060 | 0.060 | 4.96 | 20535 | 2465 | 45° |
| 6.00 | 6 | 320 | 0.035 | 0.080 | 0.080 | 5.98 | 17035 | 3575 | 45° |
| 8.00 | 6 | 320 | 0.040 | 0.080 | 0.080 | 7.98 | 12765 | 3065 | 45° |
| 10.00 | 6 | 320 | 0.045 | 0.100 | 0.100 | 9.99 | 10195 | 2755 | 45° |
| 12.00 | 6 | 320 | 0.050 | 0.100 | 0.100 | 11.99 | 8495 | 2550 | 45° |
| 16.00 | 6 | 320 | 0.055 | 0.180 | 0.180 | 15.87 | 6420 | 2120 | 45° |

| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|-----|
| 3.00 | 4 | 145 | 0.020 | 0.050 | 0.050 | 2.94 | 15700 | 1255 | 45° |
| 4.00 | 4 | 145 | 0.025 | 0.060 | 0.060 | 3.96 | 11655 | 1165 | 45° |
| 5.00 | 4 | 145 | 0.030 | 0.060 | 0.060 | 4.96 | 9305 | 1115 | 45° |
| 6.00 | 6 | 145 | 0.030 | 0.080 | 0.080 | 5.98 | 7720 | 1390 | 45° |
| 8.00 | 6 | 145 | 0.035 | 0.080 | 0.080 | 7.98 | 5785 | 1215 | 45° |
| 10.00 | 6 | 145 | 0.040 | 0.100 | 0.100 | 9.99 | 4620 | 1110 | 45° |
| 12.00 | 6 | 145 | 0.045 | 0.100 | 0.100 | 11.99 | 3850 | 1040 | 45° |
| 16.00 | 6 | 145 | 0.050 | 0.180 | 0.180 | 15.87 | 2910 | 870 | 45° |

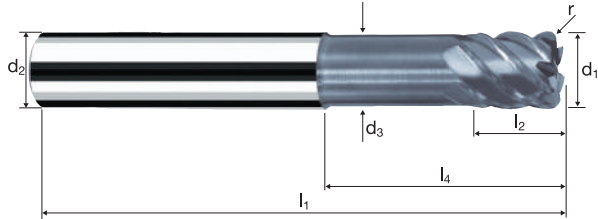
Frese toriche Multispeed

Tolleranza r 0/+0.03, 3xd



HM
MG10

λ 45°
 γ 5°



ReTool®

| | | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--|--|--|-------------------|----------------|-------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | | | | Inox Stainless | Ti Titanium | GG(G) |
|-------------|----------------|-----------------|-----------------|--|--|--|-------------------|----------------|-------|

| Esempio: N° Ordine | | | | | | | | | | | POLYCHROM | |
|--------------------|----------------------|----------------------|----------------|----------------|----------------|----------------|----------------|--------------|------|---|-----------|--|
| | | | | | | | | | | | P5250 | |
| | | | | | | | | | | | EUR | |
| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r 0/+0.03 | α | z | | |
| 180 | 3.00 | 6.00 | 2.80 | 57 | 4.00 | 14.00 | 20.63 | 0.500 | 4.4° | 4 | 90.00 | |
| 220 | 4.00 | 6.00 | 3.70 | 57 | 5.00 | 16.00 | 20.95 | 0.500 | 2.9° | 4 | 90.00 | |
| 260 | 5.00 | 6.00 | 4.60 | 57 | 6.00 | 18.00 | 21.27 | 0.500 | 1.5° | 4 | 90.00 | |
| 297 | 6.00 | 6.00 | 5.50 | 57 | 7.00 | 19.34 | 20.00 | 0.500 | 0.0° | 6 | 90.00 | |
| 388 | 8.00 | 8.00 | 7.40 | 63 | 9.00 | 25.29 | 26.00 | 0.500 | 0.0° | 6 | 113.00 | |
| 445 | 10.00 | 10.00 | 9.20 | 72 | 11.00 | 30.20 | 31.00 | 0.500 | 0.0° | 6 | 153.00 | |
| 496 | 12.00 | 12.00 | 11.00 | 83 | 13.00 | 36.13 | 37.00 | 0.500 | 0.0° | 6 | 190.00 | |
| 300 | 6.00 | 6.00 | 5.50 | 57 | 7.00 | 19.34 | 20.00 | 0.800 | 0.0° | 6 | 90.00 | |
| 391 | 8.00 | 8.00 | 7.40 | 63 | 9.00 | 25.29 | 26.00 | 1.000 | 0.0° | 6 | 113.00 | |
| 450 | 10.00 | 10.00 | 9.20 | 72 | 11.00 | 30.20 | 31.00 | 1.000 | 0.0° | 6 | 153.00 | |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 13.00 | 36.13 | 37.00 | 1.500 | 0.0° | 6 | 190.00 | |
| 610 | 16.00 | 16.00 | 15.00 | 92 | 17.00 | 42.13 | 43.00 | 1.500 | 0.0° | 6 | 296.00 | |

| Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | r [mm] |
|--|---|--|------|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------|
| | Inox normal [Cr-Ni/1.4301] [Cr-Ni-Mo/1.4571] | 2.00 | 4 | 80 | 0.015 | 0.600 | 1.200 | 12730 | 765 | 0.50 |
| | | 3.00 | 4 | 80 | 0.025 | 0.600 | 1.800 | 8490 | 850 | 0.50 |
| | | 4.00 | 4 | 80 | 0.035 | 0.600 | 2.400 | 6365 | 890 | 0.50 |
| | | 5.00 | 4 | 80 | 0.040 | 0.600 | 3.000 | 5095 | 815 | 0.50 |
| | | 6.00 | 4 | 80 | 0.050 | 0.600 | 3.600 | 4245 | 850 | 0.50 |
| | | 8.00 | 4 | 80 | 0.065 | 0.600 | 4.800 | 3185 | 830 | 0.50 |
| | | 10.00 | 4 | 80 | 0.085 | 0.600 | 6.000 | 2545 | 865 | 0.50 |
| | | 12.00 | 4 | 80 | 0.100 | 0.600 | 7.200 | 2120 | 850 | 0.50 |
| | | Inox medium [Cr-Ni-Mo+/1.4539] Acciaio duplex [17-4 PH] | 2.00 | 4 | 70 | 0.015 | 0.600 | 1.200 | 11140 | 670 |
| 3.00 | 4 | | 70 | 0.025 | 0.600 | 1.800 | 7425 | 745 | 0.50 | |
| 4.00 | 4 | | 70 | 0.030 | 0.600 | 2.400 | 5570 | 670 | 0.50 | |
| 5.00 | 4 | | 70 | 0.035 | 0.600 | 3.000 | 4455 | 625 | 0.50 | |
| 6.00 | 4 | | 70 | 0.045 | 0.600 | 3.600 | 3715 | 670 | 0.50 | |
| 8.00 | 4 | | 70 | 0.060 | 0.600 | 4.800 | 2785 | 670 | 0.50 | |
| 10.00 | 4 | | 70 | 0.075 | 0.600 | 6.000 | 2230 | 670 | 0.50 | |
| 12.00 | 4 | | 70 | 0.090 | 0.600 | 7.200 | 1855 | 670 | 0.50 | |
| Inox difficile [Cr-Ni-Mo+/1.4529] Acciaio resistente al calore [1.4841] | 2.00 | | 4 | 50 | 0.010 | 0.600 | 1.200 | 7960 | 320 | 0.50 |
| | 3.00 | 4 | 50 | 0.020 | 0.600 | 1.800 | 5305 | 425 | 0.50 | |
| | 4.00 | 4 | 50 | 0.025 | 0.600 | 2.400 | 3980 | 400 | 0.50 | |
| | 5.00 | 4 | 50 | 0.030 | 0.600 | 3.000 | 3185 | 380 | 0.50 | |
| | 6.00 | 4 | 50 | 0.035 | 0.600 | 3.600 | 2655 | 370 | 0.50 | |
| | 8.00 | 4 | 50 | 0.045 | 0.600 | 4.800 | 1990 | 360 | 0.50 | |
| | 10.00 | 4 | 50 | 0.060 | 0.600 | 6.000 | 1590 | 380 | 0.50 | |
| | 12.00 | 4 | 50 | 0.070 | 0.600 | 7.200 | 1325 | 370 | 0.50 | |
| | Acciaio < 850 N/mm ² | 2.00 | 4 | 180 | 0.020 | 0.600 | 1.200 | 28650 | 2290 | 0.50 |
| 3.00 | | 4 | 180 | 0.035 | 0.600 | 1.800 | 19100 | 2675 | 0.50 | |
| 4.00 | | 4 | 180 | 0.045 | 0.600 | 2.400 | 14325 | 2580 | 0.50 | |
| 5.00 | | 4 | 180 | 0.050 | 0.600 | 3.000 | 11460 | 2290 | 0.50 | |
| 6.00 | | 4 | 180 | 0.065 | 0.600 | 3.600 | 9550 | 2485 | 0.50 | |
| 8.00 | | 4 | 180 | 0.085 | 0.600 | 4.800 | 7160 | 2435 | 0.50 | |
| 10.00 | | 4 | 180 | 0.110 | 0.600 | 6.000 | 5730 | 2520 | 0.50 | |
| 12.00 | | 4 | 180 | 0.130 | 0.600 | 7.200 | 4775 | 2485 | 0.50 | |

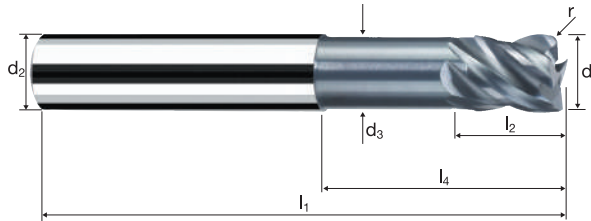
| Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|--|---|--|------|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
| | Inox normal [Cr-Ni/1.4301] [Cr-Ni-Mo/1.4571] | 2.00 | 4 | 160 | 0.030 | 0.100 | 0.100 | 1.99 | 25595 | 3070 | 45° |
| | | 3.00 | 4 | 160 | 0.050 | 0.120 | 0.120 | 3.00 | 16975 | 3395 | 45° |
| | | 4.00 | 4 | 160 | 0.070 | 0.120 | 0.120 | 4.00 | 12730 | 3565 | 45° |
| | | 5.00 | 4 | 160 | 0.080 | 0.160 | 0.160 | 5.00 | 10185 | 3260 | 45° |
| | | 6.00 | 4 | 160 | 0.100 | 0.180 | 0.180 | 6.00 | 8490 | 3395 | 45° |
| | | 8.00 | 4 | 160 | 0.130 | 0.200 | 0.200 | 7.99 | 6375 | 3315 | 45° |
| | | 10.00 | 4 | 160 | 0.170 | 0.240 | 0.240 | 9.97 | 5110 | 3475 | 45° |
| | | 12.00 | 4 | 160 | 0.200 | 0.260 | 0.260 | 11.96 | 4260 | 3405 | 45° |
| | | Inox medium [Cr-Ni-Mo+/1.4539] Acciaio duplex [17-4 PH] | 2.00 | 4 | 140 | 0.030 | 0.100 | 0.100 | 1.99 | 22395 | 2685 |
| 3.00 | 4 | | 140 | 0.050 | 0.120 | 0.120 | 3.00 | 14855 | 2970 | 45° | |
| 4.00 | 4 | | 140 | 0.060 | 0.120 | 0.120 | 4.00 | 11140 | 2675 | 45° | |
| 5.00 | 4 | | 140 | 0.070 | 0.160 | 0.160 | 5.00 | 8915 | 2495 | 45° | |
| 6.00 | 4 | | 140 | 0.090 | 0.180 | 0.180 | 6.00 | 7425 | 2675 | 45° | |
| 8.00 | 4 | | 140 | 0.120 | 0.200 | 0.200 | 7.99 | 5575 | 2675 | 45° | |
| 10.00 | 4 | | 140 | 0.150 | 0.240 | 0.240 | 9.97 | 4470 | 2680 | 45° | |
| 12.00 | 4 | | 140 | 0.180 | 0.260 | 0.260 | 11.96 | 3725 | 2685 | 45° | |
| Inox difficile [Cr-Ni-Mo+/1.4529] Acciaio resistente al calore [1.4841] | 2.00 | | 4 | 110 | 0.020 | 0.100 | 0.100 | 1.99 | 17595 | 1410 | 45° |
| | 3.00 | 4 | 110 | 0.040 | 0.120 | 0.120 | 3.00 | 11670 | 1865 | 45° | |
| | 4.00 | 4 | 110 | 0.050 | 0.120 | 0.120 | 4.00 | 8755 | 1750 | 45° | |
| | 5.00 | 4 | 110 | 0.060 | 0.160 | 0.160 | 5.00 | 7005 | 1680 | 45° | |
| | 6.00 | 4 | 110 | 0.070 | 0.180 | 0.180 | 6.00 | 5835 | 1635 | 45° | |
| | 8.00 | 4 | 110 | 0.090 | 0.200 | 0.200 | 7.99 | 4380 | 1580 | 45° | |
| | 10.00 | 4 | 110 | 0.120 | 0.240 | 0.240 | 9.97 | 3510 | 1685 | 45° | |
| | 12.00 | 4 | 110 | 0.140 | 0.260 | 0.260 | 11.96 | 2930 | 1640 | 45° | |
| | Acciaio < 850 N/mm ² | 2.00 | 4 | 263 | 0.040 | 0.100 | 0.100 | 1.99 | 42070 | 6730 | 45° |
| 3.00 | | 4 | 396 | 0.070 | 0.120 | 0.120 | 3.00 | 42015 | 11765 | 45° | |
| 4.00 | | 4 | 400 | 0.090 | 0.120 | 0.120 | 4.00 | 31830 | 11460 | 45° | |
| 5.00 | | 4 | 400 | 0.100 | 0.160 | 0.160 | 5.00 | 25465 | 10185 | 45° | |
| 6.00 | | 4 | 400 | 0.130 | 0.180 | 0.180 | 6.00 | 21220 | 11035 | 45° | |
| 8.00 | | 4 | 400 | 0.170 | 0.200 | 0.200 | 7.99 | 15935 | 10835 | 45° | |
| 10.00 | | 4 | 400 | 0.220 | 0.240 | 0.240 | 9.97 | 12770 | 11240 | 45° | |
| 12.00 | | 4 | 400 | 0.260 | 0.260 | 0.260 | 11.96 | 10645 | 11070 | 45° | |

Frese toriche Torocut (Toro-SB)

Tolleranza r 0/+0.03, 3xd



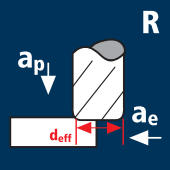










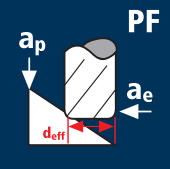










HM
MG10 λ 40°
 γ 5°



ReTool®

| | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--------------|--|-------------------|----------------|--------------------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | | Inox Stainless | Ti Titanium | GG(G) Tool Steel Nickel-Alloys |
|-------------|----------------|-----------------|-----------------|--------------|--|-------------------|----------------|--------------------------------------|

| Esempio: N° Ordine | | | | | | | | | | | POLYCHROM | |
|--------------------------------------|----------------------|----------------------|----------------|----------------|----------------|----------------|----------------|--------------|------|---|--------------|--|
| Rivestimento Articolo Codice-ø | | | | | | | | | | | | |
| P 7340 138 | | | | | | | | | | | | |
| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r 0/+0.03 | α | z | P7340 EUR | |
| 138 | 2.00 | 6.00 | 1.90 | 57 | 3.00 | 6.00 | 14.31 | 0.200 | 8.5° | 4 | 76.00 | |
| 178 | 3.00 | 6.00 | 2.80 | 57 | 4.00 | 9.00 | 15.63 | 0.200 | 5.8° | 4 | 76.00 | |
| 218 | 4.00 | 6.00 | 3.70 | 57 | 5.00 | 12.00 | 16.95 | 0.200 | 3.6° | 4 | 76.00 | |
| 258 | 5.00 | 6.00 | 4.60 | 57 | 6.00 | 15.00 | 18.27 | 0.200 | 1.7° | 4 | 76.00 | |
| 297 | 6.00 | 6.00 | 5.50 | 57 | 7.00 | 19.34 | 20.00 | 0.200 | 0.0° | 4 | 76.00 | |
| 385 | 8.00 | 8.00 | 7.40 | 63 | 9.00 | 25.29 | 26.00 | 0.200 | 0.0° | 4 | 94.00 | |
| 445 | 10.00 | 10.00 | 9.20 | 72 | 11.00 | 30.20 | 31.00 | 0.200 | 0.0° | 4 | 128.00 | |
| 496 | 12.00 | 12.00 | 11.00 | 83 | 13.00 | 36.13 | 37.00 | 0.200 | 0.0° | 4 | 159.00 | |
| 140 | 2.00 | 6.00 | 1.90 | 57 | 3.00 | 6.00 | 14.31 | 0.500 | 8.7° | 4 | 76.00 | |
| 180 | 3.00 | 6.00 | 2.80 | 57 | 4.00 | 9.00 | 15.63 | 0.500 | 6.0° | 4 | 76.00 | |
| 220 | 4.00 | 6.00 | 3.70 | 57 | 5.00 | 12.00 | 16.95 | 0.500 | 3.7° | 4 | 76.00 | |
| 260 | 5.00 | 6.00 | 4.60 | 57 | 6.00 | 15.00 | 18.27 | 0.500 | 1.7° | 4 | 76.00 | |
| 300 | 6.00 | 6.00 | 5.50 | 57 | 7.00 | 19.34 | 20.00 | 0.500 | 0.0° | 4 | 76.00 | |
| 388 | 8.00 | 8.00 | 7.40 | 63 | 9.00 | 25.29 | 26.00 | 0.500 | 0.0° | 4 | 94.00 | |
| 448 | 10.00 | 10.00 | 9.20 | 72 | 11.00 | 30.20 | 31.00 | 0.500 | 0.0° | 4 | 128.00 | |
| 498 | 12.00 | 12.00 | 11.00 | 83 | 13.00 | 36.13 | 37.00 | 0.500 | 0.0° | 4 | 159.00 | |

| Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | r [mm] |
|---|---|---------|-----|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|--------|
|  | Inox normal [Cr-Ni/1.4301] [Cr-Ni-Mo/1.4571]   | 4.00 | 4 | 100 | 0.035 | 0.600 | 2.400 | 3.83 | 8310 | 1165 | 1.00 |
| | | 5.00 | 4 | 100 | 0.045 | 0.600 | 3.000 | 4.83 | 6590 | 1185 | 1.00 |
| | | 6.00 | 4 | 100 | 0.055 | 0.600 | 3.600 | 5.83 | 5460 | 1200 | 1.00 |
| | | 8.00 | 4 | 100 | 0.075 | 0.600 | 4.800 | 7.83 | 4065 | 1220 | 1.00 |
| | | 10.00 | 4 | 100 | 0.090 | 0.600 | 6.000 | 9.83 | 3240 | 1165 | 1.00 |
| | | 12.00 | 4 | 100 | 0.110 | 0.600 | 7.200 | 11.83 | 2690 | 1185 | 1.00 |
| | | 16.00 | 4 | 100 | 0.090 | 1.200 | 9.600 | 15.67 | 2030 | 730 | 2.00 |
| Inox medium [Cr-Ni-Mo+/1.4539] Acciaio duplex [17-4 PH]   | 4.00 | 4 | 80 | 0.030 | 0.600 | 2.400 | 3.83 | 6650 | 800 | 1.00 | |
| | 5.00 | 4 | 80 | 0.040 | 0.600 | 3.000 | 4.83 | 5270 | 845 | 1.00 | |
| | 6.00 | 4 | 80 | 0.050 | 0.600 | 3.600 | 5.83 | 4370 | 875 | 1.00 | |
| | 8.00 | 4 | 80 | 0.070 | 0.600 | 4.800 | 7.83 | 3250 | 910 | 1.00 | |
| | 10.00 | 4 | 80 | 0.080 | 0.600 | 6.000 | 9.83 | 2590 | 830 | 1.00 | |
| | 12.00 | 4 | 80 | 0.100 | 0.600 | 7.200 | 11.83 | 2155 | 860 | 1.00 | |
| | 16.00 | 4 | 80 | 0.080 | 1.200 | 9.600 | 15.67 | 1625 | 520 | 2.00 | |
| Inox difficile [Cr-Ni-Mo+/1.4529] Acciaio resistente al calore [1.4841]   | 4.00 | 4 | 55 | 0.025 | 0.600 | 2.400 | 3.83 | 4570 | 455 | 1.00 | |
| | 5.00 | 4 | 55 | 0.030 | 0.600 | 3.000 | 4.83 | 3625 | 435 | 1.00 | |
| | 6.00 | 4 | 55 | 0.040 | 0.600 | 3.600 | 5.83 | 3005 | 480 | 1.00 | |
| | 8.00 | 4 | 55 | 0.055 | 0.600 | 4.800 | 7.83 | 2235 | 490 | 1.00 | |
| | 10.00 | 4 | 55 | 0.065 | 0.600 | 6.000 | 9.83 | 1780 | 465 | 1.00 | |
| | 12.00 | 4 | 55 | 0.075 | 0.600 | 7.200 | 11.83 | 1480 | 445 | 1.00 | |
| | 16.00 | 4 | 55 | 0.060 | 1.200 | 9.600 | 15.67 | 1115 | 270 | 2.00 | |
| Acciaio < 850 N/mm ²     | 4.00 | 4 | 200 | 0.045 | 0.600 | 2.400 | 3.83 | 16620 | 2990 | 1.00 | |
| | 5.00 | 4 | 200 | 0.060 | 0.600 | 3.000 | 4.83 | 13180 | 3165 | 1.00 | |
| | 6.00 | 4 | 200 | 0.070 | 0.600 | 3.600 | 5.83 | 10920 | 3060 | 1.00 | |
| | 8.00 | 4 | 200 | 0.100 | 0.600 | 4.800 | 7.83 | 8130 | 3250 | 1.00 | |
| | 10.00 | 4 | 200 | 0.115 | 0.600 | 6.000 | 9.83 | 6475 | 2980 | 1.00 | |
| | 12.00 | 4 | 200 | 0.145 | 0.600 | 7.200 | 11.83 | 5380 | 3120 | 1.00 | |
| | 16.00 | 4 | 200 | 0.115 | 1.200 | 9.600 | 15.67 | 4065 | 1870 | 2.00 | |
| Applicazione  | Inox normal [Cr-Ni/1.4301] [Cr-Ni-Mo/1.4571]   | 4.00 | 4 | 160 | 0.070 | 0.180 | 0.180 | 3.97 | 12830 | 3590 | 45° |
| | | 5.00 | 4 | 160 | 0.090 | 0.240 | 0.240 | 4.99 | 10205 | 3675 | 45° |
| | | 6.00 | 4 | 160 | 0.110 | 0.270 | 0.270 | 6.00 | 8490 | 3735 | 45° |
| | | 8.00 | 4 | 160 | 0.150 | 0.300 | 0.300 | 8.00 | 6365 | 3820 | 45° |
| | | 10.00 | 4 | 160 | 0.180 | 0.360 | 0.360 | 9.99 | 5100 | 3670 | 45° |
| | | 12.00 | 4 | 160 | 0.220 | 0.390 | 0.390 | 11.98 | 4250 | 3740 | 45° |
| | | 16.00 | 4 | 160 | 0.250 | 0.450 | 0.450 | 15.98 | 3185 | 3185 | 45° |
| Inox medium [Cr-Ni-Mo+/1.4539] Acciaio duplex [17-4 PH]   | 4.00 | 4 | 140 | 0.060 | 0.180 | 0.180 | 3.97 | 11225 | 2695 | 45° | |
| | 5.00 | 4 | 140 | 0.080 | 0.240 | 0.240 | 4.99 | 8930 | 2860 | 45° | |
| | 6.00 | 4 | 140 | 0.100 | 0.270 | 0.270 | 6.00 | 7425 | 2970 | 45° | |
| | 8.00 | 4 | 140 | 0.140 | 0.300 | 0.300 | 8.00 | 5570 | 3120 | 45° | |
| | 10.00 | 4 | 140 | 0.160 | 0.360 | 0.360 | 9.99 | 4460 | 2855 | 45° | |
| | 12.00 | 4 | 140 | 0.200 | 0.390 | 0.390 | 11.98 | 3720 | 2975 | 45° | |
| | 16.00 | 4 | 140 | 0.220 | 0.450 | 0.450 | 15.98 | 2790 | 2455 | 45° | |
| Inox difficile [Cr-Ni-Mo+/1.4529] Acciaio resistente al calore [1.4841]   | 4.00 | 4 | 110 | 0.050 | 0.180 | 0.180 | 3.97 | 8820 | 1765 | 45° | |
| | 5.00 | 4 | 110 | 0.060 | 0.240 | 0.240 | 4.99 | 7015 | 1685 | 45° | |
| | 6.00 | 4 | 110 | 0.080 | 0.270 | 0.270 | 6.00 | 5835 | 1865 | 45° | |
| | 8.00 | 4 | 110 | 0.110 | 0.300 | 0.300 | 8.00 | 4375 | 1925 | 45° | |
| | 10.00 | 4 | 110 | 0.130 | 0.360 | 0.360 | 9.99 | 3505 | 1825 | 45° | |
| | 12.00 | 4 | 110 | 0.150 | 0.390 | 0.390 | 11.98 | 2925 | 1755 | 45° | |
| | 16.00 | 4 | 110 | 0.170 | 0.450 | 0.450 | 15.98 | 2190 | 1490 | 45° | |
| Acciaio < 850 N/mm ²     | 4.00 | 4 | 400 | 0.090 | 0.180 | 0.180 | 3.97 | 32070 | 11545 | 45° | |
| | 5.00 | 4 | 400 | 0.120 | 0.240 | 0.240 | 4.99 | 25515 | 12250 | 45° | |
| | 6.00 | 4 | 400 | 0.140 | 0.270 | 0.270 | 6.00 | 21220 | 11885 | 45° | |
| | 8.00 | 4 | 400 | 0.200 | 0.300 | 0.300 | 8.00 | 15915 | 12730 | 45° | |
| | 10.00 | 4 | 400 | 0.230 | 0.360 | 0.360 | 9.99 | 12745 | 11725 | 45° | |
| | 12.00 | 4 | 400 | 0.290 | 0.390 | 0.390 | 11.98 | 10630 | 12330 | 45° | |
| | 16.00 | 4 | 400 | 0.320 | 0.450 | 0.450 | 15.98 | 7970 | 10200 | 45° | |

Frese toriche Torocut (Toro-SB)

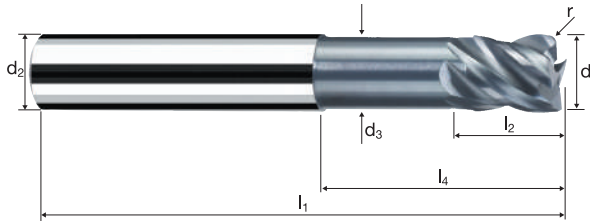
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HM
MG10 λ 40°
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Vario



ReTool®

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|-------------|----------------|-----------------|-----------------|--------------|--|--|-------------------|----------------|--------------------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | | | Inox Stainless | Ti Titanium | GG(G) Tool Steel Nickel-Alloys |
|-------------|----------------|-----------------|-----------------|--------------|--|--|-------------------|----------------|--------------------------------------|

| Esempio: N° Ordine | | | | | | | | | | | POLYCHROM | |
|--------------------|----------------------|----------------------|----------------|----------------|----------------|----------------|----------------|--------------|------|---|-----------|--|
| | | | | | | | | | | | P7340 | |
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| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r 0/+0.03 | α | z | | |
| 222 | 4.00 | 6.00 | 3.70 | 57 | 5.00 | 12.00 | 16.95 | 1.000 | 3.8° | 4 | 76.00 | |
| 262 | 5.00 | 6.00 | 4.60 | 57 | 6.00 | 15.00 | 18.27 | 1.000 | 1.8° | 4 | 76.00 | |
| 302 | 6.00 | 6.00 | 5.50 | 57 | 7.00 | 19.34 | 20.00 | 1.000 | 0.0° | 4 | 76.00 | |
| 391 | 8.00 | 8.00 | 7.40 | 63 | 9.00 | 25.29 | 26.00 | 1.000 | 0.0° | 4 | 94.00 | |
| 450 | 10.00 | 10.00 | 9.20 | 72 | 11.00 | 30.20 | 31.00 | 1.000 | 0.0° | 4 | 128.00 | |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 13.00 | 36.13 | 37.00 | 1.000 | 0.0° | 4 | 159.00 | |
| 453 | 10.00 | 10.00 | 9.20 | 72 | 11.00 | 30.20 | 31.00 | 1.500 | 0.0° | 4 | 128.00 | |
| 503 | 12.00 | 12.00 | 11.00 | 83 | 13.00 | 36.13 | 37.00 | 1.500 | 0.0° | 4 | 159.00 | |
| 611 | 16.00 | 16.00 | 15.00 | 92 | 17.00 | 42.13 | 43.00 | 2.000 | 0.0° | 4 | 248.00 | |
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| | | | | | | | | | | | | |

| Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _z [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | r [mm] |
|--|--|---------|-----|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|--------|
| | Acciaio < 850 N/mm ² | 6.00 | 6 | 200 | 0.050 | 0.150 | 1.320 | 5.33 | 11945 | 3585 | 0.80 |
| | | 8.00 | 6 | 200 | 0.065 | 0.180 | 1.760 | 7.14 | 8915 | 3475 | 1.00 |
| | | 10.00 | 6 | 200 | 0.080 | 0.200 | 2.200 | 9.20 | 6920 | 3320 | 1.00 |
| | | 12.00 | 6 | 200 | 0.090 | 0.220 | 2.640 | 10.56 | 6030 | 3255 | 1.50 |
| | | 16.00 | 6 | 200 | 0.115 | 0.250 | 3.520 | 14.66 | 4345 | 2995 | 1.50 |
| Acciaio 850 - 1100 N/mm ² | 6.00 | 6 | 180 | 0.050 | 0.150 | 1.320 | 5.33 | 10750 | 3225 | 0.80 | |
| | 8.00 | 6 | 180 | 0.060 | 0.180 | 1.760 | 7.14 | 8025 | 2890 | 1.00 | |
| | 10.00 | 6 | 180 | 0.075 | 0.200 | 2.200 | 9.20 | 6230 | 2805 | 1.00 | |
| | 12.00 | 6 | 180 | 0.085 | 0.220 | 2.640 | 10.56 | 5425 | 2765 | 1.50 | |
| | 16.00 | 6 | 180 | 0.110 | 0.250 | 3.520 | 14.66 | 3910 | 2580 | 1.50 | |
| Acciaio 1100 - 1300 N/mm ² | 6.00 | 6 | 150 | 0.045 | 0.150 | 1.320 | 5.33 | 8960 | 2420 | 0.80 | |
| | 8.00 | 6 | 150 | 0.055 | 0.180 | 1.760 | 7.14 | 6685 | 2205 | 1.00 | |
| | 10.00 | 6 | 150 | 0.070 | 0.200 | 2.200 | 9.20 | 5190 | 2180 | 1.00 | |
| | 12.00 | 6 | 150 | 0.080 | 0.220 | 2.640 | 10.56 | 4520 | 2170 | 1.50 | |
| | 16.00 | 6 | 150 | 0.100 | 0.250 | 3.520 | 14.66 | 3255 | 1955 | 1.50 | |
| Inox normal [Cr-Ni/1.4301] [Cr-Ni-Mo/1.4571] | 6.00 | 6 | 60 | 0.040 | 0.120 | 1.060 | 5.24 | 3645 | 875 | 0.80 | |
| | 8.00 | 6 | 60 | 0.050 | 0.144 | 1.400 | 7.03 | 2715 | 815 | 1.00 | |
| | 10.00 | 6 | 60 | 0.065 | 0.160 | 1.760 | 9.09 | 2100 | 820 | 1.00 | |
| | 12.00 | 6 | 60 | 0.070 | 0.176 | 2.120 | 10.41 | 1835 | 770 | 1.50 | |
| | 16.00 | 6 | 60 | 0.090 | 0.200 | 2.820 | 14.50 | 1315 | 710 | 1.50 | |

| Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _z [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|--|--|---------|-----|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
| | Acciaio < 850 N/mm ² | 6.00 | 6 | 420 | 0.040 | 0.100 | 0.100 | 5.94 | 22505 | 5400 | 45° |
| | | 8.00 | 6 | 420 | 0.045 | 0.110 | 0.110 | 7.90 | 16925 | 4570 | 45° |
| | | 10.00 | 6 | 420 | 0.050 | 0.140 | 0.140 | 9.94 | 13450 | 4035 | 45° |
| | | 12.00 | 6 | 420 | 0.055 | 0.170 | 0.170 | 11.86 | 11270 | 3720 | 45° |
| | | 16.00 | 6 | 420 | 0.065 | 0.180 | 0.180 | 15.87 | 8425 | 3285 | 45° |
| Acciaio 850 - 1100 N/mm ² | 6.00 | 6 | 360 | 0.040 | 0.100 | 0.100 | 5.94 | 19290 | 4630 | 45° | |
| | 8.00 | 6 | 360 | 0.045 | 0.110 | 0.110 | 7.90 | 14505 | 3915 | 45° | |
| | 10.00 | 6 | 360 | 0.050 | 0.140 | 0.140 | 9.94 | 11530 | 3460 | 45° | |
| | 12.00 | 6 | 360 | 0.050 | 0.170 | 0.170 | 11.86 | 9660 | 2900 | 45° | |
| | 16.00 | 6 | 360 | 0.060 | 0.180 | 0.180 | 15.87 | 7220 | 2600 | 45° | |
| Acciaio 1100 - 1300 N/mm ² | 6.00 | 6 | 320 | 0.035 | 0.100 | 0.100 | 5.94 | 17150 | 3600 | 45° | |
| | 8.00 | 6 | 320 | 0.040 | 0.110 | 0.110 | 7.90 | 12895 | 3095 | 45° | |
| | 10.00 | 6 | 320 | 0.045 | 0.140 | 0.140 | 9.94 | 10245 | 2765 | 45° | |
| | 12.00 | 6 | 320 | 0.050 | 0.170 | 0.170 | 11.86 | 8590 | 2575 | 45° | |
| | 16.00 | 6 | 320 | 0.055 | 0.180 | 0.180 | 15.87 | 6420 | 2120 | 45° | |
| Inox normal [Cr-Ni/1.4301] [Cr-Ni-Mo/1.4571] | 6.00 | 6 | 145 | 0.030 | 0.100 | 0.100 | 5.94 | 7770 | 1400 | 45° | |
| | 8.00 | 6 | 145 | 0.035 | 0.110 | 0.110 | 7.90 | 5840 | 1225 | 45° | |
| | 10.00 | 6 | 145 | 0.040 | 0.140 | 0.140 | 9.94 | 4645 | 1115 | 45° | |
| | 12.00 | 6 | 145 | 0.045 | 0.170 | 0.170 | 11.86 | 3890 | 1050 | 45° | |
| | 16.00 | 6 | 145 | 0.050 | 0.180 | 0.180 | 15.87 | 2910 | 870 | 45° | |

Applicazione

Materiale

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | r [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------|
| 2.00 | 4 | 80 | 0.015 | 0.600 | 0.800 | 12730 | 765 | 0.50 |
| 3.00 | 4 | 80 | 0.020 | 0.600 | 1.200 | 8490 | 680 | 0.50 |
| 4.00 | 4 | 80 | 0.030 | 0.600 | 1.600 | 6365 | 765 | 0.50 |
| 5.00 | 4 | 80 | 0.035 | 0.600 | 2.000 | 5095 | 715 | 0.50 |
| 6.00 | 4 | 80 | 0.045 | 0.600 | 2.400 | 4245 | 765 | 0.50 |
| 8.00 | 4 | 80 | 0.055 | 0.600 | 3.200 | 3185 | 700 | 0.50 |
| 10.00 | 4 | 80 | 0.070 | 0.600 | 4.000 | 2545 | 715 | 0.50 |
| 12.00 | 4 | 80 | 0.085 | 0.600 | 4.800 | 2120 | 720 | 0.50 |

Inox medium
[Cr-Ni-Mo+/1.4539]
Acciaio duplex
[17-4 PH]

| | | | | | | | | |
|-------|---|----|-------|-------|-------|-------|-----|------|
| 2.00 | 4 | 70 | 0.015 | 0.600 | 0.800 | 11140 | 670 | 0.50 |
| 3.00 | 4 | 70 | 0.020 | 0.600 | 1.200 | 7425 | 595 | 0.50 |
| 4.00 | 4 | 70 | 0.025 | 0.600 | 1.600 | 5570 | 555 | 0.50 |
| 5.00 | 4 | 70 | 0.030 | 0.600 | 2.000 | 4455 | 535 | 0.50 |
| 6.00 | 4 | 70 | 0.040 | 0.600 | 2.400 | 3715 | 595 | 0.50 |
| 8.00 | 4 | 70 | 0.050 | 0.600 | 3.200 | 2785 | 555 | 0.50 |
| 10.00 | 4 | 70 | 0.065 | 0.600 | 4.000 | 2230 | 580 | 0.50 |
| 12.00 | 4 | 70 | 0.075 | 0.600 | 4.800 | 1855 | 555 | 0.50 |

Inox difficile
[Cr-Ni-Mo+/1.4529]
Acciaio resistente al calore
[1.4841]

| | | | | | | | | |
|-------|---|----|-------|-------|-------|------|-----|------|
| 2.00 | 4 | 50 | 0.010 | 0.600 | 0.800 | 7960 | 320 | 0.50 |
| 3.00 | 4 | 50 | 0.015 | 0.600 | 1.200 | 5305 | 320 | 0.50 |
| 4.00 | 4 | 50 | 0.020 | 0.600 | 1.600 | 3980 | 320 | 0.50 |
| 5.00 | 4 | 50 | 0.025 | 0.600 | 2.000 | 3185 | 320 | 0.50 |
| 6.00 | 4 | 50 | 0.030 | 0.600 | 2.400 | 2655 | 320 | 0.50 |
| 8.00 | 4 | 50 | 0.040 | 0.600 | 3.200 | 1990 | 320 | 0.50 |
| 10.00 | 4 | 50 | 0.050 | 0.600 | 4.000 | 1590 | 320 | 0.50 |
| 12.00 | 4 | 50 | 0.060 | 0.600 | 4.800 | 1325 | 320 | 0.50 |

Acciaio
< 850 N/mm²

| | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|------|------|
| 2.00 | 4 | 180 | 0.020 | 0.600 | 0.800 | 28650 | 2290 | 0.50 |
| 3.00 | 4 | 180 | 0.025 | 0.600 | 1.200 | 19100 | 1910 | 0.50 |
| 4.00 | 4 | 180 | 0.040 | 0.600 | 1.600 | 14325 | 2290 | 0.50 |
| 5.00 | 4 | 180 | 0.045 | 0.600 | 2.000 | 11460 | 2065 | 0.50 |
| 6.00 | 4 | 180 | 0.060 | 0.600 | 2.400 | 9550 | 2290 | 0.50 |
| 8.00 | 4 | 180 | 0.070 | 0.600 | 3.200 | 7160 | 2005 | 0.50 |
| 10.00 | 4 | 180 | 0.090 | 0.600 | 4.000 | 5730 | 2065 | 0.50 |
| 12.00 | 4 | 180 | 0.110 | 0.600 | 4.800 | 4775 | 2100 | 0.50 |

Applicazione

Materiale

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
| 2.00 | 4 | 160 | 0.030 | 0.100 | 0.100 | 1.99 | 25595 | 3070 | 45° |
| 3.00 | 4 | 160 | 0.040 | 0.120 | 0.120 | 3.00 | 16975 | 2715 | 45° |
| 4.00 | 4 | 160 | 0.060 | 0.120 | 0.120 | 4.00 | 12730 | 3055 | 45° |
| 5.00 | 4 | 160 | 0.070 | 0.160 | 0.160 | 5.00 | 10185 | 2850 | 45° |
| 6.00 | 4 | 160 | 0.090 | 0.180 | 0.180 | 6.00 | 8490 | 3055 | 45° |
| 8.00 | 4 | 160 | 0.110 | 0.200 | 0.200 | 7.99 | 6375 | 2805 | 45° |
| 10.00 | 4 | 160 | 0.140 | 0.240 | 0.240 | 9.97 | 5110 | 2860 | 45° |
| 12.00 | 4 | 160 | 0.170 | 0.260 | 0.260 | 11.96 | 4260 | 2895 | 45° |

Inox medium
[Cr-Ni-Mo+/1.4539]
Acciaio duplex
[17-4 PH]

| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|-----|
| 2.00 | 4 | 140 | 0.030 | 0.100 | 0.100 | 1.99 | 22395 | 2685 | 45° |
| 3.00 | 4 | 140 | 0.040 | 0.120 | 0.120 | 3.00 | 14855 | 2375 | 45° |
| 4.00 | 4 | 140 | 0.050 | 0.120 | 0.120 | 4.00 | 11140 | 2230 | 45° |
| 5.00 | 4 | 140 | 0.060 | 0.160 | 0.160 | 5.00 | 8915 | 2140 | 45° |
| 6.00 | 4 | 140 | 0.080 | 0.180 | 0.180 | 6.00 | 7425 | 2375 | 45° |
| 8.00 | 4 | 140 | 0.100 | 0.200 | 0.200 | 7.99 | 5575 | 2230 | 45° |
| 10.00 | 4 | 140 | 0.130 | 0.240 | 0.240 | 9.97 | 4470 | 2325 | 45° |
| 12.00 | 4 | 140 | 0.150 | 0.260 | 0.260 | 11.96 | 3725 | 2235 | 45° |

Inox difficile
[Cr-Ni-Mo+/1.4529]
Acciaio resistente al calore
[1.4841]

| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|-----|
| 2.00 | 4 | 110 | 0.020 | 0.100 | 0.100 | 1.99 | 17595 | 1410 | 45° |
| 3.00 | 4 | 110 | 0.030 | 0.120 | 0.120 | 3.00 | 11670 | 1400 | 45° |
| 4.00 | 4 | 110 | 0.040 | 0.120 | 0.120 | 4.00 | 8755 | 1400 | 45° |
| 5.00 | 4 | 110 | 0.050 | 0.160 | 0.160 | 5.00 | 7005 | 1400 | 45° |
| 6.00 | 4 | 110 | 0.060 | 0.180 | 0.180 | 6.00 | 5835 | 1400 | 45° |
| 8.00 | 4 | 110 | 0.080 | 0.200 | 0.200 | 7.99 | 4380 | 1400 | 45° |
| 10.00 | 4 | 110 | 0.100 | 0.240 | 0.240 | 9.97 | 3510 | 1405 | 45° |
| 12.00 | 4 | 110 | 0.120 | 0.260 | 0.260 | 11.96 | 2930 | 1405 | 45° |

Acciaio
< 850 N/mm²

| | | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|-------|-----|
| 2.00 | 4 | 263 | 0.040 | 0.100 | 0.100 | 1.99 | 42070 | 6730 | 45° |
| 3.00 | 4 | 396 | 0.050 | 0.120 | 0.120 | 3.00 | 42015 | 8405 | 45° |
| 4.00 | 4 | 400 | 0.080 | 0.120 | 0.120 | 4.00 | 31830 | 10185 | 45° |
| 5.00 | 4 | 400 | 0.090 | 0.160 | 0.160 | 5.00 | 25465 | 9165 | 45° |
| 6.00 | 4 | 400 | 0.120 | 0.180 | 0.180 | 6.00 | 21220 | 10185 | 45° |
| 8.00 | 4 | 400 | 0.140 | 0.200 | 0.200 | 7.99 | 15935 | 8925 | 45° |
| 10.00 | 4 | 400 | 0.180 | 0.240 | 0.240 | 9.97 | 12770 | 9195 | 45° |
| 12.00 | 4 | 400 | 0.220 | 0.260 | 0.260 | 11.96 | 10645 | 9370 | 45° |

| Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | r [mm] |
|--------------|--|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|--------|
| | Inox normal [Cr-Ni/1.4301] [Cr-Ni-Mo/1.4571] | 4.00 | 4 | 100 | 0.030 | 0.600 | 1.600 | 3.83 | 8310 | 995 | 1.00 |
| | | 5.00 | 4 | 100 | 0.040 | 0.600 | 2.000 | 4.83 | 6590 | 1055 | 1.00 |
| | | 6.00 | 4 | 100 | 0.045 | 0.600 | 2.400 | 5.83 | 5460 | 985 | 1.00 |
| | | 8.00 | 4 | 100 | 0.060 | 0.600 | 3.200 | 7.83 | 4065 | 975 | 1.00 |
| | | 10.00 | 4 | 100 | 0.080 | 0.600 | 4.000 | 9.83 | 3240 | 1035 | 1.00 |
| | | 12.00 | 4 | 100 | 0.095 | 0.600 | 4.800 | 11.83 | 2690 | 1020 | 1.00 |
| | Inox medium [Cr-Ni-Mo+/1.4539] Acciaio duplex [17-4 PH] | 4.00 | 4 | 80 | 0.025 | 0.600 | 1.600 | 3.83 | 6650 | 665 | 1.00 |
| | | 5.00 | 4 | 80 | 0.035 | 0.600 | 2.000 | 4.83 | 5270 | 740 | 1.00 |
| | | 6.00 | 4 | 80 | 0.040 | 0.600 | 2.400 | 5.83 | 4370 | 700 | 1.00 |
| | | 8.00 | 4 | 80 | 0.055 | 0.600 | 3.200 | 7.83 | 3250 | 715 | 1.00 |
| | | 10.00 | 4 | 80 | 0.070 | 0.600 | 4.000 | 9.83 | 2590 | 725 | 1.00 |
| | | 12.00 | 4 | 80 | 0.085 | 0.600 | 4.800 | 11.83 | 2155 | 730 | 1.00 |
| | Inox difficile [Cr-Ni-Mo+/1.4529] Acciaio resistente al calore [1.4841] | 4.00 | 4 | 55 | 0.020 | 0.600 | 1.600 | 3.83 | 4570 | 365 | 1.00 |
| | | 5.00 | 4 | 55 | 0.030 | 0.600 | 2.000 | 4.83 | 3625 | 435 | 1.00 |
| | | 6.00 | 4 | 55 | 0.030 | 0.600 | 2.400 | 5.83 | 3005 | 360 | 1.00 |
| | | 8.00 | 4 | 55 | 0.040 | 0.600 | 3.200 | 7.83 | 2235 | 360 | 1.00 |
| | | 10.00 | 4 | 55 | 0.055 | 0.600 | 4.000 | 9.83 | 1780 | 390 | 1.00 |
| | | 12.00 | 4 | 55 | 0.065 | 0.600 | 4.800 | 11.83 | 1480 | 385 | 1.00 |
| | Acciaio < 850 N/mm ² | 4.00 | 4 | 200 | 0.040 | 0.600 | 1.600 | 3.83 | 16620 | 2660 | 1.00 |
| | | 5.00 | 4 | 200 | 0.050 | 0.600 | 2.000 | 4.83 | 13180 | 2635 | 1.00 |
| | | 6.00 | 4 | 200 | 0.060 | 0.600 | 2.400 | 5.83 | 10920 | 2620 | 1.00 |
| | | 8.00 | 4 | 200 | 0.080 | 0.600 | 3.200 | 7.83 | 8130 | 2600 | 1.00 |
| | | 10.00 | 4 | 200 | 0.105 | 0.600 | 4.000 | 9.83 | 6475 | 2720 | 1.00 |
| | | 12.00 | 4 | 200 | 0.125 | 0.600 | 4.800 | 11.83 | 5380 | 2690 | 1.00 |
| | | 4.00 | 4 | 200 | 0.040 | 0.600 | 1.600 | 3.83 | 16620 | 2660 | 1.00 |
| | | 5.00 | 4 | 200 | 0.050 | 0.600 | 2.000 | 4.83 | 13180 | 2635 | 1.00 |
| | | 6.00 | 4 | 200 | 0.060 | 0.600 | 2.400 | 5.83 | 10920 | 2620 | 1.00 |
| | | 8.00 | 4 | 200 | 0.080 | 0.600 | 3.200 | 7.83 | 8130 | 2600 | 1.00 |
| | | 10.00 | 4 | 200 | 0.105 | 0.600 | 4.000 | 9.83 | 6475 | 2720 | 1.00 |
| | | 12.00 | 4 | 200 | 0.125 | 0.600 | 4.800 | 11.83 | 5380 | 2690 | 1.00 |

| Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|--------------|--|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
| | Inox normal [Cr-Ni/1.4301] [Cr-Ni-Mo/1.4571] | 4.00 | 4 | 160 | 0.060 | 0.180 | 0.180 | 3.97 | 12830 | 3080 | 45° |
| | | 5.00 | 4 | 160 | 0.080 | 0.240 | 0.240 | 4.99 | 10205 | 3265 | 45° |
| | | 6.00 | 4 | 160 | 0.090 | 0.270 | 0.270 | 6.00 | 8490 | 3055 | 45° |
| | | 8.00 | 4 | 160 | 0.120 | 0.300 | 0.300 | 8.00 | 6365 | 3055 | 45° |
| | | 10.00 | 4 | 160 | 0.160 | 0.360 | 0.360 | 9.99 | 5100 | 3265 | 45° |
| | | 12.00 | 4 | 160 | 0.190 | 0.390 | 0.390 | 11.98 | 4250 | 3230 | 45° |
| | Inox medium [Cr-Ni-Mo+/1.4539] Acciaio duplex [17-4 PH] | 4.00 | 4 | 140 | 0.050 | 0.180 | 0.180 | 3.97 | 11225 | 2245 | 45° |
| | | 5.00 | 4 | 140 | 0.070 | 0.240 | 0.240 | 4.99 | 8930 | 2500 | 45° |
| | | 6.00 | 4 | 140 | 0.080 | 0.270 | 0.270 | 6.00 | 7425 | 2375 | 45° |
| | | 8.00 | 4 | 140 | 0.110 | 0.300 | 0.300 | 8.00 | 5570 | 2450 | 45° |
| | | 10.00 | 4 | 140 | 0.140 | 0.360 | 0.360 | 9.99 | 4460 | 2500 | 45° |
| | | 12.00 | 4 | 140 | 0.170 | 0.390 | 0.390 | 11.98 | 3720 | 2530 | 45° |
| | Inox difficile [Cr-Ni-Mo+/1.4529] Acciaio resistente al calore [1.4841] | 4.00 | 4 | 110 | 0.040 | 0.180 | 0.180 | 3.97 | 8820 | 1410 | 45° |
| | | 5.00 | 4 | 110 | 0.060 | 0.240 | 0.240 | 4.99 | 7015 | 1685 | 45° |
| | | 6.00 | 4 | 110 | 0.060 | 0.270 | 0.270 | 6.00 | 5835 | 1400 | 45° |
| | | 8.00 | 4 | 110 | 0.080 | 0.300 | 0.300 | 8.00 | 4375 | 1400 | 45° |
| | | 10.00 | 4 | 110 | 0.110 | 0.360 | 0.360 | 9.99 | 3505 | 1540 | 45° |
| | | 12.00 | 4 | 110 | 0.130 | 0.390 | 0.390 | 11.98 | 2925 | 1520 | 45° |
| | Acciaio < 850 N/mm ² | 4.00 | 4 | 400 | 0.080 | 0.180 | 0.180 | 3.97 | 32070 | 10265 | 45° |
| | | 5.00 | 4 | 400 | 0.100 | 0.240 | 0.240 | 4.99 | 25515 | 10205 | 45° |
| | | 6.00 | 4 | 400 | 0.120 | 0.270 | 0.270 | 6.00 | 21220 | 10185 | 45° |
| | | 8.00 | 4 | 400 | 0.160 | 0.300 | 0.300 | 8.00 | 15915 | 10185 | 45° |
| | | 10.00 | 4 | 400 | 0.210 | 0.360 | 0.360 | 9.99 | 12745 | 10705 | 45° |
| | | 12.00 | 4 | 400 | 0.250 | 0.390 | 0.390 | 11.98 | 10630 | 10630 | 45° |
| | | 4.00 | 4 | 400 | 0.080 | 0.180 | 0.180 | 3.97 | 32070 | 10265 | 45° |
| | | 5.00 | 4 | 400 | 0.100 | 0.240 | 0.240 | 4.99 | 25515 | 10205 | 45° |
| | | 6.00 | 4 | 400 | 0.120 | 0.270 | 0.270 | 6.00 | 21220 | 10185 | 45° |
| | | 8.00 | 4 | 400 | 0.160 | 0.300 | 0.300 | 8.00 | 15915 | 10185 | 45° |
| | | 10.00 | 4 | 400 | 0.210 | 0.360 | 0.360 | 9.99 | 12745 | 10705 | 45° |
| | | 12.00 | 4 | 400 | 0.250 | 0.390 | 0.390 | 11.98 | 10630 | 10630 | 45° |

Frese toriche Torocut (Toro-SB)

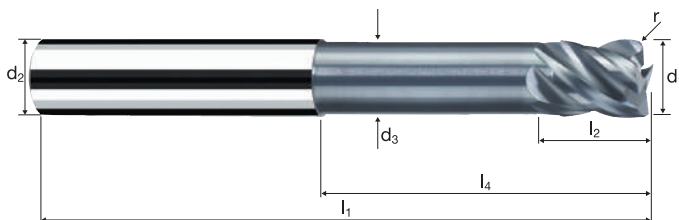
Tolleranza r 0/+0.03, 6xd



HM
MG10 λ 40°
γ 5°



Vario

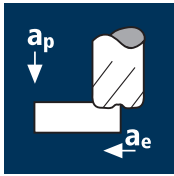


ReTool®

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|----------|-------------|--------------|--------------|-----------|----------------|-------------|-----------------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | Inox Stainless | Ti Titanium | GG(G) Tool Steel Nickel-Alloys |
|----------|-------------|--------------|--------------|-----------|----------------|-------------|-----------------------------------|

| Esempio: N° Ordine | | | | | | | | | | | POLYCHROM |
|--------------------|-------------------|-------------------|----------------|----------------|----------------|----------------|----------------|-----------|------|---|-----------|
| | | | | | | | | | | | P7344 |
| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r 0/+0.03 | α | z | EUR |
| 222 | 4.00 | 6.00 | 3.70 | 69 | 5.00 | 24.00 | 28.95 | 1.000 | 2.1° | 4 | 90.00 |
| 262 | 5.00 | 6.00 | 4.60 | 75 | 6.00 | 30.00 | 33.27 | 1.000 | 1.0° | 4 | 90.00 |
| 302 | 6.00 | 6.00 | 5.50 | 80 | 7.00 | 42.34 | 43.00 | 1.000 | 0.0° | 4 | 90.00 |
| 391 | 8.00 | 8.00 | 7.40 | 90 | 9.00 | 52.29 | 53.00 | 1.000 | 0.0° | 4 | 113.00 |
| 450 | 10.00 | 10.00 | 9.20 | 105 | 11.00 | 63.20 | 64.00 | 1.000 | 0.0° | 4 | 153.00 |
| 501 | 12.00 | 12.00 | 11.00 | 120 | 13.00 | 73.13 | 74.00 | 1.000 | 0.0° | 4 | 190.00 |
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Applicazione



Materiale

Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



Acciaio da
utensile temprato
> 60 HRC



Acciaio rapido temprato
64 - 70 HRC



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 2.00 | 4 | 140 | 0.070 | 0.060 | 1.500 | 22280 | 6240 | 0.6 |
| 3.00 | 4 | 140 | 0.105 | 0.089 | 2.250 | 14855 | 6240 | 1.2 |
| 4.00 | 4 | 140 | 0.140 | 0.140 | 3.000 | 11140 | 6240 | 2.6 |
| 5.00 | 4 | 140 | 0.175 | 0.175 | 3.750 | 8915 | 6240 | 4.1 |
| 6.00 | 6 | 105 | 0.147 | 0.210 | 4.500 | 5570 | 4915 | 4.6 |
| 8.00 | 6 | 105 | 0.196 | 0.280 | 6.000 | 4180 | 4915 | 8.3 |
| 10.00 | 6 | 105 | 0.245 | 0.350 | 7.500 | 3340 | 4915 | 12.9 |
| 12.00 | 6 | 105 | 0.294 | 0.420 | 9.000 | 2785 | 4915 | 18.6 |
| 16.00 | 6 | 105 | 0.392 | 0.560 | 12.000 | 2090 | 4915 | 33.0 |
| 2.00 | 4 | 120 | 0.070 | 0.060 | 1.500 | 19100 | 5350 | 0.5 |
| 3.00 | 4 | 120 | 0.105 | 0.089 | 2.250 | 12730 | 5350 | 1.1 |
| 4.00 | 4 | 120 | 0.140 | 0.140 | 3.000 | 9550 | 5350 | 2.2 |
| 5.00 | 4 | 120 | 0.175 | 0.175 | 3.750 | 7640 | 5350 | 3.5 |
| 6.00 | 6 | 90 | 0.147 | 0.210 | 4.500 | 4775 | 4210 | 4.0 |
| 8.00 | 6 | 90 | 0.196 | 0.280 | 6.000 | 3580 | 4210 | 7.1 |
| 10.00 | 6 | 90 | 0.245 | 0.350 | 7.500 | 2865 | 4210 | 11.1 |
| 12.00 | 6 | 90 | 0.294 | 0.420 | 9.000 | 2385 | 4210 | 15.9 |
| 16.00 | 6 | 90 | 0.392 | 0.560 | 12.000 | 1790 | 4210 | 28.3 |
| 2.00 | 4 | 90 | 0.054 | 0.051 | 1.500 | 14325 | 3095 | 0.2 |
| 3.00 | 4 | 90 | 0.081 | 0.077 | 2.250 | 9550 | 3095 | 0.5 |
| 4.00 | 4 | 90 | 0.108 | 0.120 | 3.000 | 7160 | 3095 | 1.1 |
| 5.00 | 4 | 90 | 0.135 | 0.150 | 3.750 | 5730 | 3095 | 1.7 |
| 6.00 | 6 | 80 | 0.144 | 0.180 | 4.500 | 4245 | 3665 | 3.0 |
| 8.00 | 6 | 70 | 0.168 | 0.240 | 6.000 | 2785 | 2805 | 4.0 |
| 10.00 | 6 | 60 | 0.180 | 0.300 | 7.500 | 1910 | 2065 | 4.6 |
| 12.00 | 6 | 60 | 0.216 | 0.360 | 9.000 | 1590 | 2065 | 6.7 |
| 16.00 | 6 | 50 | 0.240 | 0.480 | 12.000 | 995 | 1430 | 8.3 |
| 2.00 | 4 | 70 | 0.045 | 0.050 | 1.500 | 11140 | 2005 | 0.2 |
| 3.00 | 4 | 70 | 0.068 | 0.075 | 2.250 | 7425 | 2020 | 0.3 |
| 4.00 | 4 | 70 | 0.090 | 0.100 | 3.000 | 5570 | 2005 | 0.6 |
| 5.00 | 4 | 70 | 0.113 | 0.125 | 3.750 | 4455 | 2015 | 0.9 |
| 6.00 | 6 | 65 | 0.120 | 0.150 | 4.500 | 3450 | 2485 | 1.7 |
| 8.00 | 6 | 55 | 0.140 | 0.200 | 6.000 | 2190 | 1840 | 2.2 |
| 10.00 | 6 | 50 | 0.150 | 0.250 | 7.500 | 1590 | 1430 | 2.7 |
| 12.00 | 6 | 50 | 0.180 | 0.300 | 9.000 | 1325 | 1430 | 3.9 |
| 16.00 | 6 | 40 | 0.200 | 0.400 | 12.000 | 795 | 955 | 4.6 |
| 2.00 | 4 | 40 | 0.024 | 0.040 | 1.500 | 6365 | 610 | 0.0 |
| 3.00 | 4 | 40 | 0.036 | 0.060 | 2.250 | 4245 | 610 | 0.1 |
| 4.00 | 4 | 40 | 0.048 | 0.080 | 3.000 | 3185 | 610 | 0.1 |
| 5.00 | 4 | 40 | 0.060 | 0.100 | 3.750 | 2545 | 610 | 0.2 |
| 6.00 | 6 | 35 | 0.063 | 0.120 | 4.500 | 1855 | 700 | 0.4 |
| 8.00 | 6 | 30 | 0.072 | 0.160 | 6.000 | 1195 | 515 | 0.5 |
| 10.00 | 6 | 30 | 0.090 | 0.200 | 7.500 | 955 | 515 | 0.8 |
| 12.00 | 6 | 30 | 0.108 | 0.240 | 9.000 | 795 | 515 | 1.1 |
| 16.00 | 6 | 25 | 0.120 | 0.320 | 12.000 | 495 | 360 | 1.4 |

Frese ad alto avanzamento XFeed-H

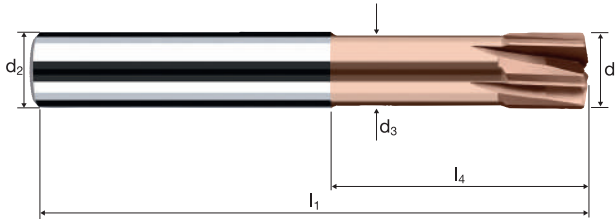
Scarico cilindrico, 3xd



HM λ 0°
XA γ 0°

HFC

new!



ReTool®

HRC
48-56

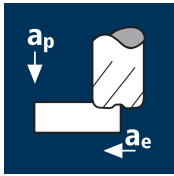
HRC
56-60

HRC
> 60

HSS

| Esempio: N° Ordine | | Rivestimento H | Articolo 7610 | Codice-ø 100 | | | | | | | | DURO-Si |
|-----------------------|-------------|--------------------------|-------------------------|------------------------|-------|-------|------------|-------------|----------|-----|--------|---------|
| Ø Code | d_1 e8 | d_2 h5 | d_3 | l_1 | l_3 | l_4 | ap_{max} | $R_{theo.}$ | α | z | H7610 | |
| | | | | | | | | | | | EUR | |
| 100 | 1.00 | 6.00 | 0.95 | 57 | 3.00 | 13.08 | 0.04 | 0.09 | 11.5° | 4 | 87.00 | |
| 140 | 2.00 | 6.00 | 1.90 | 57 | 6.00 | 14.31 | 0.08 | 0.18 | 8.5° | 4 | 87.00 | |
| 180 | 3.00 | 6.00 | 2.80 | 57 | 9.00 | 15.63 | 0.12 | 0.27 | 6.0° | 4 | 87.00 | |
| 220 | 4.00 | 6.00 | 3.70 | 57 | 12.00 | 16.95 | 0.16 | 0.36 | 3.8° | 4 | 87.00 | |
| 260 | 5.00 | 6.00 | 4.60 | 57 | 15.00 | 18.27 | 0.20 | 0.45 | 1.8° | 4 | 87.00 | |
| 300 | 6.00 | 6.00 | 5.50 | 57 | 19.34 | 20.00 | 0.25 | 0.54 | 0.0° | 6 | 87.00 | |
| 391 | 8.00 | 8.00 | 7.40 | 63 | 25.29 | 26.00 | 0.33 | 0.72 | 0.0° | 6 | 109.00 | |
| 450 | 10.00 | 10.00 | 9.20 | 72 | 30.20 | 31.00 | 0.41 | 0.90 | 0.0° | 6 | 148.00 | |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 36.13 | 37.00 | 0.50 | 1.08 | 0.0° | 6 | 182.00 | |
| 610 | 16.00 | 16.00 | 15.00 | 92 | 42.13 | 43.00 | 0.69 | 1.44 | 0.0° | 6 | 285.00 | |
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Applicazione



Materiale

Acciaio
850 - 1100 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 2.00 | 4 | 250 | 0.135 | 0.050 | 1.200 | 39790 | 21485 | 1.3 |
| 3.00 | 4 | 250 | 0.200 | 0.080 | 1.800 | 26525 | 21220 | 3.1 |
| 4.00 | 4 | 250 | 0.265 | 0.120 | 2.400 | 19895 | 21090 | 6.1 |
| 5.00 | 4 | 250 | 0.335 | 0.160 | 3.000 | 15915 | 21325 | 10.2 |
| 6.00 | 4 | 250 | 0.400 | 0.200 | 3.600 | 13265 | 21220 | 15.3 |
| 8.00 | 4 | 250 | 0.535 | 0.250 | 4.800 | 9945 | 21285 | 25.5 |
| 10.00 | 4 | 250 | 0.665 | 0.320 | 6.000 | 7960 | 21170 | 40.6 |
| 12.00 | 4 | 250 | 0.800 | 0.400 | 7.200 | 6630 | 21220 | 61.1 |
| 16.00 | 4 | 250 | 1.065 | 0.480 | 9.600 | 4975 | 21190 | 97.6 |

Acciaio
1100 - 1300 N/mm²



| | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|
| 2.00 | 4 | 220 | 0.115 | 0.050 | 1.200 | 35015 | 16105 | 1.0 |
| 3.00 | 4 | 220 | 0.170 | 0.080 | 1.800 | 23345 | 15875 | 2.3 |
| 4.00 | 4 | 220 | 0.225 | 0.120 | 2.400 | 17505 | 15755 | 4.5 |
| 5.00 | 4 | 220 | 0.285 | 0.160 | 3.000 | 14005 | 15965 | 7.7 |
| 6.00 | 4 | 220 | 0.340 | 0.200 | 3.600 | 11670 | 15875 | 11.4 |
| 8.00 | 4 | 220 | 0.455 | 0.250 | 4.800 | 8755 | 15930 | 19.1 |
| 10.00 | 4 | 220 | 0.565 | 0.320 | 6.000 | 7005 | 15825 | 30.4 |
| 12.00 | 4 | 220 | 0.680 | 0.400 | 7.200 | 5835 | 15875 | 45.7 |
| 16.00 | 4 | 220 | 0.905 | 0.480 | 9.600 | 4375 | 15845 | 73.0 |

Acciaio
1300 - 1500 N/mm²



| | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|
| 2.00 | 4 | 200 | 0.105 | 0.050 | 1.200 | 31830 | 13370 | 0.8 |
| 3.00 | 4 | 200 | 0.155 | 0.070 | 1.800 | 21220 | 13155 | 1.7 |
| 4.00 | 4 | 200 | 0.205 | 0.110 | 2.400 | 15915 | 13050 | 3.4 |
| 5.00 | 4 | 200 | 0.260 | 0.140 | 3.000 | 12730 | 13240 | 5.6 |
| 6.00 | 4 | 200 | 0.310 | 0.180 | 3.600 | 10610 | 13155 | 8.5 |
| 8.00 | 4 | 200 | 0.415 | 0.230 | 4.800 | 7960 | 13210 | 14.6 |
| 10.00 | 4 | 200 | 0.520 | 0.290 | 6.000 | 6365 | 13240 | 23.0 |
| 12.00 | 4 | 200 | 0.625 | 0.360 | 7.200 | 5305 | 13265 | 34.4 |
| 16.00 | 4 | 200 | 0.830 | 0.430 | 9.600 | 3980 | 13210 | 54.5 |

Acciaio da
utensile temprato
48 - 52 HRC



| | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|------|------|
| 2.00 | 4 | 160 | 0.060 | 0.070 | 1.200 | 25465 | 6110 | 0.5 |
| 3.00 | 4 | 160 | 0.090 | 0.110 | 1.800 | 16975 | 6110 | 1.2 |
| 4.00 | 4 | 160 | 0.120 | 0.140 | 2.400 | 12730 | 6110 | 2.1 |
| 5.00 | 4 | 160 | 0.150 | 0.180 | 3.000 | 10185 | 6110 | 3.3 |
| 6.00 | 4 | 160 | 0.180 | 0.210 | 3.600 | 8490 | 6110 | 4.6 |
| 8.00 | 4 | 160 | 0.240 | 0.280 | 4.800 | 6365 | 6110 | 8.2 |
| 10.00 | 4 | 160 | 0.300 | 0.350 | 6.000 | 5095 | 6110 | 12.8 |
| 12.00 | 4 | 160 | 0.360 | 0.420 | 7.200 | 4245 | 6110 | 18.5 |
| 16.00 | 4 | 160 | 0.480 | 0.560 | 9.600 | 3185 | 6110 | 32.9 |

Acciaio da
utensile temprato
52 - 56 HRC



| | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|------|------|
| 2.00 | 4 | 140 | 0.050 | 0.070 | 1.200 | 22280 | 4455 | 0.4 |
| 3.00 | 4 | 140 | 0.075 | 0.110 | 1.800 | 14855 | 4455 | 0.9 |
| 4.00 | 4 | 140 | 0.100 | 0.140 | 2.400 | 11140 | 4455 | 1.5 |
| 5.00 | 4 | 140 | 0.125 | 0.180 | 3.000 | 8915 | 4455 | 2.4 |
| 6.00 | 4 | 140 | 0.150 | 0.210 | 3.600 | 7425 | 4455 | 3.4 |
| 8.00 | 4 | 140 | 0.200 | 0.280 | 4.800 | 5570 | 4455 | 6.0 |
| 10.00 | 4 | 140 | 0.250 | 0.350 | 6.000 | 4455 | 4455 | 9.4 |
| 12.00 | 4 | 140 | 0.300 | 0.420 | 7.200 | 3715 | 4455 | 13.5 |
| 16.00 | 4 | 140 | 0.400 | 0.560 | 9.600 | 2785 | 4455 | 24.0 |

Acciaio da
utensile temprato
56 - 60 HRC



| | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|------|-----|
| 2.00 | 4 | 100 | 0.030 | 0.060 | 1.200 | 15915 | 1910 | 0.1 |
| 3.00 | 4 | 100 | 0.045 | 0.090 | 1.800 | 10610 | 1910 | 0.3 |
| 4.00 | 4 | 100 | 0.060 | 0.120 | 2.400 | 7960 | 1910 | 0.6 |
| 5.00 | 4 | 100 | 0.075 | 0.150 | 3.000 | 6365 | 1910 | 0.9 |
| 6.00 | 4 | 100 | 0.090 | 0.180 | 3.600 | 5305 | 1910 | 1.2 |
| 8.00 | 4 | 100 | 0.120 | 0.240 | 4.800 | 3980 | 1910 | 2.2 |
| 10.00 | 4 | 100 | 0.150 | 0.300 | 6.000 | 3185 | 1910 | 3.4 |
| 12.00 | 4 | 100 | 0.180 | 0.360 | 7.200 | 2655 | 1910 | 5.0 |
| 16.00 | 4 | 100 | 0.240 | 0.480 | 9.600 | 1990 | 1910 | 8.8 |

Acciaio da
utensile temprato
> 60 HRC



| | | | | | | | | |
|-------|---|----|-------|-------|-------|------|-----|-----|
| 2.00 | 4 | 60 | 0.020 | 0.050 | 1.200 | 9550 | 765 | 0.0 |
| 3.00 | 4 | 60 | 0.030 | 0.075 | 1.800 | 6365 | 765 | 0.1 |
| 4.00 | 4 | 60 | 0.040 | 0.100 | 2.400 | 4775 | 765 | 0.2 |
| 5.00 | 4 | 60 | 0.050 | 0.125 | 3.000 | 3820 | 765 | 0.3 |
| 6.00 | 4 | 60 | 0.060 | 0.150 | 3.600 | 3185 | 765 | 0.4 |
| 8.00 | 4 | 60 | 0.080 | 0.200 | 4.800 | 2385 | 765 | 0.7 |
| 10.00 | 4 | 60 | 0.100 | 0.250 | 6.000 | 1910 | 765 | 1.1 |
| 12.00 | 4 | 60 | 0.120 | 0.300 | 7.200 | 1590 | 765 | 1.7 |
| 16.00 | 4 | 60 | 0.160 | 0.400 | 9.600 | 1195 | 765 | 2.9 |

Ghisa
(grigia / sferoidale)



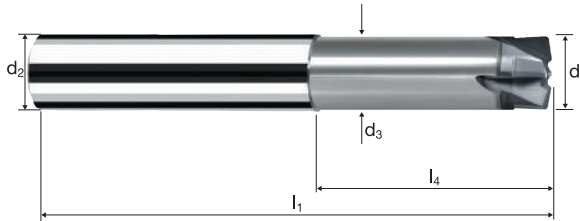
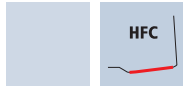
| | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|
| 2.00 | 4 | 250 | 0.135 | 0.050 | 1.200 | 39790 | 21485 | 1.3 |
| 3.00 | 4 | 250 | 0.200 | 0.080 | 1.800 | 26525 | 21220 | 3.1 |
| 4.00 | 4 | 250 | 0.265 | 0.120 | 2.400 | 19895 | 21090 | 6.1 |
| 5.00 | 4 | 250 | 0.335 | 0.160 | 3.000 | 15915 | 21325 | 10.2 |
| 6.00 | 4 | 250 | 0.400 | 0.200 | 3.600 | 13265 | 21220 | 15.3 |
| 8.00 | 4 | 250 | 0.535 | 0.250 | 4.800 | 9945 | 21285 | 25.5 |
| 10.00 | 4 | 250 | 0.665 | 0.320 | 6.000 | 7960 | 21170 | 40.6 |
| 12.00 | 4 | 250 | 0.800 | 0.400 | 7.200 | 6630 | 21220 | 61.1 |
| 16.00 | 4 | 250 | 1.065 | 0.480 | 9.600 | 4975 | 21190 | 97.6 |

Frese ad alto avanzamento XFeed

Scarico cilindrico, 3xd



| | | |
|-----------|-----------|----|
| HM | λ | 0° |
| XT | γ | 0° |

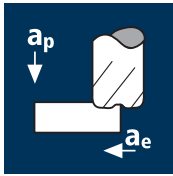


ReTool®

| | | | | | | | | |
|--------------------|-----------------------|------------------------|------------------------|---------------------|---------------------|--------------------|-----------------------|---------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Ti Titanium | HSS GG(G) |
|--------------------|-----------------------|------------------------|------------------------|---------------------|---------------------|--------------------|-----------------------|---------------------|

| | | | | | | | | | | | | X-AL |
|--|----------------------|----------------------|----------------|----------------|----------------|----------------|-------------------|--------------------|-------|---|--|--------------|
| Esempio: N° Ordine | | | | | | | | | | | | |
| Rivestimento X Articolo 7600 Codice-Ø 100 | | | | | | | | | | | | |
| | | | | | | | | | | | | X7600 |
| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₃ | l ₄ | ap _{max} | R _{theo.} | α | z | | EUR |
| 100 | 1.00 | 6.00 | 0.95 | 57 | 3.00 | 13.08 | 0.04 | 0.09 | 11.5° | 4 | | 81.00 |
| 140 | 2.00 | 6.00 | 1.90 | 57 | 6.00 | 14.31 | 0.08 | 0.18 | 8.5° | 4 | | 81.00 |
| 180 | 3.00 | 6.00 | 2.80 | 57 | 9.00 | 15.63 | 0.12 | 0.27 | 6.0° | 4 | | 81.00 |
| 220 | 4.00 | 6.00 | 3.70 | 57 | 12.00 | 16.95 | 0.16 | 0.36 | 3.8° | 4 | | 81.00 |
| 260 | 5.00 | 6.00 | 4.60 | 57 | 15.00 | 18.27 | 0.20 | 0.45 | 1.8° | 4 | | 81.00 |
| 300 | 6.00 | 6.00 | 5.50 | 57 | 19.34 | 20.00 | 0.25 | 0.54 | 0.0° | 4 | | 81.00 |
| 391 | 8.00 | 8.00 | 7.40 | 63 | 25.29 | 26.00 | 0.33 | 0.72 | 0.0° | 4 | | 101.00 |
| 450 | 10.00 | 10.00 | 9.20 | 72 | 30.20 | 31.00 | 0.41 | 0.90 | 0.0° | 4 | | 138.00 |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 36.13 | 37.00 | 0.50 | 1.08 | 0.0° | 4 | | 170.00 |
| 610 | 16.00 | 16.00 | 15.00 | 92 | 42.13 | 43.00 | 0.69 | 1.44 | 0.0° | 4 | | 266.00 |
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Applicazione



Materiale

Acciaio
850 - 1100 N/mm²



Acciaio
1100 - 1300 N/mm²



Acciaio
1300 - 1500 N/mm²



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



| d1 [mm] | z | v _c [m/min] | f _c [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 6.00 | 4 | 250 | 0.315 | 0.240 | 3.600 | 13265 | 16710 | 14.4 |
| 8.00 | 4 | 250 | 0.420 | 0.320 | 4.800 | 9945 | 16710 | 25.7 |
| 10.00 | 4 | 250 | 0.525 | 0.400 | 6.000 | 7960 | 16710 | 40.1 |
| 12.00 | 4 | 250 | 0.630 | 0.480 | 7.200 | 6630 | 16710 | 57.8 |
| 16.00 | 4 | 250 | 0.695 | 0.560 | 9.600 | 4975 | 13825 | 74.3 |

| | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|
| 6.00 | 4 | 220 | 0.270 | 0.240 | 3.600 | 11670 | 12605 | 10.9 |
| 8.00 | 4 | 220 | 0.355 | 0.320 | 4.800 | 8755 | 12430 | 19.1 |
| 10.00 | 4 | 220 | 0.445 | 0.400 | 6.000 | 7005 | 12465 | 29.9 |
| 12.00 | 4 | 220 | 0.535 | 0.480 | 7.200 | 5835 | 12490 | 43.2 |
| 16.00 | 4 | 220 | 0.590 | 0.560 | 9.600 | 4375 | 10330 | 55.5 |

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|-------|---|-----|-------|-------|-------|-------|-------|------|
| 6.00 | 4 | 200 | 0.245 | 0.220 | 3.600 | 10610 | 10400 | 8.2 |
| 8.00 | 4 | 200 | 0.330 | 0.290 | 4.800 | 7960 | 10505 | 14.6 |
| 10.00 | 4 | 200 | 0.410 | 0.360 | 6.000 | 6365 | 10440 | 22.6 |
| 12.00 | 4 | 200 | 0.490 | 0.430 | 7.200 | 5305 | 10400 | 32.2 |
| 16.00 | 4 | 200 | 0.540 | 0.500 | 9.600 | 3980 | 8595 | 41.3 |

| | | | | | | | | |
|-------|---|-----|-------|-------|-------|------|------|------|
| 6.00 | 4 | 160 | 0.180 | 0.210 | 3.600 | 8490 | 6110 | 4.6 |
| 8.00 | 4 | 160 | 0.240 | 0.280 | 4.800 | 6365 | 6110 | 8.2 |
| 10.00 | 4 | 160 | 0.300 | 0.350 | 6.000 | 5095 | 6110 | 12.8 |
| 12.00 | 4 | 160 | 0.360 | 0.420 | 7.200 | 4245 | 6110 | 18.5 |
| 16.00 | 4 | 160 | 0.480 | 0.560 | 9.600 | 3185 | 6110 | 32.9 |

| | | | | | | | | |
|-------|---|-----|-------|-------|-------|------|------|------|
| 6.00 | 4 | 140 | 0.150 | 0.210 | 3.600 | 7425 | 4455 | 3.4 |
| 8.00 | 4 | 140 | 0.200 | 0.280 | 4.800 | 5570 | 4455 | 6.0 |
| 10.00 | 4 | 140 | 0.250 | 0.350 | 6.000 | 4455 | 4455 | 9.4 |
| 12.00 | 4 | 140 | 0.300 | 0.420 | 7.200 | 3715 | 4455 | 13.5 |
| 16.00 | 4 | 140 | 0.400 | 0.560 | 9.600 | 2785 | 4455 | 24.0 |

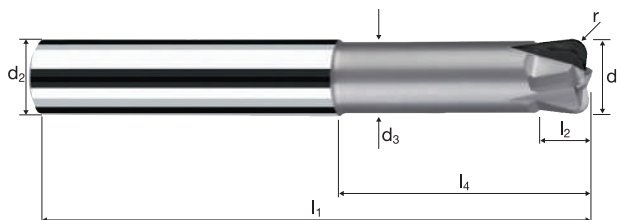
| | | | | | | | | |
|-------|---|-----|-------|-------|-------|------|------|-----|
| 6.00 | 4 | 100 | 0.090 | 0.180 | 3.600 | 5305 | 1910 | 1.2 |
| 8.00 | 4 | 100 | 0.120 | 0.240 | 4.800 | 3980 | 1910 | 2.2 |
| 10.00 | 4 | 100 | 0.150 | 0.300 | 6.000 | 3185 | 1910 | 3.4 |
| 12.00 | 4 | 100 | 0.180 | 0.360 | 7.200 | 2655 | 1910 | 5.0 |
| 16.00 | 4 | 100 | 0.240 | 0.480 | 9.600 | 1990 | 1910 | 8.8 |

Frese ad alto avanzamento XFeed (XFeed-R)

Scarico cilindrico, 3xd



HM
XT λ 0°
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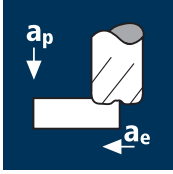


ReTool®

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|----------|-----------|-----------|-------|-------|------|--|-------|
| Rm | Rm | Rm | HRC | HRC | HRC | | HSS |
| 850-1100 | 1100-1300 | 1300-1500 | 48-56 | 56-60 | > 60 | | GG(G) |

| Esempio: N° Ordine | | | | | | | | | | | X-AL |
|--|-------------------|-------------------|----------------|----------------|----------------|----------------|----------------|-------|---|--------|-------|
| Rivestimento: X Articolo: 7620 Codice-ø: 300 | | | | | | | | | | | X7620 |
| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r | z | EUR | |
| 300 | 6.00 | 6.00 | 5.50 | 57 | 3.00 | 19.34 | 20.00 | 1.000 | 4 | 81.00 | |
| 304 | 6.00 | 6.00 | 5.50 | 57 | 3.00 | 19.34 | 20.00 | 1.500 | 4 | 81.00 | |
| 391 | 8.00 | 8.00 | 7.40 | 63 | 4.00 | 25.29 | 26.00 | 1.500 | 4 | 101.00 | |
| 395 | 8.00 | 8.00 | 7.40 | 63 | 4.00 | 25.29 | 26.00 | 2.000 | 4 | 101.00 | |
| 450 | 10.00 | 10.00 | 9.20 | 72 | 5.00 | 30.20 | 31.00 | 2.000 | 4 | 138.00 | |
| 457 | 10.00 | 10.00 | 9.20 | 72 | 5.00 | 30.20 | 31.00 | 2.500 | 4 | 138.00 | |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 6.00 | 36.13 | 37.00 | 2.500 | 4 | 170.00 | |
| 507 | 12.00 | 12.00 | 11.00 | 83 | 6.00 | 36.13 | 37.00 | 3.000 | 4 | 170.00 | |
| 610 | 16.00 | 16.00 | 15.00 | 92 | 8.00 | 42.13 | 43.00 | 3.000 | 4 | 266.00 | |
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Applicazione



Materiale

Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



Acciaio da
utensile temprato
> 60 HRC

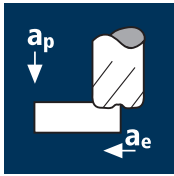


Acciaio rapido temprato
64 - 70 HRC



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 2.00 | 4 | 130 | 0.070 | 0.060 | 1.500 | 20690 | 5795 | 0.5 |
| 3.00 | 4 | 130 | 0.105 | 0.089 | 2.250 | 13795 | 5795 | 1.2 |
| 4.00 | 4 | 130 | 0.140 | 0.140 | 3.000 | 10345 | 5795 | 2.4 |
| 5.00 | 4 | 130 | 0.175 | 0.175 | 3.750 | 8275 | 5795 | 3.8 |
| 6.00 | 6 | 95 | 0.147 | 0.210 | 4.500 | 5040 | 4445 | 4.2 |
| 8.00 | 6 | 95 | 0.196 | 0.280 | 6.000 | 3780 | 4445 | 7.5 |
| 10.00 | 6 | 95 | 0.245 | 0.350 | 7.500 | 3025 | 4445 | 11.7 |
| 12.00 | 6 | 95 | 0.294 | 0.420 | 9.000 | 2520 | 4445 | 16.8 |
| 16.00 | 6 | 95 | 0.392 | 0.560 | 12.000 | 1890 | 4445 | 29.9 |
| 2.00 | 4 | 110 | 0.070 | 0.060 | 1.500 | 17505 | 4900 | 0.4 |
| 3.00 | 4 | 110 | 0.105 | 0.089 | 2.250 | 11670 | 4900 | 1.0 |
| 4.00 | 4 | 110 | 0.140 | 0.140 | 3.000 | 8755 | 4900 | 2.1 |
| 5.00 | 4 | 110 | 0.175 | 0.175 | 3.750 | 7005 | 4900 | 3.2 |
| 6.00 | 6 | 80 | 0.147 | 0.210 | 4.500 | 4245 | 3745 | 3.5 |
| 8.00 | 6 | 80 | 0.196 | 0.280 | 6.000 | 3185 | 3745 | 6.3 |
| 10.00 | 6 | 80 | 0.245 | 0.350 | 7.500 | 2545 | 3745 | 9.8 |
| 12.00 | 6 | 80 | 0.294 | 0.420 | 9.000 | 2120 | 3745 | 14.1 |
| 16.00 | 6 | 80 | 0.392 | 0.560 | 12.000 | 1590 | 3745 | 25.2 |
| 2.00 | 4 | 65 | 0.054 | 0.051 | 1.500 | 10345 | 2235 | 0.2 |
| 3.00 | 4 | 65 | 0.081 | 0.077 | 2.250 | 6895 | 2235 | 0.4 |
| 4.00 | 4 | 65 | 0.108 | 0.120 | 3.000 | 5175 | 2235 | 0.8 |
| 5.00 | 4 | 65 | 0.135 | 0.150 | 3.750 | 4140 | 2235 | 1.3 |
| 6.00 | 6 | 65 | 0.144 | 0.180 | 4.500 | 3450 | 2980 | 2.4 |
| 8.00 | 6 | 65 | 0.168 | 0.240 | 6.000 | 2585 | 2605 | 3.8 |
| 10.00 | 6 | 65 | 0.180 | 0.300 | 7.500 | 2070 | 2235 | 5.0 |
| 12.00 | 6 | 65 | 0.216 | 0.360 | 9.000 | 1725 | 2235 | 7.2 |
| 16.00 | 6 | 50 | 0.240 | 0.480 | 12.000 | 995 | 1430 | 8.3 |
| 2.00 | 4 | 50 | 0.045 | 0.040 | 1.500 | 7960 | 1430 | 0.1 |
| 3.00 | 4 | 50 | 0.068 | 0.075 | 2.250 | 5305 | 1445 | 0.2 |
| 4.00 | 4 | 50 | 0.090 | 0.100 | 3.000 | 3980 | 1430 | 0.4 |
| 5.00 | 4 | 50 | 0.113 | 0.125 | 3.750 | 3185 | 1440 | 0.7 |
| 6.00 | 6 | 50 | 0.120 | 0.150 | 4.500 | 2655 | 1910 | 1.3 |
| 8.00 | 6 | 50 | 0.140 | 0.200 | 6.000 | 1990 | 1670 | 2.0 |
| 10.00 | 6 | 50 | 0.150 | 0.250 | 7.500 | 1590 | 1430 | 2.7 |
| 12.00 | 6 | 50 | 0.180 | 0.300 | 9.000 | 1325 | 1430 | 3.9 |
| 16.00 | 6 | 40 | 0.200 | 0.400 | 12.000 | 795 | 955 | 4.6 |
| 2.00 | 4 | 30 | 0.024 | 0.032 | 1.500 | 4775 | 460 | 0.0 |
| 3.00 | 4 | 30 | 0.036 | 0.060 | 2.250 | 3185 | 460 | 0.1 |
| 4.00 | 4 | 30 | 0.048 | 0.080 | 3.000 | 2385 | 460 | 0.1 |
| 5.00 | 4 | 30 | 0.060 | 0.100 | 3.750 | 1910 | 460 | 0.2 |
| 6.00 | 6 | 30 | 0.063 | 0.120 | 4.500 | 1590 | 600 | 0.3 |
| 8.00 | 6 | 30 | 0.072 | 0.160 | 6.000 | 1195 | 515 | 0.5 |
| 10.00 | 6 | 30 | 0.090 | 0.200 | 7.500 | 955 | 515 | 0.8 |
| 12.00 | 6 | 30 | 0.108 | 0.240 | 9.000 | 795 | 515 | 1.1 |
| 16.00 | 6 | 25 | 0.120 | 0.320 | 12.000 | 495 | 360 | 1.4 |

Applicazione



Materiale

Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



Acciaio da
utensile temprato
> 60 HRC



Acciaio rapido temprato
64 - 70 HRC



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 3.00 | 4 | 112 | 0.105 | 0.069 | 2.250 | 11885 | 4990 | 0.8 |
| 4.00 | 4 | 112 | 0.140 | 0.108 | 3.000 | 8915 | 4990 | 1.6 |
| 5.00 | 4 | 112 | 0.175 | 0.135 | 3.750 | 7130 | 4990 | 2.5 |
| 6.00 | 6 | 75 | 0.147 | 0.162 | 4.500 | 3980 | 3510 | 2.6 |
| 8.00 | 6 | 75 | 0.196 | 0.216 | 6.000 | 2985 | 3510 | 4.5 |
| 10.00 | 6 | 75 | 0.245 | 0.270 | 7.500 | 2385 | 3510 | 7.1 |
| 12.00 | 6 | 75 | 0.294 | 0.324 | 9.000 | 1990 | 3510 | 10.2 |
| 16.00 | 6 | 75 | 0.392 | 0.432 | 12.000 | 1490 | 3510 | 18.2 |

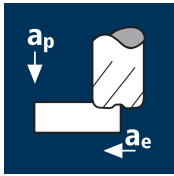
| | | | | | | | | |
|-------|---|----|-------|-------|--------|------|------|------|
| 3.00 | 4 | 90 | 0.105 | 0.069 | 2.250 | 9550 | 4010 | 0.6 |
| 4.00 | 4 | 90 | 0.140 | 0.108 | 3.000 | 7160 | 4010 | 1.3 |
| 5.00 | 4 | 90 | 0.175 | 0.135 | 3.750 | 5730 | 4010 | 2.0 |
| 6.00 | 6 | 60 | 0.147 | 0.162 | 4.500 | 3185 | 2805 | 2.0 |
| 8.00 | 6 | 60 | 0.196 | 0.216 | 6.000 | 2385 | 2805 | 3.6 |
| 10.00 | 6 | 60 | 0.245 | 0.270 | 7.500 | 1910 | 2805 | 5.7 |
| 12.00 | 6 | 60 | 0.294 | 0.324 | 9.000 | 1590 | 2805 | 8.2 |
| 16.00 | 6 | 60 | 0.392 | 0.432 | 12.000 | 1195 | 2805 | 14.6 |

| | | | | | | | | |
|-------|---|----|-------|-------|--------|------|------|-----|
| 3.00 | 4 | 65 | 0.081 | 0.059 | 2.250 | 6895 | 2235 | 0.3 |
| 4.00 | 4 | 65 | 0.108 | 0.092 | 3.000 | 5175 | 2235 | 0.6 |
| 5.00 | 4 | 65 | 0.135 | 0.115 | 3.750 | 4140 | 2235 | 1.0 |
| 6.00 | 6 | 65 | 0.144 | 0.138 | 4.500 | 3450 | 2980 | 1.9 |
| 8.00 | 6 | 65 | 0.168 | 0.184 | 6.000 | 2585 | 2605 | 2.9 |
| 10.00 | 6 | 65 | 0.180 | 0.230 | 7.500 | 2070 | 2235 | 3.9 |
| 12.00 | 6 | 65 | 0.216 | 0.276 | 9.000 | 1725 | 2235 | 5.6 |
| 16.00 | 6 | 50 | 0.240 | 0.368 | 12.000 | 995 | 1430 | 6.3 |

| | | | | | | | | |
|-------|---|----|-------|-------|--------|------|------|-----|
| 3.00 | 4 | 50 | 0.068 | 0.057 | 2.250 | 5305 | 1445 | 0.2 |
| 4.00 | 4 | 50 | 0.090 | 0.076 | 3.000 | 3980 | 1430 | 0.3 |
| 5.00 | 4 | 50 | 0.113 | 0.095 | 3.750 | 3185 | 1440 | 0.5 |
| 6.00 | 6 | 50 | 0.120 | 0.114 | 4.500 | 2655 | 1910 | 1.0 |
| 8.00 | 6 | 50 | 0.140 | 0.152 | 6.000 | 1990 | 1670 | 1.5 |
| 10.00 | 6 | 50 | 0.150 | 0.190 | 7.500 | 1590 | 1430 | 2.0 |
| 12.00 | 6 | 50 | 0.180 | 0.228 | 9.000 | 1325 | 1430 | 2.9 |
| 16.00 | 6 | 30 | 0.200 | 0.304 | 12.000 | 595 | 715 | 2.6 |

| | | | | | | | | |
|-------|---|----|-------|-------|--------|------|-----|-----|
| 3.00 | 4 | 30 | 0.036 | 0.027 | 2.250 | 3185 | 460 | 0.0 |
| 4.00 | 4 | 30 | 0.048 | 0.036 | 3.000 | 2385 | 460 | 0.0 |
| 5.00 | 4 | 30 | 0.060 | 0.045 | 3.750 | 1910 | 460 | 0.1 |
| 6.00 | 6 | 30 | 0.063 | 0.054 | 4.500 | 1590 | 600 | 0.1 |
| 8.00 | 6 | 30 | 0.072 | 0.072 | 6.000 | 1195 | 515 | 0.2 |
| 10.00 | 6 | 30 | 0.090 | 0.070 | 7.500 | 955 | 515 | 0.3 |
| 12.00 | 6 | 30 | 0.108 | 0.084 | 9.000 | 795 | 515 | 0.4 |
| 16.00 | 6 | 25 | 0.120 | 0.112 | 12.000 | 495 | 360 | 0.5 |

Applicazione



Materiale

Acciaio
850 - 1100 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 3.00 | 4 | 100 | 0.200 | 0.080 | 1.800 | 10610 | 8490 | 1.2 |
| 4.00 | 4 | 100 | 0.265 | 0.120 | 2.400 | 7960 | 8435 | 2.4 |
| 5.00 | 4 | 100 | 0.335 | 0.160 | 3.000 | 6365 | 8530 | 4.1 |
| 6.00 | 4 | 100 | 0.400 | 0.200 | 3.600 | 5305 | 8490 | 6.1 |
| 8.00 | 4 | 100 | 0.535 | 0.250 | 4.800 | 3980 | 8515 | 10.2 |
| 10.00 | 4 | 100 | 0.665 | 0.320 | 6.000 | 3185 | 8465 | 16.3 |
| 12.00 | 4 | 100 | 0.800 | 0.400 | 7.200 | 2655 | 8490 | 24.4 |
| 16.00 | 4 | 100 | 1.065 | 0.480 | 9.600 | 1990 | 8475 | 39.1 |

Acciaio
1100 - 1300 N/mm²



| | | | | | | | | |
|-------|---|----|-------|-------|-------|-------|------|------|
| 3.00 | 4 | 95 | 0.170 | 0.080 | 1.800 | 10080 | 6855 | 1.0 |
| 4.00 | 4 | 95 | 0.225 | 0.120 | 2.400 | 7560 | 6805 | 2.0 |
| 5.00 | 4 | 95 | 0.285 | 0.160 | 3.000 | 6050 | 6895 | 3.3 |
| 6.00 | 4 | 95 | 0.340 | 0.200 | 3.600 | 5040 | 6855 | 4.9 |
| 8.00 | 4 | 95 | 0.455 | 0.250 | 4.800 | 3780 | 6880 | 8.3 |
| 10.00 | 4 | 95 | 0.565 | 0.320 | 6.000 | 3025 | 6835 | 13.1 |
| 12.00 | 4 | 95 | 0.680 | 0.400 | 7.200 | 2520 | 6855 | 19.7 |
| 16.00 | 4 | 95 | 0.905 | 0.480 | 9.600 | 1890 | 6840 | 31.5 |

Acciaio
1300 - 1500 N/mm²



| | | | | | | | | |
|-------|---|----|-------|-------|-------|------|------|------|
| 3.00 | 4 | 90 | 0.155 | 0.070 | 1.800 | 9550 | 5920 | 0.7 |
| 4.00 | 4 | 90 | 0.205 | 0.110 | 2.400 | 7160 | 5875 | 1.6 |
| 5.00 | 4 | 90 | 0.260 | 0.140 | 3.000 | 5730 | 5960 | 2.5 |
| 6.00 | 4 | 90 | 0.310 | 0.180 | 3.600 | 4775 | 5920 | 3.8 |
| 8.00 | 4 | 90 | 0.415 | 0.230 | 4.800 | 3580 | 5945 | 6.6 |
| 10.00 | 4 | 90 | 0.520 | 0.290 | 6.000 | 2865 | 5960 | 10.4 |
| 12.00 | 4 | 90 | 0.625 | 0.360 | 7.200 | 2385 | 5970 | 15.5 |
| 16.00 | 4 | 90 | 0.830 | 0.430 | 9.600 | 1790 | 5945 | 24.5 |

Acciaio da
utensile temprato
48 - 52 HRC



| | | | | | | | | |
|-------|---|----|-------|-------|-------|------|------|------|
| 3.00 | 4 | 85 | 0.120 | 0.060 | 1.800 | 9020 | 4330 | 0.5 |
| 4.00 | 4 | 85 | 0.160 | 0.100 | 2.400 | 6765 | 4330 | 1.0 |
| 5.00 | 4 | 85 | 0.200 | 0.130 | 3.000 | 5410 | 4330 | 1.7 |
| 6.00 | 4 | 85 | 0.240 | 0.160 | 3.600 | 4510 | 4330 | 2.5 |
| 8.00 | 4 | 85 | 0.320 | 0.200 | 4.800 | 3380 | 4330 | 4.2 |
| 10.00 | 4 | 85 | 0.400 | 0.260 | 6.000 | 2705 | 4330 | 6.8 |
| 12.00 | 4 | 85 | 0.480 | 0.320 | 7.200 | 2255 | 4330 | 10.0 |
| 16.00 | 4 | 85 | 0.640 | 0.380 | 9.600 | 1690 | 4330 | 15.8 |

Acciaio da
utensile temprato
52 - 56 HRC



| | | | | | | | | |
|-------|---|----|-------|-------|-------|------|------|------|
| 3.00 | 4 | 80 | 0.090 | 0.060 | 1.800 | 8490 | 3055 | 0.3 |
| 4.00 | 4 | 80 | 0.120 | 0.080 | 2.400 | 6365 | 3055 | 0.6 |
| 5.00 | 4 | 80 | 0.150 | 0.110 | 3.000 | 5095 | 3055 | 1.0 |
| 6.00 | 4 | 80 | 0.180 | 0.140 | 3.600 | 4245 | 3055 | 1.5 |
| 8.00 | 4 | 80 | 0.240 | 0.180 | 4.800 | 3185 | 3055 | 2.6 |
| 10.00 | 4 | 80 | 0.300 | 0.220 | 6.000 | 2545 | 3055 | 4.0 |
| 12.00 | 4 | 80 | 0.360 | 0.280 | 7.200 | 2120 | 3055 | 6.2 |
| 16.00 | 4 | 80 | 0.480 | 0.340 | 9.600 | 1590 | 3055 | 10.0 |

Acciaio da
utensile temprato
56 - 60 HRC



| | | | | | | | | |
|-------|---|----|-------|-------|-------|------|------|-----|
| 3.00 | 4 | 65 | 0.055 | 0.050 | 1.800 | 6895 | 1515 | 0.1 |
| 4.00 | 4 | 65 | 0.075 | 0.080 | 2.400 | 5175 | 1550 | 0.3 |
| 5.00 | 4 | 65 | 0.095 | 0.100 | 3.000 | 4140 | 1570 | 0.5 |
| 6.00 | 4 | 65 | 0.110 | 0.130 | 3.600 | 3450 | 1515 | 0.7 |
| 8.00 | 4 | 65 | 0.150 | 0.160 | 4.800 | 2585 | 1550 | 1.2 |
| 10.00 | 4 | 65 | 0.185 | 0.210 | 6.000 | 2070 | 1530 | 1.9 |
| 12.00 | 4 | 65 | 0.225 | 0.260 | 7.200 | 1725 | 1550 | 2.9 |
| 16.00 | 4 | 65 | 0.300 | 0.310 | 9.600 | 1295 | 1550 | 4.6 |

Acciaio da
utensile temprato
> 60 HRC



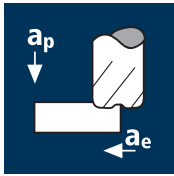
| | | | | | | | | |
|-------|---|----|-------|-------|-------|------|-----|-----|
| 3.00 | 4 | 40 | 0.045 | 0.050 | 1.800 | 4245 | 765 | 0.1 |
| 4.00 | 4 | 40 | 0.060 | 0.070 | 2.400 | 3185 | 765 | 0.1 |
| 5.00 | 4 | 40 | 0.075 | 0.100 | 3.000 | 2545 | 765 | 0.2 |
| 6.00 | 4 | 40 | 0.090 | 0.120 | 3.600 | 2120 | 765 | 0.3 |
| 8.00 | 4 | 40 | 0.120 | 0.150 | 4.800 | 1590 | 765 | 0.6 |
| 10.00 | 4 | 40 | 0.145 | 0.190 | 6.000 | 1275 | 740 | 0.8 |
| 12.00 | 4 | 40 | 0.175 | 0.240 | 7.200 | 1060 | 745 | 1.3 |
| 16.00 | 4 | 40 | 0.235 | 0.290 | 9.600 | 795 | 750 | 2.1 |

Ghisa
(grigia / sferoidale)



| | | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-------|------|
| 3.00 | 4 | 120 | 0.200 | 0.080 | 1.800 | 12730 | 10185 | 1.5 |
| 4.00 | 4 | 120 | 0.265 | 0.120 | 2.400 | 9550 | 10120 | 2.9 |
| 5.00 | 4 | 120 | 0.335 | 0.160 | 3.000 | 7640 | 10235 | 4.9 |
| 6.00 | 4 | 120 | 0.400 | 0.200 | 3.600 | 6365 | 10185 | 7.3 |
| 8.00 | 4 | 120 | 0.535 | 0.250 | 4.800 | 4775 | 10220 | 12.3 |
| 10.00 | 4 | 120 | 0.665 | 0.320 | 6.000 | 3820 | 10160 | 19.5 |
| 12.00 | 4 | 120 | 0.800 | 0.400 | 7.200 | 3185 | 10185 | 29.3 |
| 16.00 | 4 | 120 | 1.065 | 0.480 | 9.600 | 2385 | 10170 | 46.9 |

Applicazione



Materiale

Acciaio
850 - 1100 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 3.00 | 4 | 80 | 0.200 | 0.040 | 1.800 | 8490 | 6790 | 0.5 |
| 4.00 | 4 | 80 | 0.265 | 0.060 | 2.400 | 6365 | 6750 | 1.0 |
| 5.00 | 4 | 80 | 0.335 | 0.080 | 3.000 | 5095 | 6825 | 1.6 |
| 6.00 | 4 | 80 | 0.400 | 0.100 | 3.600 | 4245 | 6790 | 2.4 |
| 8.00 | 4 | 80 | 0.535 | 0.130 | 4.800 | 3185 | 6810 | 4.3 |
| 10.00 | 4 | 80 | 0.665 | 0.160 | 6.000 | 2545 | 6775 | 6.5 |
| 12.00 | 4 | 80 | 0.800 | 0.200 | 7.200 | 2120 | 6790 | 9.8 |
| 16.00 | 4 | 80 | 1.065 | 0.240 | 9.600 | 1590 | 6780 | 15.6 |

Acciaio
1100 - 1300 N/mm²



| | | | | | | | | |
|-------|---|----|-------|-------|-------|------|------|------|
| 3.00 | 4 | 75 | 0.170 | 0.040 | 1.800 | 7960 | 5410 | 0.4 |
| 4.00 | 4 | 75 | 0.225 | 0.060 | 2.400 | 5970 | 5370 | 0.8 |
| 5.00 | 4 | 75 | 0.285 | 0.080 | 3.000 | 4775 | 5445 | 1.3 |
| 6.00 | 4 | 75 | 0.340 | 0.100 | 3.600 | 3980 | 5410 | 1.9 |
| 8.00 | 4 | 75 | 0.455 | 0.130 | 4.800 | 2985 | 5430 | 3.4 |
| 10.00 | 4 | 75 | 0.565 | 0.160 | 6.000 | 2385 | 5395 | 5.2 |
| 12.00 | 4 | 75 | 0.680 | 0.200 | 7.200 | 1990 | 5410 | 7.8 |
| 16.00 | 4 | 75 | 0.905 | 0.240 | 9.600 | 1490 | 5400 | 12.4 |

Acciaio
1300 - 1500 N/mm²



| | | | | | | | | |
|-------|---|----|-------|-------|-------|------|------|-----|
| 3.00 | 4 | 70 | 0.155 | 0.040 | 1.800 | 7425 | 4605 | 0.3 |
| 4.00 | 4 | 70 | 0.205 | 0.060 | 2.400 | 5570 | 4570 | 0.7 |
| 5.00 | 4 | 70 | 0.260 | 0.070 | 3.000 | 4455 | 4635 | 1.0 |
| 6.00 | 4 | 70 | 0.310 | 0.090 | 3.600 | 3715 | 4605 | 1.5 |
| 8.00 | 4 | 70 | 0.415 | 0.120 | 4.800 | 2785 | 4625 | 2.7 |
| 10.00 | 4 | 70 | 0.520 | 0.150 | 6.000 | 2230 | 4635 | 4.2 |
| 12.00 | 4 | 70 | 0.625 | 0.180 | 7.200 | 1855 | 4640 | 6.0 |
| 16.00 | 4 | 70 | 0.830 | 0.220 | 9.600 | 1395 | 4625 | 9.8 |

Acciaio da
utensile temprato
48 - 52 HRC



| | | | | | | | | |
|-------|---|----|-------|-------|-------|------|------|-----|
| 3.00 | 4 | 65 | 0.120 | 0.030 | 1.800 | 6895 | 3310 | 0.2 |
| 4.00 | 4 | 65 | 0.160 | 0.050 | 2.400 | 5175 | 3310 | 0.4 |
| 5.00 | 4 | 65 | 0.200 | 0.070 | 3.000 | 4140 | 3310 | 0.7 |
| 6.00 | 4 | 65 | 0.240 | 0.080 | 3.600 | 3450 | 3310 | 1.0 |
| 8.00 | 4 | 65 | 0.320 | 0.100 | 4.800 | 2585 | 3310 | 1.6 |
| 10.00 | 4 | 65 | 0.400 | 0.130 | 6.000 | 2070 | 3310 | 2.6 |
| 12.00 | 4 | 65 | 0.480 | 0.160 | 7.200 | 1725 | 3310 | 3.8 |
| 16.00 | 4 | 65 | 0.640 | 0.190 | 9.600 | 1295 | 3310 | 6.0 |

Acciaio da
utensile temprato
52 - 56 HRC



| | | | | | | | | |
|-------|---|----|-------|-------|-------|------|------|-----|
| 3.00 | 4 | 60 | 0.090 | 0.030 | 1.800 | 6365 | 2290 | 0.1 |
| 4.00 | 4 | 60 | 0.120 | 0.040 | 2.400 | 4775 | 2290 | 0.2 |
| 5.00 | 4 | 60 | 0.150 | 0.060 | 3.000 | 3820 | 2290 | 0.4 |
| 6.00 | 4 | 60 | 0.180 | 0.070 | 3.600 | 3185 | 2290 | 0.6 |
| 8.00 | 4 | 60 | 0.240 | 0.090 | 4.800 | 2385 | 2290 | 1.0 |
| 10.00 | 4 | 60 | 0.300 | 0.110 | 6.000 | 1910 | 2290 | 1.5 |
| 12.00 | 4 | 60 | 0.360 | 0.140 | 7.200 | 1590 | 2290 | 2.3 |
| 16.00 | 4 | 60 | 0.480 | 0.170 | 9.600 | 1195 | 2290 | 3.7 |

Acciaio da
utensile temprato
56 - 60 HRC



| | | | | | | | | |
|-------|---|----|-------|-------|-------|------|------|-----|
| 3.00 | 4 | 55 | 0.055 | 0.030 | 1.800 | 5835 | 1285 | 0.1 |
| 4.00 | 4 | 55 | 0.075 | 0.040 | 2.400 | 4375 | 1315 | 0.1 |
| 5.00 | 4 | 55 | 0.095 | 0.050 | 3.000 | 3500 | 1330 | 0.2 |
| 6.00 | 4 | 55 | 0.110 | 0.070 | 3.600 | 2920 | 1285 | 0.3 |
| 8.00 | 4 | 55 | 0.150 | 0.080 | 4.800 | 2190 | 1315 | 0.5 |
| 10.00 | 4 | 55 | 0.185 | 0.110 | 6.000 | 1750 | 1295 | 0.9 |
| 12.00 | 4 | 55 | 0.225 | 0.130 | 7.200 | 1460 | 1315 | 1.2 |
| 16.00 | 4 | 55 | 0.300 | 0.160 | 9.600 | 1095 | 1315 | 2.0 |

Acciaio da
utensile temprato
> 60 HRC



| | | | | | | | | |
|-------|---|----|-------|-------|-------|------|-----|-----|
| 3.00 | 4 | 30 | 0.045 | 0.030 | 1.800 | 3185 | 575 | 0.0 |
| 4.00 | 4 | 30 | 0.060 | 0.040 | 2.400 | 2385 | 575 | 0.1 |
| 5.00 | 4 | 30 | 0.075 | 0.050 | 3.000 | 1910 | 575 | 0.1 |
| 6.00 | 4 | 30 | 0.090 | 0.060 | 3.600 | 1590 | 575 | 0.1 |
| 8.00 | 4 | 30 | 0.120 | 0.080 | 4.800 | 1195 | 575 | 0.2 |
| 10.00 | 4 | 30 | 0.145 | 0.100 | 6.000 | 955 | 555 | 0.3 |
| 12.00 | 4 | 30 | 0.175 | 0.120 | 7.200 | 795 | 555 | 0.5 |
| 16.00 | 4 | 30 | 0.235 | 0.150 | 9.600 | 595 | 560 | 0.8 |

Ghisa
(grigia / sferoidale)

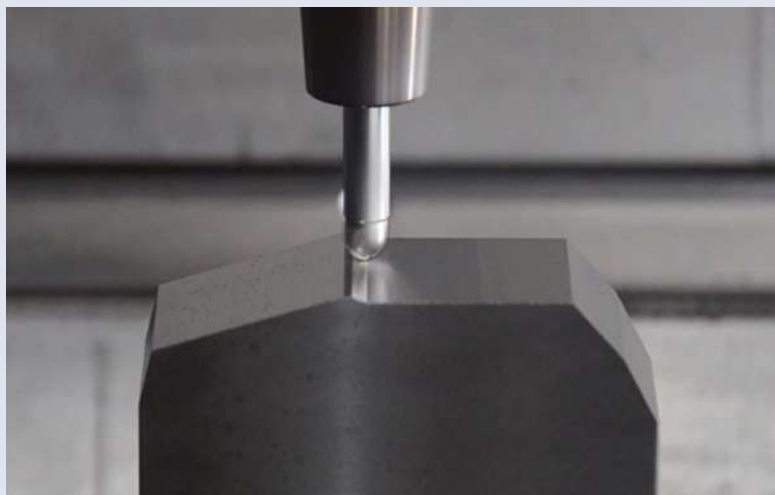


| | | | | | | | | |
|-------|---|----|-------|-------|-------|-------|------|------|
| 3.00 | 4 | 95 | 0.200 | 0.040 | 1.800 | 10080 | 8065 | 0.6 |
| 4.00 | 4 | 95 | 0.265 | 0.060 | 2.400 | 7560 | 8015 | 1.2 |
| 5.00 | 4 | 95 | 0.335 | 0.080 | 3.000 | 6050 | 8105 | 1.9 |
| 6.00 | 4 | 95 | 0.400 | 0.100 | 3.600 | 5040 | 8065 | 2.9 |
| 8.00 | 4 | 95 | 0.535 | 0.130 | 4.800 | 3780 | 8090 | 5.0 |
| 10.00 | 4 | 95 | 0.665 | 0.160 | 6.000 | 3025 | 8045 | 7.7 |
| 12.00 | 4 | 95 | 0.800 | 0.200 | 7.200 | 2520 | 8065 | 11.6 |
| 16.00 | 4 | 95 | 1.065 | 0.240 | 9.600 | 1890 | 8050 | 18.6 |

Dati applicativi per la fresatura ad alto rendimento di metallo duro

Sempre aggiornatissimi

Per poter accedere alle più aggiornate conoscenze applicative sulla fresatura ad alto rendimento di metallo duro nonché agli attuali dati di taglio per SpheroCarb, Sphero-CVD e Toro-CVD, siete pregati di contattarci. I tecnici di applicazione FRAISA saranno lieti di offrirvi consulenza.



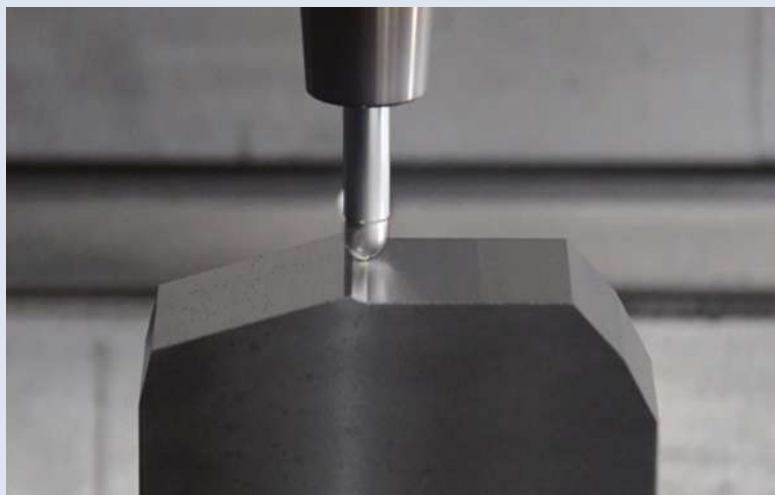
Qui si va al catalogo di prodotti online:
Fresatura ad alto rendimento di metallo duro con Sphero-CVD, SpheroCarb e Toro-CVD oppure al sito web di FRAISA al link

www.fraisa.com/it/prodotti/utensili-per-fresatura

Dati applicativi per la fresatura ad alto rendimento di metallo duro

Sempre aggiornatissimi

Per poter accedere alle più aggiornate conoscenze applicative sulla fresatura ad alto rendimento di metallo duro nonché agli attuali dati di taglio per SpheroCarb, Sphero-CVD e Toro-CVD, siete pregati di contattarci. I tecnici di applicazione FRAISA saranno lieti di offrirvi consulenza.



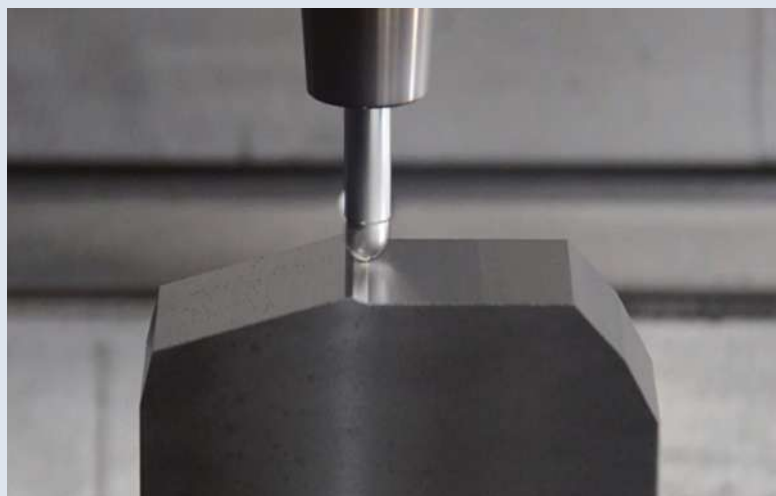
Qui si va al catalogo di prodotti online:
Fresatura ad alto rendimento di metallo duro con Sphero-CVD, SpheroCarb e Toro-CVD oppure al sito web di FRAISA al link

www.fraisa.com/it/prodotti/utensili-per-fresatura

Dati applicativi per la fresatura ad alto rendimento di metallo duro

Sempre aggiornatissimi

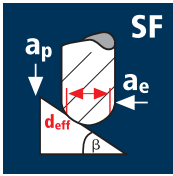
Per poter accedere alle più aggiornate conoscenze applicative sulla fresatura ad alto rendimento di metallo duro nonché agli attuali dati di taglio per SpheroCarb, Sphero-CVD e Toro-CVD, siete pregati di contattarci. I tecnici di applicazione FRAISA saranno lieti di offrirvi consulenza.



Qui si va al catalogo di prodotti online:
Fresatura ad alto rendimento di metallo duro con Sphero-CVD, SpheroCarb e Toro-CVD oppure al sito web di FRAISA al link

www.fraisa.com/it/prodotti/utensili-per-fresatura

Applicazione



Materiale

Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



Acciaio da
utensile temprato
> 60 HRC



| d1 [mm] | z | v _c [m/min] | f _z [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|----------|
| 4.00 | 2 | 488 | 0.020 | 0.018 | 0.018 | 3.70 | 41980 | 1680 | 60° |
| 5.00 | 2 | 608 | 0.025 | 0.020 | 0.020 | 4.61 | 41980 | 2100 | 60° |
| 6.00 | 2 | 700 | 0.030 | 0.022 | 0.022 | 5.52 | 40365 | 2420 | 60° |
| 8.00 | 2 | 700 | 0.040 | 0.026 | 0.026 | 7.34 | 30355 | 2430 | 60° |
| 10.00 | 2 | 700 | 0.040 | 0.028 | 0.028 | 9.14 | 24380 | 1950 | 60° |
| 12.00 | 2 | 700 | 0.050 | 0.032 | 0.032 | 10.96 | 20330 | 2035 | 60° |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| 4.00 | 2 | 488 | 0.020 | 0.018 | 0.018 | 3.70 | 41980 | 1680 | 60° |
| 5.00 | 2 | 608 | 0.025 | 0.020 | 0.020 | 4.61 | 41980 | 2100 | 60° |
| 6.00 | 2 | 650 | 0.025 | 0.022 | 0.022 | 5.52 | 37480 | 1875 | 60° |
| 8.00 | 2 | 650 | 0.035 | 0.026 | 0.026 | 7.34 | 28190 | 1975 | 60° |
| 10.00 | 2 | 650 | 0.035 | 0.028 | 0.028 | 9.14 | 22635 | 1585 | 60° |
| 12.00 | 2 | 650 | 0.045 | 0.032 | 0.032 | 10.96 | 18880 | 1700 | 60° |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| 4.00 | 2 | 488 | 0.015 | 0.018 | 0.018 | 3.70 | 41980 | 1260 | 60° |
| 5.00 | 2 | 600 | 0.020 | 0.020 | 0.020 | 4.61 | 41430 | 1655 | 60° |
| 6.00 | 2 | 600 | 0.025 | 0.022 | 0.022 | 5.52 | 34600 | 1730 | 60° |
| 8.00 | 2 | 600 | 0.030 | 0.026 | 0.026 | 7.34 | 26020 | 1560 | 60° |
| 10.00 | 2 | 600 | 0.030 | 0.028 | 0.028 | 9.14 | 20895 | 1255 | 60° |
| 12.00 | 2 | 600 | 0.040 | 0.032 | 0.032 | 10.96 | 17425 | 1395 | 60° |
| | | | | | | | | | |
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| | | | | | | | | | |

Frese con estremità emisferica

Scarico cilindrico, 3xd

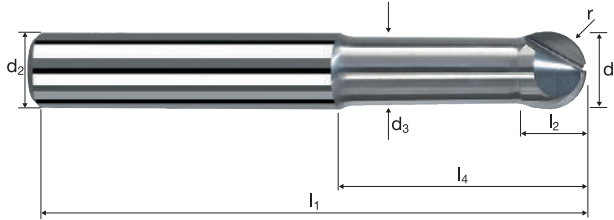


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| | | | | HRC 48-56 | HRC 56-60 | HRC > 60 | | | | HSS |
|--|--|--|--|---------------------|---------------------|--------------------|--|--|--|------------|

| Esempio: N° Ordine | | Rivestimento | | Articolo | | Codice-ø | | | | | | | |
|-----------------------|---------------------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------------|----|---|------------|--|--|
| | | | | 31700 | | 220 | | | | | | | |
| Ø Code | d ₁ 0/-0.01 | d ₂ h5 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.005 | β | z | EUR | | |
| 220 | 4.00 | 6.00 | 3.70 | 80 | 3.20 | 12.00 | 16.95 | 2.000 | 4° | 2 | 335.00 | | |
| 260 | 5.00 | 6.00 | 4.60 | 80 | 4.00 | 15.00 | 18.27 | 2.500 | 2° | 2 | 335.00 | | |
| 300 | 6.00 | 6.00 | 5.50 | 80 | 4.80 | 20.00 | - | 3.000 | 0° | 2 | 335.00 | | |
| 391 | 8.00 | 8.00 | 7.40 | 100 | 6.40 | 26.00 | - | 4.000 | 0° | 2 | 419.00 | | |
| 450 | 10.00 | 10.00 | 9.20 | 100 | 8.00 | 31.00 | - | 5.000 | 0° | 2 | 569.00 | | |
| 501 | 12.00 | 12.00 | 11.00 | 120 | 9.60 | 37.00 | - | 6.000 | 0° | 2 | 703.00 | | |
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| | | | | | | | | | | | | | |

| Applicazione | Materiale | d_1 [mm] | z | v_c [m/min] | f_z [mm] | a_p [mm] | a_e [mm] | d_{eff} [mm] | n [min ⁻¹] | v_f [mm/min] | r [mm] |
|--------------|---|---------------|-----|------------------|---------------|---------------|---------------|-------------------|-----------------------------|-------------------|-------------|
| | Acciaio da utensile temprato 52 - 56 HRC | 4.00 | 2 | 433 | 0.020 | 0.020 | 0.040 | 3.28 | 42020 | 1680 | 0.50 |
| | | 5.00 | 2 | 570 | 0.025 | 0.026 | 0.050 | 4.32 | 42000 | 2100 | 0.50 |
| | | 6.00 | 2 | 650 | 0.030 | 0.030 | 0.060 | 5.34 | 38745 | 2325 | 0.50 |
| | | 8.00 | 2 | 650 | 0.040 | 0.040 | 0.080 | 7.39 | 27995 | 2240 | 0.50 |
| | | 10.00 | 2 | 650 | 0.050 | 0.030 | 0.100 | 9.34 | 22150 | 2215 | 0.50 |
| | | 12.00 | 2 | 650 | 0.060 | 0.036 | 0.120 | 11.37 | 18195 | 2185 | 0.50 |
| | Acciaio da utensile temprato 56 - 60 HRC | 4.00 | 2 | 433 | 0.020 | 0.020 | 0.040 | 3.28 | 42020 | 1680 | 0.50 |
| | | 5.00 | 2 | 570 | 0.025 | 0.026 | 0.050 | 4.32 | 42000 | 2100 | 0.50 |
| | | 6.00 | 2 | 620 | 0.030 | 0.030 | 0.060 | 5.34 | 36955 | 2215 | 0.50 |
| | | 8.00 | 2 | 620 | 0.040 | 0.040 | 0.080 | 7.39 | 26705 | 2135 | 0.50 |
| | | 10.00 | 2 | 620 | 0.050 | 0.030 | 0.100 | 9.34 | 21130 | 2115 | 0.50 |
| | | 12.00 | 2 | 620 | 0.060 | 0.036 | 0.120 | 11.37 | 17355 | 2085 | 0.50 |
| | Acciaio da utensile temprato > 60 HRC | 4.00 | 2 | 433 | 0.020 | 0.020 | 0.040 | 3.28 | 42020 | 1680 | 0.50 |
| | | 5.00 | 2 | 570 | 0.025 | 0.026 | 0.050 | 4.32 | 42000 | 2100 | 0.50 |
| | | 6.00 | 2 | 580 | 0.030 | 0.030 | 0.060 | 5.34 | 34575 | 2075 | 0.50 |
| | | 8.00 | 2 | 580 | 0.040 | 0.040 | 0.080 | 7.39 | 24980 | 2000 | 0.50 |
| | | 10.00 | 2 | 580 | 0.050 | 0.030 | 0.100 | 9.34 | 19765 | 1975 | 0.50 |
| | | 12.00 | 2 | 580 | 0.060 | 0.036 | 0.120 | 11.37 | 16235 | 1950 | 0.50 |
| | | 4.00 | 2 | 509 | 0.020 | 0.016 | 0.016 | 3.86 | 41975 | 1680 | 45° |
| | | 5.00 | 2 | 644 | 0.025 | 0.020 | 0.020 | 4.88 | 42005 | 2100 | 45° |
| | | 6.00 | 2 | 700 | 0.030 | 0.022 | 0.022 | 5.88 | 37895 | 2275 | 45° |
| | | 8.00 | 2 | 700 | 0.040 | 0.024 | 0.024 | 7.89 | 28240 | 2260 | 45° |
| | | 10.00 | 2 | 700 | 0.050 | 0.026 | 0.026 | 9.90 | 22505 | 2250 | 45° |
| | | 12.00 | 2 | 700 | 0.060 | 0.032 | 0.032 | 11.91 | 18710 | 2245 | 45° |
| | Acciaio da utensile temprato 52 - 56 HRC | 4.00 | 2 | 509 | 0.020 | 0.016 | 0.016 | 3.86 | 41975 | 1680 | 45° |
| | | 5.00 | 2 | 644 | 0.025 | 0.020 | 0.020 | 4.88 | 42005 | 2100 | 45° |
| | | 6.00 | 2 | 650 | 0.030 | 0.022 | 0.022 | 5.88 | 35185 | 2110 | 45° |
| | | 8.00 | 2 | 650 | 0.040 | 0.024 | 0.024 | 7.89 | 26225 | 2100 | 45° |
| | | 10.00 | 2 | 650 | 0.050 | 0.026 | 0.026 | 9.90 | 20900 | 2090 | 45° |
| | | 12.00 | 2 | 650 | 0.060 | 0.032 | 0.032 | 11.91 | 17370 | 2085 | 45° |
| | Acciaio da utensile temprato 56 - 60 HRC | 4.00 | 2 | 509 | 0.020 | 0.016 | 0.016 | 3.86 | 41975 | 1680 | 45° |
| | | 5.00 | 2 | 600 | 0.025 | 0.020 | 0.020 | 4.88 | 39135 | 1955 | 45° |
| | | 6.00 | 2 | 600 | 0.030 | 0.022 | 0.022 | 5.88 | 32480 | 1950 | 45° |
| | | 8.00 | 2 | 600 | 0.040 | 0.024 | 0.024 | 7.89 | 24205 | 1935 | 45° |
| | | 10.00 | 2 | 600 | 0.050 | 0.026 | 0.026 | 9.90 | 19290 | 1930 | 45° |
| | | 12.00 | 2 | 600 | 0.060 | 0.032 | 0.032 | 11.91 | 16035 | 1925 | 45° |
| | Acciaio da utensile temprato > 60 HRC | 4.00 | 2 | 509 | 0.020 | 0.016 | 0.016 | 3.86 | 41975 | 1680 | 45° |
| | | 5.00 | 2 | 600 | 0.025 | 0.020 | 0.020 | 4.88 | 39135 | 1955 | 45° |
| | | 6.00 | 2 | 600 | 0.030 | 0.022 | 0.022 | 5.88 | 32480 | 1950 | 45° |
| | | 8.00 | 2 | 600 | 0.040 | 0.024 | 0.024 | 7.89 | 24205 | 1935 | 45° |
| | | 10.00 | 2 | 600 | 0.050 | 0.026 | 0.026 | 9.90 | 19290 | 1930 | 45° |
| | | 12.00 | 2 | 600 | 0.060 | 0.032 | 0.032 | 11.91 | 16035 | 1925 | 45° |

Frese toriche

Scarico cilindrico, 3xd



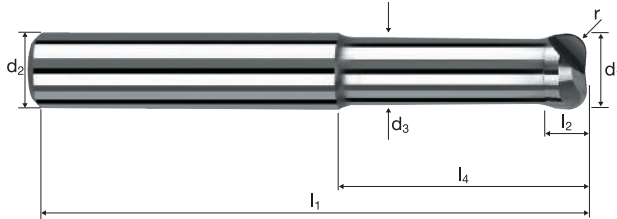
CBN λ 0°
 γ 0°

h5

d1

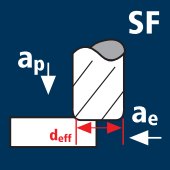






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|--|--|--|--|---------------------|---------------------|--------------------|--|--|--|------------|
| | | | | HRC 48-56 | HRC 56-60 | HRC > 60 | | | | HSS |
|--|--|--|--|---------------------|---------------------|--------------------|--|--|--|------------|

| Ø Code | d ₁ 0/-0.01 | d ₂ h5 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r 0/+0.015 | α | z | EUR | Esempio: N° Ordine | | |
|------------|---------------------------|----------------------|----------------|----------------|----------------|----------------|----------------|---------------|------|---|--------|--------------------|--------------|------------|
| | | | | | | | | | | | | Rivestimento | Articolo | Codice-Ø |
| | | | | | | | | | | | | | 31420 | 220 |
| 220 | 4.00 | 6.00 | 3.70 | 80 | 1.90 | 12.00 | 16.95 | 0.500 | 3.7° | 2 | 331.00 | | | |
| 260 | 5.00 | 6.00 | 4.60 | 80 | 2.50 | 15.00 | 18.27 | 0.500 | 1.7° | 2 | 331.00 | | | |
| 300 | 6.00 | 6.00 | 5.50 | 80 | 3.00 | 20.00 | - | 0.500 | 0.0° | 2 | 331.00 | | | |
| 391 | 8.00 | 8.00 | 7.40 | 100 | 4.00 | 26.00 | - | 0.500 | 0.0° | 2 | 413.00 | | | |
| 450 | 10.00 | 10.00 | 9.20 | 100 | 5.00 | 31.00 | - | 0.500 | 0.0° | 2 | 562.00 | | | |
| 501 | 12.00 | 12.00 | 11.00 | 120 | 6.00 | 37.00 | - | 0.500 | 0.0° | 2 | 695.00 | | | |
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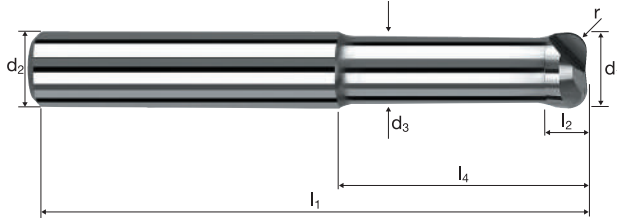
| Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _f [mm/min] | r [mm] |
|---|---|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|--------|
|  | Acciaio da utensile temprato 52 - 56 HRC | 4.00 | 2 | 317 | 0.020 | 0.020 | 0.040 | 2.40 | 42045 | 1680 | 1.00 |
| | | 5.00 | 2 | 397 | 0.025 | 0.026 | 0.050 | 3.01 | 41985 | 2100 | 1.25 |
| | | 6.00 | 2 | 475 | 0.030 | 0.030 | 0.060 | 3.60 | 42000 | 2520 | 1.50 |
| | | 8.00 | 2 | 633 | 0.040 | 0.040 | 0.080 | 4.80 | 41975 | 3360 | 2.00 |
| | | 10.00 | 2 | 650 | 0.050 | 0.030 | 0.100 | 5.77 | 35860 | 3585 | 2.50 |
| | | 12.00 | 2 | 650 | 0.060 | 0.036 | 0.120 | 6.93 | 29855 | 3585 | 3.00 |
|  | Acciaio da utensile temprato 56 - 60 HRC | 4.00 | 2 | 317 | 0.020 | 0.020 | 0.040 | 2.40 | 42045 | 1680 | 1.00 |
| | | 5.00 | 2 | 397 | 0.025 | 0.026 | 0.050 | 3.01 | 41985 | 2100 | 1.25 |
| | | 6.00 | 2 | 475 | 0.030 | 0.030 | 0.060 | 3.60 | 42000 | 2520 | 1.50 |
| | | 8.00 | 2 | 620 | 0.040 | 0.040 | 0.080 | 4.80 | 41115 | 3290 | 2.00 |
| | | 10.00 | 2 | 620 | 0.050 | 0.030 | 0.100 | 5.77 | 34205 | 3420 | 2.50 |
| | | 12.00 | 2 | 620 | 0.060 | 0.036 | 0.120 | 6.93 | 28480 | 3415 | 3.00 |
|  | Acciaio da utensile temprato > 60 HRC | 4.00 | 2 | 317 | 0.020 | 0.020 | 0.040 | 2.40 | 42045 | 1680 | 1.00 |
| | | 5.00 | 2 | 397 | 0.025 | 0.026 | 0.050 | 3.01 | 41985 | 2100 | 1.25 |
| | | 6.00 | 2 | 475 | 0.030 | 0.030 | 0.060 | 3.60 | 42000 | 2520 | 1.50 |
| | | 8.00 | 2 | 580 | 0.040 | 0.040 | 0.080 | 4.80 | 38460 | 3075 | 2.00 |
| | | 10.00 | 2 | 580 | 0.050 | 0.030 | 0.100 | 5.77 | 31995 | 3200 | 2.50 |
| | | 12.00 | 2 | 580 | 0.060 | 0.036 | 0.120 | 6.93 | 26640 | 3195 | 3.00 |
|  | Acciaio da utensile temprato 52 - 56 HRC | 4.00 | 2 | 480 | 0.020 | 0.016 | 0.016 | 3.64 | 41975 | 1680 | 45° |
| | | 5.00 | 2 | 600 | 0.025 | 0.020 | 0.020 | 4.55 | 41975 | 2100 | 45° |
| | | 6.00 | 2 | 700 | 0.030 | 0.022 | 0.022 | 5.45 | 40885 | 2455 | 45° |
| | | 8.00 | 2 | 700 | 0.040 | 0.024 | 0.024 | 7.23 | 30820 | 2465 | 45° |
| | | 10.00 | 2 | 700 | 0.050 | 0.026 | 0.026 | 9.01 | 24730 | 2475 | 45° |
| | | 12.00 | 2 | 700 | 0.060 | 0.032 | 0.032 | 10.82 | 20595 | 2470 | 45° |
|  | Acciaio da utensile temprato 56 - 60 HRC | 4.00 | 2 | 480 | 0.020 | 0.016 | 0.016 | 3.64 | 41975 | 1680 | 45° |
| | | 5.00 | 2 | 600 | 0.025 | 0.020 | 0.020 | 4.55 | 41975 | 2100 | 45° |
| | | 6.00 | 2 | 650 | 0.030 | 0.022 | 0.022 | 5.45 | 37965 | 2280 | 45° |
| | | 8.00 | 2 | 650 | 0.040 | 0.024 | 0.024 | 7.23 | 28615 | 2290 | 45° |
| | | 10.00 | 2 | 650 | 0.050 | 0.026 | 0.026 | 9.01 | 22965 | 2295 | 45° |
| | | 12.00 | 2 | 650 | 0.060 | 0.032 | 0.032 | 10.82 | 19120 | 2295 | 45° |
|  | Acciaio da utensile temprato > 60 HRC | 4.00 | 2 | 480 | 0.020 | 0.016 | 0.016 | 3.64 | 41975 | 1680 | 45° |
| | | 5.00 | 2 | 600 | 0.025 | 0.020 | 0.020 | 4.55 | 41975 | 2100 | 45° |
| | | 6.00 | 2 | 600 | 0.030 | 0.022 | 0.022 | 5.45 | 35045 | 2105 | 45° |
| | | 8.00 | 2 | 600 | 0.040 | 0.024 | 0.024 | 7.23 | 26415 | 2115 | 45° |
| | | 10.00 | 2 | 600 | 0.050 | 0.026 | 0.026 | 9.01 | 21195 | 2120 | 45° |
| | | 12.00 | 2 | 600 | 0.060 | 0.032 | 0.032 | 10.82 | 17650 | 2120 | 45° |
|  | Acciaio da utensile temprato > 60 HRC | 4.00 | 2 | 480 | 0.020 | 0.016 | 0.016 | 3.64 | 41975 | 1680 | 45° |
| | | 5.00 | 2 | 600 | 0.025 | 0.020 | 0.020 | 4.55 | 41975 | 2100 | 45° |
| | | 6.00 | 2 | 600 | 0.030 | 0.022 | 0.022 | 5.45 | 35045 | 2105 | 45° |
| | | 8.00 | 2 | 600 | 0.040 | 0.024 | 0.024 | 7.23 | 26415 | 2115 | 45° |
| | | 10.00 | 2 | 600 | 0.050 | 0.026 | 0.026 | 9.01 | 21195 | 2120 | 45° |
| | | 12.00 | 2 | 600 | 0.060 | 0.032 | 0.032 | 10.82 | 17650 | 2120 | 45° |

Frese toriche

Scarico cilindrico, 3xd



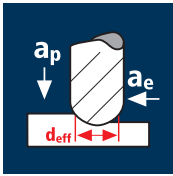
| | | |
|-----|--------------|-------------|
| CBN | λ 0° | γ 0° |
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|--|--|--|--|--------------|--------------|-------------|--|--|-----|
| | | | | HRC 48-56 | HRC 56-60 | HRC > 60 | | | HSS |
|--|--|--|--|--------------|--------------|-------------|--|--|-----|

| Ø Code | Esempio: N° Ordine | | Rivestimento | Articolo | Codice-Ø | | | | | | | 31410 | EUR |
|-----------|---------------------------|----------------------|----------------|----------------|----------------|----------------|----------------|---------------|------|---|--------|-------|-----|
| | d ₁ 0/-0.01 | d ₂ h5 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r 0/+0.015 | α | z | | | |
| 220 | 4.00 | 6.00 | 3.70 | 80 | 1.90 | 12.00 | 16.95 | 1.000 | 3.8° | 2 | 331.00 | | |
| 260 | 5.00 | 6.00 | 4.60 | 80 | 2.50 | 15.00 | 18.27 | 1.250 | 1.8° | 2 | 331.00 | | |
| 300 | 6.00 | 6.00 | 5.50 | 80 | 3.00 | 20.00 | - | 1.500 | 0.0° | 2 | 331.00 | | |
| 391 | 8.00 | 8.00 | 7.40 | 100 | 4.00 | 26.00 | - | 2.000 | 0.0° | 2 | 413.00 | | |
| 450 | 10.00 | 10.00 | 9.20 | 100 | 5.00 | 31.00 | - | 2.500 | 0.0° | 2 | 562.00 | | |
| 501 | 12.00 | 12.00 | 11.00 | 120 | 6.00 | 37.00 | - | 3.000 | 0.0° | 2 | 695.00 | | |
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Applicazione



Materiale

Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



Acciaio da
utensile temprato
> 60 HRC



Acciaio rapido temprato
64 - 70 HRC



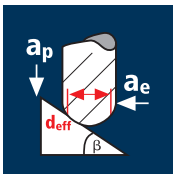
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|-----------------------------|
| 0.40 | 2 | 40 | 0.013 | 0.067 | 0.080 | 0.30 | 42440 | 1105 | 5.9 |
| 0.50 | 2 | 49 | 0.016 | 0.083 | 0.100 | 0.37 | 42155 | 1350 | 11.2 |
| 0.60 | 2 | 59 | 0.019 | 0.100 | 0.120 | 0.45 | 41735 | 1585 | 19.0 |
| 0.80 | 2 | 79 | 0.026 | 0.134 | 0.160 | 0.60 | 41910 | 2180 | 46.7 |
| 1.00 | 2 | 99 | 0.032 | 0.167 | 0.200 | 0.75 | 42015 | 2690 | 89.8 |
| 1.50 | 2 | 100 | 0.048 | 0.250 | 0.300 | 1.12 | 28420 | 2730 | 204.6 |
| 2.00 | 2 | 100 | 0.064 | 0.334 | 0.400 | 1.49 | 21365 | 2735 | 365.3 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|-------|
| 0.40 | 2 | 40 | 0.012 | 0.067 | 0.080 | 0.30 | 42440 | 995 | 5.3 |
| 0.50 | 2 | 49 | 0.014 | 0.083 | 0.100 | 0.37 | 42155 | 1215 | 10.1 |
| 0.60 | 2 | 59 | 0.017 | 0.100 | 0.120 | 0.45 | 41735 | 1425 | 17.1 |
| 0.80 | 2 | 60 | 0.023 | 0.134 | 0.160 | 0.60 | 31830 | 1490 | 31.9 |
| 1.00 | 2 | 60 | 0.029 | 0.167 | 0.200 | 0.75 | 25465 | 1465 | 49.0 |
| 1.50 | 2 | 60 | 0.043 | 0.250 | 0.300 | 1.12 | 17050 | 1475 | 110.5 |
| 2.00 | 2 | 60 | 0.058 | 0.334 | 0.400 | 1.49 | 12820 | 1475 | 197.3 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|-------|
| 0.40 | 2 | 36 | 0.009 | 0.054 | 0.080 | 0.27 | 42440 | 795 | 3.4 |
| 0.50 | 2 | 45 | 0.012 | 0.066 | 0.100 | 0.34 | 42130 | 970 | 6.4 |
| 0.60 | 2 | 50 | 0.014 | 0.080 | 0.120 | 0.41 | 38820 | 1060 | 10.2 |
| 0.80 | 2 | 50 | 0.019 | 0.107 | 0.160 | 0.55 | 28935 | 1085 | 18.6 |
| 1.00 | 2 | 50 | 0.023 | 0.134 | 0.200 | 0.68 | 23405 | 1080 | 28.8 |
| 1.50 | 2 | 50 | 0.035 | 0.200 | 0.300 | 1.02 | 15605 | 1080 | 64.7 |
| 2.00 | 2 | 50 | 0.046 | 0.267 | 0.400 | 1.36 | 11705 | 1080 | 115.3 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|-----|------|
| 0.40 | 2 | 33 | 0.007 | 0.043 | 0.080 | 0.25 | 42015 | 630 | 2.2 |
| 0.50 | 2 | 40 | 0.009 | 0.053 | 0.100 | 0.31 | 41070 | 755 | 4.0 |
| 0.60 | 2 | 40 | 0.011 | 0.064 | 0.120 | 0.37 | 34410 | 755 | 5.8 |
| 0.80 | 2 | 40 | 0.015 | 0.086 | 0.160 | 0.49 | 25985 | 780 | 10.7 |
| 1.00 | 2 | 40 | 0.018 | 0.107 | 0.200 | 0.62 | 20535 | 755 | 16.2 |
| 1.50 | 2 | 40 | 0.028 | 0.160 | 0.300 | 0.93 | 13690 | 755 | 36.3 |
| 2.00 | 2 | 40 | 0.037 | 0.214 | 0.400 | 1.24 | 10270 | 755 | 64.7 |

Applicazione



Materiale

Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



Acciaio da
utensile temprato
> 60 HRC



Acciaio rapido temprato
64 - 70 HRC



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|----------|
| 0.40 | 2 | 49 | 0.012 | 0.016 | 0.016 | 0.37 | 42155 | 1010 | 45° |
| 0.50 | 2 | 62 | 0.018 | 0.022 | 0.022 | 0.47 | 41990 | 1510 | 45° |
| 0.60 | 2 | 74 | 0.018 | 0.026 | 0.026 | 0.56 | 42060 | 1515 | 45° |
| 0.80 | 2 | 99 | 0.020 | 0.034 | 0.034 | 0.75 | 42015 | 1680 | 45° |
| 1.00 | 2 | 123 | 0.026 | 0.042 | 0.042 | 0.93 | 42100 | 2190 | 45° |
| 1.50 | 2 | 185 | 0.030 | 0.064 | 0.064 | 1.40 | 42060 | 2525 | 45° |
| 2.00 | 2 | 200 | 0.034 | 0.084 | 0.084 | 1.86 | 34225 | 2325 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.40 | 2 | 49 | 0.012 | 0.016 | 0.016 | 0.37 | 42155 | 1010 | 45° |
| 0.50 | 2 | 62 | 0.016 | 0.022 | 0.022 | 0.47 | 41990 | 1345 | 45° |
| 0.60 | 2 | 74 | 0.016 | 0.026 | 0.026 | 0.56 | 42060 | 1345 | 45° |
| 0.80 | 2 | 99 | 0.018 | 0.034 | 0.034 | 0.75 | 42015 | 1515 | 45° |
| 1.00 | 2 | 123 | 0.022 | 0.042 | 0.042 | 0.93 | 42100 | 1850 | 45° |
| 1.50 | 2 | 150 | 0.028 | 0.064 | 0.064 | 1.40 | 34105 | 1910 | 45° |
| 2.00 | 2 | 150 | 0.030 | 0.084 | 0.084 | 1.86 | 25670 | 1540 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.40 | 2 | 48 | 0.010 | 0.010 | 0.010 | 0.36 | 42440 | 850 | 45° |
| 0.50 | 2 | 61 | 0.015 | 0.020 | 0.020 | 0.46 | 42210 | 1265 | 45° |
| 0.60 | 2 | 73 | 0.015 | 0.020 | 0.020 | 0.55 | 42250 | 1265 | 45° |
| 0.80 | 2 | 98 | 0.015 | 0.030 | 0.030 | 0.74 | 42155 | 1265 | 45° |
| 1.00 | 2 | 120 | 0.020 | 0.040 | 0.040 | 0.93 | 41070 | 1645 | 45° |
| 1.50 | 2 | 120 | 0.020 | 0.060 | 0.060 | 1.39 | 27480 | 1100 | 45° |
| 2.00 | 2 | 120 | 0.025 | 0.080 | 0.080 | 1.86 | 20535 | 1025 | 45° |

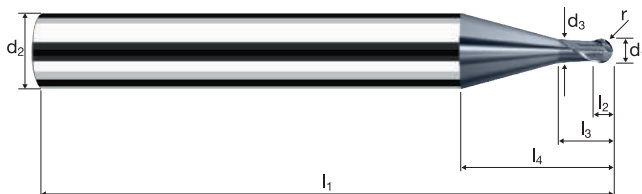
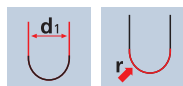
| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|-----|-----|
| 0.40 | 2 | 48 | 0.010 | 0.010 | 0.010 | 0.36 | 42440 | 850 | 45° |
| 0.50 | 2 | 61 | 0.010 | 0.020 | 0.020 | 0.46 | 42210 | 845 | 45° |
| 0.60 | 2 | 73 | 0.010 | 0.020 | 0.020 | 0.55 | 42250 | 845 | 45° |
| 0.80 | 2 | 85 | 0.010 | 0.020 | 0.030 | 0.71 | 38110 | 760 | 45° |
| 1.00 | 2 | 85 | 0.015 | 0.030 | 0.040 | 0.91 | 29730 | 890 | 45° |
| 1.50 | 2 | 85 | 0.015 | 0.040 | 0.050 | 1.35 | 20040 | 600 | 45° |
| 2.00 | 2 | 85 | 0.015 | 0.050 | 0.060 | 1.79 | 15115 | 455 | 45° |

Frese con estremità emisferica MicroHX

Gambo ø 6mm, scarico cilindrico, 1xd



HM λ 30°
XA γ -10°

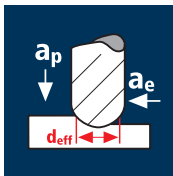


ReTool®

| | | | | | | | | | |
|--|--|------------------------|------------------------|---------------------|---------------------|--------------------|--------------------------|-----------------------|------------|
| | | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Inox Stainless | Ti Titanium | HSS |
|--|--|------------------------|------------------------|---------------------|---------------------|--------------------|--------------------------|-----------------------|------------|

| | | Rivestimento | | Articolo | | Codice-ø | | | | | | DURO-AI |
|-----------------------|----------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------------|-------|---|-------|---------|
| Esempio: N° Ordine | | Y | | 6460 | | 040 | | | | | | Y6460 |
| Ø Code | d ₁ | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.005 | α | z | EUR | |
| 040 | 0.40 | 6.00 | 0.35 | 57 | 0.40 | 0.40 | 16.78 | 0.200 | 14.6° | 2 | 80.00 | |
| 050 | 0.50 | 6.00 | 0.45 | 57 | 0.50 | 0.50 | 11.50 | 0.250 | 14.5° | 2 | 80.00 | |
| 060 | 0.60 | 6.00 | 0.55 | 57 | 0.60 | 0.60 | 11.43 | 0.300 | 14.5° | 2 | 80.00 | |
| 080 | 0.80 | 6.00 | 0.75 | 57 | 0.80 | 0.80 | 11.30 | 0.400 | 14.3° | 2 | 80.00 | |
| 100 | 1.00 | 6.00 | 0.95 | 57 | 1.00 | 1.00 | 11.19 | 0.500 | 14.1° | 2 | 80.00 | |
| 120 | 1.50 | 6.00 | 1.40 | 57 | 1.50 | 1.50 | 10.86 | 0.750 | 13.5° | 2 | 80.00 | |
| 140 | 2.00 | 6.00 | 1.90 | 57 | 2.00 | 2.00 | 10.52 | 1.000 | 12.9° | 2 | 80.00 | |
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Applicazione



Materiale

Acciaio da
utensile temprato
52 - 56 HRC



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|-----------------------------|
| 0.40 | 2 | 29 | 0.010 | 0.032 | 0.080 | 0.22 | 41960 | 840 | 2.1 |
| 0.50 | 2 | 36 | 0.013 | 0.040 | 0.100 | 0.27 | 42440 | 1105 | 4.4 |
| 0.60 | 2 | 44 | 0.016 | 0.048 | 0.120 | 0.33 | 42440 | 1360 | 7.8 |
| 0.80 | 2 | 58 | 0.021 | 0.065 | 0.160 | 0.44 | 41960 | 1760 | 18.3 |
| 1.00 | 2 | 73 | 0.026 | 0.081 | 0.200 | 0.55 | 42250 | 2195 | 35.6 |
| 1.50 | 2 | 100 | 0.039 | 0.121 | 0.300 | 0.82 | 38820 | 3030 | 109.9 |
| 2.00 | 2 | 100 | 0.052 | 0.162 | 0.400 | 1.09 | 29205 | 3035 | 196.8 |

Acciaio da
utensile temprato
56 - 60 HRC



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|-----------------------------|
| 0.40 | 2 | 29 | 0.009 | 0.032 | 0.080 | 0.22 | 41960 | 755 | 1.9 |
| 0.50 | 2 | 36 | 0.012 | 0.040 | 0.100 | 0.27 | 42440 | 995 | 4.0 |
| 0.60 | 2 | 44 | 0.014 | 0.048 | 0.120 | 0.33 | 42440 | 1220 | 7.0 |
| 0.80 | 2 | 58 | 0.019 | 0.065 | 0.160 | 0.44 | 41960 | 1585 | 16.5 |
| 1.00 | 2 | 60 | 0.023 | 0.081 | 0.200 | 0.55 | 34725 | 1625 | 26.3 |
| 1.50 | 2 | 60 | 0.035 | 0.121 | 0.300 | 0.82 | 23290 | 1635 | 59.4 |
| 2.00 | 2 | 60 | 0.047 | 0.162 | 0.400 | 1.09 | 17520 | 1640 | 106.3 |

Acciaio da
utensile temprato
> 60 HRC



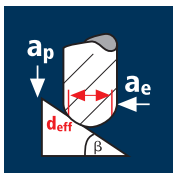
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|-----------------------------|
| 0.40 | 2 | 26 | 0.007 | 0.026 | 0.080 | 0.20 | 41380 | 595 | 1.2 |
| 0.50 | 2 | 32 | 0.009 | 0.032 | 0.100 | 0.24 | 42440 | 795 | 2.5 |
| 0.60 | 2 | 38 | 0.012 | 0.038 | 0.120 | 0.29 | 41710 | 960 | 4.4 |
| 0.80 | 2 | 50 | 0.015 | 0.052 | 0.160 | 0.39 | 40810 | 1235 | 10.3 |
| 1.00 | 2 | 50 | 0.019 | 0.065 | 0.200 | 0.49 | 32480 | 1215 | 15.8 |
| 1.50 | 2 | 50 | 0.028 | 0.097 | 0.300 | 0.74 | 21505 | 1210 | 35.1 |
| 2.00 | 2 | 50 | 0.037 | 0.130 | 0.400 | 0.98 | 16240 | 1215 | 63.0 |

Acciaio rapido temprato
64 - 70 HRC



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|-----------------------------|
| 0.40 | 2 | 24 | 0.006 | 0.020 | 0.080 | 0.18 | 42440 | 490 | 0.8 |
| 0.50 | 2 | 29 | 0.007 | 0.026 | 0.100 | 0.22 | 41960 | 630 | 1.6 |
| 0.60 | 2 | 34 | 0.009 | 0.031 | 0.120 | 0.26 | 41625 | 770 | 2.8 |
| 0.80 | 2 | 40 | 0.012 | 0.042 | 0.160 | 0.36 | 35370 | 855 | 5.7 |
| 1.00 | 2 | 40 | 0.015 | 0.052 | 0.200 | 0.44 | 28935 | 865 | 9.0 |
| 1.50 | 2 | 40 | 0.022 | 0.077 | 0.300 | 0.66 | 19290 | 865 | 20.1 |
| 2.00 | 2 | 40 | 0.030 | 0.104 | 0.400 | 0.89 | 14305 | 855 | 35.5 |

Applicazione



Materiale

Acciaio da
utensile temprato
52 - 56 HRC



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|----------|
| 0.40 | 2 | 49 | 0.012 | 0.016 | 0.016 | 0.37 | 42155 | 1010 | 45° |
| 0.50 | 2 | 62 | 0.018 | 0.022 | 0.022 | 0.47 | 41990 | 1510 | 45° |
| 0.60 | 2 | 74 | 0.018 | 0.026 | 0.026 | 0.56 | 42060 | 1515 | 45° |
| 0.80 | 2 | 99 | 0.020 | 0.034 | 0.034 | 0.75 | 42015 | 1680 | 45° |
| 1.00 | 2 | 123 | 0.026 | 0.042 | 0.042 | 0.93 | 42100 | 2190 | 45° |
| 1.50 | 2 | 185 | 0.030 | 0.064 | 0.064 | 1.40 | 42060 | 2525 | 45° |
| 2.00 | 2 | 200 | 0.034 | 0.084 | 0.084 | 1.86 | 34225 | 2325 | 45° |

Acciaio da
utensile temprato
56 - 60 HRC



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|----------|
| 0.40 | 2 | 49 | 0.012 | 0.016 | 0.016 | 0.37 | 42155 | 1010 | 45° |
| 0.50 | 2 | 62 | 0.016 | 0.022 | 0.022 | 0.47 | 41990 | 1345 | 45° |
| 0.60 | 2 | 74 | 0.016 | 0.026 | 0.026 | 0.56 | 42060 | 1345 | 45° |
| 0.80 | 2 | 99 | 0.018 | 0.034 | 0.034 | 0.75 | 42015 | 1515 | 45° |
| 1.00 | 2 | 123 | 0.022 | 0.042 | 0.042 | 0.93 | 42100 | 1850 | 45° |
| 1.50 | 2 | 150 | 0.028 | 0.064 | 0.064 | 1.40 | 34105 | 1910 | 45° |
| 2.00 | 2 | 150 | 0.030 | 0.084 | 0.084 | 1.86 | 25670 | 1540 | 45° |

Acciaio da
utensile temprato
> 60 HRC



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|----------|
| 0.40 | 2 | 48 | 0.010 | 0.010 | 0.010 | 0.36 | 42440 | 850 | 45° |
| 0.50 | 2 | 61 | 0.015 | 0.020 | 0.020 | 0.46 | 42210 | 1265 | 45° |
| 0.60 | 2 | 73 | 0.015 | 0.020 | 0.020 | 0.55 | 42250 | 1265 | 45° |
| 0.80 | 2 | 98 | 0.015 | 0.030 | 0.030 | 0.74 | 42155 | 1265 | 45° |
| 1.00 | 2 | 120 | 0.020 | 0.040 | 0.040 | 0.93 | 41070 | 1645 | 45° |
| 1.50 | 2 | 120 | 0.020 | 0.060 | 0.060 | 1.39 | 27480 | 1100 | 45° |
| 2.00 | 2 | 120 | 0.025 | 0.080 | 0.080 | 1.86 | 20535 | 1025 | 45° |

Acciaio rapido temprato
64 - 70 HRC



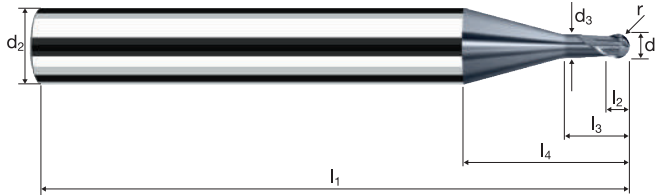
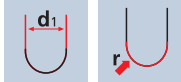
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|----------|
| 0.40 | 2 | 48 | 0.010 | 0.010 | 0.010 | 0.36 | 42440 | 850 | 45° |
| 0.50 | 2 | 61 | 0.010 | 0.020 | 0.020 | 0.46 | 42210 | 845 | 45° |
| 0.60 | 2 | 73 | 0.010 | 0.020 | 0.020 | 0.55 | 42250 | 845 | 45° |
| 0.80 | 2 | 85 | 0.010 | 0.020 | 0.030 | 0.71 | 38110 | 760 | 45° |
| 1.00 | 2 | 85 | 0.015 | 0.030 | 0.040 | 0.91 | 29730 | 890 | 45° |
| 1.50 | 2 | 85 | 0.015 | 0.040 | 0.050 | 1.35 | 20040 | 600 | 45° |
| 2.00 | 2 | 85 | 0.015 | 0.050 | 0.060 | 1.79 | 15115 | 455 | 45° |

Frese con estremità emisferica MicroHX

Gambo ø 6mm, scarico cilindrico, 2xd



HM λ 30°
XA γ -10°



ReTool®

| | | | | | | | | | |
|--|--|------------------------|------------------------|---------------------|---------------------|--------------------|--------------------------|-----------------------|------------|
| | | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Inox Stainless | Ti Titanium | HSS |
|--|--|------------------------|------------------------|---------------------|---------------------|--------------------|--------------------------|-----------------------|------------|

| Ø Code | Esempio: N° Ordine | | | | | | | | | | | DURO-AI |
|------------|--|----------------------|----------------|----------------|----------------|----------------|----------------|-------------|-------|---|-------|---------|
| | d ₁ | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.005 | α | z | Y6461 | EUR |
| | Rivestimento Y Articolo 6461 Codice-ø 040 | | | | | | | | | | | |
| | | | | | | | | | | | | |
| 040 | 0.40 | 6.00 | 0.35 | 57 | 0.24 | 0.80 | 16.76 | 0.200 | 14.1° | 2 | | 80.00 |
| 050 | 0.50 | 6.00 | 0.45 | 57 | 0.30 | 1.00 | 11.51 | 0.250 | 13.9° | 2 | | 80.00 |
| 060 | 0.60 | 6.00 | 0.55 | 57 | 0.36 | 1.20 | 11.53 | 0.300 | 13.7° | 2 | | 80.00 |
| 080 | 0.80 | 6.00 | 0.75 | 57 | 0.48 | 1.60 | 11.55 | 0.400 | 13.3° | 2 | | 80.00 |
| 100 | 1.00 | 6.00 | 0.95 | 57 | 0.60 | 2.00 | 11.58 | 0.500 | 12.9° | 2 | | 80.00 |
| 120 | 1.50 | 6.00 | 1.40 | 57 | 0.90 | 3.00 | 11.53 | 0.750 | 11.7° | 2 | | 80.00 |
| 140 | 2.00 | 6.00 | 1.90 | 57 | 1.20 | 4.00 | 11.60 | 1.000 | 10.6° | 2 | | 80.00 |
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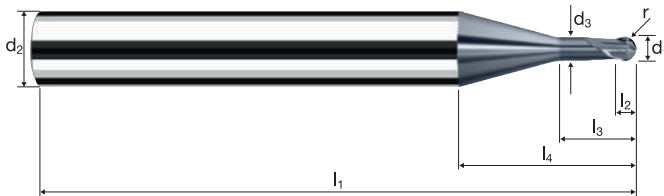
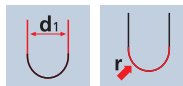
| Applicazione | Materiale | d_1 [mm] | z | v_c [m/min] | f_z [mm] | a_p [mm] | a_e [mm] | d_{eff} [mm] | n [min ⁻¹] | v_f [mm/min] | Q [mm ³ /min] |
|--------------|---|---------------|-----|------------------|---------------|---------------|---------------|-------------------|-----------------------------|-------------------|-------------------------------|
| | Acciaio da utensile temprato 52 - 56 HRC | 0.40 | 2 | 26 | 0.010 | 0.026 | 0.080 | 0.20 | 41380 | 830 | 1.7 |
| | | 0.50 | 2 | 32 | 0.013 | 0.032 | 0.100 | 0.24 | 42440 | 1105 | 3.5 |
| | | 0.60 | 2 | 40 | 0.015 | 0.039 | 0.120 | 0.30 | 42440 | 1275 | 6.0 |
| | | 0.80 | 2 | 51 | 0.020 | 0.052 | 0.160 | 0.39 | 41625 | 1665 | 13.9 |
| | | 1.00 | 2 | 65 | 0.025 | 0.064 | 0.200 | 0.49 | 42225 | 2110 | 27.0 |
| | Acciaio da utensile temprato 56 - 60 HRC | 0.40 | 2 | 26 | 0.009 | 0.026 | 0.080 | 0.20 | 41380 | 745 | 1.5 |
| | | 0.50 | 2 | 32 | 0.012 | 0.032 | 0.100 | 0.24 | 42440 | 995 | 3.2 |
| | | 0.60 | 2 | 40 | 0.014 | 0.039 | 0.120 | 0.30 | 42440 | 1145 | 5.4 |
| | | 0.80 | 2 | 51 | 0.018 | 0.052 | 0.160 | 0.39 | 41625 | 1500 | 12.5 |
| | | 1.00 | 2 | 60 | 0.023 | 0.064 | 0.200 | 0.49 | 38975 | 1755 | 22.5 |
| | Acciaio da utensile temprato > 60 HRC | 0.40 | 2 | 24 | 0.007 | 0.021 | 0.080 | 0.18 | 42440 | 610 | 1.0 |
| | | 0.50 | 2 | 29 | 0.009 | 0.026 | 0.100 | 0.22 | 41960 | 785 | 2.0 |
| | | 0.60 | 2 | 36 | 0.011 | 0.031 | 0.120 | 0.27 | 42440 | 915 | 3.4 |
| | | 0.80 | 2 | 48 | 0.014 | 0.042 | 0.160 | 0.36 | 42440 | 1220 | 8.1 |
| | | 1.00 | 2 | 50 | 0.018 | 0.051 | 0.200 | 0.44 | 36170 | 1300 | 13.3 |
| | Acciaio rapido temprato 64 - 70 HRC | 0.40 | 2 | 21 | 0.006 | 0.017 | 0.080 | 0.16 | 41780 | 480 | 0.6 |
| | | 0.50 | 2 | 26 | 0.007 | 0.020 | 0.100 | 0.20 | 41380 | 620 | 1.3 |
| | | 0.60 | 2 | 32 | 0.009 | 0.025 | 0.120 | 0.24 | 42440 | 735 | 2.2 |
| | | 0.80 | 2 | 40 | 0.012 | 0.033 | 0.160 | 0.32 | 39790 | 915 | 4.9 |
| | | 1.00 | 2 | 40 | 0.014 | 0.041 | 0.200 | 0.40 | 31830 | 915 | 7.5 |
| | Acciaio da utensile temprato 52 - 56 HRC | 0.40 | 2 | 49 | 0.012 | 0.016 | 0.016 | 0.37 | 42155 | 1010 | 45° |
| | | 0.50 | 2 | 62 | 0.018 | 0.022 | 0.022 | 0.47 | 41990 | 1510 | 45° |
| | | 0.60 | 2 | 74 | 0.018 | 0.026 | 0.026 | 0.56 | 42060 | 1515 | 45° |
| | | 0.80 | 2 | 99 | 0.020 | 0.034 | 0.034 | 0.75 | 42015 | 1680 | 45° |
| | | 1.00 | 2 | 123 | 0.026 | 0.042 | 0.042 | 0.93 | 42100 | 2190 | 45° |
| | Acciaio da utensile temprato 56 - 60 HRC | 0.40 | 2 | 49 | 0.012 | 0.016 | 0.016 | 0.37 | 42155 | 1010 | 45° |
| | | 0.50 | 2 | 62 | 0.016 | 0.022 | 0.022 | 0.47 | 41990 | 1345 | 45° |
| | | 0.60 | 2 | 74 | 0.016 | 0.026 | 0.026 | 0.56 | 42060 | 1345 | 45° |
| | | 0.80 | 2 | 99 | 0.018 | 0.034 | 0.034 | 0.75 | 42015 | 1515 | 45° |
| | | 1.00 | 2 | 123 | 0.022 | 0.042 | 0.042 | 0.93 | 42100 | 1850 | 45° |
| | Acciaio da utensile temprato > 60 HRC | 0.40 | 2 | 48 | 0.010 | 0.010 | 0.010 | 0.36 | 42440 | 850 | 45° |
| | | 0.50 | 2 | 61 | 0.015 | 0.020 | 0.020 | 0.46 | 42210 | 1265 | 45° |
| | | 0.60 | 2 | 73 | 0.015 | 0.020 | 0.020 | 0.55 | 42250 | 1265 | 45° |
| | | 0.80 | 2 | 98 | 0.015 | 0.030 | 0.030 | 0.74 | 42155 | 1265 | 45° |
| | | 1.00 | 2 | 120 | 0.020 | 0.040 | 0.040 | 0.93 | 41070 | 1645 | 45° |
| | Acciaio rapido temprato 64 - 70 HRC | 0.40 | 2 | 48 | 0.010 | 0.010 | 0.010 | 0.36 | 42440 | 850 | 45° |
| | | 0.50 | 2 | 61 | 0.010 | 0.020 | 0.020 | 0.46 | 42210 | 845 | 45° |
| | | 0.60 | 2 | 73 | 0.010 | 0.020 | 0.020 | 0.55 | 42250 | 845 | 45° |
| | | 0.80 | 2 | 85 | 0.010 | 0.020 | 0.030 | 0.71 | 38110 | 760 | 45° |
| | | 1.00 | 2 | 85 | 0.015 | 0.030 | 0.040 | 0.91 | 29730 | 890 | 45° |

Frese con estremità emisferica MicroHX

Gambo ø 6mm, scarico cilindrico, 2.5xd



| | |
|----|---------------|
| HM | λ 30° |
| XA | γ -10° |



ReTool®

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|--|--|-----------|-----------|-------|-------|------|-----------|----------|-----|
| | | Rm | Rm | HRC | HRC | HRC | Inox | Ti | HSS |
| | | 1100-1300 | 1300-1500 | 48-56 | 56-60 | > 60 | Stainless | Titanium | |

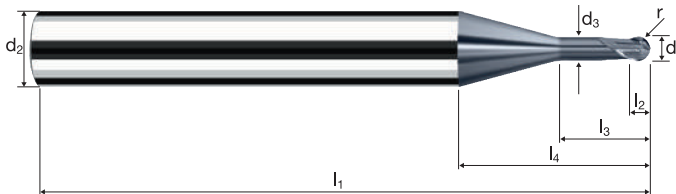
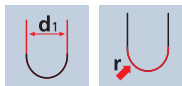
| Ø Code | Esempio: N° Ordine | | | | | | | | | | | DURO-AI |
|------------|--------------------|----------------------------------|----------------|----------------|----------------|----------------|----------------|-------------|-------|---|-------|---------|
| | d ₁ | d ₂ h ₄ | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.005 | α | z | Y6481 | EUR |
| 040 | 0.40 | 6.00 | 0.35 | 57 | 0.24 | 1.00 | 16.96 | 0.200 | 13.9° | 2 | | 80.00 |
| 050 | 0.50 | 6.00 | 0.45 | 57 | 0.30 | 1.25 | 11.76 | 0.250 | 13.6° | 2 | | 80.00 |
| 060 | 0.60 | 6.00 | 0.55 | 57 | 0.36 | 1.50 | 11.83 | 0.300 | 13.4° | 2 | | 80.00 |
| 080 | 0.80 | 6.00 | 0.75 | 57 | 0.48 | 2.00 | 11.95 | 0.400 | 12.8° | 2 | | 80.00 |
| 100 | 1.00 | 6.00 | 0.95 | 57 | 0.60 | 2.50 | 12.08 | 0.500 | 12.3° | 2 | | 80.00 |
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Frese con estremità emisferica MicroHX

Gambo ø 6mm, scarico cilindrico, 3xd



| | |
|----|---------------|
| HM | λ 30° |
| XA | γ -10° |

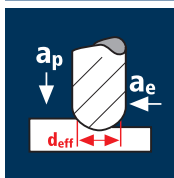


ReTool®

| | | | | | | | | |
|--|-----------|-----------|-------|-------|------|-----------|----------|-----|
| | Rm | Rm | HRC | HRC | HRC | Inox | Ti | HSS |
| | 1100-1300 | 1300-1500 | 48-56 | 56-60 | > 60 | Stainless | Titanium | |

| Esempio: N° Ordine | Rivestimento | | Articolo | | Codice-ø | | | | | | | DURO-AI |
|-----------------------|----------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------------|-------|---|-------|---------|
| | Y | | 6462 | | 040 | | | | | | | Y6462 |
| Ø Code | d ₁ | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.005 | α | z | EUR | |
| 040 | 0.40 | 6.00 | 0.35 | 57 | 0.24 | 1.20 | 17.16 | 0.200 | 13.7° | 2 | 80.00 | |
| 050 | 0.50 | 6.00 | 0.45 | 57 | 0.30 | 1.50 | 12.01 | 0.250 | 13.3° | 2 | 80.00 | |
| 060 | 0.60 | 6.00 | 0.55 | 57 | 0.36 | 1.80 | 12.13 | 0.300 | 13.0° | 2 | 80.00 | |
| 080 | 0.80 | 6.00 | 0.75 | 57 | 0.48 | 2.40 | 12.35 | 0.400 | 12.4° | 2 | 80.00 | |
| 100 | 1.00 | 6.00 | 0.95 | 57 | 0.60 | 3.00 | 12.58 | 0.500 | 11.8° | 2 | 80.00 | |
| 108 | 1.20 | 6.00 | 1.10 | 57 | 0.72 | 3.60 | 12.69 | 0.600 | 11.2° | 2 | 80.00 | |
| 120 | 1.50 | 6.00 | 1.40 | 57 | 0.90 | 4.50 | 13.03 | 0.750 | 10.3° | 2 | 80.00 | |
| 140 | 2.00 | 6.00 | 1.90 | 57 | 1.20 | 6.00 | 13.60 | 1.000 | 9.0° | 2 | 80.00 | |
| 160 | 2.50 | 6.00 | 2.40 | 57 | 1.50 | 7.50 | 14.07 | 1.250 | 7.6° | 2 | 80.00 | |
| 180 | 3.00 | 6.00 | 2.90 | 57 | 1.80 | 9.00 | 14.64 | 1.500 | 6.4° | 2 | 80.00 | |
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Applicazione



Materiale

Acciaio da utensile temprato 52 - 56 HRC

Acciaio da utensile temprato 56 - 60 HRC

Acciaio da utensile temprato > 60 HRC

Acciaio rapido temprato 64 - 70 HRC

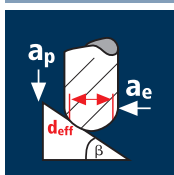
| d1 [mm] | z | v _c [m/min] | f _z [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _c [mm/min] | Q [mm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|--------------------------|
| 0.40 | 2 | 22 | 0.010 | 0.018 | 0.080 | 0.17 | 41195 | 825 | 1.2 |
| 0.50 | 2 | 28 | 0.013 | 0.023 | 0.100 | 0.21 | 42440 | 1105 | 2.5 |
| 0.60 | 2 | 33 | 0.015 | 0.028 | 0.120 | 0.25 | 42015 | 1260 | 4.2 |
| 0.80 | 2 | 45 | 0.020 | 0.037 | 0.160 | 0.34 | 42130 | 1685 | 10.0 |
| 1.00 | 2 | 55 | 0.025 | 0.046 | 0.200 | 0.42 | 41685 | 2085 | 19.2 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|------|
| 0.40 | 2 | 22 | 0.009 | 0.018 | 0.080 | 0.17 | 41195 | 740 | 1.1 |
| 0.50 | 2 | 28 | 0.012 | 0.023 | 0.100 | 0.21 | 42440 | 995 | 2.3 |
| 0.60 | 2 | 33 | 0.014 | 0.028 | 0.120 | 0.25 | 42015 | 1135 | 3.8 |
| 0.80 | 2 | 45 | 0.018 | 0.037 | 0.160 | 0.34 | 42130 | 1515 | 9.0 |
| 1.00 | 2 | 55 | 0.023 | 0.046 | 0.200 | 0.42 | 41685 | 1875 | 17.3 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|------|
| 0.40 | 2 | 20 | 0.007 | 0.014 | 0.080 | 0.15 | 42440 | 610 | 0.7 |
| 0.50 | 2 | 25 | 0.009 | 0.018 | 0.100 | 0.19 | 41885 | 785 | 1.4 |
| 0.60 | 2 | 30 | 0.011 | 0.022 | 0.120 | 0.23 | 41520 | 895 | 2.4 |
| 0.80 | 2 | 40 | 0.014 | 0.030 | 0.160 | 0.30 | 42440 | 1220 | 5.8 |
| 1.00 | 2 | 50 | 0.018 | 0.037 | 0.200 | 0.38 | 41885 | 1510 | 11.1 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|-----|
| 0.40 | 2 | 17 | 0.006 | 0.012 | 0.080 | 0.13 | 41625 | 480 | 0.4 |
| 0.50 | 2 | 22 | 0.007 | 0.015 | 0.100 | 0.17 | 41195 | 615 | 0.9 |
| 0.60 | 2 | 26 | 0.009 | 0.018 | 0.120 | 0.20 | 41380 | 715 | 1.5 |
| 0.80 | 2 | 36 | 0.012 | 0.024 | 0.160 | 0.27 | 42440 | 980 | 3.7 |
| 1.00 | 2 | 40 | 0.014 | 0.029 | 0.200 | 0.34 | 37450 | 1080 | 6.4 |

Applicazione



Materiale

Acciaio da utensile temprato 52 - 56 HRC

Acciaio da utensile temprato 56 - 60 HRC

Acciaio da utensile temprato > 60 HRC

Acciaio rapido temprato 64 - 70 HRC

| d1 [mm] | z | v _c [m/min] | f _z [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _c [mm/min] | β [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
| 0.40 | 2 | 49 | 0.012 | 0.016 | 0.016 | 0.37 | 42155 | 1010 | 45° |
| 0.50 | 2 | 62 | 0.018 | 0.022 | 0.022 | 0.47 | 41990 | 1510 | 45° |
| 0.60 | 2 | 74 | 0.018 | 0.026 | 0.026 | 0.56 | 42060 | 1515 | 45° |
| 0.80 | 2 | 99 | 0.020 | 0.034 | 0.034 | 0.75 | 42015 | 1680 | 45° |
| 1.00 | 2 | 123 | 0.026 | 0.042 | 0.042 | 0.93 | 42100 | 2190 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.40 | 2 | 49 | 0.012 | 0.016 | 0.016 | 0.37 | 42155 | 1010 | 45° |
| 0.50 | 2 | 62 | 0.016 | 0.022 | 0.022 | 0.47 | 41990 | 1345 | 45° |
| 0.60 | 2 | 74 | 0.016 | 0.026 | 0.026 | 0.56 | 42060 | 1345 | 45° |
| 0.80 | 2 | 99 | 0.018 | 0.034 | 0.034 | 0.75 | 42015 | 1515 | 45° |
| 1.00 | 2 | 123 | 0.022 | 0.042 | 0.042 | 0.93 | 42100 | 1850 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.40 | 2 | 48 | 0.010 | 0.010 | 0.010 | 0.36 | 42440 | 850 | 45° |
| 0.50 | 2 | 61 | 0.015 | 0.020 | 0.020 | 0.46 | 42210 | 1265 | 45° |
| 0.60 | 2 | 73 | 0.015 | 0.020 | 0.020 | 0.55 | 42250 | 1265 | 45° |
| 0.80 | 2 | 98 | 0.015 | 0.030 | 0.030 | 0.74 | 42155 | 1265 | 45° |
| 1.00 | 2 | 120 | 0.020 | 0.040 | 0.040 | 0.93 | 41070 | 1645 | 45° |

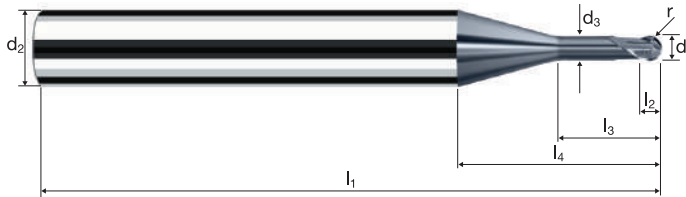
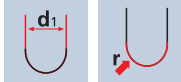
| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|-----|-----|
| 0.40 | 2 | 48 | 0.010 | 0.010 | 0.010 | 0.36 | 42440 | 850 | 45° |
| 0.50 | 2 | 61 | 0.010 | 0.020 | 0.020 | 0.46 | 42210 | 845 | 45° |
| 0.60 | 2 | 73 | 0.010 | 0.020 | 0.020 | 0.55 | 42250 | 845 | 45° |
| 0.80 | 2 | 85 | 0.010 | 0.020 | 0.030 | 0.71 | 38110 | 760 | 45° |
| 1.00 | 2 | 85 | 0.015 | 0.030 | 0.040 | 0.91 | 29730 | 890 | 45° |

Frese con estremità emisferica MicroHX

Gambo \varnothing 6mm, scarico cilindrico, 3.5xd



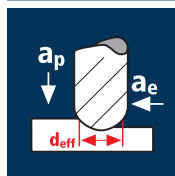
HM λ 30°
XA γ -10°



| | | | | | | | | |
|--|------------------------|------------------------|---------------------|---------------------|--------------------|--------------------------|-----------------------|------------|
| | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Inox Stainless | Ti Titanium | HSS |
|--|------------------------|------------------------|---------------------|---------------------|--------------------|--------------------------|-----------------------|------------|

| | | | | | | | | | | | DURO-AI | |
|-----------------------|-----------------------|----------------|----------------------|-------|----------------------------------|-------|-------|--------------------|--------------|-----|---------|--|
| | | | | | | | | | | | Y6482 | |
| | | | | | | | | | | | EUR | |
| Esempio: | Rivestimento Y | | Articolo 6482 | | Codice- \varnothing 040 | | | | | | | |
| N° Ordine | | | | | | | | | | | | |
| \varnothing Code | d_1 | d_2 h_4 | d_3 | l_1 | l_2 | l_3 | l_4 | r ± 0.005 | α | z | | |
| 040 | 0.40 | 6.00 | 0.35 | 57 | 0.24 | 1.40 | 17.36 | 0.200 | 13.4° | 2 | 80.00 | |
| 050 | 0.50 | 6.00 | 0.45 | 57 | 0.30 | 1.75 | 12.26 | 0.250 | 13.1° | 2 | 80.00 | |
| 060 | 0.60 | 6.00 | 0.55 | 57 | 0.36 | 2.10 | 12.43 | 0.300 | 12.7° | 2 | 80.00 | |
| 080 | 0.80 | 6.00 | 0.75 | 57 | 0.48 | 2.80 | 12.75 | 0.400 | 12.0° | 2 | 80.00 | |
| 100 | 1.00 | 6.00 | 0.95 | 57 | 0.60 | 3.50 | 13.08 | 0.500 | 11.4° | 2 | 80.00 | |
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Applicazione



Materiale

Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



Acciaio da
utensile temprato
> 60 HRC



Acciaio rapido temprato
64 - 70 HRC



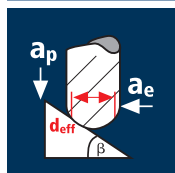
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|-----------------------------|
| 0.40 | 2 | 21 | 0.010 | 0.016 | 0.080 | 0.16 | 41780 | 835 | 1.1 |
| 0.50 | 2 | 26 | 0.013 | 0.020 | 0.100 | 0.20 | 41380 | 1075 | 2.2 |
| 0.60 | 2 | 32 | 0.015 | 0.024 | 0.120 | 0.24 | 42440 | 1275 | 3.7 |
| 0.80 | 2 | 41 | 0.020 | 0.032 | 0.160 | 0.31 | 42100 | 1685 | 8.6 |
| 1.00 | 2 | 51 | 0.025 | 0.040 | 0.200 | 0.39 | 41625 | 2080 | 16.7 |
| 1.50 | 2 | 78 | 0.038 | 0.060 | 0.300 | 0.59 | 42080 | 3200 | 57.6 |
| 2.00 | 2 | 100 | 0.050 | 0.080 | 0.400 | 0.78 | 40810 | 4080 | 130.6 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|------|
| 0.40 | 2 | 21 | 0.009 | 0.016 | 0.080 | 0.16 | 41780 | 750 | 1.0 |
| 0.50 | 2 | 26 | 0.012 | 0.020 | 0.100 | 0.20 | 41380 | 970 | 1.9 |
| 0.60 | 2 | 32 | 0.014 | 0.024 | 0.120 | 0.24 | 42440 | 1145 | 3.3 |
| 0.80 | 2 | 41 | 0.018 | 0.032 | 0.160 | 0.31 | 42100 | 1515 | 7.8 |
| 1.00 | 2 | 51 | 0.023 | 0.040 | 0.200 | 0.39 | 41625 | 1875 | 15.0 |
| 1.50 | 2 | 60 | 0.034 | 0.060 | 0.300 | 0.59 | 32370 | 2215 | 39.9 |
| 2.00 | 2 | 60 | 0.045 | 0.080 | 0.400 | 0.78 | 24485 | 2205 | 70.5 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|------|
| 0.40 | 2 | 18 | 0.007 | 0.013 | 0.080 | 0.14 | 40925 | 590 | 0.6 |
| 0.50 | 2 | 24 | 0.009 | 0.016 | 0.100 | 0.18 | 42440 | 795 | 1.3 |
| 0.60 | 2 | 28 | 0.011 | 0.019 | 0.120 | 0.21 | 42440 | 915 | 2.1 |
| 0.80 | 2 | 37 | 0.014 | 0.026 | 0.160 | 0.28 | 42060 | 1210 | 5.0 |
| 1.00 | 2 | 46 | 0.018 | 0.032 | 0.200 | 0.35 | 41835 | 1505 | 9.6 |
| 1.50 | 2 | 50 | 0.027 | 0.048 | 0.300 | 0.53 | 30030 | 1645 | 23.7 |
| 2.00 | 2 | 50 | 0.036 | 0.064 | 0.400 | 0.70 | 22735 | 1635 | 41.9 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|------|
| 0.40 | 2 | 17 | 0.006 | 0.010 | 0.080 | 0.13 | 41625 | 480 | 0.4 |
| 0.50 | 2 | 21 | 0.007 | 0.013 | 0.100 | 0.16 | 41780 | 625 | 0.8 |
| 0.60 | 2 | 25 | 0.009 | 0.015 | 0.120 | 0.19 | 41885 | 725 | 1.3 |
| 0.80 | 2 | 33 | 0.012 | 0.020 | 0.160 | 0.25 | 42015 | 970 | 3.2 |
| 1.00 | 2 | 40 | 0.014 | 0.026 | 0.200 | 0.32 | 39790 | 1145 | 5.9 |
| 1.50 | 2 | 40 | 0.022 | 0.038 | 0.300 | 0.47 | 27090 | 1185 | 13.7 |
| 2.00 | 2 | 40 | 0.029 | 0.051 | 0.400 | 0.63 | 20210 | 1165 | 23.8 |

Applicazione



Materiale

Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



Acciaio da
utensile temprato
> 60 HRC



Acciaio rapido temprato
64 - 70 HRC



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|----------|
| 0.40 | 2 | 49 | 0.012 | 0.016 | 0.016 | 0.37 | 42155 | 1010 | 45° |
| 0.50 | 2 | 62 | 0.018 | 0.022 | 0.022 | 0.47 | 41990 | 1510 | 45° |
| 0.60 | 2 | 74 | 0.018 | 0.026 | 0.026 | 0.56 | 42060 | 1515 | 45° |
| 0.80 | 2 | 99 | 0.020 | 0.034 | 0.034 | 0.75 | 42015 | 1680 | 45° |
| 1.00 | 2 | 123 | 0.026 | 0.042 | 0.042 | 0.93 | 42100 | 2190 | 45° |
| 1.50 | 2 | 185 | 0.030 | 0.064 | 0.064 | 1.40 | 42060 | 2525 | 45° |
| 2.00 | 2 | 200 | 0.034 | 0.084 | 0.084 | 1.86 | 34225 | 2325 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.40 | 2 | 49 | 0.012 | 0.016 | 0.016 | 0.37 | 42155 | 1010 | 45° |
| 0.50 | 2 | 62 | 0.016 | 0.022 | 0.022 | 0.47 | 41990 | 1345 | 45° |
| 0.60 | 2 | 74 | 0.016 | 0.026 | 0.026 | 0.56 | 42060 | 1345 | 45° |
| 0.80 | 2 | 99 | 0.018 | 0.034 | 0.034 | 0.75 | 42015 | 1515 | 45° |
| 1.00 | 2 | 123 | 0.022 | 0.042 | 0.042 | 0.93 | 42100 | 1850 | 45° |
| 1.50 | 2 | 150 | 0.028 | 0.064 | 0.064 | 1.40 | 34105 | 1910 | 45° |
| 2.00 | 2 | 150 | 0.030 | 0.084 | 0.084 | 1.86 | 25670 | 1540 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.40 | 2 | 48 | 0.010 | 0.010 | 0.010 | 0.36 | 42440 | 850 | 45° |
| 0.50 | 2 | 61 | 0.015 | 0.020 | 0.020 | 0.46 | 42210 | 1265 | 45° |
| 0.60 | 2 | 73 | 0.015 | 0.020 | 0.020 | 0.55 | 42250 | 1265 | 45° |
| 0.80 | 2 | 98 | 0.015 | 0.030 | 0.030 | 0.74 | 42155 | 1265 | 45° |
| 1.00 | 2 | 120 | 0.020 | 0.040 | 0.040 | 0.93 | 41070 | 1645 | 45° |
| 1.50 | 2 | 120 | 0.020 | 0.060 | 0.060 | 1.39 | 27480 | 1100 | 45° |
| 2.00 | 2 | 120 | 0.025 | 0.080 | 0.080 | 1.86 | 20535 | 1025 | 45° |

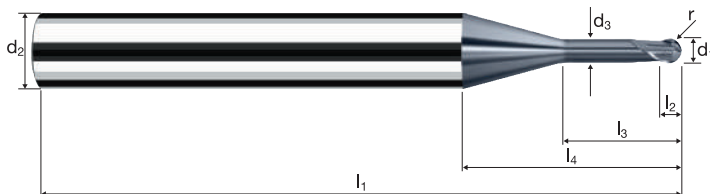
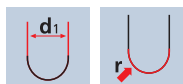
| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|-----|-----|
| 0.40 | 2 | 48 | 0.010 | 0.010 | 0.010 | 0.36 | 42440 | 850 | 45° |
| 0.50 | 2 | 61 | 0.010 | 0.020 | 0.020 | 0.46 | 42210 | 845 | 45° |
| 0.60 | 2 | 73 | 0.010 | 0.020 | 0.020 | 0.55 | 42250 | 845 | 45° |
| 0.80 | 2 | 85 | 0.010 | 0.020 | 0.030 | 0.71 | 38110 | 760 | 45° |
| 1.00 | 2 | 85 | 0.015 | 0.030 | 0.040 | 0.91 | 29730 | 890 | 45° |
| 1.50 | 2 | 85 | 0.015 | 0.050 | 0.060 | 1.37 | 19750 | 590 | 45° |
| 2.00 | 2 | 85 | 0.020 | 0.060 | 0.080 | 1.81 | 14950 | 600 | 45° |

Frese con estremità emisferica MicroHX

Gambo Ø 6mm, scarico cilindrico, 4xd



HM λ 30°
XA γ -10°

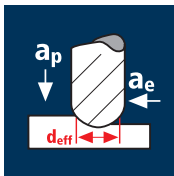


ReTool®

| | | | | | | | | | |
|--|--|-----------------|-----------------|--------------|--------------|-------------|-------------------|----------------|-----|
| | | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Inox Stainless | Ti Titanium | HSS |
|--|--|-----------------|-----------------|--------------|--------------|-------------|-------------------|----------------|-----|

| Esempio: N° Ordine | | | | | | | | | | | | DURO-AI |
|--|----------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------------|-------|---|--|--------------|
| Rivestimento Y Articolo 6463 Codice-Ø 040 | | | | | | | | | | | | Y6463 |
| Ø Code | d ₁ | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.005 | α | z | | EUR |
| 040 | 0.40 | 6.00 | 0.35 | 57 | 0.24 | 1.60 | 17.56 | 0.200 | 13.2° | 2 | | 80.00 |
| 050 | 0.50 | 6.00 | 0.45 | 57 | 0.30 | 2.00 | 12.51 | 0.250 | 12.8° | 2 | | 80.00 |
| 060 | 0.60 | 6.00 | 0.55 | 57 | 0.36 | 2.40 | 12.73 | 0.300 | 12.4° | 2 | | 80.00 |
| 080 | 0.80 | 6.00 | 0.75 | 57 | 0.48 | 3.20 | 13.15 | 0.400 | 11.7° | 2 | | 80.00 |
| 100 | 1.00 | 6.00 | 0.95 | 57 | 0.60 | 4.00 | 13.58 | 0.500 | 11.0° | 2 | | 80.00 |
| 120 | 1.50 | 6.00 | 1.40 | 57 | 0.90 | 6.00 | 14.53 | 0.750 | 9.2° | 2 | | 80.00 |
| 140 | 2.00 | 6.00 | 1.90 | 57 | 1.20 | 8.00 | 15.60 | 1.000 | 7.8° | 2 | | 80.00 |
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Applicazione



Materiale

Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



Acciaio da
utensile temprato
> 60 HRC



Acciaio rapido temprato
64 - 70 HRC



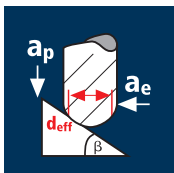
| d1 [mm] | z | v _c [m/min] | f _z [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|-----------------------------|
| 0.40 | 2 | 20 | 0.010 | 0.014 | 0.080 | 0.15 | 42440 | 850 | 1.0 |
| 0.50 | 2 | 25 | 0.013 | 0.018 | 0.100 | 0.19 | 41885 | 1090 | 2.0 |
| 0.60 | 2 | 29 | 0.015 | 0.021 | 0.120 | 0.22 | 41960 | 1260 | 3.2 |
| 0.80 | 2 | 40 | 0.020 | 0.029 | 0.160 | 0.30 | 42440 | 1700 | 7.9 |
| 1.00 | 2 | 49 | 0.025 | 0.036 | 0.200 | 0.37 | 42155 | 2110 | 15.2 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|------|
| 0.40 | 2 | 20 | 0.009 | 0.014 | 0.080 | 0.15 | 42440 | 765 | 0.9 |
| 0.50 | 2 | 25 | 0.012 | 0.018 | 0.100 | 0.19 | 41885 | 980 | 1.8 |
| 0.60 | 2 | 29 | 0.014 | 0.021 | 0.120 | 0.22 | 41960 | 1135 | 2.9 |
| 0.80 | 2 | 40 | 0.018 | 0.029 | 0.160 | 0.30 | 42440 | 1530 | 7.1 |
| 1.00 | 2 | 49 | 0.023 | 0.036 | 0.200 | 0.37 | 42155 | 1895 | 13.7 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|-----|
| 0.40 | 2 | 17 | 0.007 | 0.011 | 0.080 | 0.13 | 41625 | 600 | 0.5 |
| 0.50 | 2 | 22 | 0.009 | 0.014 | 0.100 | 0.17 | 41195 | 770 | 1.1 |
| 0.60 | 2 | 26 | 0.011 | 0.017 | 0.120 | 0.20 | 41380 | 895 | 1.8 |
| 0.80 | 2 | 36 | 0.014 | 0.023 | 0.160 | 0.27 | 42440 | 1220 | 4.5 |
| 1.00 | 2 | 44 | 0.018 | 0.029 | 0.200 | 0.33 | 42440 | 1530 | 8.8 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|-----|-----|
| 0.40 | 2 | 12 | 0.001 | 0.005 | 0.080 | 0.09 | 42440 | 100 | 0.0 |
| 0.50 | 2 | 15 | 0.002 | 0.006 | 0.100 | 0.11 | 43405 | 150 | 0.1 |
| 0.60 | 2 | 17 | 0.002 | 0.008 | 0.120 | 0.13 | 41625 | 145 | 0.1 |
| 0.80 | 2 | 24 | 0.002 | 0.010 | 0.160 | 0.18 | 42440 | 195 | 0.3 |
| 1.00 | 2 | 29 | 0.003 | 0.013 | 0.200 | 0.22 | 41960 | 240 | 0.6 |

Applicazione



Materiale

Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



Acciaio da
utensile temprato
> 60 HRC



Acciaio rapido temprato
64 - 70 HRC



| d1 [mm] | z | v _c [m/min] | f _z [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|----------|
| 0.40 | 2 | 49 | 0.012 | 0.016 | 0.016 | 0.37 | 42155 | 1010 | 45° |
| 0.50 | 2 | 61 | 0.018 | 0.020 | 0.020 | 0.46 | 42210 | 1520 | 45° |
| 0.60 | 2 | 74 | 0.018 | 0.024 | 0.024 | 0.56 | 42060 | 1515 | 45° |
| 0.80 | 2 | 98 | 0.020 | 0.032 | 0.032 | 0.74 | 42155 | 1685 | 45° |
| 1.00 | 2 | 123 | 0.026 | 0.042 | 0.042 | 0.93 | 42100 | 2190 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.40 | 2 | 49 | 0.012 | 0.016 | 0.016 | 0.37 | 42155 | 1010 | 45° |
| 0.50 | 2 | 61 | 0.016 | 0.020 | 0.020 | 0.46 | 42210 | 1350 | 45° |
| 0.60 | 2 | 74 | 0.016 | 0.024 | 0.024 | 0.56 | 42060 | 1345 | 45° |
| 0.80 | 2 | 98 | 0.018 | 0.032 | 0.032 | 0.74 | 42155 | 1520 | 45° |
| 1.00 | 2 | 123 | 0.022 | 0.042 | 0.042 | 0.93 | 42100 | 1850 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.40 | 2 | 49 | 0.012 | 0.016 | 0.016 | 0.37 | 42155 | 1010 | 45° |
| 0.50 | 2 | 61 | 0.016 | 0.020 | 0.020 | 0.46 | 42210 | 1350 | 45° |
| 0.60 | 2 | 74 | 0.016 | 0.024 | 0.024 | 0.56 | 42060 | 1345 | 45° |
| 0.80 | 2 | 98 | 0.018 | 0.032 | 0.032 | 0.74 | 42155 | 1520 | 45° |
| 1.00 | 2 | 120 | 0.022 | 0.042 | 0.042 | 0.93 | 41070 | 1805 | 45° |

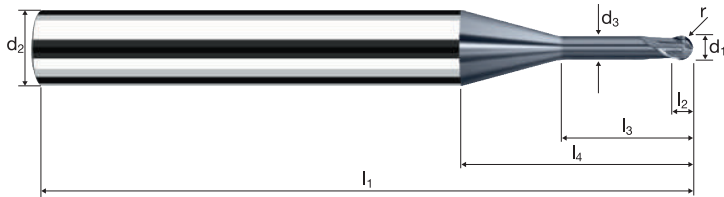
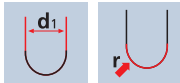
| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|-----|-----|
| 0.40 | 2 | 49 | 0.010 | 0.016 | 0.016 | 0.37 | 42155 | 845 | 45° |
| 0.50 | 2 | 61 | 0.010 | 0.020 | 0.020 | 0.46 | 42210 | 845 | 45° |
| 0.60 | 2 | 74 | 0.010 | 0.024 | 0.024 | 0.56 | 42060 | 840 | 45° |
| 0.80 | 2 | 85 | 0.010 | 0.032 | 0.032 | 0.74 | 36565 | 730 | 45° |
| 1.00 | 2 | 85 | 0.015 | 0.042 | 0.042 | 0.93 | 29095 | 875 | 45° |

Frese con estremità emisferica MicroHX

Gambo Ø 6mm, scarico cilindrico, 4.5xd



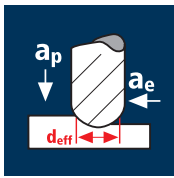
HM
XA λ 30°
 γ -10°



| | | | | | | | | | |
|--|--|------------------------|------------------------|---------------------|---------------------|--------------------|--------------------------|-----------------------|------------|
| | | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Inox Stainless | Ti Titanium | HSS |
|--|--|------------------------|------------------------|---------------------|---------------------|--------------------|--------------------------|-----------------------|------------|

| Esempio: N° Ordine | | | | | | | | | | | DURO-AI |
|---------------------------|----------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------------|-------|---|---------|
| | Rivestimento | | Articolo | | Codice-ø | | | | | | |
| | Y | | 6483 | | 040 | | | | | | |
| Ø Code | d ₁ | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.005 | α | z | EUR |
| 040 | 0.40 | 6.00 | 0.35 | 57 | 0.24 | 1.80 | 17.76 | 0.200 | 13.0° | 2 | 80.00 |
| 050 | 0.50 | 6.00 | 0.45 | 57 | 0.30 | 2.25 | 12.76 | 0.250 | 12.6° | 2 | 80.00 |
| 060 | 0.60 | 6.00 | 0.55 | 57 | 0.36 | 2.70 | 13.03 | 0.300 | 12.1° | 2 | 80.00 |
| 080 | 0.80 | 6.00 | 0.75 | 57 | 0.48 | 3.60 | 13.55 | 0.400 | 11.3° | 2 | 80.00 |
| 100 | 1.00 | 6.00 | 0.95 | 57 | 0.60 | 4.50 | 14.08 | 0.500 | 10.6° | 2 | 80.00 |
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Applicazione



Materiale

Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



Acciaio da
utensile temprato
> 60 HRC



Acciaio rapido temprato
64 - 70 HRC



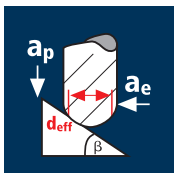
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|-----------------------------|
| 0.40 | 2 | 18 | 0.010 | 0.013 | 0.080 | 0.14 | 40925 | 820 | 0.9 |
| 0.50 | 2 | 24 | 0.013 | 0.016 | 0.100 | 0.18 | 42440 | 1105 | 1.8 |
| 0.60 | 2 | 28 | 0.015 | 0.019 | 0.120 | 0.21 | 42440 | 1275 | 2.9 |
| 0.80 | 2 | 37 | 0.020 | 0.026 | 0.160 | 0.28 | 42060 | 1680 | 7.0 |
| 1.00 | 2 | 46 | 0.025 | 0.032 | 0.200 | 0.35 | 41835 | 2090 | 13.4 |
| 1.50 | 2 | 70 | 0.038 | 0.048 | 0.300 | 0.53 | 42040 | 3195 | 46.0 |
| 2.00 | 2 | 92 | 0.050 | 0.064 | 0.400 | 0.70 | 41835 | 4185 | 107.1 |
| 2.50 | 2 | 100 | 0.063 | 0.080 | 0.500 | 0.88 | 36170 | 4560 | 182.3 |
| 3.00 | 2 | 100 | 0.075 | 0.096 | 0.600 | 1.06 | 30030 | 4505 | 259.5 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|-------|
| 0.40 | 2 | 18 | 0.009 | 0.013 | 0.080 | 0.14 | 40925 | 735 | 0.8 |
| 0.50 | 2 | 24 | 0.012 | 0.016 | 0.100 | 0.18 | 42440 | 995 | 1.6 |
| 0.60 | 2 | 28 | 0.014 | 0.019 | 0.120 | 0.21 | 42440 | 1145 | 2.6 |
| 0.80 | 2 | 37 | 0.018 | 0.026 | 0.160 | 0.28 | 42060 | 1515 | 6.3 |
| 1.00 | 2 | 46 | 0.023 | 0.032 | 0.200 | 0.35 | 41835 | 1885 | 12.0 |
| 1.50 | 2 | 60 | 0.034 | 0.048 | 0.300 | 0.53 | 36035 | 2465 | 35.5 |
| 2.00 | 2 | 60 | 0.045 | 0.064 | 0.400 | 0.70 | 27285 | 2455 | 62.9 |
| 2.50 | 2 | 60 | 0.057 | 0.080 | 0.500 | 0.88 | 21705 | 2460 | 98.4 |
| 3.00 | 2 | 60 | 0.068 | 0.096 | 0.600 | 1.06 | 18020 | 2430 | 140.1 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|------|
| 0.40 | 2 | 17 | 0.007 | 0.010 | 0.080 | 0.13 | 41625 | 600 | 0.5 |
| 0.50 | 2 | 21 | 0.009 | 0.013 | 0.100 | 0.16 | 41780 | 780 | 1.0 |
| 0.60 | 2 | 25 | 0.011 | 0.015 | 0.120 | 0.19 | 41885 | 905 | 1.7 |
| 0.80 | 2 | 33 | 0.014 | 0.021 | 0.160 | 0.25 | 42015 | 1210 | 4.0 |
| 1.00 | 2 | 42 | 0.018 | 0.026 | 0.200 | 0.32 | 41780 | 1505 | 7.7 |
| 1.50 | 2 | 50 | 0.027 | 0.038 | 0.300 | 0.47 | 33865 | 1855 | 21.3 |
| 2.00 | 2 | 50 | 0.036 | 0.051 | 0.400 | 0.63 | 25265 | 1820 | 37.3 |
| 2.50 | 2 | 50 | 0.045 | 0.064 | 0.500 | 0.79 | 20145 | 1830 | 58.5 |
| 3.00 | 2 | 50 | 0.054 | 0.077 | 0.600 | 0.95 | 16755 | 1810 | 83.4 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|------|
| 0.40 | 2 | 15 | 0.006 | 0.008 | 0.080 | 0.11 | 43405 | 500 | 0.3 |
| 0.50 | 2 | 18 | 0.007 | 0.010 | 0.100 | 0.14 | 40925 | 615 | 0.6 |
| 0.60 | 2 | 22 | 0.009 | 0.012 | 0.120 | 0.17 | 41195 | 710 | 1.0 |
| 0.80 | 2 | 30 | 0.012 | 0.017 | 0.160 | 0.23 | 41520 | 955 | 2.5 |
| 1.00 | 2 | 37 | 0.014 | 0.020 | 0.200 | 0.28 | 42060 | 1210 | 5.0 |
| 1.50 | 2 | 40 | 0.022 | 0.031 | 0.300 | 0.42 | 30315 | 1325 | 12.2 |
| 2.00 | 2 | 40 | 0.029 | 0.041 | 0.400 | 0.57 | 22340 | 1285 | 21.1 |
| 2.50 | 2 | 40 | 0.036 | 0.051 | 0.500 | 0.71 | 17935 | 1300 | 33.3 |
| 3.00 | 2 | 40 | 0.043 | 0.061 | 0.600 | 0.85 | 14980 | 1295 | 47.7 |

Applicazione



Materiale

Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



Acciaio da
utensile temprato
> 60 HRC



Acciaio rapido temprato
64 - 70 HRC



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|----------|
| 0.40 | 2 | 49 | 0.012 | 0.016 | 0.016 | 0.37 | 42155 | 1010 | 45° |
| 0.50 | 2 | 61 | 0.018 | 0.020 | 0.020 | 0.46 | 42210 | 1520 | 45° |
| 0.60 | 2 | 74 | 0.018 | 0.024 | 0.024 | 0.56 | 42060 | 1515 | 45° |
| 0.80 | 2 | 98 | 0.020 | 0.032 | 0.032 | 0.74 | 42155 | 1685 | 45° |
| 1.00 | 2 | 123 | 0.026 | 0.042 | 0.042 | 0.93 | 42100 | 2190 | 45° |
| 1.50 | 2 | 185 | 0.030 | 0.062 | 0.062 | 1.40 | 42060 | 2525 | 45° |
| 2.00 | 2 | 200 | 0.034 | 0.082 | 0.082 | 1.86 | 34225 | 2325 | 45° |
| 2.50 | 2 | 200 | 0.036 | 0.102 | 0.102 | 2.32 | 27440 | 1975 | 45° |
| 3.00 | 2 | 200 | 0.042 | 0.122 | 0.122 | 2.79 | 22820 | 1915 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.40 | 2 | 49 | 0.012 | 0.016 | 0.016 | 0.37 | 42155 | 1010 | 45° |
| 0.50 | 2 | 61 | 0.016 | 0.020 | 0.020 | 0.46 | 42210 | 1350 | 45° |
| 0.60 | 2 | 74 | 0.016 | 0.024 | 0.024 | 0.56 | 42060 | 1345 | 45° |
| 0.80 | 2 | 98 | 0.018 | 0.032 | 0.032 | 0.74 | 42155 | 1520 | 45° |
| 1.00 | 2 | 123 | 0.022 | 0.042 | 0.042 | 0.93 | 42100 | 1850 | 45° |
| 1.50 | 2 | 150 | 0.028 | 0.062 | 0.062 | 1.40 | 34105 | 1910 | 45° |
| 2.00 | 2 | 150 | 0.030 | 0.082 | 0.082 | 1.86 | 25670 | 1540 | 45° |
| 2.50 | 2 | 150 | 0.032 | 0.102 | 0.102 | 2.32 | 20580 | 1315 | 45° |
| 3.00 | 2 | 150 | 0.036 | 0.122 | 0.122 | 2.79 | 17115 | 1230 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.40 | 2 | 49 | 0.012 | 0.016 | 0.016 | 0.37 | 42155 | 1010 | 45° |
| 0.50 | 2 | 61 | 0.016 | 0.020 | 0.020 | 0.46 | 42210 | 1350 | 45° |
| 0.60 | 2 | 74 | 0.016 | 0.024 | 0.024 | 0.56 | 42060 | 1345 | 45° |
| 0.80 | 2 | 98 | 0.018 | 0.032 | 0.032 | 0.74 | 42155 | 1520 | 45° |
| 1.00 | 2 | 120 | 0.022 | 0.042 | 0.042 | 0.93 | 41070 | 1805 | 45° |
| 1.50 | 2 | 120 | 0.028 | 0.062 | 0.062 | 1.40 | 27285 | 1530 | 45° |
| 2.00 | 2 | 120 | 0.030 | 0.082 | 0.082 | 1.86 | 20535 | 1230 | 45° |
| 2.50 | 2 | 120 | 0.032 | 0.102 | 0.102 | 2.32 | 16465 | 1055 | 45° |
| 3.00 | 2 | 120 | 0.036 | 0.122 | 0.122 | 2.79 | 13690 | 985 | 45° |

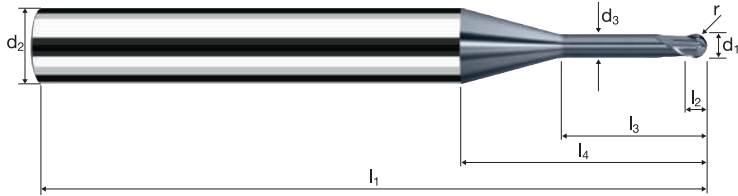
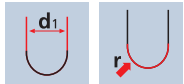
| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|-----|-----|
| 0.40 | 2 | 49 | 0.010 | 0.016 | 0.016 | 0.37 | 42155 | 845 | 45° |
| 0.50 | 2 | 61 | 0.010 | 0.020 | 0.020 | 0.46 | 42210 | 845 | 45° |
| 0.60 | 2 | 74 | 0.010 | 0.024 | 0.024 | 0.56 | 42060 | 840 | 45° |
| 0.80 | 2 | 85 | 0.010 | 0.032 | 0.032 | 0.74 | 36565 | 730 | 45° |
| 1.00 | 2 | 85 | 0.015 | 0.042 | 0.042 | 0.93 | 29095 | 875 | 45° |
| 1.50 | 2 | 85 | 0.015 | 0.062 | 0.062 | 1.40 | 19325 | 580 | 45° |
| 2.00 | 2 | 85 | 0.020 | 0.082 | 0.082 | 1.86 | 14545 | 580 | 45° |
| 2.50 | 2 | 85 | 0.020 | 0.102 | 0.102 | 2.32 | 11660 | 465 | 45° |
| 3.00 | 2 | 85 | 0.025 | 0.122 | 0.122 | 2.79 | 9700 | 485 | 45° |

Frese con estremità emisferica MicroHX

Gambo \varnothing 6mm, scarico cilindrico, 5xd



HM λ 30°
XA γ -10°

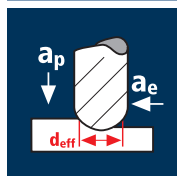


ReTool®

| | | | | | | | | | |
|--|--|-----------------|-----------------|--------------|--------------|-------------|-------------------|----------------|-----|
| | | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Inox Stainless | Ti Titanium | HSS |
|--|--|-----------------|-----------------|--------------|--------------|-------------|-------------------|----------------|-----|

| Esempio: N° Ordine | | Rivestimento Y | Articolo 6464 | Codice- \varnothing 040 | | | | | | | | |
|-----------------------|----------------|----------------------|------------------|------------------------------|----------------|----------------|----------------|-------------|----------|---|-------|--|
| \varnothing Code | d ₁ | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.005 | α | z | | |
| 040 | 0.40 | 6.00 | 0.35 | 57 | 0.24 | 2.00 | 17.96 | 0.200 | 12.8° | 2 | 80.00 | |
| 050 | 0.50 | 6.00 | 0.45 | 57 | 0.30 | 2.50 | 13.01 | 0.250 | 12.3° | 2 | 80.00 | |
| 060 | 0.60 | 6.00 | 0.55 | 57 | 0.36 | 3.00 | 13.33 | 0.300 | 11.9° | 2 | 80.00 | |
| 080 | 0.80 | 6.00 | 0.75 | 57 | 0.48 | 4.00 | 13.95 | 0.400 | 11.0° | 2 | 80.00 | |
| 100 | 1.00 | 6.00 | 0.95 | 57 | 0.60 | 5.00 | 14.58 | 0.500 | 10.2° | 2 | 80.00 | |
| 108 | 1.20 | 6.00 | 1.10 | 57 | 0.72 | 6.00 | 15.09 | 0.600 | 9.4° | 2 | 80.00 | |
| 120 | 1.50 | 6.00 | 1.40 | 61 | 0.90 | 7.50 | 16.03 | 0.750 | 8.4° | 2 | 80.00 | |
| 140 | 2.00 | 6.00 | 1.90 | 61 | 1.20 | 10.00 | 17.60 | 1.000 | 6.9° | 2 | 80.00 | |
| 160 | 2.50 | 6.00 | 2.40 | 61 | 1.50 | 12.50 | 19.07 | 1.250 | 5.5° | 2 | 80.00 | |
| 180 | 3.00 | 6.00 | 2.90 | 66 | 1.80 | 15.00 | 20.64 | 1.500 | 4.4° | 2 | 80.00 | |
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Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



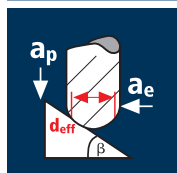
| d1 [mm] | z | v _c [m/min] | f _z [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _c [mm/min] | Q [mm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|--------------------------|
| 0.20 | 2 | 20 | 0.008 | 0.033 | 0.040 | 0.15 | 42440 | 640 | 0.8 |
| 0.30 | 2 | 29 | 0.013 | 0.050 | 0.060 | 0.22 | 41960 | 1055 | 3.2 |
| 0.40 | 2 | 40 | 0.016 | 0.067 | 0.080 | 0.30 | 42440 | 1390 | 7.5 |
| 0.50 | 2 | 49 | 0.020 | 0.083 | 0.100 | 0.37 | 42155 | 1700 | 14.1 |
| 0.60 | 2 | 59 | 0.024 | 0.100 | 0.120 | 0.45 | 41735 | 2000 | 24.0 |
| 0.80 | 2 | 79 | 0.033 | 0.134 | 0.160 | 0.60 | 41910 | 2745 | 58.9 |
| 1.00 | 2 | 99 | 0.040 | 0.167 | 0.200 | 0.75 | 42015 | 3390 | 113.2 |
| 1.50 | 2 | 140 | 0.060 | 0.250 | 0.300 | 1.12 | 39790 | 4815 | 361.0 |
| 2.00 | 2 | 140 | 0.081 | 0.334 | 0.400 | 1.49 | 29910 | 4825 | 644.4 |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-------|
| 0.20 | 2 | 20 | 0.007 | 0.033 | 0.040 | 0.15 | 42440 | 610 | 0.8 |
| 0.30 | 2 | 29 | 0.012 | 0.050 | 0.060 | 0.22 | 41960 | 1005 | 3.0 |
| 0.40 | 2 | 40 | 0.016 | 0.067 | 0.080 | 0.30 | 42440 | 1325 | 7.1 |
| 0.50 | 2 | 49 | 0.019 | 0.083 | 0.100 | 0.37 | 42155 | 1620 | 13.4 |
| 0.60 | 2 | 59 | 0.023 | 0.100 | 0.120 | 0.45 | 41735 | 1905 | 22.8 |
| 0.80 | 2 | 79 | 0.031 | 0.134 | 0.160 | 0.60 | 41910 | 2615 | 56.1 |
| 1.00 | 2 | 99 | 0.038 | 0.167 | 0.200 | 0.75 | 42015 | 3225 | 107.8 |
| 1.50 | 2 | 120 | 0.058 | 0.250 | 0.300 | 1.12 | 34105 | 3930 | 294.7 |
| 2.00 | 2 | 120 | 0.077 | 0.334 | 0.400 | 1.49 | 25635 | 3940 | 526.1 |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-------|
| 0.20 | 2 | 20 | 0.006 | 0.033 | 0.040 | 0.15 | 42440 | 510 | 0.7 |
| 0.30 | 2 | 29 | 0.010 | 0.050 | 0.060 | 0.22 | 41960 | 840 | 2.5 |
| 0.40 | 2 | 40 | 0.013 | 0.067 | 0.080 | 0.30 | 42440 | 1105 | 5.9 |
| 0.50 | 2 | 49 | 0.016 | 0.083 | 0.100 | 0.37 | 42155 | 1350 | 11.2 |
| 0.60 | 2 | 59 | 0.019 | 0.100 | 0.120 | 0.45 | 41735 | 1585 | 19.0 |
| 0.80 | 2 | 79 | 0.026 | 0.134 | 0.160 | 0.60 | 41910 | 2180 | 46.7 |
| 1.00 | 2 | 99 | 0.032 | 0.167 | 0.200 | 0.75 | 42015 | 2690 | 89.8 |
| 1.50 | 2 | 100 | 0.048 | 0.250 | 0.300 | 1.12 | 28420 | 2730 | 204.6 |
| 2.00 | 2 | 100 | 0.064 | 0.334 | 0.400 | 1.49 | 21365 | 2735 | 365.3 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|-------|
| 0.20 | 2 | 20 | 0.005 | 0.033 | 0.040 | 0.15 | 42440 | 460 | 0.6 |
| 0.30 | 2 | 29 | 0.009 | 0.050 | 0.060 | 0.22 | 41960 | 755 | 2.3 |
| 0.40 | 2 | 40 | 0.012 | 0.067 | 0.080 | 0.30 | 42440 | 995 | 5.3 |
| 0.50 | 2 | 49 | 0.014 | 0.083 | 0.100 | 0.37 | 42155 | 1215 | 10.1 |
| 0.60 | 2 | 59 | 0.017 | 0.100 | 0.120 | 0.45 | 41735 | 1425 | 17.1 |
| 0.80 | 2 | 60 | 0.023 | 0.134 | 0.160 | 0.60 | 31830 | 1490 | 31.9 |
| 1.00 | 2 | 60 | 0.029 | 0.167 | 0.200 | 0.75 | 25465 | 1465 | 49.0 |
| 1.50 | 2 | 60 | 0.043 | 0.250 | 0.300 | 1.12 | 17050 | 1475 | 110.5 |
| 2.00 | 2 | 60 | 0.058 | 0.334 | 0.400 | 1.49 | 12820 | 1475 | 197.3 |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



| d1 [mm] | z | v _c [m/min] | f _z [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _c [mm/min] | β [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
| 0.20 | 2 | 25 | 0.008 | 0.008 | 0.008 | 0.19 | 41885 | 670 | 45° |
| 0.30 | 2 | 37 | 0.010 | 0.012 | 0.012 | 0.28 | 42060 | 840 | 45° |
| 0.40 | 2 | 49 | 0.014 | 0.016 | 0.016 | 0.37 | 42155 | 1180 | 45° |
| 0.50 | 2 | 62 | 0.020 | 0.022 | 0.022 | 0.47 | 41990 | 1680 | 45° |
| 0.60 | 2 | 74 | 0.020 | 0.026 | 0.026 | 0.56 | 42060 | 1680 | 45° |
| 0.80 | 2 | 99 | 0.022 | 0.034 | 0.034 | 0.75 | 42015 | 1850 | 45° |
| 1.00 | 2 | 123 | 0.028 | 0.042 | 0.042 | 0.93 | 42100 | 2360 | 45° |
| 1.50 | 2 | 185 | 0.034 | 0.064 | 0.064 | 1.40 | 42060 | 2860 | 45° |
| 2.00 | 2 | 245 | 0.038 | 0.084 | 0.084 | 1.86 | 41930 | 3185 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.20 | 2 | 25 | 0.008 | 0.008 | 0.008 | 0.19 | 41885 | 670 | 45° |
| 0.30 | 2 | 37 | 0.010 | 0.012 | 0.012 | 0.28 | 42060 | 840 | 45° |
| 0.40 | 2 | 49 | 0.014 | 0.016 | 0.016 | 0.37 | 42155 | 1180 | 45° |
| 0.50 | 2 | 62 | 0.020 | 0.022 | 0.022 | 0.47 | 41990 | 1680 | 45° |
| 0.60 | 2 | 74 | 0.020 | 0.026 | 0.026 | 0.56 | 42060 | 1680 | 45° |
| 0.80 | 2 | 99 | 0.020 | 0.034 | 0.034 | 0.75 | 42015 | 1680 | 45° |
| 1.00 | 2 | 123 | 0.026 | 0.042 | 0.042 | 0.93 | 42100 | 2190 | 45° |
| 1.50 | 2 | 185 | 0.032 | 0.064 | 0.064 | 1.40 | 42060 | 2690 | 45° |
| 2.00 | 2 | 245 | 0.036 | 0.084 | 0.084 | 1.86 | 41930 | 3020 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.20 | 2 | 25 | 0.008 | 0.008 | 0.008 | 0.19 | 41885 | 670 | 45° |
| 0.30 | 2 | 37 | 0.010 | 0.012 | 0.012 | 0.28 | 42060 | 840 | 45° |
| 0.40 | 2 | 49 | 0.012 | 0.016 | 0.016 | 0.37 | 42155 | 1010 | 45° |
| 0.50 | 2 | 62 | 0.018 | 0.022 | 0.022 | 0.47 | 41990 | 1510 | 45° |
| 0.60 | 2 | 74 | 0.018 | 0.026 | 0.026 | 0.56 | 42060 | 1515 | 45° |
| 0.80 | 2 | 99 | 0.020 | 0.034 | 0.034 | 0.75 | 42015 | 1680 | 45° |
| 1.00 | 2 | 123 | 0.026 | 0.042 | 0.042 | 0.93 | 42100 | 2190 | 45° |
| 1.50 | 2 | 185 | 0.030 | 0.064 | 0.064 | 1.40 | 42060 | 2525 | 45° |
| 2.00 | 2 | 200 | 0.034 | 0.084 | 0.084 | 1.86 | 34225 | 2325 | 45° |

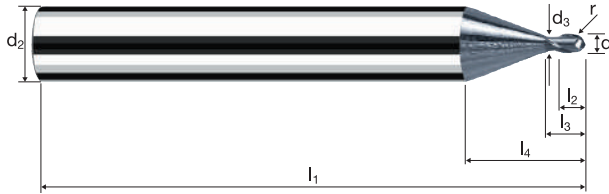
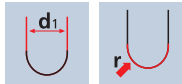
| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.20 | 2 | 25 | 0.006 | 0.008 | 0.008 | 0.19 | 41885 | 505 | 45° |
| 0.30 | 2 | 37 | 0.008 | 0.012 | 0.012 | 0.28 | 42060 | 675 | 45° |
| 0.40 | 2 | 49 | 0.012 | 0.016 | 0.016 | 0.37 | 42155 | 1010 | 45° |
| 0.50 | 2 | 62 | 0.016 | 0.022 | 0.022 | 0.47 | 41990 | 1345 | 45° |
| 0.60 | 2 | 74 | 0.016 | 0.026 | 0.026 | 0.56 | 42060 | 1345 | 45° |
| 0.80 | 2 | 99 | 0.018 | 0.034 | 0.034 | 0.75 | 42015 | 1515 | 45° |
| 1.00 | 2 | 123 | 0.022 | 0.042 | 0.042 | 0.93 | 42100 | 1850 | 45° |
| 1.50 | 2 | 150 | 0.028 | 0.064 | 0.064 | 1.40 | 34105 | 1910 | 45° |
| 2.00 | 2 | 150 | 0.030 | 0.084 | 0.084 | 1.86 | 25670 | 1540 | 45° |

Frese con estremità emisferica MicroX

Gambo ø 6mm, scarico cilindrico, 1xd



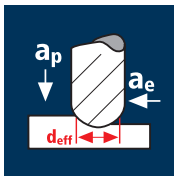
| | |
|----|---------------|
| HM | λ 30° |
| XA | γ -10° |



| | | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--------------|--------------|-------------|-------------------|----------------|-------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Inox Stainless | Ti Titanium | Cobalt-Chrome Copper |
|-------------|----------------|-----------------|-----------------|--------------|--------------|-------------|-------------------|----------------|-------------------------|

| Esempio: N° Ordine | | | | | | | | | | | X-AL |
|--------------------|----------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------------|-------|---|--------|
| Rivestimento X | | | | | | | | | | | X6560 |
| Articolo 6560 | | | | | | | | | | | EUR |
| Codice-ø 010 | | | | | | | | | | | |
| Ø Code | d ₁ | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.005 | α | z | |
| 010 | 0.10 | 6.00 | 0.09 | 57 | 0.10 | 0.10 | 17.27 | 0.050 | 14.9° | 2 | 110.00 |
| 020 | 0.20 | 6.00 | 0.18 | 57 | 0.20 | 0.20 | 17.10 | 0.100 | 14.8° | 2 | 88.00 |
| 030 | 0.30 | 6.00 | 0.25 | 57 | 0.30 | 0.30 | 16.94 | 0.150 | 14.7° | 2 | 80.00 |
| 040 | 0.40 | 6.00 | 0.35 | 57 | 0.40 | 0.40 | 16.78 | 0.200 | 14.6° | 2 | 80.00 |
| 050 | 0.50 | 6.00 | 0.45 | 57 | 0.50 | 0.50 | 11.50 | 0.250 | 14.5° | 2 | 80.00 |
| 060 | 0.60 | 6.00 | 0.55 | 57 | 0.60 | 0.60 | 11.43 | 0.300 | 14.5° | 2 | 80.00 |
| 080 | 0.80 | 6.00 | 0.75 | 57 | 0.80 | 0.80 | 11.30 | 0.400 | 14.3° | 2 | 80.00 |
| 100 | 1.00 | 6.00 | 0.95 | 57 | 1.00 | 1.00 | 11.19 | 0.500 | 14.1° | 2 | 80.00 |
| 120 | 1.50 | 6.00 | 1.40 | 57 | 1.50 | 1.50 | 10.86 | 0.750 | 13.5° | 2 | 80.00 |
| 140 | 2.00 | 6.00 | 1.90 | 57 | 2.00 | 2.00 | 10.52 | 1.000 | 12.9° | 2 | 80.00 |
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Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



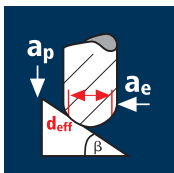
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|--------------------------|
| 0.20 | 2 | 15 | 0.006 | 0.016 | 0.040 | 0.11 | 43405 | 545 | 0.4 |
| 0.30 | 2 | 21 | 0.010 | 0.024 | 0.060 | 0.16 | 41780 | 840 | 1.2 |
| 0.40 | 2 | 29 | 0.013 | 0.032 | 0.080 | 0.22 | 41960 | 1055 | 2.7 |
| 0.50 | 2 | 36 | 0.016 | 0.040 | 0.100 | 0.27 | 42440 | 1390 | 5.6 |
| 0.60 | 2 | 44 | 0.020 | 0.048 | 0.120 | 0.33 | 42440 | 1710 | 9.9 |
| 0.80 | 2 | 58 | 0.026 | 0.065 | 0.160 | 0.44 | 41960 | 2220 | 23.1 |
| 1.00 | 2 | 73 | 0.033 | 0.081 | 0.200 | 0.55 | 42250 | 2770 | 44.8 |
| 1.50 | 2 | 108 | 0.049 | 0.121 | 0.300 | 0.82 | 41925 | 4120 | 149.6 |
| 2.00 | 2 | 140 | 0.066 | 0.162 | 0.400 | 1.09 | 40885 | 5355 | 347.2 |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-------|
| 0.20 | 2 | 15 | 0.006 | 0.016 | 0.040 | 0.11 | 43405 | 520 | 0.3 |
| 0.30 | 2 | 21 | 0.010 | 0.024 | 0.060 | 0.16 | 41780 | 800 | 1.2 |
| 0.40 | 2 | 29 | 0.012 | 0.032 | 0.080 | 0.22 | 41960 | 1005 | 2.6 |
| 0.50 | 2 | 36 | 0.016 | 0.040 | 0.100 | 0.27 | 42440 | 1325 | 5.3 |
| 0.60 | 2 | 44 | 0.019 | 0.048 | 0.120 | 0.33 | 42440 | 1630 | 9.4 |
| 0.80 | 2 | 58 | 0.025 | 0.065 | 0.160 | 0.44 | 41960 | 2115 | 22.0 |
| 1.00 | 2 | 73 | 0.031 | 0.081 | 0.200 | 0.55 | 42250 | 2635 | 42.7 |
| 1.50 | 2 | 108 | 0.047 | 0.121 | 0.300 | 0.82 | 41925 | 3925 | 142.4 |
| 2.00 | 2 | 120 | 0.062 | 0.162 | 0.400 | 1.09 | 35045 | 4375 | 283.4 |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-------|
| 0.20 | 2 | 15 | 0.005 | 0.016 | 0.040 | 0.11 | 43405 | 435 | 0.3 |
| 0.30 | 2 | 21 | 0.008 | 0.024 | 0.060 | 0.16 | 41780 | 670 | 1.0 |
| 0.40 | 2 | 29 | 0.010 | 0.032 | 0.080 | 0.22 | 41960 | 840 | 2.1 |
| 0.50 | 2 | 36 | 0.013 | 0.040 | 0.100 | 0.27 | 42440 | 1105 | 4.4 |
| 0.60 | 2 | 44 | 0.016 | 0.048 | 0.120 | 0.33 | 42440 | 1360 | 7.8 |
| 0.80 | 2 | 58 | 0.021 | 0.065 | 0.160 | 0.44 | 41960 | 1760 | 18.3 |
| 1.00 | 2 | 73 | 0.026 | 0.081 | 0.200 | 0.55 | 42250 | 2195 | 35.6 |
| 1.50 | 2 | 100 | 0.039 | 0.121 | 0.300 | 0.82 | 38820 | 3030 | 109.9 |
| 2.00 | 2 | 100 | 0.052 | 0.162 | 0.400 | 1.09 | 29205 | 3035 | 196.8 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|-------|
| 0.20 | 2 | 15 | 0.004 | 0.016 | 0.040 | 0.11 | 43405 | 390 | 0.3 |
| 0.30 | 2 | 21 | 0.007 | 0.024 | 0.060 | 0.16 | 41780 | 600 | 0.9 |
| 0.40 | 2 | 29 | 0.009 | 0.032 | 0.080 | 0.22 | 41960 | 755 | 1.9 |
| 0.50 | 2 | 36 | 0.012 | 0.040 | 0.100 | 0.27 | 42440 | 995 | 4.0 |
| 0.60 | 2 | 44 | 0.014 | 0.048 | 0.120 | 0.33 | 42440 | 1220 | 7.0 |
| 0.80 | 2 | 58 | 0.019 | 0.065 | 0.160 | 0.44 | 41960 | 1585 | 16.5 |
| 1.00 | 2 | 60 | 0.023 | 0.081 | 0.200 | 0.55 | 34725 | 1625 | 26.3 |
| 1.50 | 2 | 60 | 0.035 | 0.121 | 0.300 | 0.82 | 23290 | 1635 | 59.4 |
| 2.00 | 2 | 60 | 0.047 | 0.162 | 0.400 | 1.09 | 17520 | 1640 | 103.3 |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
| 0.20 | 2 | 25 | 0.008 | 0.008 | 0.008 | 0.19 | 41885 | 670 | 45° |
| 0.30 | 2 | 37 | 0.010 | 0.012 | 0.012 | 0.28 | 42060 | 840 | 45° |
| 0.40 | 2 | 49 | 0.014 | 0.016 | 0.016 | 0.37 | 42155 | 1180 | 45° |
| 0.50 | 2 | 62 | 0.020 | 0.022 | 0.022 | 0.47 | 41990 | 1680 | 45° |
| 0.60 | 2 | 74 | 0.020 | 0.026 | 0.026 | 0.56 | 42060 | 1680 | 45° |
| 0.80 | 2 | 99 | 0.022 | 0.034 | 0.034 | 0.75 | 42015 | 1850 | 45° |
| 1.00 | 2 | 123 | 0.028 | 0.042 | 0.042 | 0.93 | 42100 | 2360 | 45° |
| 1.50 | 2 | 185 | 0.034 | 0.064 | 0.064 | 1.40 | 42060 | 2860 | 45° |
| 2.00 | 2 | 245 | 0.038 | 0.084 | 0.084 | 1.86 | 41930 | 3185 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.20 | 2 | 25 | 0.008 | 0.008 | 0.008 | 0.19 | 41885 | 670 | 45° |
| 0.30 | 2 | 37 | 0.010 | 0.012 | 0.012 | 0.28 | 42060 | 840 | 45° |
| 0.40 | 2 | 49 | 0.014 | 0.016 | 0.016 | 0.37 | 42155 | 1180 | 45° |
| 0.50 | 2 | 62 | 0.020 | 0.022 | 0.022 | 0.47 | 41990 | 1680 | 45° |
| 0.60 | 2 | 74 | 0.020 | 0.026 | 0.026 | 0.56 | 42060 | 1680 | 45° |
| 0.80 | 2 | 99 | 0.020 | 0.034 | 0.034 | 0.75 | 42015 | 1680 | 45° |
| 1.00 | 2 | 123 | 0.026 | 0.042 | 0.042 | 0.93 | 42100 | 2190 | 45° |
| 1.50 | 2 | 185 | 0.032 | 0.064 | 0.064 | 1.40 | 42060 | 2690 | 45° |
| 2.00 | 2 | 245 | 0.036 | 0.084 | 0.084 | 1.86 | 41930 | 3020 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.20 | 2 | 25 | 0.008 | 0.008 | 0.008 | 0.19 | 41885 | 670 | 45° |
| 0.30 | 2 | 37 | 0.010 | 0.012 | 0.012 | 0.28 | 42060 | 840 | 45° |
| 0.40 | 2 | 49 | 0.012 | 0.016 | 0.016 | 0.37 | 42155 | 1010 | 45° |
| 0.50 | 2 | 62 | 0.018 | 0.022 | 0.022 | 0.47 | 41990 | 1510 | 45° |
| 0.60 | 2 | 74 | 0.018 | 0.026 | 0.026 | 0.56 | 42060 | 1515 | 45° |
| 0.80 | 2 | 99 | 0.020 | 0.034 | 0.034 | 0.75 | 42015 | 1680 | 45° |
| 1.00 | 2 | 123 | 0.026 | 0.042 | 0.042 | 0.93 | 42100 | 2190 | 45° |
| 1.50 | 2 | 185 | 0.030 | 0.064 | 0.064 | 1.40 | 42060 | 2525 | 45° |
| 2.00 | 2 | 200 | 0.034 | 0.084 | 0.084 | 1.86 | 34225 | 2325 | 45° |

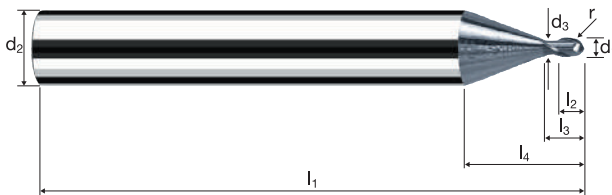
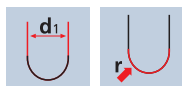
| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.20 | 2 | 25 | 0.006 | 0.008 | 0.008 | 0.19 | 41885 | 505 | 45° |
| 0.30 | 2 | 37 | 0.008 | 0.012 | 0.012 | 0.28 | 42060 | 675 | 45° |
| 0.40 | 2 | 49 | 0.012 | 0.016 | 0.016 | 0.37 | 42155 | 1010 | 45° |
| 0.50 | 2 | 62 | 0.016 | 0.022 | 0.022 | 0.47 | 41990 | 1345 | 45° |
| 0.60 | 2 | 74 | 0.016 | 0.026 | 0.026 | 0.56 | 42060 | 1345 | 45° |
| 0.80 | 2 | 99 | 0.018 | 0.034 | 0.034 | 0.75 | 42015 | 1515 | 45° |
| 1.00 | 2 | 123 | 0.022 | 0.042 | 0.042 | 0.93 | 42100 | 1850 | 45° |
| 1.50 | 2 | 150 | 0.028 | 0.064 | 0.064 | 1.40 | 34105 | 1910 | 45° |
| 2.00 | 2 | 150 | 0.030 | 0.084 | 0.084 | 1.86 | 25670 | 1540 | 45° |

Frese con estremità emisferica MicroX

Gambo \varnothing 6mm, scarico cilindrico, 2xd



HM λ 30°
XA γ -10°

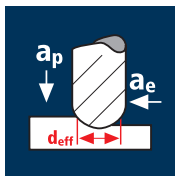


ReTool®

| | | | | | | | | | |
|----------|-------------|--------------|--------------|-----------|-----------|----------|----------------|-------------|----------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Inox Stainless | Ti Titanium | Cobalt-Chrome Copper |
|----------|-------------|--------------|--------------|-----------|-----------|----------|----------------|-------------|----------------------|

| Esempio: N° Ordine | | Rivestimento X | Articolo 6561 | Codice- \varnothing 010 | | | | | | | | X-AL |
|--------------------|----------------|-------------------------------|----------------|---------------------------|----------------|----------------|----------------|---------------|----------|---|--------|------|
| \varnothing Code | d ₁ | d ₂ h ₄ | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ± 0.005 | α | z | EUR | |
| 010 | 0.10 | 6.00 | 0.09 | 57 | 0.10 | 0.20 | 17.45 | 0.050 | 14.8° | 2 | 110.00 | |
| 020 | 0.20 | 6.00 | 0.18 | 57 | 0.20 | 0.40 | 17.34 | 0.100 | 14.6° | 2 | 88.00 | |
| 030 | 0.30 | 6.00 | 0.25 | 57 | 0.30 | 0.60 | 17.34 | 0.150 | 14.3° | 2 | 80.00 | |
| 040 | 0.40 | 6.00 | 0.35 | 57 | 0.40 | 0.80 | 17.26 | 0.200 | 14.1° | 2 | 80.00 | |
| 050 | 0.50 | 6.00 | 0.45 | 57 | 0.50 | 1.00 | 12.01 | 0.250 | 13.9° | 2 | 80.00 | |
| 060 | 0.60 | 6.00 | 0.55 | 57 | 0.60 | 1.20 | 12.03 | 0.300 | 13.7° | 2 | 80.00 | |
| 080 | 0.80 | 6.00 | 0.75 | 57 | 0.80 | 1.60 | 12.05 | 0.400 | 13.3° | 2 | 80.00 | |
| 100 | 1.00 | 6.00 | 0.95 | 57 | 1.00 | 2.00 | 12.08 | 0.500 | 12.9° | 2 | 80.00 | |
| 120 | 1.50 | 6.00 | 1.40 | 57 | 1.50 | 3.00 | 12.24 | 0.750 | 11.7° | 2 | 80.00 | |
| 140 | 2.00 | 6.00 | 1.90 | 57 | 2.00 | 4.00 | 12.31 | 1.000 | 10.6° | 2 | 80.00 | |
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Applicazione



Materiale

Acciaio da utensile temprato 42 - 48 HRC

| d1 [mm] | z | v _c [m/min] | f _f [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _c [mm/min] | Q [mm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|--------------------------|
| 0.10 | 2 | 7 | 0.004 | 0.006 | 0.020 | 0.05 | 44565 | 335 | 0.0 |
| 0.20 | 2 | 13 | 0.006 | 0.013 | 0.040 | 0.10 | 41380 | 520 | 0.3 |
| 0.30 | 2 | 20 | 0.010 | 0.019 | 0.060 | 0.15 | 42440 | 855 | 1.0 |
| 0.40 | 2 | 26 | 0.013 | 0.026 | 0.080 | 0.20 | 41380 | 1045 | 2.2 |
| 0.50 | 2 | 32 | 0.016 | 0.032 | 0.100 | 0.24 | 42440 | 1390 | 4.4 |
| 0.60 | 2 | 40 | 0.019 | 0.039 | 0.120 | 0.30 | 42440 | 1605 | 7.5 |
| 0.80 | 2 | 51 | 0.025 | 0.052 | 0.160 | 0.39 | 41625 | 2100 | 17.5 |
| 1.00 | 2 | 65 | 0.032 | 0.064 | 0.200 | 0.49 | 42225 | 2660 | 34.1 |

Acciaio da utensile temprato 48 - 52 HRC

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|------|
| 0.10 | 2 | 7 | 0.004 | 0.006 | 0.020 | 0.05 | 44565 | 320 | 0.0 |
| 0.20 | 2 | 13 | 0.006 | 0.013 | 0.040 | 0.10 | 41380 | 495 | 0.3 |
| 0.30 | 2 | 20 | 0.010 | 0.019 | 0.060 | 0.15 | 42440 | 815 | 0.9 |
| 0.40 | 2 | 26 | 0.012 | 0.026 | 0.080 | 0.20 | 41380 | 995 | 2.1 |
| 0.50 | 2 | 32 | 0.016 | 0.032 | 0.100 | 0.24 | 42440 | 1325 | 4.2 |
| 0.60 | 2 | 40 | 0.018 | 0.039 | 0.120 | 0.30 | 42440 | 1530 | 7.2 |
| 0.80 | 2 | 51 | 0.024 | 0.052 | 0.160 | 0.39 | 41625 | 2000 | 16.6 |
| 1.00 | 2 | 65 | 0.030 | 0.064 | 0.200 | 0.49 | 42225 | 2535 | 32.4 |

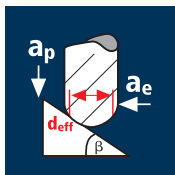
Acciaio da utensile temprato 52 - 56 HRC

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|------|
| 0.10 | 2 | 7 | 0.003 | 0.006 | 0.020 | 0.05 | 44565 | 265 | 0.0 |
| 0.20 | 2 | 13 | 0.005 | 0.013 | 0.040 | 0.10 | 41380 | 415 | 0.2 |
| 0.30 | 2 | 20 | 0.008 | 0.019 | 0.060 | 0.15 | 42440 | 680 | 0.8 |
| 0.40 | 2 | 26 | 0.010 | 0.026 | 0.080 | 0.20 | 41380 | 830 | 1.7 |
| 0.50 | 2 | 32 | 0.013 | 0.032 | 0.100 | 0.24 | 42440 | 1105 | 3.5 |
| 0.60 | 2 | 40 | 0.015 | 0.039 | 0.120 | 0.30 | 42440 | 1275 | 6.0 |
| 0.80 | 2 | 51 | 0.020 | 0.052 | 0.160 | 0.39 | 41625 | 1665 | 13.9 |
| 1.00 | 2 | 65 | 0.025 | 0.064 | 0.200 | 0.49 | 42225 | 2110 | 27.0 |

Acciaio da utensile temprato 56 - 60 HRC

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|------|
| 0.10 | 2 | 7 | 0.003 | 0.006 | 0.020 | 0.05 | 44565 | 240 | 0.0 |
| 0.20 | 2 | 13 | 0.004 | 0.013 | 0.040 | 0.10 | 41380 | 370 | 0.2 |
| 0.30 | 2 | 20 | 0.007 | 0.019 | 0.060 | 0.15 | 42440 | 610 | 0.7 |
| 0.40 | 2 | 26 | 0.009 | 0.026 | 0.080 | 0.20 | 41380 | 745 | 1.5 |
| 0.50 | 2 | 32 | 0.012 | 0.032 | 0.100 | 0.24 | 42440 | 995 | 3.2 |
| 0.60 | 2 | 40 | 0.014 | 0.039 | 0.120 | 0.30 | 42440 | 1145 | 5.4 |
| 0.80 | 2 | 51 | 0.018 | 0.052 | 0.160 | 0.39 | 41625 | 1500 | 12.5 |
| 1.00 | 2 | 60 | 0.023 | 0.064 | 0.200 | 0.49 | 38975 | 1755 | 22.5 |

Applicazione



Materiale

Acciaio da utensile temprato 42 - 48 HRC

| d1 [mm] | z | v _c [m/min] | f _f [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _c [mm/min] | β [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
| 0.10 | 2 | 12 | 0.006 | 0.004 | 0.004 | 0.09 | 42440 | 510 | 45° |
| 0.20 | 2 | 25 | 0.008 | 0.008 | 0.008 | 0.19 | 41885 | 670 | 45° |
| 0.30 | 2 | 37 | 0.010 | 0.012 | 0.012 | 0.28 | 42060 | 840 | 45° |
| 0.40 | 2 | 49 | 0.014 | 0.016 | 0.016 | 0.37 | 42155 | 1180 | 45° |
| 0.50 | 2 | 62 | 0.020 | 0.022 | 0.022 | 0.47 | 41990 | 1680 | 45° |
| 0.60 | 2 | 74 | 0.020 | 0.026 | 0.026 | 0.56 | 42060 | 1680 | 45° |
| 0.80 | 2 | 99 | 0.022 | 0.034 | 0.034 | 0.75 | 42015 | 1850 | 45° |
| 1.00 | 2 | 123 | 0.028 | 0.042 | 0.042 | 0.93 | 42100 | 2360 | 45° |

Acciaio da utensile temprato 48 - 52 HRC

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.10 | 2 | 12 | 0.006 | 0.004 | 0.004 | 0.09 | 42440 | 510 | 45° |
| 0.20 | 2 | 25 | 0.008 | 0.008 | 0.008 | 0.19 | 41885 | 670 | 45° |
| 0.30 | 2 | 37 | 0.010 | 0.012 | 0.012 | 0.28 | 42060 | 840 | 45° |
| 0.40 | 2 | 49 | 0.014 | 0.016 | 0.016 | 0.37 | 42155 | 1180 | 45° |
| 0.50 | 2 | 62 | 0.020 | 0.022 | 0.022 | 0.47 | 41990 | 1680 | 45° |
| 0.60 | 2 | 74 | 0.020 | 0.026 | 0.026 | 0.56 | 42060 | 1680 | 45° |
| 0.80 | 2 | 99 | 0.020 | 0.034 | 0.034 | 0.75 | 42015 | 1680 | 45° |
| 1.00 | 2 | 123 | 0.026 | 0.042 | 0.042 | 0.93 | 42100 | 2190 | 45° |

Acciaio da utensile temprato 52 - 56 HRC

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.10 | 2 | 12 | 0.006 | 0.004 | 0.004 | 0.09 | 42440 | 510 | 45° |
| 0.20 | 2 | 25 | 0.008 | 0.008 | 0.008 | 0.19 | 41885 | 670 | 45° |
| 0.30 | 2 | 37 | 0.010 | 0.012 | 0.012 | 0.28 | 42060 | 840 | 45° |
| 0.40 | 2 | 49 | 0.012 | 0.016 | 0.016 | 0.37 | 42155 | 1010 | 45° |
| 0.50 | 2 | 62 | 0.018 | 0.022 | 0.022 | 0.47 | 41990 | 1510 | 45° |
| 0.60 | 2 | 74 | 0.018 | 0.026 | 0.026 | 0.56 | 42060 | 1515 | 45° |
| 0.80 | 2 | 99 | 0.020 | 0.034 | 0.034 | 0.75 | 42015 | 1680 | 45° |
| 1.00 | 2 | 123 | 0.026 | 0.042 | 0.042 | 0.93 | 42100 | 2190 | 45° |

Acciaio da utensile temprato 56 - 60 HRC

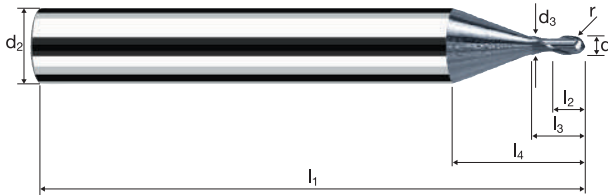
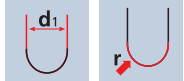
| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.10 | 2 | 12 | 0.004 | 0.004 | 0.004 | 0.09 | 42440 | 340 | 45° |
| 0.20 | 2 | 25 | 0.006 | 0.008 | 0.008 | 0.19 | 41885 | 505 | 45° |
| 0.30 | 2 | 37 | 0.008 | 0.012 | 0.012 | 0.28 | 42060 | 675 | 45° |
| 0.40 | 2 | 49 | 0.012 | 0.016 | 0.016 | 0.37 | 42155 | 1010 | 45° |
| 0.50 | 2 | 62 | 0.016 | 0.022 | 0.022 | 0.47 | 41990 | 1345 | 45° |
| 0.60 | 2 | 74 | 0.016 | 0.026 | 0.026 | 0.56 | 42060 | 1345 | 45° |
| 0.80 | 2 | 99 | 0.018 | 0.034 | 0.034 | 0.75 | 42015 | 1515 | 45° |
| 1.00 | 2 | 123 | 0.022 | 0.042 | 0.042 | 0.93 | 42100 | 1850 | 45° |

Frese con estremità emisferica MicroX

Gambo ø 6mm, scarico cilindrico, 2.5xd



HM λ 30°
XA γ -10°



ReTool®

| | | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--------------|--------------|-------------|-------------------|----------------|-------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Inox Stainless | Ti Titanium | Cobalt-Chrome Copper |
|-------------|----------------|-----------------|-----------------|--------------|--------------|-------------|-------------------|----------------|-------------------------|

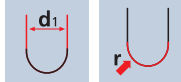
| Esempio: N° Ordine | | | | | | | | | | | | X-AL | |
|--------------------------|----------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------------|-------|---|--------|------|-------|
| Rivestimento X | | | | | | | | | | | | | X6581 |
| Articolo 6581 | | | | | | | | | | | | | EUR |
| Ø Code | d ₁ | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.005 | α | z | EUR | | |
| 010 | 0.10 | 6.00 | 0.09 | 57 | 0.10 | 0.25 | 17.50 | 0.050 | 14.8° | 2 | 110.00 | | |
| 020 | 0.20 | 6.00 | 0.18 | 57 | 0.20 | 0.50 | 17.44 | 0.100 | 14.5° | 2 | 88.00 | | |
| 030 | 0.30 | 6.00 | 0.25 | 57 | 0.30 | 0.75 | 17.49 | 0.150 | 14.1° | 2 | 80.00 | | |
| 040 | 0.40 | 6.00 | 0.35 | 57 | 0.40 | 1.00 | 17.46 | 0.200 | 13.9° | 2 | 80.00 | | |
| 050 | 0.50 | 6.00 | 0.45 | 57 | 0.50 | 1.25 | 12.26 | 0.250 | 13.6° | 2 | 80.00 | | |
| 060 | 0.60 | 6.00 | 0.55 | 57 | 0.60 | 1.50 | 12.33 | 0.300 | 13.4° | 2 | 80.00 | | |
| 080 | 0.80 | 6.00 | 0.75 | 57 | 0.80 | 2.00 | 12.45 | 0.400 | 12.9° | 2 | 80.00 | | |
| 100 | 1.00 | 6.00 | 0.95 | 57 | 1.00 | 2.50 | 12.58 | 0.500 | 12.3° | 2 | 80.00 | | |

Frese con estremità emisferica MicroX

Gambo \varnothing 6mm, scarico cilindrico, 3xd



HM λ 30°
XA γ -10°

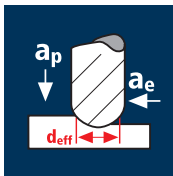


ReTool®

| | | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--------------|--------------|-------------|-------------------|----------------|-------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Inox Stainless | Ti Titanium | Cobalt-Chrome Copper |
|-------------|----------------|-----------------|-----------------|--------------|--------------|-------------|-------------------|----------------|-------------------------|

| Esempio: N° Ordine | | | | | | | | | | | X-AL |
|-----------------------|----------------|----------------------|----------------|----------------|----------------|----------------|----------------|------------------|----------|---|--------|
| Rivestimento | | | | | | | | | | | X6562 |
| Articolo | | | | | | | | | | | EUR |
| Codice- \varnothing | | | | | | | | | | | EUR |
| \varnothing Code | d ₁ | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ± 0.005 | α | z | EUR |
| 010 | 0.10 | 6.00 | 0.09 | 57 | 0.10 | 0.30 | 17.55 | 0.050 | 14.7° | 2 | 110.00 |
| 020 | 0.20 | 6.00 | 0.18 | 57 | 0.20 | 0.60 | 17.54 | 0.100 | 14.4° | 2 | 88.00 |
| 030 | 0.30 | 6.00 | 0.25 | 57 | 0.30 | 0.90 | 17.64 | 0.150 | 14.0° | 2 | 80.00 |
| 040 | 0.40 | 6.00 | 0.35 | 57 | 0.40 | 1.20 | 17.66 | 0.200 | 13.7° | 2 | 80.00 |
| 050 | 0.50 | 6.00 | 0.45 | 57 | 0.50 | 1.50 | 12.51 | 0.250 | 13.3° | 2 | 80.00 |
| 060 | 0.60 | 6.00 | 0.55 | 57 | 0.60 | 1.80 | 12.63 | 0.300 | 13.0° | 2 | 80.00 |
| 080 | 0.80 | 6.00 | 0.75 | 57 | 0.80 | 2.40 | 12.85 | 0.400 | 12.4° | 2 | 80.00 |
| 100 | 1.00 | 6.00 | 0.95 | 57 | 1.00 | 3.00 | 13.08 | 0.500 | 11.8° | 2 | 80.00 |
| 108 | 1.20 | 6.00 | 1.10 | 57 | 1.20 | 3.60 | 13.40 | 0.600 | 11.2° | 2 | 80.00 |
| 120 | 1.50 | 6.00 | 1.40 | 57 | 1.50 | 4.50 | 13.74 | 0.750 | 10.3° | 2 | 80.00 |
| 140 | 2.00 | 6.00 | 1.90 | 57 | 2.00 | 6.00 | 14.31 | 1.000 | 9.0° | 2 | 80.00 |
| 152 | 2.30 | 6.00 | 2.10 | 57 | 2.30 | 6.90 | 14.84 | 1.150 | 8.1° | 2 | 80.00 |
| 160 | 2.50 | 6.00 | 2.30 | 57 | 2.50 | 7.50 | 15.06 | 1.250 | 7.6° | 2 | 80.00 |
| 172 | 2.80 | 6.00 | 2.60 | 57 | 2.80 | 8.40 | 15.40 | 1.400 | 6.8° | 2 | 80.00 |
| 180 | 3.00 | 6.00 | 2.80 | 57 | 3.00 | 9.00 | 15.63 | 1.500 | 6.4° | 2 | 80.00 |

Applicazione



Materiale

Acciaio da utensile temprato 42 - 48 HRC

Acciaio da utensile temprato 48 - 52 HRC

Acciaio da utensile temprato 52 - 56 HRC

Acciaio da utensile temprato 56 - 60 HRC

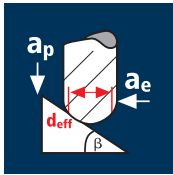
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _c [mm/min] | Q [mm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|--------------------------|
| 0.10 | 2 | 5 | 0.004 | 0.005 | 0.020 | 0.04 | 39790 | 300 | 0.0 |
| 0.20 | 2 | 11 | 0.006 | 0.009 | 0.040 | 0.08 | 43770 | 550 | 0.2 |
| 0.30 | 2 | 17 | 0.010 | 0.014 | 0.060 | 0.13 | 41625 | 840 | 0.7 |
| 0.40 | 2 | 22 | 0.013 | 0.018 | 0.080 | 0.17 | 41195 | 1040 | 1.5 |
| 0.50 | 2 | 28 | 0.016 | 0.023 | 0.100 | 0.21 | 42440 | 1390 | 3.2 |
| 0.60 | 2 | 33 | 0.019 | 0.028 | 0.120 | 0.25 | 42015 | 1590 | 5.3 |
| 0.80 | 2 | 45 | 0.025 | 0.037 | 0.160 | 0.34 | 42130 | 2125 | 12.6 |
| 1.00 | 2 | 55 | 0.032 | 0.046 | 0.200 | 0.42 | 41685 | 2625 | 24.2 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|------|
| 0.10 | 2 | 5 | 0.004 | 0.005 | 0.020 | 0.04 | 39790 | 285 | 0.0 |
| 0.20 | 2 | 11 | 0.006 | 0.009 | 0.040 | 0.08 | 43770 | 525 | 0.2 |
| 0.30 | 2 | 17 | 0.010 | 0.014 | 0.060 | 0.13 | 41625 | 800 | 0.7 |
| 0.40 | 2 | 22 | 0.012 | 0.018 | 0.080 | 0.17 | 41195 | 990 | 1.4 |
| 0.50 | 2 | 28 | 0.016 | 0.023 | 0.100 | 0.21 | 42440 | 1325 | 3.0 |
| 0.60 | 2 | 33 | 0.018 | 0.028 | 0.120 | 0.25 | 42015 | 1515 | 5.1 |
| 0.80 | 2 | 45 | 0.024 | 0.037 | 0.160 | 0.34 | 42130 | 2020 | 12.0 |
| 1.00 | 2 | 55 | 0.030 | 0.046 | 0.200 | 0.42 | 41685 | 2500 | 23.0 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|------|
| 0.10 | 2 | 5 | 0.003 | 0.005 | 0.020 | 0.04 | 39790 | 240 | 0.0 |
| 0.20 | 2 | 11 | 0.005 | 0.009 | 0.040 | 0.08 | 43770 | 440 | 0.2 |
| 0.30 | 2 | 17 | 0.008 | 0.014 | 0.060 | 0.13 | 41625 | 665 | 0.6 |
| 0.40 | 2 | 22 | 0.010 | 0.018 | 0.080 | 0.17 | 41195 | 825 | 1.2 |
| 0.50 | 2 | 28 | 0.013 | 0.023 | 0.100 | 0.21 | 42440 | 1105 | 2.5 |
| 0.60 | 2 | 33 | 0.015 | 0.028 | 0.120 | 0.25 | 42015 | 1260 | 4.2 |
| 0.80 | 2 | 45 | 0.020 | 0.037 | 0.160 | 0.34 | 42130 | 1685 | 10.0 |
| 1.00 | 2 | 55 | 0.025 | 0.046 | 0.200 | 0.42 | 41685 | 2085 | 19.2 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|------|
| 0.10 | 2 | 5 | 0.003 | 0.005 | 0.020 | 0.04 | 39790 | 215 | 0.0 |
| 0.20 | 2 | 11 | 0.004 | 0.009 | 0.040 | 0.08 | 43770 | 395 | 0.1 |
| 0.30 | 2 | 17 | 0.007 | 0.014 | 0.060 | 0.13 | 41625 | 600 | 0.5 |
| 0.40 | 2 | 22 | 0.009 | 0.018 | 0.080 | 0.17 | 41195 | 740 | 1.1 |
| 0.50 | 2 | 28 | 0.012 | 0.023 | 0.100 | 0.21 | 42440 | 995 | 2.3 |
| 0.60 | 2 | 33 | 0.014 | 0.028 | 0.120 | 0.25 | 42015 | 1135 | 3.8 |
| 0.80 | 2 | 45 | 0.018 | 0.037 | 0.160 | 0.34 | 42130 | 1515 | 9.0 |
| 1.00 | 2 | 55 | 0.023 | 0.046 | 0.200 | 0.42 | 41685 | 1875 | 17.3 |

Applicazione



Materiale

Acciaio da utensile temprato 42 - 48 HRC

Acciaio da utensile temprato 48 - 52 HRC

Acciaio da utensile temprato 52 - 56 HRC

Acciaio da utensile temprato 56 - 60 HRC

| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _c [mm/min] | β [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
| 0.10 | 2 | 12 | 0.006 | 0.004 | 0.004 | 0.09 | 42440 | 510 | 45° |
| 0.20 | 2 | 25 | 0.008 | 0.008 | 0.008 | 0.19 | 41885 | 670 | 45° |
| 0.30 | 2 | 37 | 0.010 | 0.012 | 0.012 | 0.28 | 42060 | 840 | 45° |
| 0.40 | 2 | 49 | 0.014 | 0.016 | 0.016 | 0.37 | 42155 | 1180 | 45° |
| 0.50 | 2 | 62 | 0.020 | 0.022 | 0.022 | 0.47 | 41990 | 1680 | 45° |
| 0.60 | 2 | 74 | 0.020 | 0.026 | 0.026 | 0.56 | 42060 | 1680 | 45° |
| 0.80 | 2 | 99 | 0.022 | 0.034 | 0.034 | 0.75 | 42015 | 1850 | 45° |
| 1.00 | 2 | 123 | 0.028 | 0.042 | 0.042 | 0.93 | 42100 | 2360 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.10 | 2 | 12 | 0.006 | 0.004 | 0.004 | 0.09 | 42440 | 510 | 45° |
| 0.20 | 2 | 25 | 0.008 | 0.008 | 0.008 | 0.19 | 41885 | 670 | 45° |
| 0.30 | 2 | 37 | 0.010 | 0.012 | 0.012 | 0.28 | 42060 | 840 | 45° |
| 0.40 | 2 | 49 | 0.014 | 0.016 | 0.016 | 0.37 | 42155 | 1180 | 45° |
| 0.50 | 2 | 62 | 0.020 | 0.022 | 0.022 | 0.47 | 41990 | 1680 | 45° |
| 0.60 | 2 | 74 | 0.020 | 0.026 | 0.026 | 0.56 | 42060 | 1680 | 45° |
| 0.80 | 2 | 99 | 0.020 | 0.034 | 0.034 | 0.75 | 42015 | 1680 | 45° |
| 1.00 | 2 | 123 | 0.026 | 0.042 | 0.042 | 0.93 | 42100 | 2190 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.10 | 2 | 12 | 0.006 | 0.004 | 0.004 | 0.09 | 42440 | 510 | 45° |
| 0.20 | 2 | 25 | 0.008 | 0.008 | 0.008 | 0.19 | 41885 | 670 | 45° |
| 0.30 | 2 | 37 | 0.010 | 0.012 | 0.012 | 0.28 | 42060 | 840 | 45° |
| 0.40 | 2 | 49 | 0.012 | 0.016 | 0.016 | 0.37 | 42155 | 1010 | 45° |
| 0.50 | 2 | 62 | 0.018 | 0.022 | 0.022 | 0.47 | 41990 | 1510 | 45° |
| 0.60 | 2 | 74 | 0.018 | 0.026 | 0.026 | 0.56 | 42060 | 1515 | 45° |
| 0.80 | 2 | 99 | 0.020 | 0.034 | 0.034 | 0.75 | 42015 | 1680 | 45° |
| 1.00 | 2 | 123 | 0.026 | 0.042 | 0.042 | 0.93 | 42100 | 2190 | 45° |

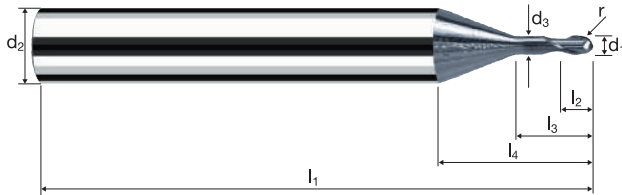
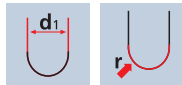
| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.10 | 2 | 12 | 0.004 | 0.004 | 0.004 | 0.09 | 42440 | 340 | 45° |
| 0.20 | 2 | 25 | 0.006 | 0.008 | 0.008 | 0.19 | 41885 | 505 | 45° |
| 0.30 | 2 | 37 | 0.008 | 0.012 | 0.012 | 0.28 | 42060 | 675 | 45° |
| 0.40 | 2 | 49 | 0.012 | 0.016 | 0.016 | 0.37 | 42155 | 1010 | 45° |
| 0.50 | 2 | 62 | 0.016 | 0.022 | 0.022 | 0.47 | 41990 | 1345 | 45° |
| 0.60 | 2 | 74 | 0.016 | 0.026 | 0.026 | 0.56 | 42060 | 1345 | 45° |
| 0.80 | 2 | 99 | 0.018 | 0.034 | 0.034 | 0.75 | 42015 | 1515 | 45° |
| 1.00 | 2 | 123 | 0.022 | 0.042 | 0.042 | 0.93 | 42100 | 1850 | 45° |

Frese con estremità emisferica MicroX

Gambo ø 6mm, scarico cilindrico, 3.5xd



HM λ 30°
XA γ -10°

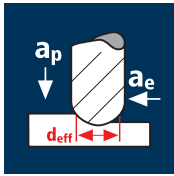


ReTool®

| | | | | | | | | | |
|----------|-------------|--------------|--------------|-----------|-----------|----------|----------------|-------------|----------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Inox Stainless | Ti Titanium | Cobalt-Chrome Copper |
|----------|-------------|--------------|--------------|-----------|-----------|----------|----------------|-------------|----------------------|

| Esempio: N° Ordine | | | | | | | | | | | X-AL |
|--------------------|----------------|-------------------|----------------|----------------|----------------|----------------|----------------|----------|-------|---|--------|
| Rivestimento X | | | | | | | | | | | X6582 |
| Articolo 6582 | | | | | | | | | | | EUR |
| Codice-ø 010 | | | | | | | | | | | EUR |
| Ø Code | d ₁ | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.005 | α | z | EUR |
| 010 | 0.10 | 6.00 | 0.09 | 57 | 0.10 | 0.35 | 17.60 | 0.050 | 14.6° | 2 | 110.00 |
| 020 | 0.20 | 6.00 | 0.18 | 57 | 0.20 | 0.70 | 17.64 | 0.100 | 14.2° | 2 | 88.00 |
| 030 | 0.30 | 6.00 | 0.25 | 57 | 0.30 | 1.05 | 17.79 | 0.150 | 13.8° | 2 | 80.00 |
| 040 | 0.40 | 6.00 | 0.35 | 57 | 0.40 | 1.40 | 17.86 | 0.200 | 13.4° | 2 | 80.00 |
| 050 | 0.50 | 6.00 | 0.45 | 57 | 0.50 | 1.75 | 12.76 | 0.250 | 13.1° | 2 | 80.00 |
| 060 | 0.60 | 6.00 | 0.55 | 57 | 0.60 | 2.10 | 12.93 | 0.300 | 12.7° | 2 | 80.00 |
| 080 | 0.80 | 6.00 | 0.75 | 57 | 0.80 | 2.80 | 13.25 | 0.400 | 12.0° | 2 | 80.00 |
| 100 | 1.00 | 6.00 | 0.95 | 57 | 1.00 | 3.50 | 13.58 | 0.500 | 11.4° | 2 | 80.00 |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



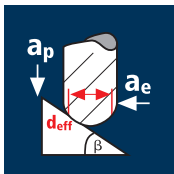
| d1 [mm] | z | v_c [m/min] | f_z [mm] | a_p [mm] | a_e [mm] | d_{eff} [mm] | n [min ⁻¹] | v_r [mm/min] | Q [mm ³ /min] |
|---------|---|---------------|------------|------------|------------|----------------|------------------------|----------------|--------------------------|
| 0.10 | 2 | 5 | 0.004 | 0.004 | 0.020 | 0.04 | 39790 | 300 | 0.0 |
| 0.20 | 2 | 9 | 0.006 | 0.007 | 0.040 | 0.07 | 40925 | 515 | 0.1 |
| 0.30 | 2 | 15 | 0.010 | 0.011 | 0.060 | 0.11 | 43405 | 875 | 0.6 |
| 0.40 | 2 | 20 | 0.013 | 0.014 | 0.080 | 0.15 | 42440 | 1070 | 1.2 |
| 0.50 | 2 | 25 | 0.016 | 0.018 | 0.100 | 0.19 | 41885 | 1370 | 2.5 |
| 0.60 | 2 | 29 | 0.019 | 0.021 | 0.120 | 0.22 | 41960 | 1585 | 4.0 |
| 0.80 | 2 | 40 | 0.025 | 0.029 | 0.160 | 0.30 | 42440 | 2140 | 9.9 |
| 1.00 | 2 | 49 | 0.032 | 0.036 | 0.200 | 0.37 | 42155 | 2655 | 19.1 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|------|
| 0.10 | 2 | 5 | 0.004 | 0.004 | 0.020 | 0.04 | 39790 | 285 | 0.0 |
| 0.20 | 2 | 9 | 0.006 | 0.007 | 0.040 | 0.07 | 40925 | 490 | 0.1 |
| 0.30 | 2 | 15 | 0.010 | 0.011 | 0.060 | 0.11 | 43405 | 835 | 0.6 |
| 0.40 | 2 | 20 | 0.012 | 0.014 | 0.080 | 0.15 | 42440 | 1020 | 1.1 |
| 0.50 | 2 | 25 | 0.016 | 0.018 | 0.100 | 0.19 | 41885 | 1305 | 2.4 |
| 0.60 | 2 | 29 | 0.018 | 0.021 | 0.120 | 0.22 | 41960 | 1510 | 3.8 |
| 0.80 | 2 | 40 | 0.024 | 0.029 | 0.160 | 0.30 | 42440 | 2035 | 9.5 |
| 1.00 | 2 | 49 | 0.030 | 0.036 | 0.200 | 0.37 | 42155 | 2530 | 18.2 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|------|
| 0.10 | 2 | 5 | 0.003 | 0.004 | 0.020 | 0.04 | 39790 | 240 | 0.0 |
| 0.20 | 2 | 9 | 0.005 | 0.007 | 0.040 | 0.07 | 40925 | 410 | 0.1 |
| 0.30 | 2 | 15 | 0.008 | 0.011 | 0.060 | 0.11 | 43405 | 695 | 0.5 |
| 0.40 | 2 | 20 | 0.010 | 0.014 | 0.080 | 0.15 | 42440 | 850 | 1.0 |
| 0.50 | 2 | 25 | 0.013 | 0.018 | 0.100 | 0.19 | 41885 | 1090 | 2.0 |
| 0.60 | 2 | 29 | 0.015 | 0.021 | 0.120 | 0.22 | 41960 | 1260 | 3.2 |
| 0.80 | 2 | 40 | 0.020 | 0.029 | 0.160 | 0.30 | 42440 | 1700 | 7.9 |
| 1.00 | 2 | 49 | 0.025 | 0.036 | 0.200 | 0.37 | 42155 | 2110 | 15.2 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|------|
| 0.10 | 2 | 5 | 0.003 | 0.004 | 0.020 | 0.04 | 39790 | 215 | 0.0 |
| 0.20 | 2 | 9 | 0.004 | 0.007 | 0.040 | 0.07 | 40925 | 370 | 0.1 |
| 0.30 | 2 | 15 | 0.007 | 0.011 | 0.060 | 0.11 | 43405 | 625 | 0.4 |
| 0.40 | 2 | 20 | 0.009 | 0.014 | 0.080 | 0.15 | 42440 | 765 | 0.9 |
| 0.50 | 2 | 25 | 0.012 | 0.018 | 0.100 | 0.19 | 41885 | 980 | 1.8 |
| 0.60 | 2 | 29 | 0.014 | 0.021 | 0.120 | 0.22 | 41960 | 1135 | 2.9 |
| 0.80 | 2 | 40 | 0.018 | 0.029 | 0.160 | 0.30 | 42440 | 1530 | 7.1 |
| 1.00 | 2 | 49 | 0.023 | 0.036 | 0.200 | 0.37 | 42155 | 1895 | 13.7 |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



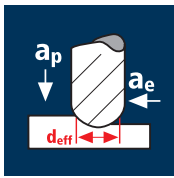
| d1 [mm] | z | v_c [m/min] | f_z [mm] | a_p [mm] | a_e [mm] | d_{eff} [mm] | n [min ⁻¹] | v_r [mm/min] | β [°] |
|---------|---|---------------|------------|------------|------------|----------------|------------------------|----------------|-------------|
| 0.10 | 2 | 12 | 0.006 | 0.004 | 0.004 | 0.09 | 42440 | 510 | 45° |
| 0.20 | 2 | 25 | 0.008 | 0.008 | 0.008 | 0.19 | 41885 | 670 | 45° |
| 0.30 | 2 | 37 | 0.010 | 0.012 | 0.012 | 0.28 | 42060 | 840 | 45° |
| 0.40 | 2 | 49 | 0.014 | 0.016 | 0.016 | 0.37 | 42155 | 1180 | 45° |
| 0.50 | 2 | 61 | 0.020 | 0.020 | 0.020 | 0.46 | 42210 | 1690 | 45° |
| 0.60 | 2 | 74 | 0.020 | 0.024 | 0.024 | 0.56 | 42060 | 1680 | 45° |
| 0.80 | 2 | 98 | 0.022 | 0.032 | 0.032 | 0.74 | 42155 | 1855 | 45° |
| 1.00 | 2 | 123 | 0.028 | 0.042 | 0.042 | 0.93 | 42100 | 2360 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.10 | 2 | 12 | 0.006 | 0.004 | 0.004 | 0.09 | 42440 | 510 | 45° |
| 0.20 | 2 | 25 | 0.008 | 0.008 | 0.008 | 0.19 | 41885 | 670 | 45° |
| 0.30 | 2 | 37 | 0.010 | 0.012 | 0.012 | 0.28 | 42060 | 840 | 45° |
| 0.40 | 2 | 49 | 0.014 | 0.016 | 0.016 | 0.37 | 42155 | 1180 | 45° |
| 0.50 | 2 | 61 | 0.020 | 0.020 | 0.020 | 0.46 | 42210 | 1690 | 45° |
| 0.60 | 2 | 74 | 0.020 | 0.024 | 0.024 | 0.56 | 42060 | 1680 | 45° |
| 0.80 | 2 | 98 | 0.020 | 0.032 | 0.032 | 0.74 | 42155 | 1685 | 45° |
| 1.00 | 2 | 123 | 0.026 | 0.042 | 0.042 | 0.93 | 42100 | 2190 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.10 | 2 | 12 | 0.006 | 0.004 | 0.004 | 0.09 | 42440 | 510 | 45° |
| 0.20 | 2 | 25 | 0.008 | 0.008 | 0.008 | 0.19 | 41885 | 670 | 45° |
| 0.30 | 2 | 37 | 0.010 | 0.012 | 0.012 | 0.28 | 42060 | 840 | 45° |
| 0.40 | 2 | 49 | 0.012 | 0.016 | 0.016 | 0.37 | 42155 | 1010 | 45° |
| 0.50 | 2 | 61 | 0.018 | 0.020 | 0.020 | 0.46 | 42210 | 1520 | 45° |
| 0.60 | 2 | 74 | 0.018 | 0.024 | 0.024 | 0.56 | 42060 | 1515 | 45° |
| 0.80 | 2 | 98 | 0.020 | 0.032 | 0.032 | 0.74 | 42155 | 1685 | 45° |
| 1.00 | 2 | 123 | 0.026 | 0.042 | 0.042 | 0.93 | 42100 | 2190 | 45° |

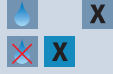
| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.10 | 2 | 12 | 0.004 | 0.004 | 0.004 | 0.09 | 42440 | 340 | 45° |
| 0.20 | 2 | 25 | 0.006 | 0.008 | 0.008 | 0.19 | 41885 | 505 | 45° |
| 0.30 | 2 | 37 | 0.008 | 0.012 | 0.012 | 0.28 | 42060 | 675 | 45° |
| 0.40 | 2 | 49 | 0.012 | 0.016 | 0.016 | 0.37 | 42155 | 1010 | 45° |
| 0.50 | 2 | 61 | 0.016 | 0.020 | 0.020 | 0.46 | 42210 | 1350 | 45° |
| 0.60 | 2 | 74 | 0.016 | 0.024 | 0.024 | 0.56 | 42060 | 1345 | 45° |
| 0.80 | 2 | 98 | 0.018 | 0.032 | 0.032 | 0.74 | 42155 | 1520 | 45° |
| 1.00 | 2 | 123 | 0.022 | 0.042 | 0.042 | 0.93 | 42100 | 1850 | 45° |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



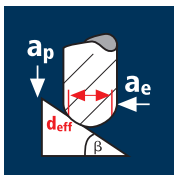
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|--------------------------|
| 0.20 | 2 | 9 | 0.006 | 0.006 | 0.040 | 0.07 | 40925 | 515 | 0.1 |
| 0.40 | 2 | 18 | 0.013 | 0.013 | 0.080 | 0.14 | 40925 | 1030 | 1.1 |
| 0.50 | 2 | 24 | 0.016 | 0.016 | 0.100 | 0.18 | 42440 | 1390 | 2.2 |
| 0.80 | 2 | 37 | 0.025 | 0.026 | 0.160 | 0.28 | 42060 | 2120 | 8.8 |
| 1.00 | 2 | 46 | 0.032 | 0.032 | 0.200 | 0.35 | 41835 | 2635 | 16.9 |
| 1.50 | 2 | 70 | 0.048 | 0.048 | 0.300 | 0.53 | 42040 | 4025 | 58.0 |
| 2.00 | 2 | 92 | 0.063 | 0.064 | 0.400 | 0.70 | 41835 | 5270 | 134.9 |
| 2.50 | 2 | 116 | 0.079 | 0.080 | 0.500 | 0.88 | 41960 | 6660 | 266.5 |
| 3.00 | 2 | 140 | 0.094 | 0.096 | 0.600 | 1.06 | 42040 | 7945 | 457.7 |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-------|
| 0.20 | 2 | 9 | 0.006 | 0.006 | 0.040 | 0.07 | 40925 | 490 | 0.1 |
| 0.40 | 2 | 18 | 0.012 | 0.013 | 0.080 | 0.14 | 40925 | 980 | 1.0 |
| 0.50 | 2 | 24 | 0.016 | 0.016 | 0.100 | 0.18 | 42440 | 1325 | 2.1 |
| 0.80 | 2 | 37 | 0.024 | 0.026 | 0.160 | 0.28 | 42060 | 2020 | 8.4 |
| 1.00 | 2 | 46 | 0.030 | 0.032 | 0.200 | 0.35 | 41835 | 2510 | 16.1 |
| 1.50 | 2 | 70 | 0.046 | 0.048 | 0.300 | 0.53 | 42040 | 3835 | 55.2 |
| 2.00 | 2 | 92 | 0.060 | 0.064 | 0.400 | 0.70 | 41835 | 5020 | 128.5 |
| 2.50 | 2 | 116 | 0.076 | 0.080 | 0.500 | 0.88 | 41960 | 6345 | 253.8 |
| 3.00 | 2 | 120 | 0.090 | 0.096 | 0.600 | 1.06 | 36035 | 6485 | 373.6 |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-------|
| 0.20 | 2 | 9 | 0.005 | 0.006 | 0.040 | 0.07 | 40925 | 410 | 0.1 |
| 0.40 | 2 | 18 | 0.010 | 0.013 | 0.080 | 0.14 | 40925 | 820 | 0.9 |
| 0.50 | 2 | 24 | 0.013 | 0.016 | 0.100 | 0.18 | 42440 | 1105 | 1.8 |
| 0.80 | 2 | 37 | 0.020 | 0.026 | 0.160 | 0.28 | 42060 | 1680 | 7.0 |
| 1.00 | 2 | 46 | 0.025 | 0.032 | 0.200 | 0.35 | 41835 | 2090 | 13.4 |
| 1.50 | 2 | 70 | 0.038 | 0.048 | 0.300 | 0.53 | 42040 | 3195 | 46.0 |
| 2.00 | 2 | 92 | 0.050 | 0.064 | 0.400 | 0.70 | 41835 | 4185 | 107.1 |
| 2.50 | 2 | 100 | 0.063 | 0.080 | 0.500 | 0.88 | 36170 | 4560 | 182.3 |
| 3.00 | 2 | 100 | 0.075 | 0.096 | 0.600 | 1.06 | 30030 | 4505 | 259.5 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|-------|
| 0.20 | 2 | 9 | 0.004 | 0.006 | 0.040 | 0.07 | 40925 | 370 | 0.1 |
| 0.40 | 2 | 18 | 0.009 | 0.013 | 0.080 | 0.14 | 40925 | 735 | 0.8 |
| 0.50 | 2 | 24 | 0.012 | 0.016 | 0.100 | 0.18 | 42440 | 995 | 1.6 |
| 0.80 | 2 | 37 | 0.018 | 0.026 | 0.160 | 0.28 | 42060 | 1515 | 6.3 |
| 1.00 | 2 | 46 | 0.023 | 0.032 | 0.200 | 0.35 | 41835 | 1885 | 12.0 |
| 1.50 | 2 | 60 | 0.034 | 0.048 | 0.300 | 0.53 | 36035 | 2465 | 35.5 |
| 2.00 | 2 | 60 | 0.045 | 0.064 | 0.400 | 0.70 | 27285 | 2455 | 62.9 |
| 2.50 | 2 | 60 | 0.057 | 0.080 | 0.500 | 0.88 | 21705 | 2460 | 98.4 |
| 3.00 | 2 | 60 | 0.068 | 0.096 | 0.600 | 1.06 | 18020 | 2430 | 140.1 |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
| 0.20 | 2 | 25 | 0.008 | 0.008 | 0.008 | 0.19 | 41885 | 670 | 45° |
| 0.40 | 2 | 49 | 0.014 | 0.016 | 0.016 | 0.37 | 42155 | 1180 | 45° |
| 0.50 | 2 | 61 | 0.020 | 0.020 | 0.020 | 0.46 | 42210 | 1690 | 45° |
| 0.80 | 2 | 98 | 0.022 | 0.032 | 0.032 | 0.74 | 42155 | 1855 | 45° |
| 1.00 | 2 | 123 | 0.028 | 0.042 | 0.042 | 0.93 | 42100 | 2360 | 45° |
| 1.50 | 2 | 185 | 0.034 | 0.062 | 0.062 | 1.40 | 42060 | 2860 | 45° |
| 2.00 | 2 | 245 | 0.038 | 0.082 | 0.082 | 1.86 | 41930 | 3185 | 45° |
| 2.50 | 2 | 300 | 0.040 | 0.102 | 0.102 | 2.32 | 41160 | 3295 | 45° |
| 3.00 | 2 | 300 | 0.046 | 0.122 | 0.122 | 2.79 | 34225 | 3150 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.20 | 2 | 25 | 0.008 | 0.008 | 0.008 | 0.19 | 41885 | 670 | 45° |
| 0.40 | 2 | 49 | 0.014 | 0.016 | 0.016 | 0.37 | 42155 | 1180 | 45° |
| 0.50 | 2 | 61 | 0.020 | 0.020 | 0.020 | 0.46 | 42210 | 1690 | 45° |
| 0.80 | 2 | 98 | 0.020 | 0.032 | 0.032 | 0.74 | 42155 | 1685 | 45° |
| 1.00 | 2 | 123 | 0.026 | 0.042 | 0.042 | 0.93 | 42100 | 2190 | 45° |
| 1.50 | 2 | 185 | 0.032 | 0.062 | 0.062 | 1.40 | 42060 | 2690 | 45° |
| 2.00 | 2 | 245 | 0.036 | 0.082 | 0.082 | 1.86 | 41930 | 3020 | 45° |
| 2.50 | 2 | 250 | 0.038 | 0.102 | 0.102 | 2.32 | 34300 | 2605 | 45° |
| 3.00 | 2 | 250 | 0.044 | 0.122 | 0.122 | 2.79 | 28520 | 2510 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.20 | 2 | 25 | 0.008 | 0.008 | 0.008 | 0.19 | 41885 | 670 | 45° |
| 0.40 | 2 | 49 | 0.012 | 0.016 | 0.016 | 0.37 | 42155 | 1010 | 45° |
| 0.50 | 2 | 61 | 0.018 | 0.020 | 0.020 | 0.46 | 42210 | 1520 | 45° |
| 0.80 | 2 | 98 | 0.020 | 0.032 | 0.032 | 0.74 | 42155 | 1685 | 45° |
| 1.00 | 2 | 123 | 0.026 | 0.042 | 0.042 | 0.93 | 42100 | 2190 | 45° |
| 1.50 | 2 | 185 | 0.030 | 0.062 | 0.062 | 1.40 | 42060 | 2525 | 45° |
| 2.00 | 2 | 200 | 0.034 | 0.082 | 0.082 | 1.86 | 34225 | 2325 | 45° |
| 2.50 | 2 | 200 | 0.036 | 0.102 | 0.102 | 2.32 | 27440 | 1975 | 45° |
| 3.00 | 2 | 200 | 0.042 | 0.122 | 0.122 | 2.79 | 22820 | 1915 | 45° |

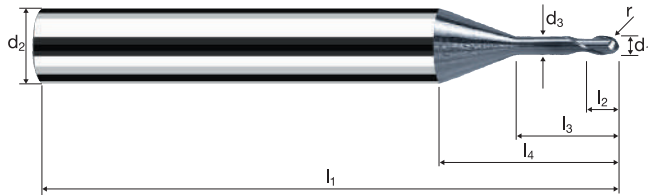
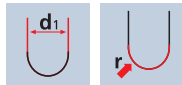
| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.20 | 2 | 25 | 0.006 | 0.008 | 0.008 | 0.19 | 41885 | 505 | 45° |
| 0.40 | 2 | 49 | 0.012 | 0.016 | 0.016 | 0.37 | 42155 | 1010 | 45° |
| 0.50 | 2 | 61 | 0.016 | 0.020 | 0.020 | 0.46 | 42210 | 1350 | 45° |
| 0.80 | 2 | 98 | 0.018 | 0.032 | 0.032 | 0.74 | 42155 | 1520 | 45° |
| 1.00 | 2 | 123 | 0.022 | 0.042 | 0.042 | 0.93 | 42100 | 1850 | 45° |
| 1.50 | 2 | 150 | 0.028 | 0.062 | 0.062 | 1.40 | 34105 | 1910 | 45° |
| 2.00 | 2 | 150 | 0.030 | 0.082 | 0.082 | 1.86 | 25670 | 1540 | 45° |
| 2.50 | 2 | 150 | 0.032 | 0.102 | 0.102 | 2.32 | 20580 | 1315 | 45° |
| 3.00 | 2 | 150 | 0.036 | 0.122 | 0.122 | 2.79 | 17115 | 1230 | 45° |

Frese con estremità emisferica MicroX

Gambo \varnothing 6mm, scarico cilindrico, 5xd



HM λ 30°
XA γ -10°

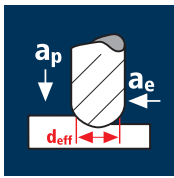


ReTool®

| | | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--------------|--------------|-------------|-------------------|----------------|-------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Inox Stainless | Ti Titanium | Cobalt-Chrome Copper |
|-------------|----------------|-----------------|-----------------|--------------|--------------|-------------|-------------------|----------------|-------------------------|

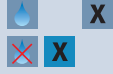
| Esempio: N° Ordine | | | | | | | | | | | X-AL |
|-----------------------|-------|-------------|-------|-------|-------|-------|-------|--------------------|----------|-----|--------|
| Rivestimento | | | | | | | | | | | X6564 |
| Articolo | | | | | | | | | | | EUR |
| Codice- \varnothing | | | | | | | | | | | |
| \varnothing Code | d_1 | d_2 h4 | d_3 | l_1 | l_2 | l_3 | l_4 | r ± 0.005 | α | z | |
| 010 | 0.10 | 6.00 | 0.09 | 57 | 0.10 | 0.50 | 17.70 | 0.050 | 14.5° | 2 | 110.00 |
| 020 | 0.20 | 6.00 | 0.18 | 57 | 0.20 | 1.00 | 17.94 | 0.100 | 13.9° | 2 | 88.00 |
| 030 | 0.30 | 6.00 | 0.25 | 57 | 0.30 | 1.50 | 18.24 | 0.150 | 13.8° | 2 | 80.00 |
| 040 | 0.40 | 6.00 | 0.35 | 57 | 0.40 | 2.00 | 18.46 | 0.200 | 12.8° | 2 | 80.00 |
| 050 | 0.50 | 6.00 | 0.45 | 57 | 0.50 | 2.50 | 13.51 | 0.250 | 12.3° | 2 | 80.00 |
| 060 | 0.60 | 6.00 | 0.55 | 57 | 0.60 | 3.00 | 13.83 | 0.300 | 11.9° | 2 | 80.00 |
| 080 | 0.80 | 6.00 | 0.75 | 57 | 0.80 | 4.00 | 14.45 | 0.400 | 11.0° | 2 | 80.00 |
| 100 | 1.00 | 6.00 | 0.95 | 57 | 1.00 | 5.00 | 15.08 | 0.500 | 10.2° | 2 | 80.00 |
| 108 | 1.20 | 6.00 | 1.10 | 57 | 1.20 | 6.00 | 15.80 | 0.600 | 9.4° | 2 | 80.00 |
| 120 | 1.50 | 6.00 | 1.40 | 61 | 1.50 | 7.50 | 16.74 | 0.750 | 8.4° | 2 | 80.00 |
| 140 | 2.00 | 6.00 | 1.90 | 61 | 2.00 | 10.00 | 18.31 | 1.000 | 6.9° | 2 | 80.00 |
| 152 | 2.30 | 6.00 | 2.10 | 61 | 2.30 | 11.50 | 19.44 | 1.150 | 6.0° | 2 | 80.00 |
| 160 | 2.50 | 6.00 | 2.30 | 61 | 2.50 | 12.50 | 20.06 | 1.250 | 5.5° | 2 | 80.00 |
| 172 | 2.80 | 6.00 | 2.60 | 61 | 2.80 | 14.00 | 21.00 | 1.400 | 4.9° | 2 | 80.00 |
| 180 | 3.00 | 6.00 | 2.80 | 66 | 3.00 | 15.00 | 21.63 | 1.500 | 4.4° | 2 | 80.00 |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



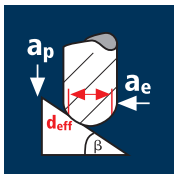
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|--------------------------|
| 0.20 | 2 | 8 | 0.006 | 0.005 | 0.040 | 0.06 | 42440 | 535 | 0.1 |
| 0.30 | 2 | 13 | 0.010 | 0.008 | 0.060 | 0.10 | 41380 | 835 | 0.4 |
| 0.40 | 2 | 17 | 0.013 | 0.011 | 0.080 | 0.13 | 41625 | 1050 | 0.9 |
| 0.50 | 2 | 21 | 0.016 | 0.013 | 0.100 | 0.16 | 41780 | 1370 | 1.8 |
| 0.60 | 2 | 25 | 0.019 | 0.016 | 0.120 | 0.19 | 41885 | 1585 | 3.0 |
| 0.80 | 2 | 34 | 0.025 | 0.021 | 0.160 | 0.26 | 41625 | 2100 | 7.0 |
| 1.00 | 2 | 42 | 0.032 | 0.027 | 0.200 | 0.32 | 41780 | 2630 | 14.2 |
| 1.50 | 2 | 63 | 0.048 | 0.040 | 0.300 | 0.48 | 41780 | 4000 | 48.0 |
| 2.00 | 2 | 84 | 0.063 | 0.053 | 0.400 | 0.64 | 41780 | 5265 | 111.6 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|-------|
| 0.20 | 2 | 8 | 0.006 | 0.005 | 0.040 | 0.06 | 42440 | 510 | 0.1 |
| 0.30 | 2 | 13 | 0.010 | 0.008 | 0.060 | 0.10 | 41380 | 795 | 0.4 |
| 0.40 | 2 | 17 | 0.012 | 0.011 | 0.080 | 0.13 | 41625 | 1000 | 0.9 |
| 0.50 | 2 | 21 | 0.016 | 0.013 | 0.100 | 0.16 | 41780 | 1305 | 1.7 |
| 0.60 | 2 | 25 | 0.018 | 0.016 | 0.120 | 0.19 | 41885 | 1510 | 2.9 |
| 0.80 | 2 | 34 | 0.024 | 0.021 | 0.160 | 0.26 | 41625 | 2000 | 6.7 |
| 1.00 | 2 | 42 | 0.030 | 0.027 | 0.200 | 0.32 | 41780 | 2505 | 13.5 |
| 1.50 | 2 | 63 | 0.046 | 0.040 | 0.300 | 0.48 | 41780 | 3810 | 45.7 |
| 2.00 | 2 | 84 | 0.060 | 0.053 | 0.400 | 0.64 | 41780 | 5015 | 106.3 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|------|
| 0.20 | 2 | 8 | 0.005 | 0.005 | 0.040 | 0.06 | 42440 | 425 | 0.1 |
| 0.30 | 2 | 13 | 0.008 | 0.008 | 0.060 | 0.10 | 41380 | 660 | 0.3 |
| 0.40 | 2 | 17 | 0.010 | 0.011 | 0.080 | 0.13 | 41625 | 835 | 0.7 |
| 0.50 | 2 | 21 | 0.013 | 0.013 | 0.100 | 0.16 | 41780 | 1085 | 1.4 |
| 0.60 | 2 | 25 | 0.015 | 0.016 | 0.120 | 0.19 | 41885 | 1255 | 2.4 |
| 0.80 | 2 | 34 | 0.020 | 0.021 | 0.160 | 0.26 | 41625 | 1665 | 5.6 |
| 1.00 | 2 | 42 | 0.025 | 0.027 | 0.200 | 0.32 | 41780 | 2090 | 11.3 |
| 1.50 | 2 | 63 | 0.038 | 0.040 | 0.300 | 0.48 | 41780 | 3175 | 38.1 |
| 2.00 | 2 | 84 | 0.050 | 0.053 | 0.400 | 0.64 | 41780 | 4180 | 88.6 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|------|
| 0.20 | 2 | 8 | 0.004 | 0.005 | 0.040 | 0.06 | 42440 | 380 | 0.1 |
| 0.30 | 2 | 13 | 0.007 | 0.008 | 0.060 | 0.10 | 41380 | 595 | 0.3 |
| 0.40 | 2 | 17 | 0.009 | 0.011 | 0.080 | 0.13 | 41625 | 750 | 0.7 |
| 0.50 | 2 | 21 | 0.012 | 0.013 | 0.100 | 0.16 | 41780 | 980 | 1.3 |
| 0.60 | 2 | 25 | 0.014 | 0.016 | 0.120 | 0.19 | 41885 | 1130 | 2.2 |
| 0.80 | 2 | 34 | 0.018 | 0.021 | 0.160 | 0.26 | 41625 | 1500 | 5.0 |
| 1.00 | 2 | 42 | 0.023 | 0.027 | 0.200 | 0.32 | 41780 | 1880 | 10.2 |
| 1.50 | 2 | 60 | 0.034 | 0.040 | 0.300 | 0.48 | 39790 | 2720 | 32.7 |
| 2.00 | 2 | 60 | 0.045 | 0.053 | 0.400 | 0.64 | 29840 | 2685 | 56.9 |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
| 0.20 | 2 | 25 | 0.008 | 0.008 | 0.008 | 0.19 | 41885 | 670 | 45° |
| 0.30 | 2 | 37 | 0.010 | 0.012 | 0.012 | 0.28 | 42060 | 840 | 45° |
| 0.40 | 2 | 49 | 0.014 | 0.016 | 0.016 | 0.37 | 42155 | 1180 | 45° |
| 0.50 | 2 | 61 | 0.020 | 0.020 | 0.020 | 0.46 | 42210 | 1690 | 45° |
| 0.60 | 2 | 74 | 0.020 | 0.024 | 0.024 | 0.56 | 42060 | 1680 | 45° |
| 0.80 | 2 | 98 | 0.022 | 0.032 | 0.032 | 0.74 | 42155 | 1855 | 45° |
| 1.00 | 2 | 123 | 0.028 | 0.042 | 0.042 | 0.93 | 42100 | 2360 | 45° |
| 1.50 | 2 | 185 | 0.034 | 0.062 | 0.062 | 1.40 | 42060 | 2860 | 45° |
| 2.00 | 2 | 245 | 0.038 | 0.082 | 0.082 | 1.86 | 41930 | 3185 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.20 | 2 | 25 | 0.008 | 0.008 | 0.008 | 0.19 | 41885 | 670 | 45° |
| 0.30 | 2 | 37 | 0.010 | 0.012 | 0.012 | 0.28 | 42060 | 840 | 45° |
| 0.40 | 2 | 49 | 0.014 | 0.016 | 0.016 | 0.37 | 42155 | 1180 | 45° |
| 0.50 | 2 | 61 | 0.020 | 0.020 | 0.020 | 0.46 | 42210 | 1690 | 45° |
| 0.60 | 2 | 74 | 0.020 | 0.024 | 0.024 | 0.56 | 42060 | 1680 | 45° |
| 0.80 | 2 | 98 | 0.020 | 0.032 | 0.032 | 0.74 | 42155 | 1685 | 45° |
| 1.00 | 2 | 123 | 0.026 | 0.042 | 0.042 | 0.93 | 42100 | 2190 | 45° |
| 1.50 | 2 | 185 | 0.032 | 0.062 | 0.062 | 1.40 | 42060 | 2690 | 45° |
| 2.00 | 2 | 245 | 0.036 | 0.082 | 0.082 | 1.86 | 41930 | 3020 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.20 | 2 | 25 | 0.008 | 0.008 | 0.008 | 0.19 | 41885 | 670 | 45° |
| 0.30 | 2 | 37 | 0.010 | 0.012 | 0.012 | 0.28 | 42060 | 840 | 45° |
| 0.40 | 2 | 49 | 0.012 | 0.016 | 0.016 | 0.37 | 42155 | 1010 | 45° |
| 0.50 | 2 | 61 | 0.018 | 0.020 | 0.020 | 0.46 | 42210 | 1520 | 45° |
| 0.60 | 2 | 74 | 0.018 | 0.024 | 0.024 | 0.56 | 42060 | 1515 | 45° |
| 0.80 | 2 | 98 | 0.020 | 0.032 | 0.032 | 0.74 | 42155 | 1685 | 45° |
| 1.00 | 2 | 123 | 0.026 | 0.042 | 0.042 | 0.93 | 42100 | 2190 | 45° |
| 1.50 | 2 | 185 | 0.030 | 0.062 | 0.062 | 1.40 | 42060 | 2525 | 45° |
| 2.00 | 2 | 200 | 0.034 | 0.082 | 0.082 | 1.86 | 34225 | 2325 | 45° |

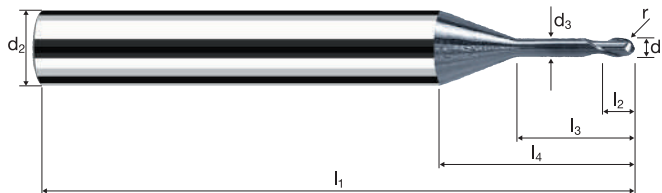
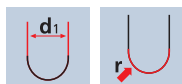
| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.20 | 2 | 25 | 0.006 | 0.008 | 0.008 | 0.19 | 41885 | 505 | 45° |
| 0.30 | 2 | 37 | 0.008 | 0.012 | 0.012 | 0.28 | 42060 | 675 | 45° |
| 0.40 | 2 | 49 | 0.012 | 0.016 | 0.016 | 0.37 | 42155 | 1010 | 45° |
| 0.50 | 2 | 61 | 0.016 | 0.020 | 0.020 | 0.46 | 42210 | 1350 | 45° |
| 0.60 | 2 | 74 | 0.016 | 0.024 | 0.024 | 0.56 | 42060 | 1345 | 45° |
| 0.80 | 2 | 98 | 0.018 | 0.032 | 0.032 | 0.74 | 42155 | 1520 | 45° |
| 1.00 | 2 | 123 | 0.022 | 0.042 | 0.042 | 0.93 | 42100 | 1850 | 45° |
| 1.50 | 2 | 150 | 0.028 | 0.062 | 0.062 | 1.40 | 34105 | 1910 | 45° |
| 2.00 | 2 | 150 | 0.030 | 0.082 | 0.082 | 1.86 | 25670 | 1540 | 45° |

Frese con estremità emisferica MicroX

Gambo ø 6mm, scarico cilindrico, 6xd



| | |
|----|---------------|
| HM | λ 30° |
| XA | γ -10° |

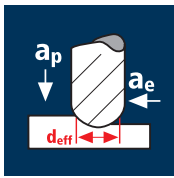


ReTool®

| | | | | | | | | | |
|----------|-------------|--------------|--------------|-----------|-----------|----------|----------------|-------------|----------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Inox Stainless | Ti Titanium | Cobalt-Chrome Copper |
|----------|-------------|--------------|--------------|-----------|-----------|----------|----------------|-------------|----------------------|

| Esempio: N° Ordine | | | | | | | | | | | X-AL | |
|--------------------|----------------|----------------------------------|----------------|----------------|----------------|----------------|----------------|-------------|-------|---|-------|--|
| | | | | | | | | | | | X6565 | |
| | | | | | | | | | | | EUR | |
| Ø Code | d ₁ | d ₂ h ₄ | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.005 | α | z | | |
| 020 | 0.20 | 6.00 | 0.18 | 57 | 0.20 | 1.20 | 18.14 | 0.100 | 13.7° | 2 | 88.00 | |
| 030 | 0.30 | 6.00 | 0.25 | 57 | 0.30 | 1.80 | 18.54 | 0.150 | 13.0° | 2 | 80.00 | |
| 040 | 0.40 | 6.00 | 0.35 | 57 | 0.40 | 2.40 | 18.86 | 0.200 | 12.4° | 2 | 80.00 | |
| 050 | 0.50 | 6.00 | 0.45 | 57 | 0.50 | 3.00 | 14.01 | 0.250 | 11.9° | 2 | 80.00 | |
| 060 | 0.60 | 6.00 | 0.55 | 57 | 0.60 | 3.60 | 14.43 | 0.300 | 11.4° | 2 | 80.00 | |
| 080 | 0.80 | 6.00 | 0.75 | 57 | 0.80 | 4.80 | 15.25 | 0.400 | 10.4° | 2 | 80.00 | |
| 100 | 1.00 | 6.00 | 0.95 | 57 | 1.00 | 6.00 | 16.08 | 0.500 | 9.5° | 2 | 80.00 | |
| 120 | 1.50 | 6.00 | 1.40 | 61 | 1.50 | 9.00 | 18.24 | 0.750 | 7.6° | 2 | 80.00 | |
| 140 | 2.00 | 6.00 | 1.90 | 66 | 2.00 | 12.00 | 20.31 | 1.000 | 6.1° | 2 | 80.00 | |
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Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



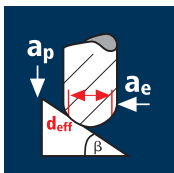
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|--------------------------|
| 0.20 | 2 | 8 | 0.006 | 0.005 | 0.040 | 0.06 | 42440 | 535 | 0.1 |
| 0.30 | 2 | 12 | 0.010 | 0.007 | 0.060 | 0.09 | 42440 | 855 | 0.4 |
| 0.40 | 2 | 16 | 0.013 | 0.009 | 0.080 | 0.12 | 42440 | 1070 | 0.8 |
| 0.50 | 2 | 20 | 0.016 | 0.011 | 0.100 | 0.15 | 42440 | 1390 | 1.5 |
| 0.60 | 2 | 24 | 0.019 | 0.014 | 0.120 | 0.18 | 42440 | 1605 | 2.7 |
| 0.80 | 2 | 32 | 0.025 | 0.018 | 0.160 | 0.24 | 42440 | 2140 | 6.2 |
| 1.00 | 2 | 40 | 0.032 | 0.023 | 0.200 | 0.30 | 42440 | 2675 | 12.3 |
| 1.50 | 2 | 59 | 0.048 | 0.034 | 0.300 | 0.45 | 41735 | 3995 | 40.8 |
| 2.00 | 2 | 79 | 0.063 | 0.046 | 0.400 | 0.60 | 41910 | 5280 | 97.2 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|------|
| 0.20 | 2 | 8 | 0.006 | 0.005 | 0.040 | 0.06 | 42440 | 510 | 0.1 |
| 0.30 | 2 | 12 | 0.010 | 0.007 | 0.060 | 0.09 | 42440 | 815 | 0.3 |
| 0.40 | 2 | 16 | 0.012 | 0.009 | 0.080 | 0.12 | 42440 | 1020 | 0.7 |
| 0.50 | 2 | 20 | 0.016 | 0.011 | 0.100 | 0.15 | 42440 | 1325 | 1.5 |
| 0.60 | 2 | 24 | 0.018 | 0.014 | 0.120 | 0.18 | 42440 | 1530 | 2.6 |
| 0.80 | 2 | 32 | 0.024 | 0.018 | 0.160 | 0.24 | 42440 | 2035 | 5.9 |
| 1.00 | 2 | 40 | 0.030 | 0.023 | 0.200 | 0.30 | 42440 | 2545 | 11.7 |
| 1.50 | 2 | 59 | 0.046 | 0.034 | 0.300 | 0.45 | 41735 | 3805 | 38.8 |
| 2.00 | 2 | 79 | 0.060 | 0.046 | 0.400 | 0.60 | 41910 | 5030 | 92.5 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|------|
| 0.20 | 2 | 8 | 0.005 | 0.005 | 0.040 | 0.06 | 42440 | 425 | 0.1 |
| 0.30 | 2 | 12 | 0.008 | 0.007 | 0.060 | 0.09 | 42440 | 680 | 0.3 |
| 0.40 | 2 | 16 | 0.010 | 0.009 | 0.080 | 0.12 | 42440 | 850 | 0.6 |
| 0.50 | 2 | 20 | 0.013 | 0.011 | 0.100 | 0.15 | 42440 | 1105 | 1.2 |
| 0.60 | 2 | 24 | 0.015 | 0.014 | 0.120 | 0.18 | 42440 | 1275 | 2.1 |
| 0.80 | 2 | 32 | 0.020 | 0.018 | 0.160 | 0.24 | 42440 | 1700 | 4.9 |
| 1.00 | 2 | 40 | 0.025 | 0.023 | 0.200 | 0.30 | 42440 | 2120 | 9.8 |
| 1.50 | 2 | 59 | 0.038 | 0.034 | 0.300 | 0.45 | 41735 | 3170 | 32.4 |
| 2.00 | 2 | 79 | 0.050 | 0.046 | 0.400 | 0.60 | 41910 | 4190 | 77.1 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|------|
| 0.20 | 2 | 8 | 0.004 | 0.005 | 0.040 | 0.06 | 42440 | 380 | 0.1 |
| 0.30 | 2 | 12 | 0.007 | 0.007 | 0.060 | 0.09 | 42440 | 610 | 0.3 |
| 0.40 | 2 | 16 | 0.009 | 0.009 | 0.080 | 0.12 | 42440 | 765 | 0.6 |
| 0.50 | 2 | 20 | 0.012 | 0.011 | 0.100 | 0.15 | 42440 | 995 | 1.1 |
| 0.60 | 2 | 24 | 0.014 | 0.014 | 0.120 | 0.18 | 42440 | 1145 | 1.9 |
| 0.80 | 2 | 32 | 0.018 | 0.018 | 0.160 | 0.24 | 42440 | 1530 | 4.4 |
| 1.00 | 2 | 40 | 0.023 | 0.023 | 0.200 | 0.30 | 42440 | 1910 | 8.8 |
| 1.50 | 2 | 59 | 0.034 | 0.034 | 0.300 | 0.45 | 41735 | 2855 | 29.1 |
| 2.00 | 2 | 60 | 0.045 | 0.046 | 0.400 | 0.60 | 31830 | 2865 | 52.7 |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
| 0.20 | 2 | 25 | 0.008 | 0.008 | 0.008 | 0.19 | 41885 | 670 | 45° |
| 0.30 | 2 | 37 | 0.010 | 0.012 | 0.012 | 0.28 | 42060 | 840 | 45° |
| 0.40 | 2 | 49 | 0.014 | 0.016 | 0.016 | 0.37 | 42155 | 1180 | 45° |
| 0.50 | 2 | 61 | 0.020 | 0.020 | 0.020 | 0.46 | 42210 | 1690 | 45° |
| 0.60 | 2 | 74 | 0.020 | 0.024 | 0.024 | 0.56 | 42060 | 1680 | 45° |
| 0.80 | 2 | 98 | 0.022 | 0.032 | 0.032 | 0.74 | 42155 | 1855 | 45° |
| 1.00 | 2 | 123 | 0.028 | 0.042 | 0.042 | 0.93 | 42100 | 2360 | 45° |
| 1.50 | 2 | 185 | 0.034 | 0.062 | 0.062 | 1.40 | 42060 | 2860 | 45° |
| 2.00 | 2 | 245 | 0.038 | 0.082 | 0.082 | 1.86 | 41930 | 3185 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.20 | 2 | 25 | 0.008 | 0.008 | 0.008 | 0.19 | 41885 | 670 | 45° |
| 0.30 | 2 | 37 | 0.010 | 0.012 | 0.012 | 0.28 | 42060 | 840 | 45° |
| 0.40 | 2 | 49 | 0.014 | 0.016 | 0.016 | 0.37 | 42155 | 1180 | 45° |
| 0.50 | 2 | 61 | 0.020 | 0.020 | 0.020 | 0.46 | 42210 | 1690 | 45° |
| 0.60 | 2 | 74 | 0.020 | 0.024 | 0.024 | 0.56 | 42060 | 1680 | 45° |
| 0.80 | 2 | 98 | 0.020 | 0.032 | 0.032 | 0.74 | 42155 | 1685 | 45° |
| 1.00 | 2 | 123 | 0.026 | 0.042 | 0.042 | 0.93 | 42100 | 2190 | 45° |
| 1.50 | 2 | 185 | 0.032 | 0.062 | 0.062 | 1.40 | 42060 | 2690 | 45° |
| 2.00 | 2 | 245 | 0.036 | 0.082 | 0.082 | 1.86 | 41930 | 3020 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.20 | 2 | 25 | 0.008 | 0.008 | 0.008 | 0.19 | 41885 | 670 | 45° |
| 0.30 | 2 | 37 | 0.010 | 0.012 | 0.012 | 0.28 | 42060 | 840 | 45° |
| 0.40 | 2 | 49 | 0.012 | 0.016 | 0.016 | 0.37 | 42155 | 1010 | 45° |
| 0.50 | 2 | 61 | 0.018 | 0.020 | 0.020 | 0.46 | 42210 | 1520 | 45° |
| 0.60 | 2 | 74 | 0.018 | 0.024 | 0.024 | 0.56 | 42060 | 1515 | 45° |
| 0.80 | 2 | 98 | 0.020 | 0.032 | 0.032 | 0.74 | 42155 | 1685 | 45° |
| 1.00 | 2 | 123 | 0.026 | 0.042 | 0.042 | 0.93 | 42100 | 2190 | 45° |
| 1.50 | 2 | 185 | 0.030 | 0.062 | 0.062 | 1.40 | 42060 | 2525 | 45° |
| 2.00 | 2 | 200 | 0.034 | 0.082 | 0.082 | 1.86 | 34225 | 2325 | 45° |

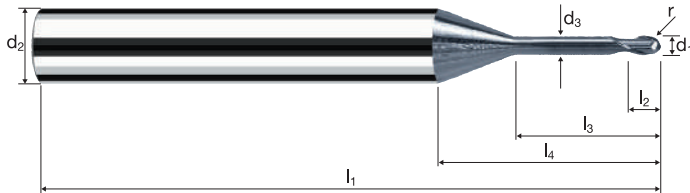
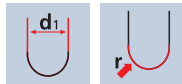
| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.20 | 2 | 25 | 0.006 | 0.008 | 0.008 | 0.19 | 41885 | 505 | 45° |
| 0.30 | 2 | 37 | 0.008 | 0.012 | 0.012 | 0.28 | 42060 | 675 | 45° |
| 0.40 | 2 | 49 | 0.012 | 0.016 | 0.016 | 0.37 | 42155 | 1010 | 45° |
| 0.50 | 2 | 61 | 0.016 | 0.020 | 0.020 | 0.46 | 42210 | 1350 | 45° |
| 0.60 | 2 | 74 | 0.016 | 0.024 | 0.024 | 0.56 | 42060 | 1345 | 45° |
| 0.80 | 2 | 98 | 0.018 | 0.032 | 0.032 | 0.74 | 42155 | 1520 | 45° |
| 1.00 | 2 | 123 | 0.022 | 0.042 | 0.042 | 0.93 | 42100 | 1850 | 45° |
| 1.50 | 2 | 150 | 0.028 | 0.062 | 0.062 | 1.40 | 34105 | 1910 | 45° |
| 2.00 | 2 | 150 | 0.030 | 0.082 | 0.082 | 1.86 | 25670 | 1540 | 45° |

Frese con estremità emisferica MicroX

Gambo \varnothing 6mm, scarico cilindrico, 7xd



HM λ 30°
XA γ -10°

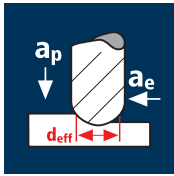


ReTool®

| | | | | | | | | | |
|--------------------|-----------------------|------------------------|------------------------|---------------------|---------------------|--------------------|--------------------------|-----------------------|--------------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Inox Stainless | Ti Titanium | Cobalt-Chrome Copper |
|--------------------|-----------------------|------------------------|------------------------|---------------------|---------------------|--------------------|--------------------------|-----------------------|--------------------------------|

| Esempio: N° Ordine | | | | | | | | | | | X-AL | |
|--------------------------|-------|----------------|-------------------------|-------|-------|-------------------------------------|-------|--------------------|----------|-----|------------|--------------|
| Rivestimento X | | | Articolo 6579 | | | Codice- \varnothing 020 | | | | | | X6579 |
| \varnothing Code | d_1 | d_2 h_4 | d_3 | l_1 | l_2 | l_3 | l_4 | r ± 0.005 | α | z | EUR | |
| 020 | 0.20 | 6.00 | 0.18 | 57 | 0.20 | 1.40 | 18.02 | 0.100 | 13.4° | 2 | 88.00 | |
| 030 | 0.30 | 6.00 | 0.25 | 57 | 0.30 | 2.10 | 18.34 | 0.150 | 12.7° | 2 | 80.00 | |
| 040 | 0.40 | 6.00 | 0.35 | 57 | 0.40 | 2.80 | 18.76 | 0.200 | 12.1° | 2 | 80.00 | |
| 050 | 0.50 | 6.00 | 0.45 | 57 | 0.50 | 3.50 | 14.51 | 0.250 | 11.5° | 2 | 80.00 | |
| 060 | 0.60 | 6.00 | 0.55 | 57 | 0.60 | 4.20 | 15.03 | 0.300 | 10.9° | 2 | 80.00 | |
| 080 | 0.80 | 6.00 | 0.75 | 57 | 0.80 | 5.60 | 16.05 | 0.400 | 9.9° | 2 | 80.00 | |
| 100 | 1.00 | 6.00 | 0.95 | 61 | 1.00 | 7.00 | 17.08 | 0.500 | 9.0° | 2 | 80.00 | |
| 120 | 1.50 | 6.00 | 1.40 | 61 | 1.50 | 10.50 | 19.74 | 0.750 | 7.0° | 2 | 80.00 | |
| 140 | 2.00 | 6.00 | 1.90 | 66 | 2.00 | 14.00 | 22.31 | 1.000 | 5.6° | 2 | 80.00 | |
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Applicazione



Materiale

Acciaio da utensile temprato 42 - 48 HRC

Acciaio da utensile temprato 48 - 52 HRC

Acciaio da utensile temprato 52 - 56 HRC

Acciaio da utensile temprato 56 - 60 HRC

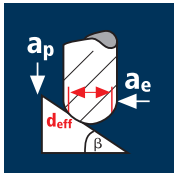
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|--------------------------|
| 0.20 | 2 | 8 | 0.006 | 0.004 | 0.040 | 0.06 | 42440 | 535 | 0.1 |
| 0.40 | 2 | 15 | 0.013 | 0.008 | 0.080 | 0.11 | 43405 | 1095 | 0.7 |
| 0.50 | 2 | 18 | 0.016 | 0.010 | 0.100 | 0.14 | 40925 | 1340 | 1.3 |
| 0.80 | 2 | 29 | 0.025 | 0.016 | 0.160 | 0.22 | 41960 | 2115 | 5.4 |
| 1.00 | 2 | 37 | 0.032 | 0.020 | 0.200 | 0.28 | 42060 | 2650 | 10.6 |
| 1.20 | 2 | 45 | 0.038 | 0.024 | 0.240 | 0.34 | 42130 | 3185 | 18.3 |
| 1.50 | 2 | 55 | 0.048 | 0.030 | 0.300 | 0.42 | 41685 | 3990 | 35.9 |
| 2.00 | 2 | 74 | 0.063 | 0.040 | 0.400 | 0.56 | 42060 | 5300 | 84.8 |
| 2.50 | 2 | 92 | 0.079 | 0.050 | 0.500 | 0.70 | 41835 | 6640 | 166.0 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|-------|
| 0.20 | 2 | 8 | 0.006 | 0.004 | 0.040 | 0.06 | 42440 | 510 | 0.1 |
| 0.40 | 2 | 15 | 0.012 | 0.008 | 0.080 | 0.11 | 43405 | 1040 | 0.7 |
| 0.50 | 2 | 18 | 0.016 | 0.010 | 0.100 | 0.14 | 40925 | 1275 | 1.3 |
| 0.80 | 2 | 29 | 0.024 | 0.016 | 0.160 | 0.22 | 41960 | 2015 | 5.2 |
| 1.00 | 2 | 37 | 0.030 | 0.020 | 0.200 | 0.28 | 42060 | 2525 | 10.1 |
| 1.20 | 2 | 45 | 0.036 | 0.024 | 0.240 | 0.34 | 42130 | 3035 | 17.5 |
| 1.50 | 2 | 55 | 0.046 | 0.030 | 0.300 | 0.42 | 41685 | 3800 | 34.2 |
| 2.00 | 2 | 74 | 0.060 | 0.040 | 0.400 | 0.56 | 42060 | 5045 | 80.8 |
| 2.50 | 2 | 92 | 0.076 | 0.050 | 0.500 | 0.70 | 41835 | 6325 | 158.1 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|-------|
| 0.20 | 2 | 8 | 0.005 | 0.004 | 0.040 | 0.06 | 42440 | 425 | 0.1 |
| 0.40 | 2 | 15 | 0.010 | 0.008 | 0.080 | 0.11 | 43405 | 870 | 0.6 |
| 0.50 | 2 | 18 | 0.013 | 0.010 | 0.100 | 0.14 | 40925 | 1065 | 1.1 |
| 0.80 | 2 | 29 | 0.020 | 0.016 | 0.160 | 0.22 | 41960 | 1680 | 4.3 |
| 1.00 | 2 | 37 | 0.025 | 0.020 | 0.200 | 0.28 | 42060 | 2105 | 8.4 |
| 1.20 | 2 | 45 | 0.030 | 0.024 | 0.240 | 0.34 | 42130 | 2530 | 14.6 |
| 1.50 | 2 | 55 | 0.038 | 0.030 | 0.300 | 0.42 | 41685 | 3170 | 28.5 |
| 2.00 | 2 | 74 | 0.050 | 0.040 | 0.400 | 0.56 | 42060 | 4205 | 67.3 |
| 2.50 | 2 | 92 | 0.063 | 0.050 | 0.500 | 0.70 | 41835 | 5270 | 131.8 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|------|
| 0.20 | 2 | 8 | 0.004 | 0.004 | 0.040 | 0.06 | 42440 | 380 | 0.1 |
| 0.40 | 2 | 15 | 0.009 | 0.008 | 0.080 | 0.11 | 43405 | 780 | 0.5 |
| 0.50 | 2 | 18 | 0.012 | 0.010 | 0.100 | 0.14 | 40925 | 960 | 1.0 |
| 0.80 | 2 | 29 | 0.018 | 0.016 | 0.160 | 0.22 | 41960 | 1510 | 3.9 |
| 1.00 | 2 | 37 | 0.023 | 0.020 | 0.200 | 0.28 | 42060 | 1895 | 7.6 |
| 1.20 | 2 | 45 | 0.027 | 0.024 | 0.240 | 0.34 | 42130 | 2275 | 13.1 |
| 1.50 | 2 | 55 | 0.034 | 0.030 | 0.300 | 0.42 | 41685 | 2850 | 25.7 |
| 2.00 | 2 | 60 | 0.045 | 0.040 | 0.400 | 0.56 | 34105 | 3070 | 49.1 |
| 2.50 | 2 | 60 | 0.057 | 0.050 | 0.500 | 0.70 | 27285 | 3095 | 77.3 |

Applicazione



Materiale

Acciaio da utensile temprato 42 - 48 HRC

Acciaio da utensile temprato 48 - 52 HRC

Acciaio da utensile temprato 52 - 56 HRC

Acciaio da utensile temprato 56 - 60 HRC

| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
| 0.20 | 2 | 25 | 0.008 | 0.008 | 0.008 | 0.19 | 41885 | 670 | 45° |
| 0.40 | 2 | 49 | 0.014 | 0.016 | 0.016 | 0.37 | 42155 | 1180 | 45° |
| 0.50 | 2 | 61 | 0.020 | 0.020 | 0.020 | 0.46 | 42210 | 1690 | 45° |
| 0.80 | 2 | 98 | 0.024 | 0.032 | 0.032 | 0.74 | 42155 | 2025 | 45° |
| 1.00 | 2 | 123 | 0.028 | 0.040 | 0.040 | 0.93 | 42100 | 2360 | 45° |
| 1.20 | 2 | 146 | 0.030 | 0.048 | 0.048 | 1.11 | 41870 | 2510 | 45° |
| 1.50 | 2 | 183 | 0.034 | 0.060 | 0.060 | 1.39 | 41905 | 2850 | 45° |
| 2.00 | 2 | 245 | 0.038 | 0.080 | 0.080 | 1.86 | 41930 | 3185 | 45° |
| 2.50 | 2 | 300 | 0.040 | 0.100 | 0.100 | 2.32 | 41160 | 3295 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.20 | 2 | 25 | 0.008 | 0.008 | 0.008 | 0.19 | 41885 | 670 | 45° |
| 0.40 | 2 | 49 | 0.014 | 0.016 | 0.016 | 0.37 | 42155 | 1180 | 45° |
| 0.50 | 2 | 61 | 0.020 | 0.020 | 0.020 | 0.46 | 42210 | 1690 | 45° |
| 0.80 | 2 | 98 | 0.022 | 0.032 | 0.032 | 0.74 | 42155 | 1855 | 45° |
| 1.00 | 2 | 123 | 0.026 | 0.040 | 0.040 | 0.93 | 42100 | 2190 | 45° |
| 1.20 | 2 | 146 | 0.028 | 0.048 | 0.048 | 1.11 | 41870 | 2345 | 45° |
| 1.50 | 2 | 183 | 0.032 | 0.060 | 0.060 | 1.39 | 41905 | 2680 | 45° |
| 2.00 | 2 | 245 | 0.036 | 0.080 | 0.080 | 1.86 | 41930 | 3020 | 45° |
| 2.50 | 2 | 250 | 0.038 | 0.100 | 0.100 | 2.32 | 34300 | 2605 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.20 | 2 | 25 | 0.008 | 0.008 | 0.008 | 0.19 | 41885 | 670 | 45° |
| 0.40 | 2 | 49 | 0.012 | 0.016 | 0.016 | 0.37 | 42155 | 1010 | 45° |
| 0.50 | 2 | 61 | 0.018 | 0.020 | 0.020 | 0.46 | 42210 | 1520 | 45° |
| 0.80 | 2 | 98 | 0.022 | 0.032 | 0.032 | 0.74 | 42155 | 1855 | 45° |
| 1.00 | 2 | 123 | 0.026 | 0.040 | 0.040 | 0.93 | 42100 | 2190 | 45° |
| 1.20 | 2 | 146 | 0.028 | 0.048 | 0.048 | 1.11 | 41870 | 2345 | 45° |
| 1.50 | 2 | 183 | 0.030 | 0.060 | 0.060 | 1.39 | 41905 | 2515 | 45° |
| 2.00 | 2 | 200 | 0.034 | 0.080 | 0.080 | 1.86 | 34225 | 2325 | 45° |
| 2.50 | 2 | 200 | 0.036 | 0.100 | 0.100 | 2.32 | 27440 | 1975 | 45° |

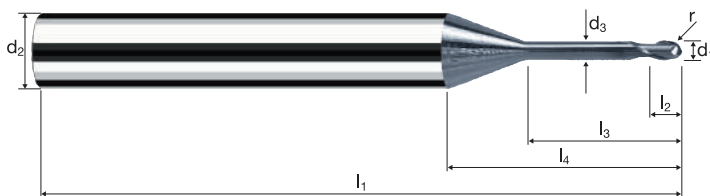
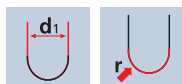
| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.20 | 2 | 25 | 0.006 | 0.008 | 0.008 | 0.19 | 41885 | 505 | 45° |
| 0.40 | 2 | 49 | 0.012 | 0.016 | 0.016 | 0.37 | 42155 | 1010 | 45° |
| 0.50 | 2 | 61 | 0.016 | 0.020 | 0.020 | 0.46 | 42210 | 1350 | 45° |
| 0.80 | 2 | 98 | 0.020 | 0.032 | 0.032 | 0.74 | 42155 | 1685 | 45° |
| 1.00 | 2 | 123 | 0.022 | 0.040 | 0.040 | 0.93 | 42100 | 1850 | 45° |
| 1.20 | 2 | 146 | 0.024 | 0.048 | 0.048 | 1.11 | 41870 | 2010 | 45° |
| 1.50 | 2 | 150 | 0.028 | 0.060 | 0.060 | 1.39 | 34350 | 1925 | 45° |
| 2.00 | 2 | 150 | 0.030 | 0.080 | 0.080 | 1.86 | 25670 | 1540 | 45° |
| 2.50 | 2 | 150 | 0.032 | 0.100 | 0.100 | 2.32 | 20580 | 1315 | 45° |

Frese con estremità emisferica MicroX

Gambo \varnothing 6mm, scarico cilindrico, 8xd



HM λ 30°
XA γ -10°

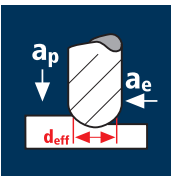


ReTool®

| | | | | | | | | | |
|----------|-------------|--------------|--------------|-----------|-----------|----------|----------------|-------------|----------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Inox Stainless | Ti Titanium | Cobalt-Chrome Copper |
|----------|-------------|--------------|--------------|-----------|-----------|----------|----------------|-------------|----------------------|

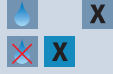
| Esempio: N° Ordine X 6566 020 | | | | | | | | | | | | X-AL |
|--------------------------------------|-------|----------|-------|-------|-------|-------|-------|------------|----------|-----|--|-------|
| | | | | | | | | | | | | X6566 |
| \varnothing Code | d_1 | d_2 h4 | d_3 | l_1 | l_2 | l_3 | l_4 | r ±0.005 | α | z | | EUR |
| 020 | 0.20 | 6.00 | 0.18 | 57 | 0.20 | 1.60 | 18.22 | 0.100 | 13.2° | 2 | | 88.00 |
| 030 | 0.30 | 6.00 | 0.25 | 57 | 0.30 | 2.40 | 18.64 | 0.150 | 12.4° | 2 | | 80.00 |
| 040 | 0.40 | 6.00 | 0.35 | 57 | 0.40 | 3.20 | 19.16 | 0.200 | 11.7° | 2 | | 80.00 |
| 050 | 0.50 | 6.00 | 0.45 | 57 | 0.50 | 4.00 | 15.01 | 0.250 | 11.1° | 2 | | 80.00 |
| 060 | 0.60 | 6.00 | 0.55 | 57 | 0.60 | 4.80 | 15.63 | 0.300 | 10.5° | 2 | | 80.00 |
| 080 | 0.80 | 6.00 | 0.75 | 57 | 0.80 | 6.40 | 16.85 | 0.400 | 9.4° | 2 | | 80.00 |
| 100 | 1.00 | 6.00 | 0.95 | 61 | 1.00 | 8.00 | 18.08 | 0.500 | 8.4° | 2 | | 80.00 |
| 108 | 1.20 | 6.00 | 1.10 | 61 | 1.20 | 9.60 | 19.40 | 0.600 | 7.6° | 2 | | 80.00 |
| 120 | 1.50 | 6.00 | 1.40 | 61 | 1.50 | 12.00 | 21.24 | 0.750 | 6.5° | 2 | | 80.00 |
| 140 | 2.00 | 6.00 | 1.90 | 66 | 2.00 | 16.00 | 24.31 | 1.000 | 5.1° | 2 | | 80.00 |
| 160 | 2.50 | 6.00 | 2.30 | 69 | 2.50 | 20.00 | 27.56 | 1.250 | 3.9° | 2 | | 80.00 |
| 180 | 3.00 | 6.00 | 2.80 | 75 | 3.00 | 24.00 | 30.63 | 1.500 | 3.1° | 2 | | 80.00 |
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Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



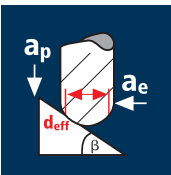
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _t [mm/min] | Q [mm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|--------------------------|
| 0.20 | 2 | 8 | 0.006 | 0.004 | 0.040 | 0.06 | 42440 | 535 | 0.1 |
| 0.30 | 2 | 11 | 0.010 | 0.005 | 0.060 | 0.08 | 43770 | 880 | 0.3 |
| 0.40 | 2 | 13 | 0.013 | 0.007 | 0.080 | 0.10 | 41380 | 1045 | 0.6 |
| 0.50 | 2 | 17 | 0.016 | 0.009 | 0.100 | 0.13 | 41625 | 1365 | 1.2 |
| 0.60 | 2 | 21 | 0.019 | 0.011 | 0.120 | 0.16 | 41780 | 1580 | 2.1 |
| 0.80 | 2 | 28 | 0.025 | 0.014 | 0.160 | 0.21 | 42440 | 2140 | 4.8 |
| 1.00 | 2 | 36 | 0.032 | 0.018 | 0.200 | 0.27 | 42440 | 2675 | 9.6 |
| 1.50 | 2 | 53 | 0.048 | 0.027 | 0.300 | 0.40 | 42175 | 4040 | 32.7 |
| 2.00 | 2 | 70 | 0.063 | 0.036 | 0.400 | 0.53 | 42040 | 5295 | 76.3 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|------|
| 0.20 | 2 | 8 | 0.006 | 0.004 | 0.040 | 0.06 | 42440 | 510 | 0.1 |
| 0.30 | 2 | 11 | 0.010 | 0.005 | 0.060 | 0.08 | 43770 | 840 | 0.3 |
| 0.40 | 2 | 13 | 0.012 | 0.007 | 0.080 | 0.10 | 41380 | 995 | 0.6 |
| 0.50 | 2 | 17 | 0.016 | 0.009 | 0.100 | 0.13 | 41625 | 1300 | 1.2 |
| 0.60 | 2 | 21 | 0.018 | 0.011 | 0.120 | 0.16 | 41780 | 1505 | 2.0 |
| 0.80 | 2 | 28 | 0.024 | 0.014 | 0.160 | 0.21 | 42440 | 2035 | 4.6 |
| 1.00 | 2 | 36 | 0.030 | 0.018 | 0.200 | 0.27 | 42440 | 2545 | 9.2 |
| 1.50 | 2 | 53 | 0.046 | 0.027 | 0.300 | 0.40 | 42175 | 3845 | 31.2 |
| 2.00 | 2 | 70 | 0.060 | 0.036 | 0.400 | 0.53 | 42040 | 5045 | 72.6 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|------|
| 0.20 | 2 | 8 | 0.005 | 0.004 | 0.040 | 0.06 | 42440 | 425 | 0.1 |
| 0.30 | 2 | 11 | 0.008 | 0.005 | 0.060 | 0.08 | 43770 | 700 | 0.2 |
| 0.40 | 2 | 13 | 0.010 | 0.007 | 0.080 | 0.10 | 41380 | 830 | 0.5 |
| 0.50 | 2 | 17 | 0.013 | 0.009 | 0.100 | 0.13 | 41625 | 1080 | 1.0 |
| 0.60 | 2 | 21 | 0.015 | 0.011 | 0.120 | 0.16 | 41780 | 1255 | 1.7 |
| 0.80 | 2 | 28 | 0.020 | 0.014 | 0.160 | 0.21 | 42440 | 1700 | 3.8 |
| 1.00 | 2 | 36 | 0.025 | 0.018 | 0.200 | 0.27 | 42440 | 2120 | 7.6 |
| 1.50 | 2 | 53 | 0.038 | 0.027 | 0.300 | 0.40 | 42175 | 3205 | 26.0 |
| 2.00 | 2 | 70 | 0.050 | 0.036 | 0.400 | 0.53 | 42040 | 4205 | 60.5 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|------|
| 0.20 | 2 | 8 | 0.004 | 0.004 | 0.040 | 0.06 | 42440 | 380 | 0.1 |
| 0.30 | 2 | 11 | 0.007 | 0.005 | 0.060 | 0.08 | 43770 | 630 | 0.2 |
| 0.40 | 2 | 13 | 0.009 | 0.007 | 0.080 | 0.10 | 41380 | 745 | 0.4 |
| 0.50 | 2 | 17 | 0.012 | 0.009 | 0.100 | 0.13 | 41625 | 975 | 0.9 |
| 0.60 | 2 | 21 | 0.014 | 0.011 | 0.120 | 0.16 | 41780 | 1130 | 1.5 |
| 0.80 | 2 | 28 | 0.018 | 0.014 | 0.160 | 0.21 | 42440 | 1530 | 3.4 |
| 1.00 | 2 | 36 | 0.023 | 0.018 | 0.200 | 0.27 | 42440 | 1910 | 6.9 |
| 1.50 | 2 | 53 | 0.034 | 0.027 | 0.300 | 0.40 | 42175 | 2885 | 23.4 |
| 2.00 | 2 | 60 | 0.045 | 0.036 | 0.400 | 0.53 | 36035 | 3245 | 46.7 |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _t [mm/min] | β [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
| 0.20 | 2 | 25 | 0.008 | 0.008 | 0.008 | 0.19 | 41885 | 670 | 45° |
| 0.30 | 2 | 36 | 0.010 | 0.010 | 0.010 | 0.27 | 42440 | 850 | 45° |
| 0.40 | 2 | 49 | 0.012 | 0.014 | 0.014 | 0.37 | 42155 | 1010 | 45° |
| 0.50 | 2 | 61 | 0.016 | 0.018 | 0.018 | 0.46 | 42210 | 1350 | 45° |
| 0.60 | 2 | 73 | 0.018 | 0.022 | 0.022 | 0.55 | 42250 | 1520 | 45° |
| 0.80 | 2 | 96 | 0.020 | 0.028 | 0.028 | 0.73 | 41860 | 1675 | 45° |
| 1.00 | 2 | 121 | 0.026 | 0.036 | 0.036 | 0.92 | 41865 | 2175 | 45° |
| 1.50 | 2 | 182 | 0.030 | 0.052 | 0.052 | 1.38 | 41980 | 2520 | 45° |
| 2.00 | 2 | 243 | 0.034 | 0.070 | 0.070 | 1.84 | 42040 | 2860 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.20 | 2 | 25 | 0.008 | 0.008 | 0.008 | 0.19 | 41885 | 670 | 45° |
| 0.30 | 2 | 36 | 0.010 | 0.010 | 0.010 | 0.27 | 42440 | 850 | 45° |
| 0.40 | 2 | 49 | 0.012 | 0.014 | 0.014 | 0.37 | 42155 | 1010 | 45° |
| 0.50 | 2 | 61 | 0.016 | 0.018 | 0.018 | 0.46 | 42210 | 1350 | 45° |
| 0.60 | 2 | 73 | 0.018 | 0.022 | 0.022 | 0.55 | 42250 | 1520 | 45° |
| 0.80 | 2 | 96 | 0.020 | 0.028 | 0.028 | 0.73 | 41860 | 1675 | 45° |
| 1.00 | 2 | 121 | 0.024 | 0.036 | 0.036 | 0.92 | 41865 | 2010 | 45° |
| 1.50 | 2 | 182 | 0.028 | 0.052 | 0.052 | 1.38 | 41980 | 2350 | 45° |
| 2.00 | 2 | 243 | 0.032 | 0.070 | 0.070 | 1.84 | 42040 | 2690 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.20 | 2 | 25 | 0.008 | 0.008 | 0.008 | 0.19 | 41885 | 670 | 45° |
| 0.30 | 2 | 36 | 0.010 | 0.010 | 0.010 | 0.27 | 42440 | 850 | 45° |
| 0.40 | 2 | 49 | 0.010 | 0.014 | 0.014 | 0.37 | 42155 | 845 | 45° |
| 0.50 | 2 | 61 | 0.014 | 0.018 | 0.018 | 0.46 | 42210 | 1180 | 45° |
| 0.60 | 2 | 73 | 0.016 | 0.022 | 0.022 | 0.55 | 42250 | 1350 | 45° |
| 0.80 | 2 | 96 | 0.018 | 0.028 | 0.028 | 0.73 | 41860 | 1505 | 45° |
| 1.00 | 2 | 121 | 0.024 | 0.036 | 0.036 | 0.92 | 41865 | 2010 | 45° |
| 1.50 | 2 | 182 | 0.028 | 0.052 | 0.052 | 1.38 | 41980 | 2350 | 45° |
| 2.00 | 2 | 200 | 0.030 | 0.070 | 0.070 | 1.84 | 34600 | 2075 | 45° |

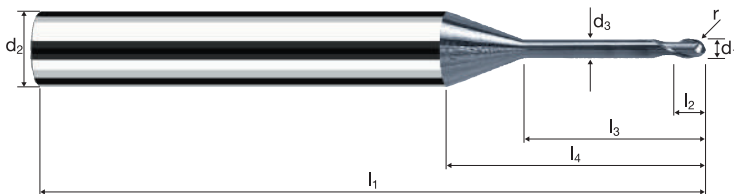
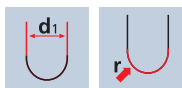
| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.20 | 2 | 25 | 0.006 | 0.008 | 0.008 | 0.19 | 41885 | 505 | 45° |
| 0.30 | 2 | 36 | 0.008 | 0.010 | 0.010 | 0.27 | 42440 | 680 | 45° |
| 0.40 | 2 | 49 | 0.010 | 0.014 | 0.014 | 0.37 | 42155 | 845 | 45° |
| 0.50 | 2 | 61 | 0.012 | 0.018 | 0.018 | 0.46 | 42210 | 1015 | 45° |
| 0.60 | 2 | 73 | 0.014 | 0.022 | 0.022 | 0.55 | 42250 | 1185 | 45° |
| 0.80 | 2 | 96 | 0.016 | 0.028 | 0.028 | 0.73 | 41860 | 1340 | 45° |
| 1.00 | 2 | 121 | 0.020 | 0.036 | 0.036 | 0.92 | 41865 | 1675 | 45° |
| 1.50 | 2 | 150 | 0.024 | 0.052 | 0.052 | 1.38 | 34600 | 1660 | 45° |
| 2.00 | 2 | 150 | 0.028 | 0.070 | 0.070 | 1.84 | 25950 | 1455 | 45° |

Frese con estremità emisferica MicroX

Gambo Ø 6mm, scarico cilindrico, 9xd



HM λ 30°
XA γ -10°

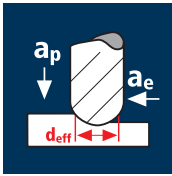


ReTool®

| | | | | | | | | | |
|--------------------|-----------------------|------------------------|------------------------|---------------------|---------------------|--------------------|--------------------------|-----------------------|---------------------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Inox Stainless | Ti Titanium | Cobalt-Chrome Copper |
|--------------------|-----------------------|------------------------|------------------------|---------------------|---------------------|--------------------|--------------------------|-----------------------|---------------------------------------|

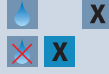
| Ø Code | Esempio: N° Ordine | | | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.005 | α | z | X-AL |
|-----------|-----------------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------------|-------|---|-------|
| | d ₁ | d ₂ h4 | d ₃ | | | | | | | | |
| 020 | 0.20 | 6.00 | 0.18 | 57 | 0.20 | 1.80 | 18.42 | 0.100 | 13.0° | 2 | 88.00 |
| 030 | 0.30 | 6.00 | 0.25 | 57 | 0.30 | 2.70 | 18.94 | 0.150 | 12.1° | 2 | 80.00 |
| 040 | 0.40 | 6.00 | 0.35 | 57 | 0.40 | 3.60 | 19.56 | 0.200 | 11.4° | 2 | 80.00 |
| 050 | 0.50 | 6.00 | 0.45 | 57 | 0.50 | 4.50 | 15.51 | 0.250 | 10.7° | 2 | 80.00 |
| 060 | 0.60 | 6.00 | 0.55 | 57 | 0.60 | 5.40 | 16.23 | 0.300 | 10.1° | 2 | 80.00 |
| 080 | 0.80 | 6.00 | 0.75 | 61 | 0.80 | 7.20 | 17.65 | 0.400 | 8.9° | 2 | 80.00 |
| 100 | 1.00 | 6.00 | 0.95 | 61 | 1.00 | 9.00 | 19.08 | 0.500 | 8.0° | 2 | 80.00 |
| 120 | 1.50 | 6.00 | 1.40 | 66 | 1.50 | 13.50 | 22.74 | 0.750 | 6.1° | 2 | 80.00 |
| 140 | 2.00 | 6.00 | 1.90 | 69 | 2.00 | 18.00 | 26.31 | 1.000 | 4.7° | 2 | 80.00 |
| | | | | | | | | | | | |
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Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



| d1 [mm] | z | v_c [m/min] | f_z [mm] | a_p [mm] | a_e [mm] | d_{eff} [mm] | n [min ⁻¹] | v_t [mm/min] | Q [mm ³ /min] |
|---------|---|---------------|------------|------------|------------|----------------|------------------------|----------------|--------------------------|
| 0.20 | 2 | 7 | 0.006 | 0.003 | 0.004 | 0.05 | 44565 | 560 | 0.0 |
| 0.40 | 2 | 13 | 0.013 | 0.006 | 0.080 | 0.10 | 41380 | 1045 | 0.5 |
| 0.50 | 2 | 17 | 0.016 | 0.008 | 0.100 | 0.13 | 41625 | 1365 | 1.1 |
| 0.80 | 2 | 26 | 0.025 | 0.013 | 0.160 | 0.20 | 41380 | 2085 | 4.3 |
| 1.00 | 2 | 33 | 0.032 | 0.016 | 0.200 | 0.25 | 42015 | 2645 | 8.5 |
| 1.20 | 2 | 40 | 0.038 | 0.019 | 0.240 | 0.30 | 42440 | 3210 | 14.6 |
| 1.50 | 2 | 50 | 0.048 | 0.024 | 0.300 | 0.38 | 41885 | 4010 | 28.9 |
| 2.00 | 2 | 66 | 0.063 | 0.032 | 0.400 | 0.50 | 42015 | 5295 | 67.8 |
| 2.50 | 2 | 83 | 0.079 | 0.040 | 0.500 | 0.63 | 41935 | 6660 | 133.2 |

Acciaio da
utensile temprato
48 - 52 HRC



| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|-------|
| 0.20 | 2 | 7 | 0.006 | 0.003 | 0.004 | 0.05 | 44565 | 535 | 0.0 |
| 0.40 | 2 | 13 | 0.012 | 0.006 | 0.080 | 0.10 | 41380 | 995 | 0.5 |
| 0.50 | 2 | 17 | 0.016 | 0.008 | 0.100 | 0.13 | 41625 | 1300 | 1.0 |
| 0.80 | 2 | 26 | 0.024 | 0.013 | 0.160 | 0.20 | 41380 | 1985 | 4.1 |
| 1.00 | 2 | 33 | 0.030 | 0.016 | 0.200 | 0.25 | 42015 | 2520 | 8.1 |
| 1.20 | 2 | 40 | 0.036 | 0.019 | 0.240 | 0.30 | 42440 | 3055 | 13.9 |
| 1.50 | 2 | 50 | 0.046 | 0.024 | 0.300 | 0.38 | 41885 | 3820 | 27.5 |
| 2.00 | 2 | 66 | 0.060 | 0.032 | 0.400 | 0.50 | 42015 | 5040 | 64.5 |
| 2.50 | 2 | 83 | 0.076 | 0.040 | 0.500 | 0.63 | 41935 | 6340 | 126.8 |

Acciaio da
utensile temprato
52 - 56 HRC



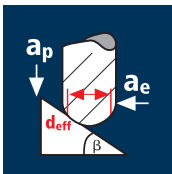
| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|-------|
| 0.20 | 2 | 7 | 0.005 | 0.003 | 0.004 | 0.05 | 44565 | 445 | 0.0 |
| 0.40 | 2 | 13 | 0.010 | 0.006 | 0.080 | 0.10 | 41380 | 830 | 0.4 |
| 0.50 | 2 | 17 | 0.013 | 0.008 | 0.100 | 0.13 | 41625 | 1080 | 0.9 |
| 0.80 | 2 | 26 | 0.020 | 0.013 | 0.160 | 0.20 | 41380 | 1655 | 3.4 |
| 1.00 | 2 | 33 | 0.025 | 0.016 | 0.200 | 0.25 | 42015 | 2100 | 6.7 |
| 1.20 | 2 | 40 | 0.030 | 0.019 | 0.240 | 0.30 | 42440 | 2545 | 11.6 |
| 1.50 | 2 | 50 | 0.038 | 0.024 | 0.300 | 0.38 | 41885 | 3185 | 22.9 |
| 2.00 | 2 | 66 | 0.050 | 0.032 | 0.400 | 0.50 | 42015 | 4200 | 53.8 |
| 2.50 | 2 | 83 | 0.063 | 0.040 | 0.500 | 0.63 | 41935 | 5285 | 105.7 |

Acciaio da
utensile temprato
56 - 60 HRC



| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|------|
| 0.20 | 2 | 7 | 0.004 | 0.003 | 0.004 | 0.05 | 44565 | 400 | 0.0 |
| 0.40 | 2 | 13 | 0.009 | 0.006 | 0.080 | 0.10 | 41380 | 745 | 0.4 |
| 0.50 | 2 | 17 | 0.012 | 0.008 | 0.100 | 0.13 | 41625 | 975 | 0.8 |
| 0.80 | 2 | 26 | 0.018 | 0.013 | 0.160 | 0.20 | 41380 | 1490 | 3.1 |
| 1.00 | 2 | 33 | 0.023 | 0.016 | 0.200 | 0.25 | 42015 | 1890 | 6.1 |
| 1.20 | 2 | 40 | 0.027 | 0.019 | 0.240 | 0.30 | 42440 | 2290 | 10.5 |
| 1.50 | 2 | 50 | 0.034 | 0.024 | 0.300 | 0.38 | 41885 | 2865 | 20.6 |
| 2.00 | 2 | 60 | 0.045 | 0.032 | 0.400 | 0.50 | 38195 | 3440 | 44.0 |
| 2.50 | 2 | 60 | 0.057 | 0.040 | 0.500 | 0.63 | 30315 | 3440 | 68.8 |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



| d1 [mm] | z | v_c [m/min] | f_z [mm] | a_p [mm] | a_e [mm] | d_{eff} [mm] | n [min ⁻¹] | v_t [mm/min] | β [°] |
|---------|---|---------------|------------|------------|------------|----------------|------------------------|----------------|-------------|
| 0.20 | 2 | 25 | 0.008 | 0.008 | 0.008 | 0.19 | 41885 | 670 | 45° |
| 0.40 | 2 | 49 | 0.012 | 0.014 | 0.014 | 0.37 | 42155 | 1010 | 45° |
| 0.50 | 2 | 61 | 0.016 | 0.018 | 0.018 | 0.46 | 42210 | 1350 | 45° |
| 0.80 | 2 | 96 | 0.020 | 0.028 | 0.028 | 0.73 | 41860 | 1675 | 45° |
| 1.00 | 2 | 121 | 0.026 | 0.036 | 0.036 | 0.92 | 41865 | 2175 | 45° |
| 1.20 | 2 | 145 | 0.028 | 0.042 | 0.042 | 1.10 | 41960 | 2350 | 45° |
| 1.50 | 2 | 182 | 0.030 | 0.052 | 0.052 | 1.38 | 41980 | 2520 | 45° |
| 2.00 | 2 | 243 | 0.034 | 0.070 | 0.070 | 1.84 | 42040 | 2860 | 45° |
| 2.50 | 2 | 300 | 0.036 | 0.088 | 0.088 | 2.29 | 41700 | 3000 | 45° |

Acciaio da
utensile temprato
48 - 52 HRC



| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.20 | 2 | 25 | 0.008 | 0.008 | 0.008 | 0.19 | 41885 | 670 | 45° |
| 0.40 | 2 | 49 | 0.012 | 0.014 | 0.014 | 0.37 | 42155 | 1010 | 45° |
| 0.50 | 2 | 61 | 0.016 | 0.018 | 0.018 | 0.46 | 42210 | 1350 | 45° |
| 0.80 | 2 | 96 | 0.020 | 0.028 | 0.028 | 0.73 | 41860 | 1675 | 45° |
| 1.00 | 2 | 121 | 0.024 | 0.036 | 0.036 | 0.92 | 41865 | 2010 | 45° |
| 1.20 | 2 | 145 | 0.026 | 0.042 | 0.042 | 1.10 | 41960 | 2180 | 45° |
| 1.50 | 2 | 182 | 0.028 | 0.052 | 0.052 | 1.38 | 41980 | 2350 | 45° |
| 2.00 | 2 | 243 | 0.032 | 0.070 | 0.070 | 1.84 | 42040 | 2690 | 45° |
| 2.50 | 2 | 250 | 0.034 | 0.088 | 0.088 | 2.29 | 34750 | 2365 | 45° |

Acciaio da
utensile temprato
52 - 56 HRC



| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.20 | 2 | 25 | 0.008 | 0.008 | 0.008 | 0.19 | 41885 | 670 | 45° |
| 0.40 | 2 | 49 | 0.010 | 0.014 | 0.014 | 0.37 | 42155 | 845 | 45° |
| 0.50 | 2 | 61 | 0.014 | 0.018 | 0.018 | 0.46 | 42210 | 1180 | 45° |
| 0.80 | 2 | 96 | 0.018 | 0.028 | 0.028 | 0.73 | 41860 | 1505 | 45° |
| 1.00 | 2 | 121 | 0.024 | 0.036 | 0.036 | 0.92 | 41865 | 2010 | 45° |
| 1.20 | 2 | 145 | 0.026 | 0.042 | 0.042 | 1.10 | 41960 | 2180 | 45° |
| 1.50 | 2 | 182 | 0.028 | 0.052 | 0.052 | 1.38 | 41980 | 2350 | 45° |
| 2.00 | 2 | 200 | 0.030 | 0.070 | 0.070 | 1.84 | 34600 | 2075 | 45° |
| 2.50 | 2 | 200 | 0.032 | 0.088 | 0.088 | 2.29 | 27800 | 1780 | 45° |

Acciaio da
utensile temprato
56 - 60 HRC



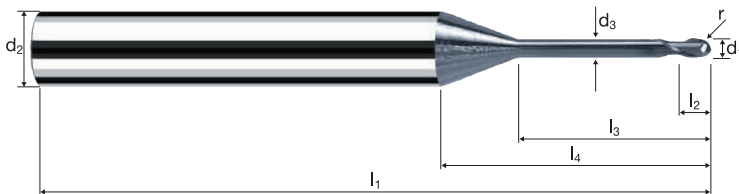
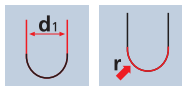
| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.20 | 2 | 25 | 0.006 | 0.008 | 0.008 | 0.19 | 41885 | 505 | 45° |
| 0.40 | 2 | 49 | 0.010 | 0.014 | 0.014 | 0.37 | 42155 | 845 | 45° |
| 0.50 | 2 | 61 | 0.012 | 0.018 | 0.018 | 0.46 | 42210 | 1015 | 45° |
| 0.80 | 2 | 96 | 0.016 | 0.028 | 0.028 | 0.73 | 41860 | 1340 | 45° |
| 1.00 | 2 | 121 | 0.020 | 0.036 | 0.036 | 0.92 | 41865 | 1675 | 45° |
| 1.20 | 2 | 145 | 0.022 | 0.042 | 0.042 | 1.10 | 41960 | 1845 | 45° |
| 1.50 | 2 | 150 | 0.024 | 0.052 | 0.052 | 1.38 | 34600 | 1660 | 45° |
| 2.00 | 2 | 150 | 0.028 | 0.070 | 0.070 | 1.84 | 25950 | 1455 | 45° |
| 2.50 | 2 | 150 | 0.028 | 0.088 | 0.088 | 2.29 | 20850 | 1170 | 45° |

Frese con estremità emisferica MicroX

Gambo ø 6mm, scarico cilindrico, 10xd



HM λ 30°
XA γ -10°

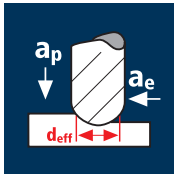


ReTool®

| | | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--------------|--------------|-------------|-------------------|----------------|-------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Inox Stainless | Ti Titanium | Cobalt-Chrome Copper |
|-------------|----------------|-----------------|-----------------|--------------|--------------|-------------|-------------------|----------------|-------------------------|

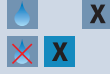
| Esempio: N° Ordine | | | | | | | | | | | X-AL |
|-----------------------|----------------|----------------------------------|----------------|----------------|----------------|----------------|----------------|-------------|-------|---|-------|
| | | | | | | | | | | | X6568 |
| | | | | | | | | | | | EUR |
| Ø Code | d ₁ | d ₂ h ₄ | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.005 | α | z | EUR |
| 020 | 0.20 | 6.00 | 0.18 | 57 | 0.20 | 2.00 | 18.62 | 0.100 | 12.8° | 2 | 88.00 |
| 030 | 0.30 | 6.00 | 0.25 | 57 | 0.30 | 3.00 | 19.24 | 0.150 | 11.9° | 2 | 80.00 |
| 040 | 0.40 | 6.00 | 0.35 | 57 | 0.40 | 4.00 | 19.96 | 0.200 | 11.1° | 2 | 80.00 |
| 050 | 0.50 | 6.00 | 0.45 | 57 | 0.50 | 5.00 | 16.01 | 0.250 | 10.3° | 2 | 80.00 |
| 060 | 0.60 | 6.00 | 0.55 | 57 | 0.60 | 6.00 | 16.83 | 0.300 | 9.7° | 2 | 80.00 |
| 080 | 0.80 | 6.00 | 0.75 | 61 | 0.80 | 8.00 | 18.45 | 0.400 | 8.5° | 2 | 80.00 |
| 100 | 1.00 | 6.00 | 0.95 | 61 | 1.00 | 10.00 | 20.08 | 0.500 | 7.6° | 2 | 80.00 |
| 108 | 1.20 | 6.00 | 1.10 | 66 | 1.20 | 12.00 | 21.80 | 0.600 | 6.7° | 2 | 80.00 |
| 120 | 1.50 | 6.00 | 1.40 | 66 | 1.50 | 15.00 | 24.24 | 0.750 | 5.7° | 2 | 80.00 |
| 140 | 2.00 | 6.00 | 1.90 | 69 | 2.00 | 20.00 | 28.31 | 1.000 | 4.3° | 2 | 80.00 |
| 160 | 2.50 | 6.00 | 2.30 | 75 | 2.50 | 25.00 | 32.56 | 1.250 | 3.3° | 2 | 80.00 |
| 180 | 3.00 | 6.00 | 2.80 | 80 | 3.00 | 30.00 | 36.63 | 1.500 | 2.5° | 2 | 80.00 |
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Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



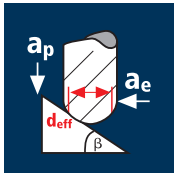
Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



| d1 [mm] | z | v_c [m/min] | f_z [mm] | a_p [mm] | a_e [mm] | d_{eff} [mm] | n [min ⁻¹] | v_f [mm/min] | Q [mm ³ /min] |
|---------|---|---------------|------------|------------|------------|----------------|------------------------|----------------|--------------------------|
| 0.50 | 2 | 21 | 0.019 | 0.013 | 0.100 | 0.16 | 41780 | 1580 | 2.1 |
| 0.60 | 2 | 25 | 0.023 | 0.016 | 0.120 | 0.19 | 41885 | 1900 | 3.6 |
| 0.80 | 2 | 34 | 0.030 | 0.021 | 0.160 | 0.26 | 41625 | 2515 | 8.5 |
| 1.00 | 2 | 42 | 0.038 | 0.027 | 0.200 | 0.32 | 41780 | 3160 | 17.1 |
| 1.50 | 2 | 63 | 0.057 | 0.040 | 0.300 | 0.48 | 41780 | 4740 | 56.9 |
| 2.00 | 2 | 84 | 0.076 | 0.053 | 0.400 | 0.64 | 41780 | 6315 | 133.9 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|-------|
| 0.50 | 2 | 21 | 0.018 | 0.013 | 0.100 | 0.16 | 41780 | 1505 | 2.0 |
| 0.60 | 2 | 25 | 0.022 | 0.016 | 0.120 | 0.19 | 41885 | 1810 | 3.5 |
| 0.80 | 2 | 34 | 0.029 | 0.021 | 0.160 | 0.26 | 41625 | 2400 | 8.1 |
| 1.00 | 2 | 42 | 0.036 | 0.027 | 0.200 | 0.32 | 41780 | 3010 | 16.2 |
| 1.50 | 2 | 63 | 0.054 | 0.040 | 0.300 | 0.48 | 41780 | 4510 | 54.1 |
| 2.00 | 2 | 84 | 0.072 | 0.053 | 0.400 | 0.64 | 41780 | 6015 | 127.5 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|-------|
| 0.50 | 2 | 21 | 0.015 | 0.013 | 0.100 | 0.16 | 41780 | 1255 | 1.6 |
| 0.60 | 2 | 25 | 0.018 | 0.016 | 0.120 | 0.19 | 41885 | 1510 | 2.9 |
| 0.80 | 2 | 34 | 0.024 | 0.021 | 0.160 | 0.26 | 41625 | 2000 | 6.7 |
| 1.00 | 2 | 42 | 0.030 | 0.027 | 0.200 | 0.32 | 41780 | 2505 | 13.5 |
| 1.50 | 2 | 63 | 0.045 | 0.040 | 0.300 | 0.48 | 41780 | 3760 | 45.1 |
| 2.00 | 2 | 84 | 0.060 | 0.053 | 0.400 | 0.64 | 41780 | 5015 | 106.3 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|------|
| 0.50 | 2 | 21 | 0.014 | 0.013 | 0.100 | 0.16 | 41780 | 1130 | 1.5 |
| 0.60 | 2 | 25 | 0.016 | 0.016 | 0.120 | 0.19 | 41885 | 1355 | 2.6 |
| 0.80 | 2 | 34 | 0.022 | 0.021 | 0.160 | 0.26 | 41625 | 1800 | 6.0 |
| 1.00 | 2 | 42 | 0.027 | 0.027 | 0.200 | 0.32 | 41780 | 2255 | 12.2 |
| 1.50 | 2 | 60 | 0.041 | 0.040 | 0.300 | 0.48 | 39790 | 3225 | 38.7 |
| 2.00 | 2 | 60 | 0.054 | 0.053 | 0.400 | 0.64 | 29840 | 3225 | 68.3 |

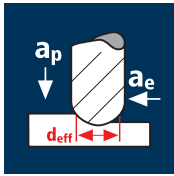
| d1 [mm] | z | v_c [m/min] | f_z [mm] | a_p [mm] | a_e [mm] | d_{eff} [mm] | n [min ⁻¹] | v_f [mm/min] | β [°] |
|---------|---|---------------|------------|------------|------------|----------------|------------------------|----------------|-------------|
| 0.50 | 2 | 61 | 0.024 | 0.020 | 0.020 | 0.46 | 42210 | 2025 | 45° |
| 0.60 | 2 | 74 | 0.026 | 0.024 | 0.024 | 0.56 | 42060 | 2185 | 45° |
| 0.80 | 2 | 98 | 0.030 | 0.032 | 0.032 | 0.74 | 42155 | 2530 | 45° |
| 1.00 | 2 | 123 | 0.034 | 0.040 | 0.040 | 0.93 | 42100 | 2865 | 45° |
| 1.50 | 2 | 183 | 0.040 | 0.060 | 0.060 | 1.39 | 41905 | 3355 | 45° |
| 2.00 | 2 | 245 | 0.046 | 0.080 | 0.080 | 1.86 | 41930 | 3855 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 2 | 61 | 0.022 | 0.020 | 0.020 | 0.46 | 42210 | 1855 | 45° |
| 0.60 | 2 | 74 | 0.024 | 0.024 | 0.024 | 0.56 | 42060 | 2020 | 45° |
| 0.80 | 2 | 98 | 0.028 | 0.032 | 0.032 | 0.74 | 42155 | 2360 | 45° |
| 1.00 | 2 | 123 | 0.032 | 0.040 | 0.040 | 0.93 | 42100 | 2695 | 45° |
| 1.50 | 2 | 183 | 0.038 | 0.060 | 0.060 | 1.39 | 41905 | 3185 | 45° |
| 2.00 | 2 | 245 | 0.044 | 0.080 | 0.080 | 1.86 | 41930 | 3690 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 2 | 61 | 0.022 | 0.020 | 0.020 | 0.46 | 42210 | 1855 | 45° |
| 0.60 | 2 | 74 | 0.024 | 0.024 | 0.024 | 0.56 | 42060 | 2020 | 45° |
| 0.80 | 2 | 98 | 0.028 | 0.032 | 0.032 | 0.74 | 42155 | 2360 | 45° |
| 1.00 | 2 | 123 | 0.030 | 0.040 | 0.040 | 0.93 | 42100 | 2525 | 45° |
| 1.50 | 2 | 183 | 0.036 | 0.060 | 0.060 | 1.39 | 41905 | 3015 | 45° |
| 2.00 | 2 | 200 | 0.042 | 0.080 | 0.080 | 1.86 | 34225 | 2875 | 45° |

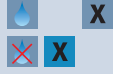
| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 2 | 61 | 0.020 | 0.020 | 0.020 | 0.46 | 42210 | 1690 | 45° |
| 0.60 | 2 | 74 | 0.020 | 0.024 | 0.024 | 0.56 | 42060 | 1680 | 45° |
| 0.80 | 2 | 98 | 0.024 | 0.032 | 0.032 | 0.74 | 42155 | 2025 | 45° |
| 1.00 | 2 | 123 | 0.028 | 0.040 | 0.040 | 0.93 | 42100 | 2360 | 45° |
| 1.50 | 2 | 150 | 0.032 | 0.060 | 0.060 | 1.39 | 34350 | 2200 | 45° |
| 2.00 | 2 | 150 | 0.036 | 0.080 | 0.080 | 1.86 | 25670 | 1850 | 45° |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



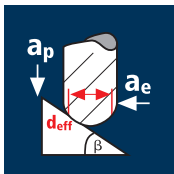
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|--------------------------|
| 0.50 | 2 | 18 | 0.019 | 0.010 | 0.100 | 0.14 | 40925 | 1545 | 1.5 |
| 0.60 | 2 | 22 | 0.023 | 0.012 | 0.120 | 0.17 | 41195 | 1870 | 2.7 |
| 0.80 | 2 | 29 | 0.030 | 0.016 | 0.160 | 0.22 | 41960 | 2540 | 6.5 |
| 1.00 | 2 | 37 | 0.038 | 0.020 | 0.200 | 0.28 | 42060 | 3180 | 12.7 |
| 1.20 | 2 | 45 | 0.045 | 0.024 | 0.240 | 0.34 | 42130 | 3820 | 22.0 |
| 1.50 | 2 | 55 | 0.057 | 0.030 | 0.300 | 0.42 | 41685 | 4725 | 42.5 |
| 2.00 | 2 | 74 | 0.076 | 0.040 | 0.400 | 0.56 | 42060 | 6360 | 101.8 |
| 2.50 | 2 | 92 | 0.094 | 0.050 | 0.500 | 0.70 | 41835 | 7905 | 197.7 |
| 3.00 | 2 | 111 | 0.113 | 0.060 | 0.600 | 0.84 | 42060 | 9540 | 343.4 |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-------|
| 0.50 | 2 | 18 | 0.018 | 0.010 | 0.100 | 0.14 | 40925 | 1475 | 1.5 |
| 0.60 | 2 | 22 | 0.022 | 0.012 | 0.120 | 0.17 | 41195 | 1780 | 2.6 |
| 0.80 | 2 | 29 | 0.029 | 0.016 | 0.160 | 0.22 | 41960 | 2415 | 6.2 |
| 1.00 | 2 | 37 | 0.036 | 0.020 | 0.200 | 0.28 | 42060 | 3030 | 12.1 |
| 1.20 | 2 | 45 | 0.043 | 0.024 | 0.240 | 0.34 | 42130 | 3640 | 21.0 |
| 1.50 | 2 | 55 | 0.054 | 0.030 | 0.300 | 0.42 | 41685 | 4500 | 40.5 |
| 2.00 | 2 | 74 | 0.072 | 0.040 | 0.400 | 0.56 | 42060 | 6055 | 96.9 |
| 2.50 | 2 | 92 | 0.090 | 0.050 | 0.500 | 0.70 | 41835 | 7530 | 188.3 |
| 3.00 | 2 | 111 | 0.108 | 0.060 | 0.600 | 0.84 | 42060 | 9085 | 327.1 |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-------|
| 0.50 | 2 | 18 | 0.015 | 0.010 | 0.100 | 0.14 | 40925 | 1230 | 1.2 |
| 0.60 | 2 | 22 | 0.018 | 0.012 | 0.120 | 0.17 | 41195 | 1485 | 2.1 |
| 0.80 | 2 | 29 | 0.024 | 0.016 | 0.160 | 0.22 | 41960 | 2015 | 5.2 |
| 1.00 | 2 | 37 | 0.030 | 0.020 | 0.200 | 0.28 | 42060 | 2525 | 10.1 |
| 1.20 | 2 | 45 | 0.036 | 0.024 | 0.240 | 0.34 | 42130 | 3035 | 17.5 |
| 1.50 | 2 | 55 | 0.045 | 0.030 | 0.300 | 0.42 | 41685 | 3750 | 33.8 |
| 2.00 | 2 | 74 | 0.060 | 0.040 | 0.400 | 0.56 | 42060 | 5045 | 80.8 |
| 2.50 | 2 | 92 | 0.075 | 0.050 | 0.500 | 0.70 | 41835 | 6275 | 156.9 |
| 3.00 | 2 | 100 | 0.090 | 0.060 | 0.600 | 0.84 | 37895 | 6820 | 245.6 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|-------|
| 0.50 | 2 | 18 | 0.014 | 0.010 | 0.100 | 0.14 | 40925 | 1105 | 1.1 |
| 0.60 | 2 | 22 | 0.016 | 0.012 | 0.120 | 0.17 | 41195 | 1335 | 1.9 |
| 0.80 | 2 | 29 | 0.022 | 0.016 | 0.160 | 0.22 | 41960 | 1815 | 4.6 |
| 1.00 | 2 | 37 | 0.027 | 0.020 | 0.200 | 0.28 | 42060 | 2270 | 9.1 |
| 1.20 | 2 | 45 | 0.032 | 0.024 | 0.240 | 0.34 | 42130 | 2730 | 15.7 |
| 1.50 | 2 | 55 | 0.041 | 0.030 | 0.300 | 0.42 | 41685 | 3375 | 30.4 |
| 2.00 | 2 | 60 | 0.054 | 0.040 | 0.400 | 0.56 | 34105 | 3685 | 58.9 |
| 2.50 | 2 | 60 | 0.068 | 0.050 | 0.500 | 0.70 | 27285 | 3685 | 92.1 |
| 3.00 | 2 | 60 | 0.081 | 0.060 | 0.600 | 0.84 | 22735 | 3685 | 132.6 |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



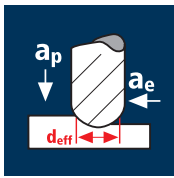
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
| 0.50 | 2 | 61 | 0.024 | 0.020 | 0.020 | 0.46 | 42210 | 2025 | 45° |
| 0.60 | 2 | 74 | 0.026 | 0.024 | 0.024 | 0.56 | 42060 | 2185 | 45° |
| 0.80 | 2 | 98 | 0.030 | 0.032 | 0.032 | 0.74 | 42155 | 2530 | 45° |
| 1.00 | 2 | 123 | 0.034 | 0.040 | 0.040 | 0.93 | 42100 | 2865 | 45° |
| 1.20 | 2 | 146 | 0.036 | 0.048 | 0.048 | 1.11 | 41870 | 3015 | 45° |
| 1.50 | 2 | 183 | 0.040 | 0.060 | 0.060 | 1.39 | 41905 | 3355 | 45° |
| 2.00 | 2 | 245 | 0.046 | 0.080 | 0.080 | 1.86 | 41930 | 3855 | 45° |
| 2.50 | 2 | 300 | 0.048 | 0.100 | 0.100 | 2.32 | 41160 | 3950 | 45° |
| 3.00 | 2 | 300 | 0.056 | 0.120 | 0.120 | 2.78 | 34350 | 3845 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 2 | 61 | 0.022 | 0.020 | 0.020 | 0.46 | 42210 | 1855 | 45° |
| 0.60 | 2 | 74 | 0.024 | 0.024 | 0.024 | 0.56 | 42060 | 2020 | 45° |
| 0.80 | 2 | 98 | 0.028 | 0.032 | 0.032 | 0.74 | 42155 | 2360 | 45° |
| 1.00 | 2 | 123 | 0.032 | 0.040 | 0.040 | 0.93 | 42100 | 2695 | 45° |
| 1.20 | 2 | 146 | 0.034 | 0.048 | 0.048 | 1.11 | 41870 | 2845 | 45° |
| 1.50 | 2 | 183 | 0.038 | 0.060 | 0.060 | 1.39 | 41905 | 3185 | 45° |
| 2.00 | 2 | 245 | 0.044 | 0.080 | 0.080 | 1.86 | 41930 | 3690 | 45° |
| 2.50 | 2 | 250 | 0.046 | 0.100 | 0.100 | 2.32 | 34300 | 3155 | 45° |
| 3.00 | 2 | 250 | 0.054 | 0.120 | 0.120 | 2.78 | 28625 | 3090 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 2 | 61 | 0.022 | 0.020 | 0.020 | 0.46 | 42210 | 1855 | 45° |
| 0.60 | 2 | 74 | 0.024 | 0.024 | 0.024 | 0.56 | 42060 | 2020 | 45° |
| 0.80 | 2 | 98 | 0.028 | 0.032 | 0.032 | 0.74 | 42155 | 2360 | 45° |
| 1.00 | 2 | 123 | 0.030 | 0.040 | 0.040 | 0.93 | 42100 | 2525 | 45° |
| 1.20 | 2 | 146 | 0.032 | 0.048 | 0.048 | 1.11 | 41870 | 2680 | 45° |
| 1.50 | 2 | 183 | 0.036 | 0.060 | 0.060 | 1.39 | 41905 | 3015 | 45° |
| 2.00 | 2 | 200 | 0.042 | 0.080 | 0.080 | 1.86 | 34225 | 2875 | 45° |
| 2.50 | 2 | 200 | 0.044 | 0.100 | 0.100 | 2.32 | 27440 | 2415 | 45° |
| 3.00 | 2 | 200 | 0.050 | 0.120 | 0.120 | 2.78 | 22900 | 2290 | 45° |

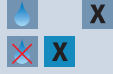
| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 2 | 61 | 0.020 | 0.020 | 0.020 | 0.46 | 42210 | 1690 | 45° |
| 0.60 | 2 | 74 | 0.020 | 0.024 | 0.024 | 0.56 | 42060 | 1680 | 45° |
| 0.80 | 2 | 98 | 0.024 | 0.032 | 0.032 | 0.74 | 42155 | 2025 | 45° |
| 1.00 | 2 | 123 | 0.028 | 0.040 | 0.040 | 0.93 | 42100 | 2360 | 45° |
| 1.20 | 2 | 146 | 0.028 | 0.048 | 0.048 | 1.11 | 41870 | 2345 | 45° |
| 1.50 | 2 | 150 | 0.032 | 0.060 | 0.060 | 1.39 | 34350 | 2200 | 45° |
| 2.00 | 2 | 150 | 0.036 | 0.080 | 0.080 | 1.86 | 25670 | 1850 | 45° |
| 2.50 | 2 | 150 | 0.038 | 0.100 | 0.100 | 2.32 | 20580 | 1565 | 45° |
| 3.00 | 2 | 150 | 0.044 | 0.120 | 0.120 | 2.78 | 17175 | 1510 | 45° |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



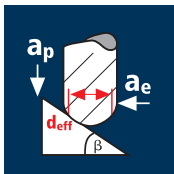
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _c [mm/min] | Q [mm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|--------------------------|
| 0.50 | 2 | 17 | 0.019 | 0.008 | 0.100 | 0.13 | 41625 | 1575 | 1.3 |
| 0.60 | 2 | 20 | 0.023 | 0.010 | 0.120 | 0.15 | 42440 | 1925 | 2.3 |
| 0.80 | 2 | 26 | 0.030 | 0.013 | 0.160 | 0.20 | 41380 | 2505 | 5.2 |
| 1.00 | 2 | 33 | 0.038 | 0.016 | 0.200 | 0.25 | 42015 | 3175 | 10.2 |
| 1.20 | 2 | 40 | 0.045 | 0.019 | 0.240 | 0.30 | 42440 | 3850 | 17.6 |
| 1.50 | 2 | 50 | 0.057 | 0.024 | 0.300 | 0.38 | 41885 | 4750 | 34.2 |
| 2.00 | 2 | 66 | 0.076 | 0.032 | 0.400 | 0.50 | 42015 | 6355 | 81.3 |
| 2.50 | 2 | 83 | 0.094 | 0.040 | 0.500 | 0.63 | 41935 | 7925 | 158.5 |
| 3.00 | 2 | 99 | 0.113 | 0.048 | 0.600 | 0.75 | 42015 | 9530 | 274.4 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|-------|
| 0.50 | 2 | 17 | 0.018 | 0.008 | 0.100 | 0.13 | 41625 | 1500 | 1.2 |
| 0.60 | 2 | 20 | 0.022 | 0.010 | 0.120 | 0.15 | 42440 | 1835 | 2.2 |
| 0.80 | 2 | 26 | 0.029 | 0.013 | 0.160 | 0.20 | 41380 | 2385 | 5.0 |
| 1.00 | 2 | 33 | 0.036 | 0.016 | 0.200 | 0.25 | 42015 | 3025 | 9.7 |
| 1.20 | 2 | 40 | 0.043 | 0.019 | 0.240 | 0.30 | 42440 | 3665 | 16.7 |
| 1.50 | 2 | 50 | 0.054 | 0.024 | 0.300 | 0.38 | 41885 | 4525 | 32.6 |
| 2.00 | 2 | 66 | 0.072 | 0.032 | 0.400 | 0.50 | 42015 | 6050 | 77.4 |
| 2.50 | 2 | 83 | 0.090 | 0.040 | 0.500 | 0.63 | 41935 | 7550 | 151.0 |
| 3.00 | 2 | 99 | 0.108 | 0.048 | 0.600 | 0.75 | 42015 | 9075 | 261.4 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|-------|
| 0.50 | 2 | 17 | 0.015 | 0.008 | 0.100 | 0.13 | 41625 | 1250 | 1.0 |
| 0.60 | 2 | 20 | 0.018 | 0.010 | 0.120 | 0.15 | 42440 | 1530 | 1.8 |
| 0.80 | 2 | 26 | 0.024 | 0.013 | 0.160 | 0.20 | 41380 | 1985 | 4.1 |
| 1.00 | 2 | 33 | 0.030 | 0.016 | 0.200 | 0.25 | 42015 | 2520 | 8.1 |
| 1.20 | 2 | 40 | 0.036 | 0.019 | 0.240 | 0.30 | 42440 | 3055 | 13.9 |
| 1.50 | 2 | 50 | 0.045 | 0.024 | 0.300 | 0.38 | 41885 | 3770 | 27.1 |
| 2.00 | 2 | 66 | 0.060 | 0.032 | 0.400 | 0.50 | 42015 | 5040 | 64.5 |
| 2.50 | 2 | 83 | 0.075 | 0.040 | 0.500 | 0.63 | 41935 | 6290 | 125.8 |
| 3.00 | 2 | 99 | 0.090 | 0.048 | 0.600 | 0.75 | 42015 | 7565 | 217.8 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|-------|
| 0.50 | 2 | 17 | 0.014 | 0.008 | 0.100 | 0.13 | 41625 | 1125 | 0.9 |
| 0.60 | 2 | 20 | 0.016 | 0.010 | 0.120 | 0.15 | 42440 | 1375 | 1.7 |
| 0.80 | 2 | 26 | 0.022 | 0.013 | 0.160 | 0.20 | 41380 | 1790 | 3.7 |
| 1.00 | 2 | 33 | 0.027 | 0.016 | 0.200 | 0.25 | 42015 | 2270 | 7.3 |
| 1.20 | 2 | 40 | 0.032 | 0.019 | 0.240 | 0.30 | 42440 | 2750 | 12.5 |
| 1.50 | 2 | 50 | 0.041 | 0.024 | 0.300 | 0.38 | 41885 | 3395 | 24.4 |
| 2.00 | 2 | 60 | 0.054 | 0.032 | 0.400 | 0.50 | 38195 | 4125 | 52.8 |
| 2.50 | 2 | 60 | 0.068 | 0.040 | 0.500 | 0.63 | 30315 | 4095 | 81.9 |
| 3.00 | 2 | 60 | 0.081 | 0.048 | 0.600 | 0.75 | 25465 | 4125 | 118.8 |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



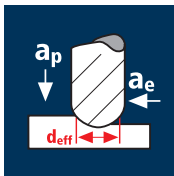
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _c [mm/min] | β [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
| 0.50 | 2 | 61 | 0.022 | 0.018 | 0.018 | 0.46 | 42210 | 1855 | 45° |
| 0.60 | 2 | 73 | 0.024 | 0.022 | 0.022 | 0.55 | 42250 | 2030 | 45° |
| 0.80 | 2 | 96 | 0.026 | 0.028 | 0.028 | 0.73 | 41860 | 2175 | 45° |
| 1.00 | 2 | 121 | 0.032 | 0.036 | 0.036 | 0.92 | 41865 | 2680 | 45° |
| 1.20 | 2 | 145 | 0.034 | 0.042 | 0.042 | 1.10 | 41960 | 2855 | 45° |
| 1.50 | 2 | 182 | 0.038 | 0.052 | 0.052 | 1.38 | 41980 | 3190 | 45° |
| 2.00 | 2 | 243 | 0.042 | 0.070 | 0.070 | 1.84 | 42040 | 3530 | 45° |
| 2.50 | 2 | 300 | 0.044 | 0.088 | 0.088 | 2.29 | 41700 | 3670 | 45° |
| 3.00 | 2 | 300 | 0.050 | 0.106 | 0.106 | 2.75 | 34725 | 3470 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 2 | 61 | 0.020 | 0.018 | 0.018 | 0.46 | 42210 | 1690 | 45° |
| 0.60 | 2 | 73 | 0.022 | 0.022 | 0.022 | 0.55 | 42250 | 1860 | 45° |
| 0.80 | 2 | 96 | 0.024 | 0.028 | 0.028 | 0.73 | 41860 | 2010 | 45° |
| 1.00 | 2 | 121 | 0.030 | 0.036 | 0.036 | 0.92 | 41865 | 2510 | 45° |
| 1.20 | 2 | 145 | 0.032 | 0.042 | 0.042 | 1.10 | 41960 | 2685 | 45° |
| 1.50 | 2 | 182 | 0.036 | 0.052 | 0.052 | 1.38 | 41980 | 3025 | 45° |
| 2.00 | 2 | 243 | 0.040 | 0.070 | 0.070 | 1.84 | 42040 | 3365 | 45° |
| 2.50 | 2 | 250 | 0.042 | 0.088 | 0.088 | 2.29 | 34750 | 2920 | 45° |
| 3.00 | 2 | 250 | 0.048 | 0.106 | 0.106 | 2.75 | 28935 | 2780 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 2 | 61 | 0.020 | 0.018 | 0.018 | 0.46 | 42210 | 1690 | 45° |
| 0.60 | 2 | 73 | 0.022 | 0.022 | 0.022 | 0.55 | 42250 | 1860 | 45° |
| 0.80 | 2 | 96 | 0.024 | 0.028 | 0.028 | 0.73 | 41860 | 2010 | 45° |
| 1.00 | 2 | 121 | 0.028 | 0.036 | 0.036 | 0.92 | 41865 | 2345 | 45° |
| 1.20 | 2 | 145 | 0.030 | 0.042 | 0.042 | 1.10 | 41960 | 2520 | 45° |
| 1.50 | 2 | 182 | 0.034 | 0.052 | 0.052 | 1.38 | 41980 | 2855 | 45° |
| 2.00 | 2 | 200 | 0.038 | 0.070 | 0.070 | 1.84 | 34600 | 2630 | 45° |
| 2.50 | 2 | 200 | 0.040 | 0.088 | 0.088 | 2.29 | 27800 | 2225 | 45° |
| 3.00 | 2 | 200 | 0.046 | 0.106 | 0.106 | 2.75 | 23150 | 2130 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 2 | 61 | 0.018 | 0.018 | 0.018 | 0.46 | 42210 | 1520 | 45° |
| 0.60 | 2 | 73 | 0.020 | 0.022 | 0.022 | 0.55 | 42250 | 1690 | 45° |
| 0.80 | 2 | 96 | 0.020 | 0.028 | 0.028 | 0.73 | 41860 | 1675 | 45° |
| 1.00 | 2 | 121 | 0.026 | 0.036 | 0.036 | 0.92 | 41865 | 2175 | 45° |
| 1.20 | 2 | 145 | 0.028 | 0.042 | 0.042 | 1.10 | 41960 | 2350 | 45° |
| 1.50 | 2 | 150 | 0.030 | 0.052 | 0.052 | 1.38 | 34600 | 2075 | 45° |
| 2.00 | 2 | 150 | 0.034 | 0.070 | 0.070 | 1.84 | 25950 | 1765 | 45° |
| 2.50 | 2 | 150 | 0.036 | 0.088 | 0.088 | 2.29 | 20850 | 1500 | 45° |
| 3.00 | 2 | 150 | 0.040 | 0.106 | 0.106 | 2.75 | 17360 | 1390 | 45° |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



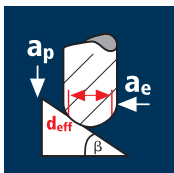
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|--------------------------|
| 0.50 | 2 | 16 | 0.019 | 0.007 | 0.100 | 0.12 | 42440 | 1605 | 1.1 |
| 0.60 | 2 | 18 | 0.023 | 0.008 | 0.120 | 0.14 | 40925 | 1855 | 1.8 |
| 0.80 | 2 | 25 | 0.030 | 0.011 | 0.160 | 0.19 | 41885 | 2535 | 4.5 |
| 1.00 | 2 | 30 | 0.038 | 0.013 | 0.200 | 0.23 | 41520 | 3140 | 8.2 |
| 1.20 | 2 | 37 | 0.045 | 0.016 | 0.240 | 0.28 | 42060 | 3815 | 14.7 |
| 1.50 | 2 | 45 | 0.057 | 0.020 | 0.300 | 0.34 | 42130 | 4775 | 28.7 |
| 2.00 | 2 | 61 | 0.076 | 0.027 | 0.400 | 0.46 | 42210 | 6380 | 68.9 |
| 2.50 | 2 | 75 | 0.094 | 0.033 | 0.500 | 0.57 | 41885 | 7915 | 130.6 |
| 3.00 | 2 | 91 | 0.113 | 0.040 | 0.600 | 0.69 | 41980 | 9520 | 228.5 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|-------|
| 0.50 | 2 | 16 | 0.018 | 0.007 | 0.100 | 0.12 | 42440 | 1530 | 1.1 |
| 0.60 | 2 | 18 | 0.022 | 0.008 | 0.120 | 0.14 | 40925 | 1770 | 1.7 |
| 0.80 | 2 | 25 | 0.029 | 0.011 | 0.160 | 0.19 | 41885 | 2410 | 4.2 |
| 1.00 | 2 | 30 | 0.036 | 0.013 | 0.200 | 0.23 | 41520 | 2990 | 7.8 |
| 1.20 | 2 | 37 | 0.043 | 0.016 | 0.240 | 0.28 | 42060 | 3635 | 14.0 |
| 1.50 | 2 | 45 | 0.054 | 0.020 | 0.300 | 0.34 | 42130 | 4550 | 27.3 |
| 2.00 | 2 | 61 | 0.072 | 0.027 | 0.400 | 0.46 | 42210 | 6080 | 65.6 |
| 2.50 | 2 | 75 | 0.090 | 0.033 | 0.500 | 0.57 | 41885 | 7540 | 124.4 |
| 3.00 | 2 | 91 | 0.108 | 0.040 | 0.600 | 0.69 | 41980 | 9070 | 217.6 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|-------|
| 0.50 | 2 | 16 | 0.015 | 0.007 | 0.100 | 0.12 | 42440 | 1275 | 0.9 |
| 0.60 | 2 | 18 | 0.018 | 0.008 | 0.120 | 0.14 | 40925 | 1475 | 1.4 |
| 0.80 | 2 | 25 | 0.024 | 0.011 | 0.160 | 0.19 | 41885 | 2010 | 3.5 |
| 1.00 | 2 | 30 | 0.030 | 0.013 | 0.200 | 0.23 | 41520 | 2490 | 6.5 |
| 1.20 | 2 | 37 | 0.036 | 0.016 | 0.240 | 0.28 | 42060 | 3030 | 11.6 |
| 1.50 | 2 | 45 | 0.045 | 0.020 | 0.300 | 0.34 | 42130 | 3790 | 22.7 |
| 2.00 | 2 | 61 | 0.060 | 0.027 | 0.400 | 0.46 | 42210 | 5065 | 54.7 |
| 2.50 | 2 | 75 | 0.075 | 0.033 | 0.500 | 0.57 | 41885 | 6280 | 103.7 |
| 3.00 | 2 | 91 | 0.090 | 0.040 | 0.600 | 0.69 | 41980 | 7555 | 181.4 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|-------|
| 0.50 | 2 | 16 | 0.014 | 0.007 | 0.100 | 0.12 | 42440 | 1145 | 0.8 |
| 0.60 | 2 | 18 | 0.016 | 0.008 | 0.120 | 0.14 | 40925 | 1325 | 1.3 |
| 0.80 | 2 | 25 | 0.022 | 0.011 | 0.160 | 0.19 | 41885 | 1810 | 3.2 |
| 1.00 | 2 | 30 | 0.027 | 0.013 | 0.200 | 0.23 | 41520 | 2240 | 5.8 |
| 1.20 | 2 | 37 | 0.032 | 0.016 | 0.240 | 0.28 | 42060 | 2725 | 10.5 |
| 1.50 | 2 | 45 | 0.041 | 0.020 | 0.300 | 0.34 | 42130 | 3410 | 20.5 |
| 2.00 | 2 | 60 | 0.054 | 0.027 | 0.400 | 0.46 | 41520 | 4485 | 48.4 |
| 2.50 | 2 | 60 | 0.068 | 0.033 | 0.500 | 0.57 | 33505 | 4525 | 74.6 |
| 3.00 | 2 | 60 | 0.081 | 0.040 | 0.600 | 0.69 | 27680 | 4485 | 107.6 |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



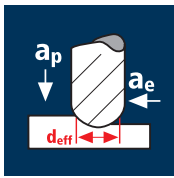
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
| 0.50 | 2 | 61 | 0.018 | 0.016 | 0.016 | 0.46 | 42210 | 1520 | 45° |
| 0.60 | 2 | 71 | 0.018 | 0.016 | 0.016 | 0.54 | 41850 | 1505 | 45° |
| 0.80 | 2 | 95 | 0.020 | 0.024 | 0.024 | 0.72 | 42000 | 1680 | 45° |
| 1.00 | 2 | 120 | 0.026 | 0.030 | 0.030 | 0.91 | 41975 | 2185 | 45° |
| 1.20 | 2 | 144 | 0.028 | 0.036 | 0.036 | 1.09 | 42050 | 2355 | 45° |
| 1.50 | 2 | 179 | 0.030 | 0.046 | 0.046 | 1.36 | 41895 | 2515 | 45° |
| 2.00 | 2 | 239 | 0.034 | 0.060 | 0.060 | 1.81 | 42030 | 2860 | 45° |
| 2.50 | 2 | 300 | 0.036 | 0.076 | 0.076 | 2.27 | 42065 | 3030 | 45° |
| 3.00 | 2 | 300 | 0.042 | 0.090 | 0.090 | 2.72 | 35110 | 2950 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 2 | 61 | 0.018 | 0.016 | 0.016 | 0.46 | 42210 | 1520 | 45° |
| 0.60 | 2 | 71 | 0.018 | 0.016 | 0.016 | 0.54 | 41850 | 1505 | 45° |
| 0.80 | 2 | 95 | 0.020 | 0.024 | 0.024 | 0.72 | 42000 | 1680 | 45° |
| 1.00 | 2 | 120 | 0.024 | 0.030 | 0.030 | 0.91 | 41975 | 2015 | 45° |
| 1.20 | 2 | 144 | 0.026 | 0.036 | 0.036 | 1.09 | 42050 | 2185 | 45° |
| 1.50 | 2 | 179 | 0.028 | 0.046 | 0.046 | 1.36 | 41895 | 2345 | 45° |
| 2.00 | 2 | 239 | 0.032 | 0.060 | 0.060 | 1.81 | 42030 | 2690 | 45° |
| 2.50 | 2 | 250 | 0.034 | 0.076 | 0.076 | 2.27 | 35055 | 2385 | 45° |
| 3.00 | 2 | 250 | 0.040 | 0.090 | 0.090 | 2.72 | 29255 | 2340 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 2 | 61 | 0.016 | 0.016 | 0.016 | 0.46 | 42210 | 1350 | 45° |
| 0.60 | 2 | 71 | 0.016 | 0.016 | 0.016 | 0.54 | 41850 | 1340 | 45° |
| 0.80 | 2 | 95 | 0.018 | 0.024 | 0.024 | 0.72 | 42000 | 1510 | 45° |
| 1.00 | 2 | 120 | 0.024 | 0.030 | 0.030 | 0.91 | 41975 | 2015 | 45° |
| 1.20 | 2 | 144 | 0.026 | 0.036 | 0.036 | 1.09 | 42050 | 2185 | 45° |
| 1.50 | 2 | 179 | 0.028 | 0.046 | 0.046 | 1.36 | 41895 | 2345 | 45° |
| 2.00 | 2 | 200 | 0.030 | 0.060 | 0.060 | 1.81 | 35170 | 2110 | 45° |
| 2.50 | 2 | 200 | 0.032 | 0.076 | 0.076 | 2.27 | 28045 | 1795 | 45° |
| 3.00 | 2 | 200 | 0.038 | 0.090 | 0.090 | 2.72 | 23405 | 1780 | 45° |

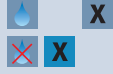
| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 2 | 61 | 0.014 | 0.016 | 0.016 | 0.46 | 42210 | 1180 | 45° |
| 0.60 | 2 | 71 | 0.014 | 0.016 | 0.016 | 0.54 | 41850 | 1170 | 45° |
| 0.80 | 2 | 95 | 0.016 | 0.024 | 0.024 | 0.72 | 42000 | 1345 | 45° |
| 1.00 | 2 | 120 | 0.020 | 0.030 | 0.030 | 0.91 | 41975 | 1680 | 45° |
| 1.20 | 2 | 144 | 0.022 | 0.036 | 0.036 | 1.09 | 42050 | 1850 | 45° |
| 1.50 | 2 | 150 | 0.024 | 0.046 | 0.046 | 1.36 | 35110 | 1685 | 45° |
| 2.00 | 2 | 150 | 0.028 | 0.060 | 0.060 | 1.81 | 26380 | 1475 | 45° |
| 2.50 | 2 | 150 | 0.028 | 0.076 | 0.076 | 2.27 | 21035 | 1180 | 45° |
| 3.00 | 2 | 150 | 0.034 | 0.090 | 0.090 | 2.72 | 17555 | 1195 | 45° |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



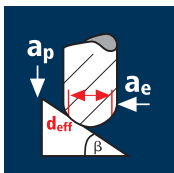
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|--------------------------|
| 0.50 | 2 | 13 | 0.019 | 0.005 | 0.100 | 0.10 | 41380 | 1565 | 0.8 |
| 0.60 | 2 | 16 | 0.023 | 0.006 | 0.120 | 0.12 | 42440 | 1925 | 1.4 |
| 0.80 | 2 | 22 | 0.030 | 0.009 | 0.160 | 0.17 | 41195 | 2490 | 3.6 |
| 1.00 | 2 | 28 | 0.038 | 0.011 | 0.200 | 0.21 | 42440 | 3210 | 7.1 |
| 1.20 | 2 | 33 | 0.045 | 0.013 | 0.240 | 0.25 | 42015 | 3810 | 11.9 |
| 1.50 | 2 | 41 | 0.057 | 0.016 | 0.300 | 0.31 | 42100 | 4775 | 22.9 |
| 2.00 | 2 | 54 | 0.076 | 0.021 | 0.400 | 0.41 | 41925 | 6340 | 53.2 |
| 2.50 | 2 | 69 | 0.094 | 0.027 | 0.500 | 0.52 | 42235 | 7985 | 107.8 |
| 3.00 | 2 | 82 | 0.113 | 0.032 | 0.600 | 0.62 | 42100 | 9550 | 183.3 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|-------|
| 0.50 | 2 | 13 | 0.018 | 0.005 | 0.100 | 0.10 | 41380 | 1490 | 0.7 |
| 0.60 | 2 | 16 | 0.022 | 0.006 | 0.120 | 0.12 | 42440 | 1835 | 1.3 |
| 0.80 | 2 | 22 | 0.029 | 0.009 | 0.160 | 0.17 | 41195 | 2375 | 3.4 |
| 1.00 | 2 | 28 | 0.036 | 0.011 | 0.200 | 0.21 | 42440 | 3055 | 6.7 |
| 1.20 | 2 | 33 | 0.043 | 0.013 | 0.240 | 0.25 | 42015 | 3630 | 11.3 |
| 1.50 | 2 | 41 | 0.054 | 0.016 | 0.300 | 0.31 | 42100 | 4545 | 21.8 |
| 2.00 | 2 | 54 | 0.072 | 0.021 | 0.400 | 0.41 | 41925 | 6035 | 50.7 |
| 2.50 | 2 | 69 | 0.090 | 0.027 | 0.500 | 0.52 | 42235 | 7605 | 102.6 |
| 3.00 | 2 | 82 | 0.108 | 0.032 | 0.600 | 0.62 | 42100 | 9095 | 174.6 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|-------|
| 0.50 | 2 | 13 | 0.015 | 0.005 | 0.100 | 0.10 | 41380 | 1240 | 0.6 |
| 0.60 | 2 | 16 | 0.018 | 0.006 | 0.120 | 0.12 | 42440 | 1530 | 1.1 |
| 0.80 | 2 | 22 | 0.024 | 0.009 | 0.160 | 0.17 | 41195 | 1975 | 2.8 |
| 1.00 | 2 | 28 | 0.030 | 0.011 | 0.200 | 0.21 | 42440 | 2545 | 5.6 |
| 1.20 | 2 | 33 | 0.036 | 0.013 | 0.240 | 0.25 | 42015 | 3025 | 9.4 |
| 1.50 | 2 | 41 | 0.045 | 0.016 | 0.300 | 0.31 | 42100 | 3790 | 18.2 |
| 2.00 | 2 | 54 | 0.060 | 0.021 | 0.400 | 0.41 | 41925 | 5030 | 42.3 |
| 2.50 | 2 | 69 | 0.075 | 0.027 | 0.500 | 0.52 | 42235 | 6335 | 85.5 |
| 3.00 | 2 | 82 | 0.090 | 0.032 | 0.600 | 0.62 | 42100 | 7580 | 145.5 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|------|
| 0.50 | 2 | 13 | 0.014 | 0.005 | 0.100 | 0.10 | 41380 | 1115 | 0.6 |
| 0.60 | 2 | 16 | 0.016 | 0.006 | 0.120 | 0.12 | 42440 | 1375 | 1.0 |
| 0.80 | 2 | 22 | 0.022 | 0.009 | 0.160 | 0.17 | 41195 | 1780 | 2.6 |
| 1.00 | 2 | 28 | 0.027 | 0.011 | 0.200 | 0.21 | 42440 | 2290 | 5.0 |
| 1.20 | 2 | 33 | 0.032 | 0.013 | 0.240 | 0.25 | 42015 | 2725 | 8.5 |
| 1.50 | 2 | 41 | 0.041 | 0.016 | 0.300 | 0.31 | 42100 | 3410 | 16.4 |
| 2.00 | 2 | 54 | 0.054 | 0.021 | 0.400 | 0.41 | 41925 | 4530 | 38.0 |
| 2.50 | 2 | 60 | 0.068 | 0.027 | 0.500 | 0.52 | 36730 | 4960 | 66.9 |
| 3.00 | 2 | 60 | 0.081 | 0.032 | 0.600 | 0.62 | 30805 | 4990 | 95.8 |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
| 0.50 | 2 | 58 | 0.018 | 0.012 | 0.012 | 0.44 | 41960 | 1510 | 45° |
| 0.60 | 2 | 70 | 0.018 | 0.012 | 0.012 | 0.53 | 42040 | 1515 | 45° |
| 0.80 | 2 | 94 | 0.020 | 0.020 | 0.020 | 0.71 | 42140 | 1685 | 45° |
| 1.00 | 2 | 119 | 0.026 | 0.026 | 0.026 | 0.90 | 42090 | 2190 | 45° |
| 1.20 | 2 | 141 | 0.028 | 0.030 | 0.030 | 1.07 | 41945 | 2350 | 45° |
| 1.50 | 2 | 177 | 0.030 | 0.038 | 0.038 | 1.34 | 42045 | 2525 | 45° |
| 2.00 | 2 | 236 | 0.034 | 0.050 | 0.050 | 1.79 | 41965 | 2855 | 45° |
| 2.50 | 2 | 294 | 0.036 | 0.062 | 0.062 | 2.23 | 41965 | 3020 | 45° |
| 3.00 | 2 | 300 | 0.042 | 0.076 | 0.076 | 2.68 | 35630 | 2995 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 2 | 58 | 0.018 | 0.012 | 0.012 | 0.44 | 41960 | 1510 | 45° |
| 0.60 | 2 | 70 | 0.018 | 0.012 | 0.012 | 0.53 | 42040 | 1515 | 45° |
| 0.80 | 2 | 94 | 0.020 | 0.020 | 0.020 | 0.71 | 42140 | 1685 | 45° |
| 1.00 | 2 | 119 | 0.024 | 0.026 | 0.026 | 0.90 | 42090 | 2020 | 45° |
| 1.20 | 2 | 141 | 0.026 | 0.030 | 0.030 | 1.07 | 41945 | 2180 | 45° |
| 1.50 | 2 | 177 | 0.028 | 0.038 | 0.038 | 1.34 | 42045 | 2355 | 45° |
| 2.00 | 2 | 236 | 0.032 | 0.050 | 0.050 | 1.79 | 41965 | 2685 | 45° |
| 2.50 | 2 | 250 | 0.034 | 0.062 | 0.062 | 2.23 | 35685 | 2425 | 45° |
| 3.00 | 2 | 250 | 0.040 | 0.076 | 0.076 | 2.68 | 29695 | 2375 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 2 | 58 | 0.016 | 0.012 | 0.012 | 0.44 | 41960 | 1345 | 45° |
| 0.60 | 2 | 70 | 0.016 | 0.012 | 0.012 | 0.53 | 42040 | 1345 | 45° |
| 0.80 | 2 | 94 | 0.018 | 0.020 | 0.020 | 0.71 | 42140 | 1515 | 45° |
| 1.00 | 2 | 119 | 0.024 | 0.026 | 0.026 | 0.90 | 42090 | 2020 | 45° |
| 1.20 | 2 | 141 | 0.026 | 0.030 | 0.030 | 1.07 | 41945 | 2180 | 45° |
| 1.50 | 2 | 177 | 0.028 | 0.038 | 0.038 | 1.34 | 42045 | 2355 | 45° |
| 2.00 | 2 | 200 | 0.030 | 0.050 | 0.050 | 1.79 | 35565 | 2135 | 45° |
| 2.50 | 2 | 200 | 0.032 | 0.062 | 0.062 | 2.23 | 28550 | 1825 | 45° |
| 3.00 | 2 | 200 | 0.038 | 0.076 | 0.076 | 2.68 | 23755 | 1805 | 45° |

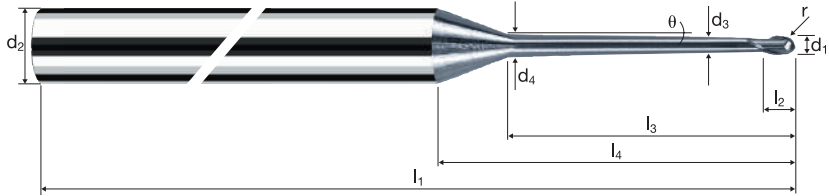
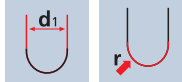
| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 2 | 58 | 0.014 | 0.012 | 0.012 | 0.44 | 41960 | 1175 | 45° |
| 0.60 | 2 | 70 | 0.014 | 0.012 | 0.012 | 0.53 | 42040 | 1175 | 45° |
| 0.80 | 2 | 94 | 0.016 | 0.020 | 0.020 | 0.71 | 42140 | 1350 | 45° |
| 1.00 | 2 | 119 | 0.020 | 0.026 | 0.026 | 0.90 | 42090 | 1685 | 45° |
| 1.20 | 2 | 141 | 0.022 | 0.030 | 0.030 | 1.07 | 41945 | 1845 | 45° |
| 1.50 | 2 | 150 | 0.024 | 0.038 | 0.038 | 1.34 | 35630 | 1710 | 45° |
| 2.00 | 2 | 150 | 0.028 | 0.050 | 0.050 | 1.79 | 26675 | 1495 | 45° |
| 2.50 | 2 | 150 | 0.028 | 0.062 | 0.062 | 2.23 | 21410 | 1200 | 45° |
| 3.00 | 2 | 150 | 0.034 | 0.076 | 0.076 | 2.68 | 17815 | 1210 | 45° |

Frese con estremità emisferica MicroX

Gambo \varnothing 6mm, scarico conico 0.9°, 15xd



HM λ 30°
XA γ -10°



ReTool®

| | | | | | | | | | |
|----------|-------------|--------------|--------------|-----------|-----------|----------|----------------|-------------|----------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Inox Stainless | Ti Titanium | Cobalt-Chrome Copper |
|----------|-------------|--------------|--------------|-----------|-----------|----------|----------------|-------------|----------------------|

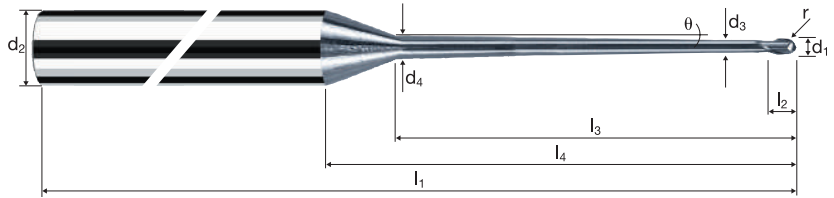
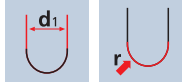
| Esempio: N° Ordine | | | | | | | | | | | | | X-AL |
|---------------------------|-------|----------|-------|-------|-------|-------|-------|-------|----------|-----------------|----------|-----|-------|
| Rivestimento X | | | | | | | | | | | | | |
| Articolo 6772 | | | | | | | | | | | | | |
| Codice- \varnothing 050 | | | | | | | | | | | | | |
| \varnothing Code | d_1 | d_2 h4 | d_3 | d_4 | l_1 | l_2 | l_3 | l_4 | θ | r ± 0.005 | α | z | EUR |
| 050 | 0.50 | 6.00 | 0.45 | 0.67 | 61 | 0.40 | 7.50 | 18.10 | 0.9° | 0.250 | 9.1° | 2 | 84.00 |
| 060 | 0.60 | 6.00 | 0.55 | 0.82 | 61 | 0.50 | 9.00 | 19.32 | 0.9° | 0.300 | 8.2° | 2 | 84.00 |
| 080 | 0.80 | 6.00 | 0.75 | 1.11 | 66 | 0.65 | 12.00 | 21.78 | 0.9° | 0.400 | 7.1° | 2 | 84.00 |
| 100 | 1.00 | 6.00 | 0.95 | 1.40 | 66 | 0.80 | 15.00 | 24.24 | 0.9° | 0.500 | 6.1° | 2 | 84.00 |
| 108 | 1.20 | 6.00 | 1.10 | 1.63 | 69 | 1.00 | 18.00 | 26.81 | 0.9° | 0.600 | 5.3° | 2 | 84.00 |
| 120 | 1.50 | 6.00 | 1.40 | 2.07 | 75 | 1.20 | 22.50 | 30.49 | 0.9° | 0.750 | 4.5° | 2 | 84.00 |
| 140 | 2.00 | 6.00 | 1.90 | 2.79 | 80 | 1.60 | 30.00 | 36.65 | 0.9° | 1.000 | 3.3° | 2 | 84.00 |
| 160 | 2.50 | 6.00 | 2.30 | 3.42 | 87 | 2.00 | 37.50 | 42.97 | 0.9° | 1.250 | 2.4° | 2 | 84.00 |
| 180 | 3.00 | 6.00 | 2.80 | 4.14 | 100 | 2.40 | 45.00 | 49.13 | 0.9° | 1.500 | 1.8° | 2 | 84.00 |
| | | | | | | | | | | | | | |
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Frese con estremità emisferica MicroX

Gambo ø 6mm, scarico conico 0.9°, 20xd



HM λ 30°
XA γ -10°



ReTool®

| | | | | | | | | | |
|----------|-------------|--------------|--------------|-----------|-----------|----------|----------------|-------------|----------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Inox Stainless | Ti Titanium | Cobalt-Chrome Copper |
|----------|-------------|--------------|--------------|-----------|-----------|----------|----------------|-------------|----------------------|

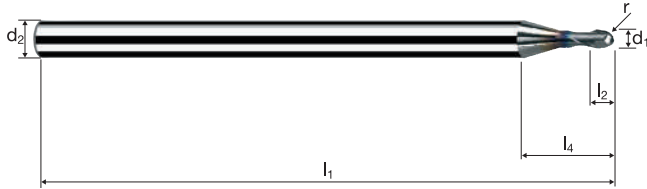
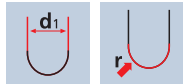
| Ø Code | Esempio: N° Ordine | | | | | | | | | | | | | X-AL |
|--------|--------------------|-----------------------|----------------|----------------|----------------|----------------|----------------|----------------|------|-------------|------|---|-------|------|
| | d ₁ | d ₂ h/4 | d ₃ | d ₄ | l ₁ | l ₂ | l ₃ | l ₄ | θ | r ±0.005 | α | z | EUR | |
| 050 | 0.50 | 6.00 | 0.45 | 0.75 | 61 | 0.40 | 10.00 | 20.45 | 0.9° | 0.250 | 7.8° | 2 | 92.00 | |
| 060 | 0.60 | 6.00 | 0.55 | 0.91 | 66 | 0.50 | 12.00 | 22.16 | 0.9° | 0.300 | 7.1° | 2 | 92.00 | |
| 080 | 0.80 | 6.00 | 0.75 | 1.23 | 69 | 0.65 | 16.00 | 25.56 | 0.9° | 0.400 | 5.9° | 2 | 92.00 | |
| 100 | 1.00 | 6.00 | 0.95 | 1.55 | 69 | 0.80 | 20.00 | 28.96 | 0.9° | 0.500 | 5.0° | 2 | 92.00 | |
| 120 | 1.50 | 6.00 | 1.40 | 2.30 | 80 | 1.20 | 30.00 | 37.56 | 0.9° | 0.750 | 3.4° | 2 | 92.00 | |
| 140 | 2.00 | 6.00 | 1.90 | 3.11 | 87 | 1.60 | 40.00 | 46.05 | 0.9° | 1.000 | 2.5° | 2 | 92.00 | |
| 160 | 2.50 | 6.00 | 2.30 | 3.81 | 100 | 2.00 | 50.00 | 54.74 | 0.9° | 1.250 | 1.8° | 2 | 92.00 | |
| 180 | 3.00 | 6.00 | 2.80 | 4.61 | 100 | 2.40 | 60.00 | 63.25 | 0.9° | 1.500 | 1.4° | 2 | 92.00 | |

Frese con estremità emisferica MicroX (Microcut-B1H)

Gambo ø 3mm, 1xd



HM
XA λ 30°
 γ -10°



ToolSchool

Rm
850-1100

Rm
1100-1300

Rm
1300-1500

HRC
48-56

HRC
56-60

HRC
> 60

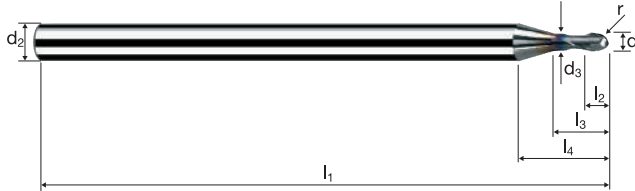
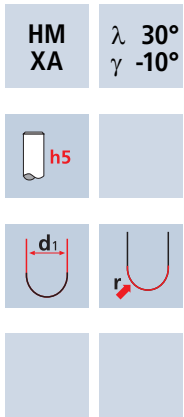
Inox
Stainless

Ti
Titanium

| Esempio: N° Ordine | | | | | | | | | | DURO-S |
|-----------------------|----------------|----------------------|--------------------------|--------------------------|------------------------|----------------|-------------|-------|---|--------|
| | | | Rivestimento D | Articolo 15781 | Codice-ø 020 | | | | | |
| Ø Code | d ₁ | d ₂ h5 | | l ₁ | l ₂ | l ₄ | r ±0.005 | α | z | EUR |
| 020 | 0.20 | 3.00 | | 40 | 0.24 | 5.91 | 0.100 | 14.7° | 2 | 101.00 |
| 030 | 0.30 | 3.00 | | 40 | 0.36 | 5.84 | 0.150 | 14.3° | 2 | 93.00 |
| 040 | 0.40 | 3.00 | | 40 | 0.48 | 5.78 | 0.200 | 14.1° | 2 | 89.00 |
| 050 | 0.50 | 3.00 | | 40 | 0.60 | 5.71 | 0.250 | 14.0° | 2 | 89.00 |
| 060 | 0.60 | 3.00 | | 40 | 0.72 | 5.64 | 0.300 | 13.8° | 2 | 84.00 |
| 080 | 0.80 | 3.00 | | 40 | 0.96 | 5.51 | 0.400 | 13.1° | 2 | 84.00 |
| 100 | 1.00 | 3.00 | | 50 | 1.20 | 5.38 | 0.500 | 12.6° | 2 | 84.00 |
| 108 | 1.20 | 3.00 | | 50 | 1.40 | 5.29 | 0.600 | 12.1° | 2 | 84.00 |
| 120 | 1.50 | 3.00 | | 50 | 1.80 | 5.09 | 0.750 | 10.9° | 2 | 84.00 |
| 140 | 2.00 | 3.00 | | 50 | 2.40 | 4.76 | 1.000 | 8.6° | 2 | 84.00 |
| 160 | 2.50 | 3.00 | | 50 | 3.00 | 4.43 | 1.250 | 5.3° | 2 | 84.00 |
| 180 | 3.00 | 3.00 | | 50 | 3.60 | - | 1.500 | 0.0° | 2 | 84.00 |
| | | | | | | | | | | |
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Frese con estremità emisferica MicroX (Microcut-B3H)

Gambo ø 3mm, scarico cilindrico, 3xd



ToolSchool **ReTool®**

| | | | | | | | |
|-----------------------|------------------------|------------------------|---------------------|---------------------|--------------------|--------------------------|-----------------------|
| Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Inox Stainless | Ti Titanium |
|-----------------------|------------------------|------------------------|---------------------|---------------------|--------------------|--------------------------|-----------------------|

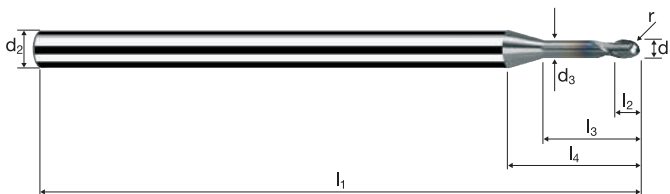
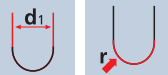
| Ø Code | Esempio: N° Ordine | | | | | | | | | | DURO-S | |
|------------|--------------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------------|-------|---|--------|-------|
| | d ₁ | d ₂ h5 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.005 | α | z | D5792 | EUR |
| 050 | 0.50 | 3.00 | 0.45 | 40 | 0.60 | 1.50 | 6.65 | 0.250 | 11.8° | 2 | | 89.00 |
| 060 | 0.60 | 3.00 | 0.55 | 40 | 0.72 | 1.80 | 6.77 | 0.300 | 11.2° | 2 | | 84.00 |
| 080 | 0.80 | 3.00 | 0.75 | 40 | 0.96 | 2.40 | 6.99 | 0.400 | 10.1° | 2 | | 84.00 |
| 100 | 1.00 | 3.00 | 0.95 | 50 | 1.20 | 3.00 | 7.22 | 0.500 | 9.0° | 2 | | 84.00 |
| 108 | 1.20 | 3.00 | 1.10 | 50 | 1.44 | 3.60 | 7.54 | 0.600 | 7.9° | 2 | | 84.00 |
| 120 | 1.50 | 3.00 | 1.40 | 50 | 1.80 | 4.50 | 7.88 | 0.750 | 6.5° | 2 | | 84.00 |
| 140 | 2.00 | 3.00 | 1.90 | 50 | 2.40 | 6.00 | 8.45 | 1.000 | 4.1° | 2 | | 84.00 |
| 160 | 2.50 | 3.00 | 2.30 | 50 | 3.00 | 7.50 | 9.20 | 1.250 | 2.0° | 2 | | 84.00 |
| 180 | 3.00 | 3.00 | 2.80 | 50 | 3.60 | 8.56 | 9.00 | 1.500 | 0.0° | 2 | | 84.00 |

Frese con estremità emisferica MicroX (Microcut-B5H)

Gambo ø 3mm, scarico cilindrico, 5xd



HM
XA λ 30°
 γ -10°



ToolSchool

ReTool®

Rm
850-1100

Rm
1100-1300

Rm
1300-1500

HRC
48-56

HRC
56-60

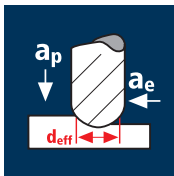
HRC
> 60

Inox
Stainless

Ti
Titanium

| Esempio: N° Ordine | | | | | | | | | | | DURO-S |
|--------------------------------|----------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------------|-------|---|--------|
| Rivestimento Articolo Codice-ø | | | | | | | | | | | D5794 |
| D 5794 050 | | | | | | | | | | | EUR |
| Ø Code | d ₁ | d ₂ h5 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.005 | α | z | EUR |
| 050 | 0.50 | 3.00 | 0.45 | 40 | 0.60 | 2.50 | 7.65 | 0.250 | 10.1° | 2 | 89.00 |
| 060 | 0.60 | 3.00 | 0.55 | 40 | 0.72 | 3.00 | 7.97 | 0.300 | 9.4° | 2 | 84.00 |
| 070 | 0.70 | 3.00 | 0.65 | 40 | 0.84 | 3.50 | 8.28 | 0.350 | 8.7° | 2 | 84.00 |
| 080 | 0.80 | 3.00 | 0.75 | 40 | 0.96 | 4.00 | 8.59 | 0.400 | 8.0° | 2 | 84.00 |
| 090 | 0.90 | 3.00 | 0.85 | 40 | 1.08 | 4.50 | 8.91 | 0.450 | 7.4° | 2 | 84.00 |
| 100 | 1.00 | 3.00 | 0.95 | 50 | 1.20 | 5.00 | 9.22 | 0.500 | 6.9° | 2 | 84.00 |
| 108 | 1.20 | 3.00 | 1.10 | 50 | 1.44 | 6.00 | 9.94 | 0.600 | 5.8° | 2 | 84.00 |
| 120 | 1.50 | 3.00 | 1.40 | 50 | 1.80 | 7.50 | 10.88 | 0.750 | 4.4° | 2 | 84.00 |
| 132 | 1.80 | 3.00 | 1.70 | 50 | 2.16 | 9.00 | 11.82 | 0.900 | 3.3° | 2 | 84.00 |
| 140 | 2.00 | 3.00 | 1.90 | 50 | 2.40 | 10.00 | 12.45 | 1.000 | 2.6° | 2 | 84.00 |
| 152 | 2.30 | 3.00 | 2.10 | 50 | 2.76 | 11.50 | 13.57 | 1.150 | 1.7° | 2 | 84.00 |
| 160 | 2.50 | 3.00 | 2.30 | 50 | 3.00 | 12.50 | 14.20 | 1.250 | 1.2° | 2 | 84.00 |
| 172 | 2.80 | 3.00 | 2.60 | 50 | 3.36 | 14.00 | 15.14 | 1.400 | 0.5° | 2 | 84.00 |
| 180 | 3.00 | 3.00 | 2.80 | 50 | 3.60 | 14.56 | 15.00 | 1.500 | 0.0° | 2 | 84.00 |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



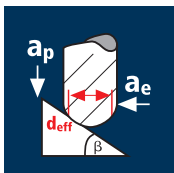
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|-----------------------------|
| 0.50 | 2 | 26 | 0.012 | 0.020 | 0.090 | 0.20 | 41380 | 995 | 1.8 |
| 0.60 | 2 | 29 | 0.016 | 0.020 | 0.110 | 0.22 | 41960 | 1345 | 3.0 |
| 0.80 | 2 | 40 | 0.020 | 0.030 | 0.140 | 0.30 | 42440 | 1700 | 7.1 |
| 1.00 | 2 | 51 | 0.026 | 0.040 | 0.180 | 0.39 | 41625 | 2165 | 15.6 |
| 1.20 | 2 | 63 | 0.030 | 0.050 | 0.220 | 0.48 | 41780 | 2505 | 27.6 |
| 1.50 | 2 | 78 | 0.038 | 0.060 | 0.270 | 0.59 | 42080 | 3200 | 51.8 |
| 2.00 | 2 | 103 | 0.050 | 0.080 | 0.360 | 0.78 | 42035 | 4205 | 121.1 |
| 2.50 | 2 | 129 | 0.062 | 0.100 | 0.450 | 0.98 | 41900 | 5195 | 233.8 |
| 3.00 | 2 | 140 | 0.076 | 0.120 | 0.540 | 1.18 | 37765 | 5740 | 372.0 |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-------|
| 0.50 | 2 | 26 | 0.012 | 0.020 | 0.090 | 0.20 | 41380 | 995 | 1.8 |
| 0.60 | 2 | 29 | 0.016 | 0.020 | 0.110 | 0.22 | 41960 | 1345 | 3.0 |
| 0.80 | 2 | 40 | 0.020 | 0.030 | 0.140 | 0.30 | 42440 | 1700 | 7.1 |
| 1.00 | 2 | 51 | 0.024 | 0.040 | 0.180 | 0.39 | 41625 | 2000 | 14.4 |
| 1.20 | 2 | 63 | 0.028 | 0.050 | 0.220 | 0.48 | 41780 | 2340 | 25.7 |
| 1.50 | 2 | 78 | 0.036 | 0.060 | 0.270 | 0.59 | 42080 | 3030 | 49.1 |
| 2.00 | 2 | 103 | 0.048 | 0.080 | 0.360 | 0.78 | 42035 | 4035 | 116.2 |
| 2.50 | 2 | 120 | 0.058 | 0.100 | 0.450 | 0.98 | 38975 | 4520 | 203.5 |
| 3.00 | 2 | 120 | 0.072 | 0.120 | 0.540 | 1.18 | 32370 | 4660 | 302.1 |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-------|
| 0.50 | 2 | 26 | 0.010 | 0.020 | 0.090 | 0.20 | 41380 | 830 | 1.5 |
| 0.60 | 2 | 29 | 0.014 | 0.020 | 0.110 | 0.22 | 41960 | 1175 | 2.6 |
| 0.80 | 2 | 40 | 0.018 | 0.030 | 0.140 | 0.30 | 42440 | 1530 | 6.4 |
| 1.00 | 2 | 51 | 0.022 | 0.040 | 0.180 | 0.39 | 41625 | 1830 | 13.2 |
| 1.20 | 2 | 63 | 0.026 | 0.050 | 0.220 | 0.48 | 41780 | 2170 | 23.9 |
| 1.50 | 2 | 78 | 0.034 | 0.060 | 0.270 | 0.59 | 42080 | 2860 | 46.4 |
| 2.00 | 2 | 100 | 0.044 | 0.080 | 0.360 | 0.78 | 40810 | 3590 | 103.4 |
| 2.50 | 2 | 100 | 0.054 | 0.100 | 0.450 | 0.98 | 32480 | 3510 | 157.9 |
| 3.00 | 2 | 100 | 0.066 | 0.120 | 0.540 | 1.18 | 26975 | 3560 | 230.7 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|-------|
| 0.50 | 2 | 26 | 0.010 | 0.020 | 0.090 | 0.20 | 41380 | 830 | 1.5 |
| 0.60 | 2 | 29 | 0.012 | 0.020 | 0.110 | 0.22 | 41960 | 1005 | 2.2 |
| 0.80 | 2 | 40 | 0.016 | 0.030 | 0.140 | 0.30 | 42440 | 1360 | 5.7 |
| 1.00 | 2 | 51 | 0.020 | 0.040 | 0.180 | 0.39 | 41625 | 1665 | 12.0 |
| 1.20 | 2 | 60 | 0.024 | 0.050 | 0.220 | 0.48 | 39790 | 1910 | 21.0 |
| 1.50 | 2 | 60 | 0.030 | 0.060 | 0.270 | 0.59 | 32370 | 1940 | 31.5 |
| 2.00 | 2 | 60 | 0.040 | 0.080 | 0.360 | 0.78 | 24485 | 1960 | 56.4 |
| 2.50 | 2 | 60 | 0.050 | 0.100 | 0.450 | 0.98 | 19490 | 1950 | 87.7 |
| 3.00 | 2 | 60 | 0.060 | 0.120 | 0.540 | 1.18 | 16185 | 1940 | 125.9 |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|----------|
| 0.50 | 2 | 61 | 0.016 | 0.020 | 0.020 | 0.46 | 42210 | 1350 | 45° |
| 0.60 | 2 | 73 | 0.018 | 0.022 | 0.022 | 0.55 | 42250 | 1520 | 45° |
| 0.80 | 2 | 98 | 0.020 | 0.030 | 0.030 | 0.74 | 42155 | 1685 | 45° |
| 1.00 | 2 | 121 | 0.022 | 0.038 | 0.038 | 0.92 | 41865 | 1840 | 45° |
| 1.20 | 2 | 146 | 0.024 | 0.046 | 0.046 | 1.11 | 41870 | 2010 | 45° |
| 1.50 | 2 | 183 | 0.028 | 0.058 | 0.058 | 1.39 | 41905 | 2345 | 45° |
| 2.00 | 2 | 244 | 0.030 | 0.076 | 0.076 | 1.85 | 41980 | 2520 | 45° |
| 2.50 | 2 | 300 | 0.032 | 0.096 | 0.096 | 2.31 | 41340 | 2645 | 45° |
| 3.00 | 2 | 300 | 0.036 | 0.114 | 0.114 | 2.77 | 34475 | 2480 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 2 | 61 | 0.016 | 0.020 | 0.020 | 0.46 | 42210 | 1350 | 45° |
| 0.60 | 2 | 73 | 0.018 | 0.022 | 0.022 | 0.55 | 42250 | 1520 | 45° |
| 0.80 | 2 | 98 | 0.020 | 0.030 | 0.030 | 0.74 | 42155 | 1685 | 45° |
| 1.00 | 2 | 121 | 0.020 | 0.038 | 0.038 | 0.92 | 41865 | 1675 | 45° |
| 1.20 | 2 | 146 | 0.022 | 0.046 | 0.046 | 1.11 | 41870 | 1840 | 45° |
| 1.50 | 2 | 183 | 0.026 | 0.058 | 0.058 | 1.39 | 41905 | 2180 | 45° |
| 2.00 | 2 | 244 | 0.028 | 0.076 | 0.076 | 1.85 | 41980 | 2350 | 45° |
| 2.50 | 2 | 250 | 0.030 | 0.096 | 0.096 | 2.31 | 34450 | 2065 | 45° |
| 3.00 | 2 | 250 | 0.034 | 0.114 | 0.114 | 2.77 | 28730 | 1955 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 2 | 61 | 0.014 | 0.020 | 0.020 | 0.46 | 42210 | 1180 | 45° |
| 0.60 | 2 | 73 | 0.016 | 0.022 | 0.022 | 0.55 | 42250 | 1350 | 45° |
| 0.80 | 2 | 98 | 0.018 | 0.030 | 0.030 | 0.74 | 42155 | 1520 | 45° |
| 1.00 | 2 | 121 | 0.020 | 0.038 | 0.038 | 0.92 | 41865 | 1675 | 45° |
| 1.20 | 2 | 146 | 0.022 | 0.046 | 0.046 | 1.11 | 41870 | 1840 | 45° |
| 1.50 | 2 | 183 | 0.026 | 0.058 | 0.058 | 1.39 | 41905 | 2180 | 45° |
| 2.00 | 2 | 200 | 0.028 | 0.076 | 0.076 | 1.85 | 34410 | 1925 | 45° |
| 2.50 | 2 | 200 | 0.028 | 0.096 | 0.096 | 2.31 | 27560 | 1545 | 45° |
| 3.00 | 2 | 200 | 0.032 | 0.114 | 0.114 | 2.77 | 22985 | 1470 | 45° |

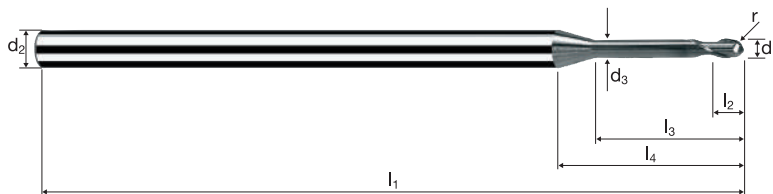
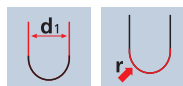
| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 2 | 61 | 0.012 | 0.020 | 0.020 | 0.46 | 42210 | 1015 | 45° |
| 0.60 | 2 | 73 | 0.014 | 0.022 | 0.022 | 0.55 | 42250 | 1185 | 45° |
| 0.80 | 2 | 98 | 0.016 | 0.030 | 0.030 | 0.74 | 42155 | 1350 | 45° |
| 1.00 | 2 | 121 | 0.018 | 0.038 | 0.038 | 0.92 | 41865 | 1505 | 45° |
| 1.20 | 2 | 146 | 0.020 | 0.046 | 0.046 | 1.11 | 41870 | 1675 | 45° |
| 1.50 | 2 | 150 | 0.022 | 0.058 | 0.058 | 1.39 | 34350 | 1510 | 45° |
| 2.00 | 2 | 150 | 0.024 | 0.076 | 0.076 | 1.85 | 25810 | 1240 | 45° |
| 2.50 | 2 | 150 | 0.026 | 0.096 | 0.096 | 2.31 | 20670 | 1075 | 45° |
| 3.00 | 2 | 150 | 0.028 | 0.114 | 0.114 | 2.77 | 17235 | 965 | 45° |

Frese con estremità emisferica MicroX (Microcut-B8H)

Gambo ø 3mm, scarico cilindrico, 8xd



HM
XA λ 30°
 γ -10°



ToolSchool ReTool®

| | | | | | | | |
|----------|-----------|-----------|-------|-------|------|-----------|----------|
| Rm | Rm | Rm | HRC | HRC | HRC | Inox | Ti |
| 850-1100 | 1100-1300 | 1300-1500 | 48-56 | 56-60 | > 60 | Stainless | Titanium |

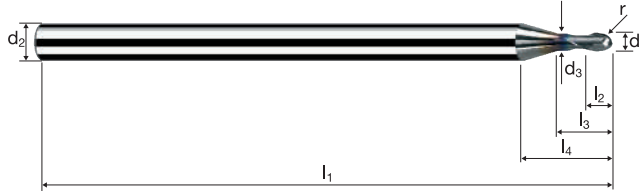
| | | | | | | | | | | | DURO-S | |
|--------------------|-----------------------|-------------------|----------------|----------------------|----------------|---------------------|----------------|----------|------|---|--------|--|
| Esempio: N° Ordine | | | | | | | | | | | D5796 | |
| | | | | | | | | | | | EUR | |
| Ø Code | d ₁ | d ₂ h5 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.005 | α | z | | |
| | Rivestimento D | | | Articolo 5796 | | Codice-ø 050 | | | | | | |
| 050 | 0.50 | 3.00 | 0.45 | 40 | 0.60 | 4.00 | 9.15 | 0.250 | 8.4° | 2 | 89.00 | |
| 060 | 0.60 | 3.00 | 0.55 | 40 | 0.72 | 4.80 | 9.77 | 0.300 | 7.6° | 2 | 84.00 | |
| 080 | 0.80 | 3.00 | 0.75 | 40 | 0.96 | 6.40 | 10.99 | 0.400 | 6.2° | 2 | 84.00 | |
| 100 | 1.00 | 3.00 | 0.95 | 50 | 1.20 | 8.00 | 12.22 | 0.500 | 5.1° | 2 | 84.00 | |
| 108 | 1.20 | 3.00 | 1.10 | 50 | 1.44 | 9.60 | 13.54 | 0.600 | 4.2° | 2 | 84.00 | |
| 120 | 1.50 | 3.00 | 1.40 | 60 | 1.80 | 12.00 | 15.38 | 0.750 | 3.1° | 2 | 84.00 | |
| 140 | 2.00 | 3.00 | 1.90 | 60 | 2.40 | 16.00 | 18.45 | 1.000 | 1.7° | 2 | 84.00 | |
| 160 | 2.50 | 3.00 | 2.30 | 60 | 3.00 | 20.00 | 21.70 | 1.250 | 0.8° | 2 | 84.00 | |
| 180 | 3.00 | 3.00 | 2.80 | 60 | 3.60 | 23.56 | 24.00 | 1.500 | 0.0° | 2 | 84.00 | |
| | | | | | | | | | | | | |
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Frese con estremità emisferica Microcut

Gambo \emptyset 3mm, scarico cilindrico, 3xd



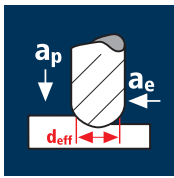
| | |
|------|---------------|
| HM | λ 30° |
| MG10 | γ 5° |



| | | | | | | | | | |
|----------|-------------|--------------|--------------|--|--|--|----------------|-------------|--------------------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | | | | Inox Stainless | Ti Titanium | Cobalt-Chrome Gold / Platinum Copper |
|----------|-------------|--------------|--------------|--|--|--|----------------|-------------|--------------------------------------|

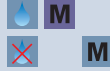
| Esempio: N° Ordine | | Rivestimento M | Articolo 5782 | Codice- \emptyset 020 | | | | | | | | MICRO |
|-----------------------|------------------|--------------------------|-------------------------|-----------------------------------|-------|-------|-------|----------------|----------|-----|--|--------------|
| \emptyset Code | d_1 ± 0.01 | d_2 $h6$ | d_3 | l_1 | l_2 | l_3 | l_4 | r ± 0.01 | α | z | | M5782 |
| | | | | | | | | | | | | EUR |
| 020 | 0.20 | 3.00 | 0.18 | 40 | 0.24 | 0.60 | 8.86 | 0.100 | 9.4° | 2 | | 97.00 |
| 030 | 0.30 | 3.00 | 0.25 | 40 | 0.36 | 0.90 | 8.96 | 0.150 | 9.0° | 2 | | 89.00 |
| 040 | 0.40 | 3.00 | 0.35 | 40 | 0.48 | 1.20 | 8.98 | 0.200 | 8.7° | 2 | | 85.00 |
| 050 | 0.50 | 3.00 | 0.45 | 40 | 0.60 | 1.50 | 6.65 | 0.250 | 11.8° | 2 | | 85.00 |
| 060 | 0.60 | 3.00 | 0.55 | 40 | 0.72 | 1.80 | 6.77 | 0.300 | 11.2° | 2 | | 81.00 |
| 080 | 0.80 | 3.00 | 0.75 | 40 | 0.96 | 2.40 | 6.99 | 0.400 | 10.1° | 2 | | 81.00 |
| 100 | 1.00 | 3.00 | 0.95 | 50 | 1.20 | 3.00 | 7.22 | 0.500 | 9.0° | 2 | | 81.00 |
| 108 | 1.20 | 3.00 | 1.10 | 50 | 1.44 | 3.60 | 7.54 | 0.600 | 7.9° | 2 | | 81.00 |
| 120 | 1.50 | 3.00 | 1.40 | 50 | 1.80 | 4.50 | 7.88 | 0.750 | 6.5° | 2 | | 81.00 |
| 140 | 2.00 | 3.00 | 1.90 | 50 | 2.40 | 6.00 | 8.45 | 1.000 | 4.1° | 2 | | 81.00 |
| 160 | 2.50 | 3.00 | 2.30 | 50 | 3.00 | 7.50 | 9.20 | 1.250 | 2.0° | 2 | | 81.00 |
| 180 | 3.00 | 3.00 | 2.80 | 50 | 3.60 | 8.56 | 9.00 | 1.500 | 0.0° | 2 | | 81.00 |
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Applicazione



Materiale

Acciaio
850 - 1100 N/mm²



Acciaio
1100 - 1300 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]



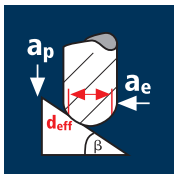
| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _s [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|--------------------------|
| 0.50 | 2 | 36 | 0.018 | 0.040 | 0.100 | 0.27 | 42440 | 1530 | 6.1 |
| 0.60 | 2 | 40 | 0.022 | 0.040 | 0.120 | 0.30 | 42440 | 1865 | 9.0 |
| 0.80 | 2 | 55 | 0.028 | 0.060 | 0.160 | 0.42 | 41685 | 2335 | 22.4 |
| 1.00 | 2 | 67 | 0.036 | 0.070 | 0.200 | 0.51 | 41815 | 3010 | 42.2 |
| 1.20 | 2 | 79 | 0.042 | 0.080 | 0.240 | 0.60 | 41910 | 3520 | 67.6 |
| 1.50 | 2 | 103 | 0.054 | 0.110 | 0.300 | 0.78 | 42035 | 4540 | 149.8 |
| 2.00 | 2 | 135 | 0.072 | 0.140 | 0.400 | 1.02 | 42130 | 6065 | 339.7 |
| 2.50 | 2 | 170 | 0.090 | 0.180 | 0.500 | 1.29 | 41950 | 7550 | 679.6 |
| 3.00 | 2 | 180 | 0.108 | 0.210 | 0.600 | 1.53 | 37450 | 8090 | 1019.2 |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-------|
| 0.50 | 2 | 36 | 0.016 | 0.040 | 0.100 | 0.27 | 42440 | 1360 | 5.4 |
| 0.60 | 2 | 40 | 0.020 | 0.040 | 0.120 | 0.30 | 42440 | 1700 | 8.1 |
| 0.80 | 2 | 55 | 0.026 | 0.060 | 0.160 | 0.42 | 41685 | 2170 | 20.8 |
| 1.00 | 2 | 67 | 0.032 | 0.070 | 0.200 | 0.51 | 41815 | 2675 | 37.5 |
| 1.20 | 2 | 79 | 0.038 | 0.080 | 0.240 | 0.60 | 41910 | 3185 | 61.2 |
| 1.50 | 2 | 103 | 0.048 | 0.110 | 0.300 | 0.78 | 42035 | 4035 | 133.2 |
| 2.00 | 2 | 135 | 0.064 | 0.140 | 0.400 | 1.02 | 42130 | 5395 | 302.0 |
| 2.50 | 2 | 160 | 0.082 | 0.180 | 0.500 | 1.29 | 39480 | 6475 | 582.7 |
| 3.00 | 2 | 160 | 0.098 | 0.210 | 0.600 | 1.53 | 33285 | 6525 | 822.1 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|-------|
| 0.50 | 2 | 36 | 0.016 | 0.040 | 0.100 | 0.27 | 42440 | 1360 | 5.4 |
| 0.60 | 2 | 40 | 0.020 | 0.040 | 0.120 | 0.30 | 42440 | 1700 | 8.1 |
| 0.80 | 2 | 55 | 0.026 | 0.060 | 0.160 | 0.42 | 41685 | 2170 | 20.8 |
| 1.00 | 2 | 67 | 0.032 | 0.070 | 0.200 | 0.51 | 41815 | 2675 | 37.5 |
| 1.20 | 2 | 79 | 0.038 | 0.080 | 0.240 | 0.60 | 41910 | 3185 | 61.2 |
| 1.50 | 2 | 80 | 0.048 | 0.110 | 0.300 | 0.78 | 32645 | 3135 | 103.4 |
| 2.00 | 2 | 80 | 0.064 | 0.140 | 0.400 | 1.02 | 24965 | 3195 | 179.0 |
| 2.50 | 2 | 80 | 0.082 | 0.180 | 0.500 | 1.29 | 19740 | 3235 | 291.4 |
| 3.00 | 2 | 80 | 0.098 | 0.210 | 0.600 | 1.53 | 16645 | 3260 | 411.0 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|-------|
| 0.50 | 2 | 36 | 0.012 | 0.040 | 0.100 | 0.27 | 42440 | 1020 | 4.1 |
| 0.60 | 2 | 40 | 0.016 | 0.040 | 0.120 | 0.30 | 42440 | 1360 | 6.5 |
| 0.80 | 2 | 55 | 0.020 | 0.060 | 0.160 | 0.42 | 41685 | 1665 | 16.0 |
| 1.00 | 2 | 60 | 0.026 | 0.070 | 0.200 | 0.51 | 37450 | 1945 | 27.3 |
| 1.20 | 2 | 60 | 0.030 | 0.080 | 0.240 | 0.60 | 31830 | 1910 | 36.7 |
| 1.50 | 2 | 60 | 0.038 | 0.110 | 0.300 | 0.78 | 24485 | 1860 | 61.4 |
| 2.00 | 2 | 60 | 0.050 | 0.140 | 0.400 | 1.02 | 18725 | 1870 | 104.9 |
| 2.50 | 2 | 60 | 0.064 | 0.180 | 0.500 | 1.29 | 14805 | 1895 | 170.6 |
| 3.00 | 2 | 60 | 0.076 | 0.210 | 0.600 | 1.53 | 12485 | 1895 | 239.1 |

Applicazione



Materiale

Acciaio
850 - 1100 N/mm²



Acciaio
1100 - 1300 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _s [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
| 0.50 | 2 | 61 | 0.014 | 0.020 | 0.020 | 0.46 | 42210 | 1180 | 45° |
| 0.60 | 2 | 74 | 0.016 | 0.024 | 0.024 | 0.56 | 42060 | 1345 | 45° |
| 0.80 | 2 | 98 | 0.018 | 0.032 | 0.032 | 0.74 | 42155 | 1520 | 45° |
| 1.00 | 2 | 123 | 0.022 | 0.040 | 0.040 | 0.93 | 42100 | 1850 | 45° |
| 1.20 | 2 | 146 | 0.024 | 0.048 | 0.048 | 1.11 | 41870 | 2010 | 45° |
| 1.50 | 2 | 183 | 0.028 | 0.060 | 0.060 | 1.39 | 41905 | 2345 | 45° |
| 2.00 | 2 | 245 | 0.030 | 0.080 | 0.080 | 1.86 | 41930 | 2515 | 45° |
| 2.50 | 2 | 300 | 0.032 | 0.100 | 0.100 | 2.32 | 41160 | 2635 | 45° |
| 3.00 | 2 | 300 | 0.036 | 0.120 | 0.120 | 2.78 | 34350 | 2475 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 2 | 57 | 0.012 | 0.008 | 0.008 | 0.43 | 42195 | 1015 | 45° |
| 0.60 | 2 | 73 | 0.014 | 0.020 | 0.020 | 0.55 | 42250 | 1185 | 45° |
| 0.80 | 2 | 98 | 0.016 | 0.032 | 0.032 | 0.74 | 42155 | 1350 | 45° |
| 1.00 | 2 | 123 | 0.020 | 0.040 | 0.040 | 0.93 | 42100 | 1685 | 45° |
| 1.20 | 2 | 146 | 0.022 | 0.048 | 0.048 | 1.11 | 41870 | 1840 | 45° |
| 1.50 | 2 | 183 | 0.026 | 0.060 | 0.060 | 1.39 | 41905 | 2180 | 45° |
| 2.00 | 2 | 245 | 0.028 | 0.080 | 0.080 | 1.86 | 41930 | 2350 | 45° |
| 2.50 | 2 | 250 | 0.028 | 0.100 | 0.100 | 2.32 | 34300 | 1920 | 45° |
| 3.00 | 2 | 250 | 0.032 | 0.120 | 0.120 | 2.78 | 28625 | 1830 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 2 | 57 | 0.012 | 0.008 | 0.008 | 0.43 | 42195 | 1015 | 45° |
| 0.60 | 2 | 73 | 0.012 | 0.020 | 0.020 | 0.55 | 42250 | 1015 | 45° |
| 0.80 | 2 | 98 | 0.014 | 0.032 | 0.032 | 0.74 | 42155 | 1180 | 45° |
| 1.00 | 2 | 120 | 0.018 | 0.040 | 0.040 | 0.93 | 41070 | 1480 | 45° |
| 1.20 | 2 | 120 | 0.020 | 0.048 | 0.048 | 1.11 | 34410 | 1375 | 45° |
| 1.50 | 2 | 120 | 0.022 | 0.060 | 0.060 | 1.39 | 27480 | 1210 | 45° |
| 2.00 | 2 | 120 | 0.024 | 0.080 | 0.080 | 1.86 | 20535 | 985 | 45° |
| 2.50 | 2 | 120 | 0.026 | 0.100 | 0.100 | 2.32 | 16465 | 855 | 45° |
| 3.00 | 2 | 120 | 0.028 | 0.120 | 0.120 | 2.78 | 13740 | 770 | 45° |

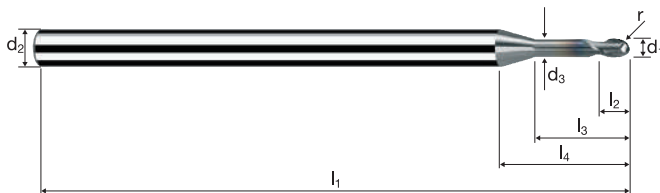
| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 2 | 57 | 0.010 | 0.008 | 0.008 | 0.43 | 42195 | 845 | 45° |
| 0.60 | 2 | 73 | 0.012 | 0.020 | 0.020 | 0.55 | 42250 | 1015 | 45° |
| 0.80 | 2 | 98 | 0.012 | 0.032 | 0.032 | 0.74 | 42155 | 1010 | 45° |
| 1.00 | 2 | 100 | 0.016 | 0.040 | 0.040 | 0.93 | 34225 | 1095 | 45° |
| 1.20 | 2 | 100 | 0.016 | 0.048 | 0.048 | 1.11 | 28675 | 920 | 45° |
| 1.50 | 2 | 100 | 0.020 | 0.060 | 0.060 | 1.39 | 22900 | 915 | 45° |
| 2.00 | 2 | 100 | 0.022 | 0.080 | 0.080 | 1.86 | 17115 | 755 | 45° |
| 2.50 | 2 | 100 | 0.022 | 0.100 | 0.100 | 2.32 | 13720 | 605 | 45° |
| 3.00 | 2 | 100 | 0.026 | 0.120 | 0.120 | 2.78 | 11450 | 595 | 45° |

Frese con estremità emisferica Microcut

Gambo ø 3mm, scarico cilindrico, 5xd



| | |
|-------------|---------------|
| HM | λ 30° |
| MG10 | γ 5° |

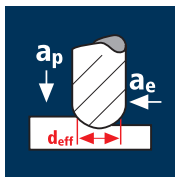


ReTool®

| | | | | | | | | |
|--------------------|-----------------------|------------------------|------------------------|--|--|--------------------------|-----------------------|---|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | | | Inox Stainless | Ti Titanium | Cobalt-Chrome Gold / Platinum Copper |
|--------------------|-----------------------|------------------------|------------------------|--|--|--------------------------|-----------------------|---|

| Esempio: N° Ordine M 5784 050 | | | | | | | | | | | MICRO |
|--------------------------------------|---------------------|-------------|-------|-------|-------|-------|-------|-------------------|----------|-----|--------------|
| | | | | | | | | | | | M5784 |
| \emptyset Code | d_1 ± 0.01 | d_2 h6 | d_3 | l_1 | l_2 | l_3 | l_4 | r ± 0.01 | α | z | EUR |
| 050 | 0.50 | 3.00 | 0.45 | 40 | 0.60 | 2.50 | 7.65 | 0.250 | 10.1° | 2 | 85.00 |
| 060 | 0.60 | 3.00 | 0.55 | 40 | 0.72 | 3.00 | 7.97 | 0.300 | 9.4° | 2 | 81.00 |
| 070 | 0.70 | 3.00 | 0.65 | 40 | 0.84 | 3.50 | 8.28 | 0.350 | 8.7° | 2 | 81.00 |
| 080 | 0.80 | 3.00 | 0.75 | 40 | 0.96 | 4.00 | 8.59 | 0.400 | 8.0° | 2 | 81.00 |
| 090 | 0.90 | 3.00 | 0.85 | 40 | 1.08 | 4.50 | 8.91 | 0.450 | 7.4° | 2 | 81.00 |
| 100 | 1.00 | 3.00 | 0.95 | 50 | 1.20 | 5.00 | 9.22 | 0.500 | 6.9° | 2 | 81.00 |
| 108 | 1.20 | 3.00 | 1.10 | 50 | 1.44 | 6.00 | 9.94 | 0.600 | 5.8° | 2 | 81.00 |
| 120 | 1.50 | 3.00 | 1.40 | 50 | 1.80 | 7.50 | 10.88 | 0.750 | 4.4° | 2 | 81.00 |
| 132 | 1.80 | 3.00 | 1.70 | 50 | 2.16 | 9.00 | 11.82 | 0.900 | 3.3° | 2 | 81.00 |
| 140 | 2.00 | 3.00 | 1.90 | 50 | 2.40 | 10.00 | 12.45 | 1.000 | 2.6° | 2 | 81.00 |
| 152 | 2.30 | 3.00 | 2.10 | 50 | 2.76 | 11.50 | 13.57 | 1.150 | 1.7° | 2 | 81.00 |
| 160 | 2.50 | 3.00 | 2.30 | 50 | 3.00 | 12.50 | 14.20 | 1.250 | 1.2° | 2 | 81.00 |
| 172 | 2.80 | 3.00 | 2.60 | 50 | 3.36 | 14.00 | 15.14 | 1.400 | 0.5° | 2 | 81.00 |
| 180 | 3.00 | 3.00 | 2.80 | 50 | 3.60 | 14.56 | 15.00 | 1.500 | 0.0° | 2 | 81.00 |
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Applicazione



Materiale

Acciaio
850 - 1100 N/mm²

Acciaio
1100 - 1300 N/mm²

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]

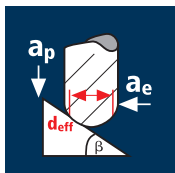
| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _s [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|--------------------------|
| 0.50 | 2 | 32 | 0.018 | 0.030 | 0.100 | 0.24 | 42440 | 1530 | 4.6 |
| 0.60 | 2 | 34 | 0.022 | 0.030 | 0.120 | 0.26 | 41625 | 1830 | 6.6 |
| 0.80 | 2 | 46 | 0.028 | 0.040 | 0.160 | 0.35 | 41835 | 2345 | 15.0 |
| 1.00 | 2 | 58 | 0.036 | 0.050 | 0.200 | 0.44 | 41960 | 3020 | 30.2 |
| 1.20 | 2 | 69 | 0.042 | 0.060 | 0.240 | 0.52 | 42235 | 3550 | 51.1 |
| 1.50 | 2 | 88 | 0.054 | 0.080 | 0.300 | 0.67 | 41810 | 4515 | 108.4 |
| 2.00 | 2 | 115 | 0.072 | 0.100 | 0.400 | 0.87 | 42075 | 6060 | 242.4 |
| 2.50 | 2 | 146 | 0.090 | 0.130 | 0.500 | 1.11 | 41870 | 7535 | 489.9 |
| 3.00 | 2 | 173 | 0.108 | 0.150 | 0.600 | 1.31 | 42035 | 9080 | 817.2 |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-------|
| 0.50 | 2 | 32 | 0.016 | 0.030 | 0.100 | 0.24 | 42440 | 1360 | 4.1 |
| 0.60 | 2 | 34 | 0.020 | 0.030 | 0.120 | 0.26 | 41625 | 1665 | 6.0 |
| 0.80 | 2 | 46 | 0.026 | 0.040 | 0.160 | 0.35 | 41835 | 2175 | 13.9 |
| 1.00 | 2 | 58 | 0.032 | 0.050 | 0.200 | 0.44 | 41960 | 2685 | 26.9 |
| 1.20 | 2 | 69 | 0.038 | 0.060 | 0.240 | 0.52 | 42235 | 3210 | 46.2 |
| 1.50 | 2 | 88 | 0.048 | 0.080 | 0.300 | 0.67 | 41810 | 4015 | 96.3 |
| 2.00 | 2 | 115 | 0.064 | 0.100 | 0.400 | 0.87 | 42075 | 5385 | 215.4 |
| 2.50 | 2 | 146 | 0.082 | 0.130 | 0.500 | 1.11 | 41870 | 6865 | 446.3 |
| 3.00 | 2 | 160 | 0.098 | 0.150 | 0.600 | 1.31 | 38880 | 7620 | 685.8 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|-------|
| 0.50 | 2 | 32 | 0.016 | 0.030 | 0.100 | 0.24 | 42440 | 1360 | 4.1 |
| 0.60 | 2 | 34 | 0.020 | 0.030 | 0.120 | 0.26 | 41625 | 1665 | 6.0 |
| 0.80 | 2 | 46 | 0.026 | 0.040 | 0.160 | 0.35 | 41835 | 2175 | 13.9 |
| 1.00 | 2 | 58 | 0.032 | 0.050 | 0.200 | 0.44 | 41960 | 2685 | 26.9 |
| 1.20 | 2 | 69 | 0.038 | 0.060 | 0.240 | 0.52 | 42235 | 3210 | 46.2 |
| 1.50 | 2 | 80 | 0.048 | 0.080 | 0.300 | 0.67 | 38005 | 3650 | 87.6 |
| 2.00 | 2 | 80 | 0.064 | 0.100 | 0.400 | 0.87 | 29270 | 3745 | 149.9 |
| 2.50 | 2 | 80 | 0.082 | 0.130 | 0.500 | 1.11 | 22940 | 3760 | 244.6 |
| 3.00 | 2 | 80 | 0.098 | 0.150 | 0.600 | 1.31 | 19440 | 3810 | 342.9 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|-------|
| 0.50 | 2 | 32 | 0.012 | 0.030 | 0.100 | 0.24 | 42440 | 1020 | 3.1 |
| 0.60 | 2 | 34 | 0.016 | 0.030 | 0.120 | 0.26 | 41625 | 1330 | 4.8 |
| 0.80 | 2 | 46 | 0.020 | 0.040 | 0.160 | 0.35 | 41835 | 1675 | 10.7 |
| 1.00 | 2 | 58 | 0.026 | 0.050 | 0.200 | 0.44 | 41960 | 2180 | 21.8 |
| 1.20 | 2 | 60 | 0.030 | 0.060 | 0.240 | 0.52 | 36730 | 2205 | 31.7 |
| 1.50 | 2 | 60 | 0.038 | 0.080 | 0.300 | 0.67 | 28505 | 2165 | 52.0 |
| 2.00 | 2 | 60 | 0.050 | 0.100 | 0.400 | 0.87 | 21950 | 2195 | 87.8 |
| 2.50 | 2 | 60 | 0.064 | 0.130 | 0.500 | 1.11 | 17205 | 2200 | 143.2 |
| 3.00 | 2 | 60 | 0.076 | 0.150 | 0.600 | 1.31 | 14580 | 2215 | 199.4 |

Applicazione



Materiale

Acciaio
850 - 1100 N/mm²

Acciaio
1100 - 1300 N/mm²

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]

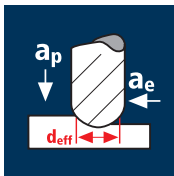
| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _s [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
| 0.50 | 2 | 61 | 0.014 | 0.020 | 0.020 | 0.46 | 42210 | 1180 | 45° |
| 0.60 | 2 | 73 | 0.016 | 0.022 | 0.022 | 0.55 | 42250 | 1350 | 45° |
| 0.80 | 2 | 98 | 0.018 | 0.030 | 0.030 | 0.74 | 42155 | 1520 | 45° |
| 1.00 | 2 | 121 | 0.022 | 0.038 | 0.038 | 0.92 | 41865 | 1840 | 45° |
| 1.20 | 2 | 146 | 0.024 | 0.046 | 0.046 | 1.11 | 41870 | 2010 | 45° |
| 1.50 | 2 | 183 | 0.028 | 0.058 | 0.058 | 1.39 | 41905 | 2345 | 45° |
| 2.00 | 2 | 244 | 0.030 | 0.076 | 0.076 | 1.85 | 41980 | 2520 | 45° |
| 2.50 | 2 | 300 | 0.032 | 0.096 | 0.096 | 2.31 | 41340 | 2645 | 45° |
| 3.00 | 2 | 300 | 0.036 | 0.114 | 0.114 | 2.77 | 34475 | 2480 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 2 | 61 | 0.012 | 0.020 | 0.020 | 0.46 | 42210 | 1015 | 45° |
| 0.60 | 2 | 73 | 0.014 | 0.022 | 0.022 | 0.55 | 42250 | 1185 | 45° |
| 0.80 | 2 | 98 | 0.016 | 0.030 | 0.030 | 0.74 | 42155 | 1350 | 45° |
| 1.00 | 2 | 121 | 0.020 | 0.038 | 0.038 | 0.92 | 41865 | 1675 | 45° |
| 1.20 | 2 | 146 | 0.022 | 0.046 | 0.046 | 1.11 | 41870 | 1840 | 45° |
| 1.50 | 2 | 183 | 0.026 | 0.058 | 0.058 | 1.39 | 41905 | 2180 | 45° |
| 2.00 | 2 | 244 | 0.028 | 0.076 | 0.076 | 1.85 | 41980 | 2350 | 45° |
| 2.50 | 2 | 250 | 0.028 | 0.096 | 0.096 | 2.31 | 34450 | 1930 | 45° |
| 3.00 | 2 | 250 | 0.032 | 0.114 | 0.114 | 2.77 | 28730 | 1840 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 2 | 61 | 0.012 | 0.020 | 0.020 | 0.46 | 42210 | 1015 | 45° |
| 0.60 | 2 | 73 | 0.012 | 0.022 | 0.022 | 0.55 | 42250 | 1015 | 45° |
| 0.80 | 2 | 98 | 0.014 | 0.030 | 0.030 | 0.74 | 42155 | 1180 | 45° |
| 1.00 | 2 | 120 | 0.018 | 0.038 | 0.038 | 0.92 | 41520 | 1495 | 45° |
| 1.20 | 2 | 120 | 0.020 | 0.046 | 0.046 | 1.11 | 34410 | 1375 | 45° |
| 1.50 | 2 | 120 | 0.022 | 0.058 | 0.058 | 1.39 | 27480 | 1210 | 45° |
| 2.00 | 2 | 120 | 0.024 | 0.076 | 0.076 | 1.85 | 20645 | 990 | 45° |
| 2.50 | 2 | 120 | 0.026 | 0.096 | 0.096 | 2.31 | 16535 | 860 | 45° |
| 3.00 | 2 | 120 | 0.028 | 0.114 | 0.114 | 2.77 | 13790 | 770 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 2 | 61 | 0.010 | 0.020 | 0.020 | 0.46 | 42210 | 845 | 45° |
| 0.60 | 2 | 73 | 0.012 | 0.022 | 0.022 | 0.55 | 42250 | 1015 | 45° |
| 0.80 | 2 | 98 | 0.012 | 0.030 | 0.030 | 0.74 | 42155 | 1010 | 45° |
| 1.00 | 2 | 100 | 0.016 | 0.038 | 0.038 | 0.92 | 34600 | 1105 | 45° |
| 1.20 | 2 | 100 | 0.016 | 0.046 | 0.046 | 1.11 | 28675 | 920 | 45° |
| 1.50 | 2 | 100 | 0.020 | 0.058 | 0.058 | 1.39 | 22900 | 915 | 45° |
| 2.00 | 2 | 100 | 0.022 | 0.076 | 0.076 | 1.85 | 17205 | 755 | 45° |
| 2.50 | 2 | 100 | 0.022 | 0.096 | 0.096 | 2.31 | 13780 | 605 | 45° |
| 3.00 | 2 | 100 | 0.026 | 0.114 | 0.114 | 2.77 | 11490 | 600 | 45° |

Applicazione



Materiale

Acciaio
850 - 1100 N/mm²



Acciaio
1100 - 1300 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]



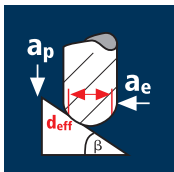
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|--------------------------|
| 0.50 | 2 | 26 | 0.018 | 0.020 | 0.080 | 0.20 | 41380 | 1490 | 2.4 |
| 0.60 | 2 | 29 | 0.022 | 0.020 | 0.090 | 0.22 | 41960 | 1845 | 3.3 |
| 0.80 | 2 | 40 | 0.028 | 0.030 | 0.120 | 0.30 | 42440 | 2375 | 8.6 |
| 1.00 | 2 | 51 | 0.036 | 0.040 | 0.150 | 0.39 | 41625 | 2995 | 18.0 |
| 1.20 | 2 | 63 | 0.042 | 0.050 | 0.180 | 0.48 | 41780 | 3510 | 31.6 |
| 1.50 | 2 | 78 | 0.054 | 0.060 | 0.230 | 0.59 | 42080 | 4545 | 62.7 |
| 2.00 | 2 | 103 | 0.072 | 0.080 | 0.300 | 0.78 | 42035 | 6055 | 145.3 |
| 2.50 | 2 | 129 | 0.090 | 0.100 | 0.380 | 0.98 | 41900 | 7540 | 286.6 |
| 3.00 | 2 | 156 | 0.108 | 0.120 | 0.450 | 1.18 | 42080 | 9090 | 490.8 |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-------|
| 0.50 | 2 | 26 | 0.016 | 0.020 | 0.080 | 0.20 | 41380 | 1325 | 2.1 |
| 0.60 | 2 | 29 | 0.020 | 0.020 | 0.090 | 0.22 | 41960 | 1680 | 3.0 |
| 0.80 | 2 | 40 | 0.026 | 0.030 | 0.120 | 0.30 | 42440 | 2205 | 7.9 |
| 1.00 | 2 | 51 | 0.032 | 0.040 | 0.150 | 0.39 | 41625 | 2665 | 16.0 |
| 1.20 | 2 | 63 | 0.038 | 0.050 | 0.180 | 0.48 | 41780 | 3175 | 28.6 |
| 1.50 | 2 | 78 | 0.048 | 0.060 | 0.230 | 0.59 | 42080 | 4040 | 55.7 |
| 2.00 | 2 | 103 | 0.064 | 0.080 | 0.300 | 0.78 | 42035 | 5380 | 129.1 |
| 2.50 | 2 | 129 | 0.082 | 0.100 | 0.380 | 0.98 | 41900 | 6870 | 261.1 |
| 3.00 | 2 | 156 | 0.098 | 0.120 | 0.450 | 1.18 | 42080 | 8250 | 445.4 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|-------|
| 0.50 | 2 | 26 | 0.016 | 0.020 | 0.080 | 0.20 | 41380 | 1325 | 2.1 |
| 0.60 | 2 | 29 | 0.020 | 0.020 | 0.090 | 0.22 | 41960 | 1680 | 3.0 |
| 0.80 | 2 | 40 | 0.026 | 0.030 | 0.120 | 0.30 | 42440 | 2205 | 7.9 |
| 1.00 | 2 | 51 | 0.032 | 0.040 | 0.150 | 0.39 | 41625 | 2665 | 16.0 |
| 1.20 | 2 | 63 | 0.038 | 0.050 | 0.180 | 0.48 | 41780 | 3175 | 28.6 |
| 1.50 | 2 | 78 | 0.048 | 0.060 | 0.230 | 0.59 | 42080 | 4040 | 55.7 |
| 2.00 | 2 | 80 | 0.064 | 0.080 | 0.300 | 0.78 | 32645 | 4180 | 100.3 |
| 2.50 | 2 | 80 | 0.082 | 0.100 | 0.380 | 0.98 | 25985 | 4260 | 161.9 |
| 3.00 | 2 | 80 | 0.098 | 0.120 | 0.450 | 1.18 | 21580 | 4230 | 228.4 |

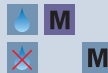
| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|-------|
| 0.50 | 2 | 26 | 0.012 | 0.020 | 0.080 | 0.20 | 41380 | 995 | 1.6 |
| 0.60 | 2 | 29 | 0.016 | 0.020 | 0.090 | 0.22 | 41960 | 1345 | 2.4 |
| 0.80 | 2 | 40 | 0.020 | 0.030 | 0.120 | 0.30 | 42440 | 1700 | 6.1 |
| 1.00 | 2 | 51 | 0.026 | 0.040 | 0.150 | 0.39 | 41625 | 2165 | 13.0 |
| 1.20 | 2 | 60 | 0.030 | 0.050 | 0.180 | 0.48 | 39790 | 2385 | 21.5 |
| 1.50 | 2 | 60 | 0.038 | 0.060 | 0.230 | 0.59 | 32370 | 2460 | 34.0 |
| 2.00 | 2 | 60 | 0.050 | 0.080 | 0.300 | 0.78 | 24485 | 2450 | 58.8 |
| 2.50 | 2 | 60 | 0.064 | 0.100 | 0.380 | 0.98 | 19490 | 2495 | 94.8 |
| 3.00 | 2 | 60 | 0.076 | 0.120 | 0.450 | 1.18 | 16185 | 2460 | 132.8 |

Applicazione



Materiale

Acciaio
850 - 1100 N/mm²



Acciaio
1100 - 1300 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]



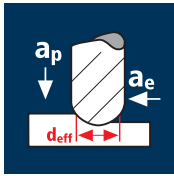
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
| 0.50 | 2 | 61 | 0.012 | 0.018 | 0.018 | 0.46 | 42210 | 1015 | 45° |
| 0.60 | 2 | 73 | 0.014 | 0.022 | 0.022 | 0.55 | 42250 | 1185 | 45° |
| 0.80 | 2 | 96 | 0.016 | 0.028 | 0.028 | 0.73 | 41860 | 1340 | 45° |
| 1.00 | 2 | 121 | 0.020 | 0.036 | 0.036 | 0.92 | 41865 | 1675 | 45° |
| 1.20 | 2 | 145 | 0.022 | 0.042 | 0.042 | 1.10 | 41960 | 1845 | 45° |
| 1.50 | 2 | 182 | 0.024 | 0.052 | 0.052 | 1.38 | 41980 | 2015 | 45° |
| 2.00 | 2 | 243 | 0.026 | 0.070 | 0.070 | 1.84 | 42040 | 2185 | 45° |
| 2.50 | 2 | 300 | 0.028 | 0.088 | 0.088 | 2.29 | 41700 | 2335 | 45° |
| 3.00 | 2 | 300 | 0.032 | 0.106 | 0.106 | 2.75 | 34725 | 2220 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 2 | 57 | 0.010 | 0.008 | 0.008 | 0.43 | 42195 | 845 | 45° |
| 0.60 | 2 | 71 | 0.012 | 0.018 | 0.018 | 0.54 | 41850 | 1005 | 45° |
| 0.80 | 2 | 96 | 0.014 | 0.028 | 0.028 | 0.73 | 41860 | 1170 | 45° |
| 1.00 | 2 | 121 | 0.018 | 0.036 | 0.036 | 0.92 | 41865 | 1505 | 45° |
| 1.20 | 2 | 145 | 0.020 | 0.042 | 0.042 | 1.10 | 41960 | 1680 | 45° |
| 1.50 | 2 | 182 | 0.022 | 0.052 | 0.052 | 1.38 | 41980 | 1845 | 45° |
| 2.00 | 2 | 243 | 0.024 | 0.070 | 0.070 | 1.84 | 42040 | 2020 | 45° |
| 2.50 | 2 | 250 | 0.026 | 0.088 | 0.088 | 2.29 | 34750 | 1805 | 45° |
| 3.00 | 2 | 250 | 0.028 | 0.106 | 0.106 | 2.75 | 28935 | 1620 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 2 | 57 | 0.010 | 0.008 | 0.008 | 0.43 | 42195 | 845 | 45° |
| 0.60 | 2 | 71 | 0.012 | 0.018 | 0.018 | 0.54 | 41850 | 1005 | 45° |
| 0.80 | 2 | 96 | 0.012 | 0.028 | 0.028 | 0.73 | 41860 | 1005 | 45° |
| 1.00 | 2 | 120 | 0.016 | 0.036 | 0.036 | 0.92 | 41520 | 1330 | 45° |
| 1.20 | 2 | 120 | 0.018 | 0.042 | 0.042 | 1.10 | 34725 | 1250 | 45° |
| 1.50 | 2 | 120 | 0.020 | 0.052 | 0.052 | 1.38 | 27680 | 1105 | 45° |
| 2.00 | 2 | 120 | 0.020 | 0.070 | 0.070 | 1.84 | 20760 | 830 | 45° |
| 2.50 | 2 | 120 | 0.022 | 0.088 | 0.088 | 2.29 | 16680 | 735 | 45° |
| 3.00 | 2 | 120 | 0.026 | 0.106 | 0.106 | 2.75 | 13890 | 720 | 45° |

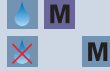
| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 2 | 57 | 0.008 | 0.008 | 0.008 | 0.43 | 42195 | 675 | 45° |
| 0.60 | 2 | 71 | 0.010 | 0.018 | 0.018 | 0.54 | 41850 | 835 | 45° |
| 0.80 | 2 | 96 | 0.012 | 0.028 | 0.028 | 0.73 | 41860 | 1005 | 45° |
| 1.00 | 2 | 100 | 0.014 | 0.036 | 0.036 | 0.92 | 34600 | 970 | 45° |
| 1.20 | 2 | 100 | 0.016 | 0.042 | 0.042 | 1.10 | 28935 | 925 | 45° |
| 1.50 | 2 | 100 | 0.016 | 0.052 | 0.052 | 1.38 | 23065 | 740 | 45° |
| 2.00 | 2 | 100 | 0.018 | 0.070 | 0.070 | 1.84 | 17300 | 625 | 45° |
| 2.50 | 2 | 100 | 0.020 | 0.088 | 0.088 | 2.29 | 13900 | 555 | 45° |
| 3.00 | 2 | 100 | 0.022 | 0.106 | 0.106 | 2.75 | 11575 | 510 | 45° |

Applicazione



Materiale

Acciaio
850 - 1100 N/mm²



Acciaio
1100 - 1300 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]



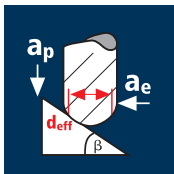
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|--------------------------|
| 1.00 | 2 | 45 | 0.028 | 0.030 | 0.120 | 0.34 | 42130 | 2360 | 8.5 |
| 1.20 | 2 | 57 | 0.034 | 0.040 | 0.140 | 0.43 | 42195 | 2870 | 16.1 |
| 1.50 | 2 | 71 | 0.042 | 0.050 | 0.180 | 0.54 | 41850 | 3515 | 31.6 |
| 2.00 | 2 | 90 | 0.058 | 0.060 | 0.240 | 0.68 | 42130 | 4885 | 70.4 |
| 2.50 | 2 | 116 | 0.072 | 0.080 | 0.300 | 0.88 | 41960 | 6040 | 145.0 |
| 3.00 | 2 | 135 | 0.086 | 0.090 | 0.360 | 1.02 | 42130 | 7245 | 234.8 |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-------|
| 1.00 | 2 | 45 | 0.026 | 0.030 | 0.120 | 0.34 | 42130 | 2190 | 7.9 |
| 1.20 | 2 | 57 | 0.030 | 0.040 | 0.140 | 0.43 | 42195 | 2530 | 14.2 |
| 1.50 | 2 | 71 | 0.038 | 0.050 | 0.180 | 0.54 | 41850 | 3180 | 28.6 |
| 2.00 | 2 | 90 | 0.052 | 0.060 | 0.240 | 0.68 | 42130 | 4380 | 63.1 |
| 2.50 | 2 | 116 | 0.064 | 0.080 | 0.300 | 0.88 | 41960 | 5370 | 128.9 |
| 3.00 | 2 | 135 | 0.078 | 0.090 | 0.360 | 1.02 | 42130 | 6570 | 212.9 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|-------|
| 1.00 | 2 | 45 | 0.022 | 0.030 | 0.120 | 0.34 | 42130 | 1855 | 6.7 |
| 1.20 | 2 | 57 | 0.028 | 0.040 | 0.140 | 0.43 | 42195 | 2365 | 13.2 |
| 1.50 | 2 | 71 | 0.034 | 0.050 | 0.180 | 0.54 | 41850 | 2845 | 25.6 |
| 2.00 | 2 | 80 | 0.046 | 0.060 | 0.240 | 0.68 | 37450 | 3445 | 49.6 |
| 2.50 | 2 | 80 | 0.058 | 0.080 | 0.300 | 0.88 | 28935 | 3355 | 80.6 |
| 3.00 | 2 | 80 | 0.068 | 0.090 | 0.360 | 1.02 | 24965 | 3395 | 110.0 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|------|
| 1.00 | 2 | 45 | 0.020 | 0.030 | 0.120 | 0.34 | 42130 | 1685 | 6.1 |
| 1.20 | 2 | 57 | 0.024 | 0.040 | 0.140 | 0.43 | 42195 | 2025 | 11.3 |
| 1.50 | 2 | 60 | 0.030 | 0.050 | 0.180 | 0.54 | 35370 | 2120 | 19.1 |
| 2.00 | 2 | 60 | 0.040 | 0.060 | 0.240 | 0.68 | 28085 | 2245 | 32.4 |
| 2.50 | 2 | 60 | 0.050 | 0.080 | 0.300 | 0.88 | 21705 | 2170 | 52.1 |
| 3.00 | 2 | 60 | 0.060 | 0.090 | 0.360 | 1.02 | 18725 | 2245 | 72.8 |

Applicazione



Materiale

Acciaio
850 - 1100 N/mm²



Acciaio
1100 - 1300 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]



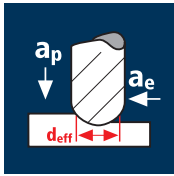
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
| 1.00 | 2 | 119 | 0.020 | 0.028 | 0.028 | 0.90 | 42090 | 1685 | 45° |
| 1.20 | 2 | 143 | 0.022 | 0.034 | 0.034 | 1.08 | 42145 | 1855 | 45° |
| 1.50 | 2 | 178 | 0.024 | 0.042 | 0.042 | 1.35 | 41970 | 2015 | 45° |
| 2.00 | 2 | 238 | 0.026 | 0.056 | 0.056 | 1.80 | 42090 | 2190 | 45° |
| 2.50 | 2 | 297 | 0.028 | 0.070 | 0.070 | 2.25 | 42015 | 2355 | 45° |
| 3.00 | 2 | 300 | 0.032 | 0.084 | 0.084 | 2.70 | 35370 | 2265 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 1.00 | 2 | 119 | 0.018 | 0.028 | 0.028 | 0.90 | 42090 | 1515 | 45° |
| 1.20 | 2 | 143 | 0.020 | 0.034 | 0.034 | 1.08 | 42145 | 1685 | 45° |
| 1.50 | 2 | 178 | 0.022 | 0.042 | 0.042 | 1.35 | 41970 | 1845 | 45° |
| 2.00 | 2 | 238 | 0.024 | 0.056 | 0.056 | 1.80 | 42090 | 2020 | 45° |
| 2.50 | 2 | 250 | 0.026 | 0.070 | 0.070 | 2.25 | 35370 | 1840 | 45° |
| 3.00 | 2 | 250 | 0.028 | 0.084 | 0.084 | 2.70 | 29475 | 1650 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 1.00 | 2 | 119 | 0.016 | 0.028 | 0.028 | 0.90 | 42090 | 1345 | 45° |
| 1.20 | 2 | 120 | 0.018 | 0.034 | 0.034 | 1.08 | 35370 | 1275 | 45° |
| 1.50 | 2 | 120 | 0.020 | 0.042 | 0.042 | 1.35 | 28295 | 1130 | 45° |
| 2.00 | 2 | 120 | 0.020 | 0.056 | 0.056 | 1.80 | 21220 | 850 | 45° |
| 2.50 | 2 | 120 | 0.022 | 0.070 | 0.070 | 2.25 | 16975 | 745 | 45° |
| 3.00 | 2 | 120 | 0.026 | 0.084 | 0.084 | 2.70 | 14145 | 735 | 45° |

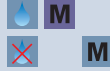
| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|-----|-----|
| 1.00 | 2 | 100 | 0.014 | 0.028 | 0.028 | 0.90 | 35370 | 990 | 45° |
| 1.20 | 2 | 100 | 0.016 | 0.034 | 0.034 | 1.08 | 29475 | 945 | 45° |
| 1.50 | 2 | 100 | 0.016 | 0.042 | 0.042 | 1.35 | 23580 | 755 | 45° |
| 2.00 | 2 | 100 | 0.018 | 0.056 | 0.056 | 1.80 | 17685 | 635 | 45° |
| 2.50 | 2 | 100 | 0.020 | 0.070 | 0.070 | 2.25 | 14145 | 565 | 45° |
| 3.00 | 2 | 100 | 0.022 | 0.084 | 0.084 | 2.70 | 11790 | 520 | 45° |

Applicazione



Materiale

Acciaio
850 - 1100 N/mm²



Acciaio
1100 - 1300 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]



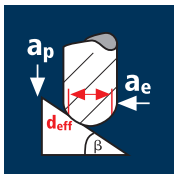
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|--------------------------|
| 1.00 | 2 | 45 | 0.028 | 0.030 | 0.100 | 0.34 | 42130 | 2360 | 7.1 |
| 1.20 | 2 | 57 | 0.034 | 0.040 | 0.120 | 0.43 | 42195 | 2870 | 13.8 |
| 1.50 | 2 | 71 | 0.042 | 0.050 | 0.150 | 0.54 | 41850 | 3515 | 26.4 |
| 2.00 | 2 | 90 | 0.058 | 0.060 | 0.200 | 0.68 | 42130 | 4885 | 58.6 |
| 2.50 | 2 | 116 | 0.072 | 0.080 | 0.250 | 0.88 | 41960 | 6040 | 120.8 |
| 3.00 | 2 | 135 | 0.086 | 0.090 | 0.300 | 1.02 | 42130 | 7245 | 195.6 |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-------|
| 1.00 | 2 | 45 | 0.026 | 0.030 | 0.100 | 0.34 | 42130 | 2190 | 6.6 |
| 1.20 | 2 | 57 | 0.030 | 0.040 | 0.120 | 0.43 | 42195 | 2530 | 12.2 |
| 1.50 | 2 | 71 | 0.038 | 0.050 | 0.150 | 0.54 | 41850 | 3180 | 23.9 |
| 2.00 | 2 | 90 | 0.052 | 0.060 | 0.200 | 0.68 | 42130 | 4380 | 52.6 |
| 2.50 | 2 | 116 | 0.064 | 0.080 | 0.250 | 0.88 | 41960 | 5370 | 107.4 |
| 3.00 | 2 | 120 | 0.078 | 0.090 | 0.300 | 1.02 | 37450 | 5840 | 157.7 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|------|
| 1.00 | 2 | 45 | 0.022 | 0.030 | 0.100 | 0.34 | 42130 | 1855 | 5.6 |
| 1.20 | 2 | 57 | 0.028 | 0.040 | 0.120 | 0.43 | 42195 | 2365 | 11.3 |
| 1.50 | 2 | 70 | 0.034 | 0.050 | 0.150 | 0.54 | 41260 | 2805 | 21.0 |
| 2.00 | 2 | 70 | 0.046 | 0.060 | 0.200 | 0.68 | 32765 | 3015 | 36.2 |
| 2.50 | 2 | 70 | 0.058 | 0.080 | 0.250 | 0.88 | 25320 | 2935 | 58.7 |
| 3.00 | 2 | 70 | 0.068 | 0.090 | 0.300 | 1.02 | 21845 | 2970 | 80.2 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|------|
| 1.00 | 2 | 45 | 0.020 | 0.030 | 0.100 | 0.34 | 42130 | 1685 | 5.1 |
| 1.20 | 2 | 50 | 0.024 | 0.040 | 0.120 | 0.43 | 37015 | 1775 | 8.5 |
| 1.50 | 2 | 50 | 0.030 | 0.050 | 0.150 | 0.54 | 29475 | 1770 | 13.3 |
| 2.00 | 2 | 50 | 0.040 | 0.060 | 0.200 | 0.68 | 23405 | 1870 | 22.5 |
| 2.50 | 2 | 50 | 0.050 | 0.080 | 0.250 | 0.88 | 18085 | 1810 | 36.2 |
| 3.00 | 2 | 50 | 0.060 | 0.090 | 0.300 | 1.02 | 15605 | 1870 | 50.6 |

Applicazione



Materiale

Acciaio
850 - 1100 N/mm²



Acciaio
1100 - 1300 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]



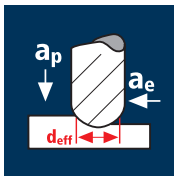
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
| 1.00 | 2 | 119 | 0.020 | 0.026 | 0.026 | 0.90 | 42090 | 1685 | 45° |
| 1.20 | 2 | 143 | 0.022 | 0.032 | 0.032 | 1.08 | 42145 | 1855 | 45° |
| 1.50 | 2 | 178 | 0.024 | 0.040 | 0.040 | 1.35 | 41970 | 2015 | 45° |
| 2.00 | 2 | 236 | 0.026 | 0.052 | 0.052 | 1.79 | 41965 | 2180 | 45° |
| 2.50 | 2 | 250 | 0.028 | 0.066 | 0.066 | 2.24 | 35525 | 1990 | 45° |
| 3.00 | 2 | 250 | 0.032 | 0.078 | 0.078 | 2.69 | 29585 | 1895 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 1.00 | 2 | 119 | 0.018 | 0.026 | 0.026 | 0.90 | 42090 | 1515 | 45° |
| 1.20 | 2 | 143 | 0.020 | 0.032 | 0.032 | 1.08 | 42145 | 1685 | 45° |
| 1.50 | 2 | 178 | 0.022 | 0.040 | 0.040 | 1.35 | 41970 | 1845 | 45° |
| 2.00 | 2 | 200 | 0.024 | 0.052 | 0.052 | 1.79 | 35565 | 1705 | 45° |
| 2.50 | 2 | 200 | 0.026 | 0.066 | 0.066 | 2.24 | 28420 | 1480 | 45° |
| 3.00 | 2 | 200 | 0.028 | 0.078 | 0.078 | 2.69 | 23665 | 1325 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 1.00 | 2 | 100 | 0.016 | 0.026 | 0.026 | 0.90 | 35370 | 1130 | 45° |
| 1.20 | 2 | 100 | 0.018 | 0.032 | 0.032 | 1.08 | 29475 | 1060 | 45° |
| 1.50 | 2 | 100 | 0.020 | 0.040 | 0.040 | 1.35 | 23580 | 945 | 45° |
| 2.00 | 2 | 100 | 0.020 | 0.052 | 0.052 | 1.79 | 17785 | 710 | 45° |
| 2.50 | 2 | 100 | 0.022 | 0.066 | 0.066 | 2.24 | 14210 | 625 | 45° |
| 3.00 | 2 | 100 | 0.026 | 0.078 | 0.078 | 2.69 | 11835 | 615 | 45° |

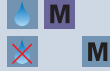
| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|-----|-----|
| 1.00 | 2 | 80 | 0.014 | 0.026 | 0.026 | 0.90 | 28295 | 790 | 45° |
| 1.20 | 2 | 80 | 0.016 | 0.032 | 0.032 | 1.08 | 23580 | 755 | 45° |
| 1.50 | 2 | 80 | 0.016 | 0.040 | 0.040 | 1.35 | 18865 | 605 | 45° |
| 2.00 | 2 | 80 | 0.018 | 0.052 | 0.052 | 1.79 | 14225 | 510 | 45° |
| 2.50 | 2 | 80 | 0.020 | 0.066 | 0.066 | 2.24 | 11370 | 455 | 45° |
| 3.00 | 2 | 80 | 0.022 | 0.078 | 0.078 | 2.69 | 9465 | 415 | 45° |

Applicazione



Materiale

Acciaio
850 - 1100 N/mm²



Acciaio
1100 - 1300 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]



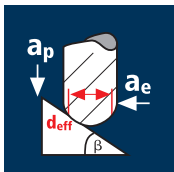
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | Q [mm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|--------------------------|
| 1.00 | 2 | 45 | 0.028 | 0.030 | 0.080 | 0.34 | 42130 | 2360 | 5.7 |
| 1.20 | 2 | 57 | 0.034 | 0.040 | 0.100 | 0.43 | 42195 | 2870 | 11.5 |
| 1.50 | 2 | 71 | 0.042 | 0.050 | 0.120 | 0.54 | 41850 | 3515 | 21.1 |
| 2.00 | 2 | 90 | 0.058 | 0.060 | 0.160 | 0.68 | 42130 | 4885 | 46.9 |
| 2.50 | 2 | 116 | 0.072 | 0.080 | 0.200 | 0.88 | 41960 | 6040 | 96.7 |
| 3.00 | 2 | 135 | 0.086 | 0.090 | 0.240 | 1.02 | 42130 | 7245 | 156.5 |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-------|
| 1.00 | 2 | 45 | 0.026 | 0.030 | 0.080 | 0.34 | 42130 | 2190 | 5.3 |
| 1.20 | 2 | 57 | 0.030 | 0.040 | 0.100 | 0.43 | 42195 | 2530 | 10.1 |
| 1.50 | 2 | 71 | 0.038 | 0.050 | 0.120 | 0.54 | 41850 | 3180 | 19.1 |
| 2.00 | 2 | 90 | 0.052 | 0.060 | 0.160 | 0.68 | 42130 | 4380 | 42.1 |
| 2.50 | 2 | 116 | 0.064 | 0.080 | 0.200 | 0.88 | 41960 | 5370 | 85.9 |
| 3.00 | 2 | 120 | 0.078 | 0.090 | 0.240 | 1.02 | 37450 | 5840 | 126.2 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|------|
| 1.00 | 2 | 45 | 0.022 | 0.030 | 0.080 | 0.34 | 42130 | 1855 | 4.4 |
| 1.20 | 2 | 57 | 0.028 | 0.040 | 0.100 | 0.43 | 42195 | 2365 | 9.5 |
| 1.50 | 2 | 70 | 0.034 | 0.050 | 0.120 | 0.54 | 41260 | 2805 | 16.8 |
| 2.00 | 2 | 70 | 0.046 | 0.060 | 0.160 | 0.68 | 32765 | 3015 | 28.9 |
| 2.50 | 2 | 70 | 0.058 | 0.080 | 0.200 | 0.88 | 25320 | 2935 | 47.0 |
| 3.00 | 2 | 70 | 0.068 | 0.090 | 0.240 | 1.02 | 21845 | 2970 | 64.2 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|------|
| 1.00 | 2 | 45 | 0.020 | 0.030 | 0.080 | 0.34 | 42130 | 1685 | 4.0 |
| 1.20 | 2 | 50 | 0.024 | 0.040 | 0.100 | 0.43 | 37015 | 1775 | 7.1 |
| 1.50 | 2 | 50 | 0.030 | 0.050 | 0.120 | 0.54 | 29475 | 1770 | 10.6 |
| 2.00 | 2 | 50 | 0.040 | 0.060 | 0.160 | 0.68 | 23405 | 1870 | 18.0 |
| 2.50 | 2 | 50 | 0.050 | 0.080 | 0.200 | 0.88 | 18085 | 1810 | 28.9 |
| 3.00 | 2 | 50 | 0.060 | 0.090 | 0.240 | 1.02 | 15605 | 1870 | 40.4 |

Applicazione



Materiale

Acciaio
850 - 1100 N/mm²



Acciaio
1100 - 1300 N/mm²



Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]



Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
| 1.00 | 2 | 116 | 0.020 | 0.022 | 0.022 | 0.88 | 41960 | 1680 | 45° |
| 1.20 | 2 | 140 | 0.022 | 0.026 | 0.026 | 1.06 | 42040 | 1850 | 45° |
| 1.50 | 2 | 175 | 0.024 | 0.034 | 0.034 | 1.33 | 41885 | 2010 | 45° |
| 2.00 | 2 | 234 | 0.026 | 0.044 | 0.044 | 1.77 | 42080 | 2190 | 45° |
| 2.50 | 2 | 250 | 0.028 | 0.056 | 0.056 | 2.21 | 36010 | 2015 | 45° |
| 3.00 | 2 | 250 | 0.032 | 0.066 | 0.066 | 2.65 | 30030 | 1920 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 1.00 | 2 | 116 | 0.018 | 0.022 | 0.022 | 0.88 | 41960 | 1510 | 45° |
| 1.20 | 2 | 140 | 0.020 | 0.026 | 0.026 | 1.06 | 42040 | 1680 | 45° |
| 1.50 | 2 | 175 | 0.022 | 0.034 | 0.034 | 1.33 | 41885 | 1845 | 45° |
| 2.00 | 2 | 200 | 0.024 | 0.044 | 0.044 | 1.77 | 35965 | 1725 | 45° |
| 2.50 | 2 | 200 | 0.026 | 0.056 | 0.056 | 2.21 | 28805 | 1500 | 45° |
| 3.00 | 2 | 200 | 0.028 | 0.066 | 0.066 | 2.65 | 24025 | 1345 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 1.00 | 2 | 100 | 0.016 | 0.022 | 0.022 | 0.88 | 36170 | 1155 | 45° |
| 1.20 | 2 | 100 | 0.018 | 0.026 | 0.026 | 1.06 | 30030 | 1080 | 45° |
| 1.50 | 2 | 100 | 0.020 | 0.034 | 0.034 | 1.33 | 23935 | 955 | 45° |
| 2.00 | 2 | 100 | 0.020 | 0.044 | 0.044 | 1.77 | 17985 | 720 | 45° |
| 2.50 | 2 | 100 | 0.022 | 0.056 | 0.056 | 2.21 | 14405 | 635 | 45° |
| 3.00 | 2 | 100 | 0.026 | 0.066 | 0.066 | 2.65 | 12010 | 625 | 45° |

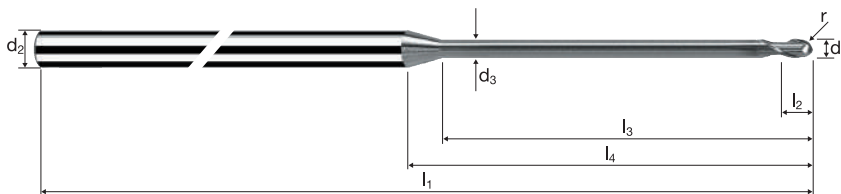
| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|-----|-----|
| 1.00 | 2 | 80 | 0.014 | 0.022 | 0.022 | 0.88 | 28935 | 810 | 45° |
| 1.20 | 2 | 80 | 0.016 | 0.026 | 0.026 | 1.06 | 24025 | 770 | 45° |
| 1.50 | 2 | 80 | 0.016 | 0.034 | 0.034 | 1.33 | 19145 | 615 | 45° |
| 2.00 | 2 | 80 | 0.018 | 0.044 | 0.044 | 1.77 | 14385 | 520 | 45° |
| 2.50 | 2 | 80 | 0.020 | 0.056 | 0.056 | 2.21 | 11525 | 460 | 45° |
| 3.00 | 2 | 80 | 0.022 | 0.066 | 0.066 | 2.65 | 9610 | 425 | 45° |

Frese con estremità emisferica Microcut

Gambo ø 3mm, scarico cilindrico, 20xd



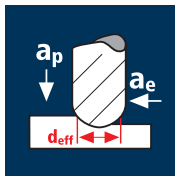
| | |
|------|---------------|
| HM | λ 30° |
| MG10 | γ 5° |



| | | | | | | | | | | |
|----------|-------------|--------------|--|--|--|--|--|--|--|------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | | | | | | | | Gold / Platinum Copper |
|----------|-------------|--------------|--|--|--|--|--|--|--|------------------------|

| Ø Code | Esempio: N° Ordine | | | | | | | | | | MICRO |
|--------|--------------------|-------|------|-----------------|------|-------|---------------|---------|----------|---|--------|
| | d1 ±0.01 | d2 h6 | d3 | l1 | l2 | l3 | l4 | r ±0.01 | α | z | |
| | Rivestimento: M | | | Articolo: 15795 | | | Codice-ø: 100 | | [Image] | | |
| 100 | 1.00 | 3.00 | 0.95 | 60 | 1.20 | 20.00 | 24.22 | 0.500 | 2.5° | 2 | M15795 |
| 108 | 1.20 | 3.00 | 1.10 | 60 | 1.44 | 24.00 | 27.94 | 0.600 | 2.0° | 2 | EUR |
| 120 | 1.50 | 3.00 | 1.40 | 70 | 1.80 | 30.00 | 33.38 | 0.750 | 1.4° | 2 | 81.00 |
| 140 | 2.00 | 3.00 | 1.90 | 80 | 2.40 | 40.00 | 42.45 | 1.000 | 0.8° | 2 | 81.00 |
| 160 | 2.50 | 3.00 | 2.30 | 80 | 3.00 | 50.00 | 51.70 | 1.250 | 0.3° | 2 | 81.00 |
| 180 | 3.00 | 3.00 | 2.80 | 90 | 3.60 | 59.56 | 60.00 | 1.500 | 0.0° | 2 | 81.00 |
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Applicazione



Materiale

Acciaio
< 850 N/mm²

Acciaio
850 - 1100 N/mm²

Rame non legato

Alluminio malleabile
Costruzione integrale Al

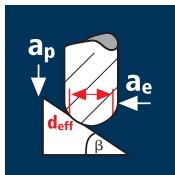
| d1 [mm] | z | v_c [m/min] | f_z [mm] | a_p [mm] | a_e [mm] | d_{eff} [mm] | n [min ⁻¹] | v_f [mm/min] | Q [mm ³ /min] |
|---------|---|---------------|------------|------------|------------|----------------|------------------------|----------------|--------------------------|
| 0.50 | 2 | 32 | 0.014 | 0.030 | 0.100 | 0.24 | 42440 | 1190 | 3.6 |
| 0.60 | 2 | 40 | 0.020 | 0.040 | 0.140 | 0.30 | 42440 | 1700 | 9.5 |
| 0.80 | 2 | 51 | 0.022 | 0.050 | 0.160 | 0.39 | 41625 | 1830 | 14.7 |
| 1.00 | 2 | 62 | 0.028 | 0.060 | 0.200 | 0.47 | 41990 | 2350 | 28.2 |
| 1.20 | 2 | 74 | 0.034 | 0.070 | 0.240 | 0.56 | 42060 | 2860 | 48.1 |
| 1.50 | 2 | 94 | 0.042 | 0.090 | 0.300 | 0.71 | 42140 | 3540 | 95.6 |
| 2.00 | 2 | 120 | 0.058 | 0.120 | 0.400 | 0.95 | 40210 | 4665 | 223.9 |
| 2.50 | 2 | 120 | 0.072 | 0.150 | 0.500 | 1.19 | 32100 | 4620 | 346.7 |
| 3.00 | 2 | 120 | 0.086 | 0.180 | 0.600 | 1.42 | 26900 | 4625 | 499.7 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|-------|
| 0.50 | 2 | 32 | 0.012 | 0.030 | 0.100 | 0.24 | 42440 | 1020 | 3.1 |
| 0.60 | 2 | 40 | 0.016 | 0.040 | 0.120 | 0.30 | 42440 | 1360 | 6.5 |
| 0.80 | 2 | 51 | 0.020 | 0.050 | 0.160 | 0.39 | 41625 | 1665 | 13.3 |
| 1.00 | 2 | 62 | 0.026 | 0.060 | 0.200 | 0.47 | 41990 | 2185 | 26.2 |
| 1.20 | 2 | 74 | 0.030 | 0.070 | 0.240 | 0.56 | 42060 | 2525 | 42.4 |
| 1.50 | 2 | 80 | 0.038 | 0.090 | 0.300 | 0.71 | 35865 | 2725 | 73.6 |
| 2.00 | 2 | 80 | 0.052 | 0.120 | 0.400 | 0.95 | 26805 | 2790 | 133.8 |
| 2.50 | 2 | 80 | 0.064 | 0.150 | 0.500 | 1.19 | 21400 | 2740 | 205.4 |
| 3.00 | 2 | 80 | 0.078 | 0.180 | 0.600 | 1.42 | 17935 | 2800 | 302.1 |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-------|
| 0.50 | 2 | 32 | 0.016 | 0.030 | 0.100 | 0.24 | 42440 | 1360 | 4.1 |
| 0.60 | 2 | 40 | 0.020 | 0.040 | 0.120 | 0.30 | 42440 | 1700 | 8.1 |
| 0.80 | 2 | 51 | 0.024 | 0.050 | 0.160 | 0.39 | 41625 | 2000 | 16.0 |
| 1.00 | 2 | 62 | 0.030 | 0.060 | 0.200 | 0.47 | 41990 | 2520 | 30.2 |
| 1.20 | 2 | 74 | 0.038 | 0.070 | 0.240 | 0.56 | 42060 | 3195 | 53.7 |
| 1.50 | 2 | 94 | 0.046 | 0.090 | 0.300 | 0.71 | 42140 | 3875 | 104.7 |
| 2.00 | 2 | 125 | 0.064 | 0.120 | 0.400 | 0.95 | 41885 | 5360 | 257.3 |
| 2.50 | 2 | 157 | 0.080 | 0.150 | 0.500 | 1.19 | 41995 | 6720 | 503.9 |
| 3.00 | 2 | 187 | 0.094 | 0.180 | 0.600 | 1.42 | 41920 | 7880 | 851.1 |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-------|
| 0.50 | 2 | 32 | 0.016 | 0.030 | 0.100 | 0.24 | 42440 | 1360 | 4.1 |
| 0.60 | 2 | 40 | 0.020 | 0.040 | 0.120 | 0.30 | 42440 | 1700 | 8.1 |
| 0.80 | 2 | 51 | 0.024 | 0.050 | 0.160 | 0.39 | 41625 | 2000 | 16.0 |
| 1.00 | 2 | 62 | 0.030 | 0.060 | 0.200 | 0.47 | 41990 | 2520 | 30.2 |
| 1.20 | 2 | 74 | 0.038 | 0.070 | 0.240 | 0.56 | 42060 | 3195 | 53.7 |
| 1.50 | 2 | 94 | 0.046 | 0.090 | 0.300 | 0.71 | 42140 | 3875 | 104.7 |
| 2.00 | 2 | 125 | 0.064 | 0.120 | 0.400 | 0.95 | 41885 | 5360 | 257.3 |
| 2.50 | 2 | 157 | 0.080 | 0.150 | 0.500 | 1.19 | 41995 | 6720 | 503.9 |
| 3.00 | 2 | 187 | 0.094 | 0.180 | 0.600 | 1.42 | 41920 | 7880 | 851.1 |

Applicazione



Materiale

Acciaio
< 850 N/mm²

Acciaio
850 - 1100 N/mm²

Rame non legato

Alluminio malleabile
Costruzione integrale Al

| d1 [mm] | z | v_c [m/min] | f_z [mm] | a_p [mm] | a_e [mm] | d_{eff} [mm] | n [min ⁻¹] | v_f [mm/min] | β [°] |
|---------|---|---------------|------------|------------|------------|----------------|------------------------|----------------|-------------|
| 0.50 | 2 | 61 | 0.016 | 0.020 | 0.020 | 0.46 | 42210 | 1350 | 45° |
| 0.60 | 2 | 74 | 0.018 | 0.028 | 0.028 | 0.56 | 42060 | 1515 | 45° |
| 0.80 | 2 | 98 | 0.020 | 0.032 | 0.032 | 0.74 | 42155 | 1685 | 45° |
| 1.00 | 2 | 123 | 0.022 | 0.040 | 0.040 | 0.93 | 42100 | 1850 | 45° |
| 1.20 | 2 | 146 | 0.024 | 0.048 | 0.048 | 1.11 | 41870 | 2010 | 45° |
| 1.50 | 2 | 183 | 0.028 | 0.060 | 0.060 | 1.39 | 41905 | 2345 | 45° |
| 2.00 | 2 | 220 | 0.030 | 0.080 | 0.080 | 1.86 | 37650 | 2260 | 45° |
| 2.50 | 2 | 220 | 0.032 | 0.100 | 0.100 | 2.32 | 30185 | 1930 | 45° |
| 3.00 | 2 | 220 | 0.036 | 0.120 | 0.120 | 2.78 | 25190 | 1815 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 2 | 61 | 0.014 | 0.020 | 0.020 | 0.46 | 42210 | 1180 | 45° |
| 0.60 | 2 | 74 | 0.016 | 0.024 | 0.024 | 0.56 | 42060 | 1345 | 45° |
| 0.80 | 2 | 98 | 0.018 | 0.032 | 0.032 | 0.74 | 42155 | 1520 | 45° |
| 1.00 | 2 | 123 | 0.020 | 0.040 | 0.040 | 0.93 | 42100 | 1685 | 45° |
| 1.20 | 2 | 146 | 0.022 | 0.048 | 0.048 | 1.11 | 41870 | 1840 | 45° |
| 1.50 | 2 | 150 | 0.026 | 0.060 | 0.060 | 1.39 | 34350 | 1785 | 45° |
| 2.00 | 2 | 150 | 0.028 | 0.080 | 0.080 | 1.86 | 25670 | 1440 | 45° |
| 2.50 | 2 | 150 | 0.028 | 0.100 | 0.100 | 2.32 | 20580 | 1155 | 45° |
| 3.00 | 2 | 150 | 0.032 | 0.120 | 0.120 | 2.78 | 17175 | 1100 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 2 | 61 | 0.018 | 0.020 | 0.020 | 0.46 | 42210 | 1520 | 45° |
| 0.60 | 2 | 74 | 0.020 | 0.024 | 0.024 | 0.56 | 42060 | 1680 | 45° |
| 0.80 | 2 | 98 | 0.022 | 0.032 | 0.032 | 0.74 | 42155 | 1855 | 45° |
| 1.00 | 2 | 123 | 0.024 | 0.040 | 0.040 | 0.93 | 42100 | 2020 | 45° |
| 1.20 | 2 | 146 | 0.026 | 0.048 | 0.048 | 1.11 | 41870 | 2175 | 45° |
| 1.50 | 2 | 183 | 0.030 | 0.060 | 0.060 | 1.39 | 41905 | 2515 | 45° |
| 2.00 | 2 | 245 | 0.034 | 0.080 | 0.080 | 1.86 | 41930 | 2850 | 45° |
| 2.50 | 2 | 306 | 0.036 | 0.100 | 0.100 | 2.32 | 41985 | 3025 | 45° |
| 3.00 | 2 | 367 | 0.040 | 0.120 | 0.120 | 2.78 | 42020 | 3360 | 45° |

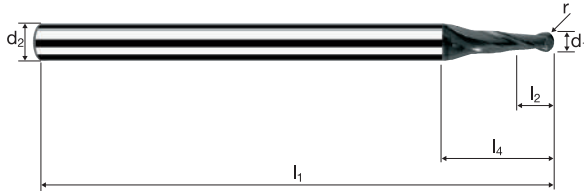
| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 2 | 61 | 0.018 | 0.020 | 0.020 | 0.46 | 42210 | 1520 | 45° |
| 0.60 | 2 | 74 | 0.020 | 0.024 | 0.024 | 0.56 | 42060 | 1680 | 45° |
| 0.80 | 2 | 98 | 0.022 | 0.032 | 0.032 | 0.74 | 42155 | 1855 | 45° |
| 1.00 | 2 | 123 | 0.024 | 0.040 | 0.040 | 0.93 | 42100 | 2020 | 45° |
| 1.20 | 2 | 146 | 0.026 | 0.048 | 0.048 | 1.11 | 41870 | 2175 | 45° |
| 1.50 | 2 | 183 | 0.030 | 0.060 | 0.060 | 1.39 | 41905 | 2515 | 45° |
| 2.00 | 2 | 245 | 0.034 | 0.080 | 0.080 | 1.86 | 41930 | 2850 | 45° |
| 2.50 | 2 | 306 | 0.036 | 0.100 | 0.100 | 2.32 | 41985 | 3025 | 45° |
| 3.00 | 2 | 367 | 0.040 | 0.120 | 0.120 | 2.78 | 42020 | 3360 | 45° |

Frese con estremità emisferica

Gambo ø 3mm, 3xd



| | |
|------|---------------|
| HM | λ 30° |
| MG10 | γ 10° |



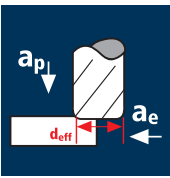
ReTool®

| | | | | | | | | | |
|----------|-------------|--------------|--|--|--|--|----------------|-------------|------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | | | | | Inox Stainless | Ti Titanium | Copper Aluminium |
|----------|-------------|--------------|--|--|--|--|----------------|-------------|------------------|

| Esempio: N° Ordine | | | | | | | | | | MICRO |
|--------------------|----------------------|-------------------|----------------|----------------|----------------|---------|------|---|--|--------|
| | | | | | | | | | | M45785 |
| | | | | | | | | | | EUR |
| Ø Code | d ₁ ±0.01 | d ₂ h6 | l ₁ | l ₂ | l ₄ | r ±0.01 | α | z | | |
| 030 | 0.30 | 3.00 | 40 | 1.00 | 9.00 | 0.150 | 9.0° | 2 | | 49.20 |
| 040 | 0.40 | 3.00 | 40 | 1.00 | 8.70 | 0.200 | 8.9° | 2 | | 47.00 |
| 050 | 0.50 | 3.00 | 40 | 1.50 | 8.90 | 0.250 | 8.4° | 2 | | 47.00 |
| 060 | 0.60 | 3.00 | 40 | 1.50 | 8.60 | 0.300 | 8.3° | 2 | | 44.80 |
| 070 | 0.70 | 3.00 | 40 | 2.00 | 8.80 | 0.350 | 7.8° | 2 | | 44.80 |
| 080 | 0.80 | 3.00 | 40 | 2.00 | 8.60 | 0.400 | 7.7° | 2 | | 44.80 |
| 090 | 0.90 | 3.00 | 40 | 2.50 | 8.80 | 0.450 | 7.2° | 2 | | 44.80 |
| 100 | 1.00 | 3.00 | 40 | 3.00 | 9.00 | 0.500 | 6.7° | 2 | | 44.80 |
| 108 | 1.20 | 3.00 | 40 | 4.00 | 9.50 | 0.600 | 5.7° | 2 | | 44.80 |
| 120 | 1.50 | 3.00 | 40 | 4.00 | 8.60 | 0.750 | 5.3° | 2 | | 44.80 |
| 130 | 1.80 | 3.00 | 40 | 5.00 | 7.30 | 0.900 | 5.2° | 2 | | 44.80 |
| 140 | 2.00 | 3.00 | 40 | 5.00 | 7.00 | 1.000 | 4.6° | 2 | | 44.80 |
| 160 | 2.50 | 3.00 | 40 | 7.00 | 8.30 | 1.250 | 2.0° | 2 | | 44.80 |
| 180 | 3.00 | 4.00 | 44 | 10.00 | 12.40 | 1.500 | 2.6° | 2 | | 44.80 |
| | | | | | | | | | | |
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Applicazione

Materiale



Acciaio da
utensile temprato
42 - 48 HRC



| d1 [mm] | z | v_c [m/min] | f_z [mm] | a_p [mm] | a_e [mm] | d_{eff} [mm] | n [min ⁻¹] | v_r [mm/min] | r [mm] |
|---------|---|---------------|------------|------------|------------|----------------|------------------------|----------------|--------|
| 0.20 | 2 | 22 | 0.004 | 0.016 | 0.040 | 0.17 | 41195 | 310 | 0.05 |
| 0.40 | 2 | 51 | 0.006 | 0.032 | 0.080 | 0.39 | 41625 | 525 | 0.05 |
| 0.50 | 2 | 65 | 0.006 | 0.032 | 0.080 | 0.49 | 42225 | 530 | 0.05 |
| 0.60 | 2 | 75 | 0.010 | 0.048 | 0.120 | 0.57 | 41885 | 845 | 0.10 |
| 0.80 | 2 | 104 | 0.013 | 0.065 | 0.160 | 0.79 | 41905 | 1055 | 0.10 |
| 1.00 | 2 | 132 | 0.016 | 0.081 | 0.200 | 1.00 | 42015 | 1375 | 0.10 |
| 1.50 | 2 | 140 | 0.024 | 0.121 | 0.300 | 1.47 | 30315 | 1450 | 0.20 |
| 2.00 | 2 | 140 | 0.032 | 0.162 | 0.400 | 1.99 | 22395 | 1410 | 0.20 |

Acciaio da
utensile temprato
48 - 52 HRC



| d1 [mm] | z | v_c [m/min] | f_z [mm] | a_p [mm] | a_e [mm] | d_{eff} [mm] | n [min ⁻¹] | v_r [mm/min] | r [mm] |
|---------|---|---------------|------------|------------|------------|----------------|------------------------|----------------|--------|
| 0.20 | 2 | 22 | 0.004 | 0.016 | 0.040 | 0.17 | 41195 | 295 | 0.05 |
| 0.40 | 2 | 51 | 0.006 | 0.032 | 0.080 | 0.39 | 41625 | 500 | 0.05 |
| 0.50 | 2 | 65 | 0.006 | 0.032 | 0.080 | 0.49 | 42225 | 505 | 0.05 |
| 0.60 | 2 | 75 | 0.010 | 0.048 | 0.120 | 0.57 | 41885 | 805 | 0.10 |
| 0.80 | 2 | 104 | 0.012 | 0.065 | 0.160 | 0.79 | 41905 | 1005 | 0.10 |
| 1.00 | 2 | 120 | 0.016 | 0.081 | 0.200 | 1.00 | 38195 | 1190 | 0.10 |
| 1.50 | 2 | 120 | 0.023 | 0.121 | 0.300 | 1.47 | 25985 | 1185 | 0.20 |
| 2.00 | 2 | 120 | 0.030 | 0.162 | 0.400 | 1.99 | 19195 | 1150 | 0.20 |

Acciaio da
utensile temprato
52 - 56 HRC



| d1 [mm] | z | v_c [m/min] | f_z [mm] | a_p [mm] | a_e [mm] | d_{eff} [mm] | n [min ⁻¹] | v_r [mm/min] | r [mm] |
|---------|---|---------------|------------|------------|------------|----------------|------------------------|----------------|--------|
| 0.20 | 2 | 22 | 0.003 | 0.016 | 0.040 | 0.17 | 41195 | 245 | 0.05 |
| 0.40 | 2 | 51 | 0.005 | 0.032 | 0.080 | 0.39 | 41625 | 415 | 0.05 |
| 0.50 | 2 | 65 | 0.005 | 0.032 | 0.080 | 0.49 | 42225 | 420 | 0.05 |
| 0.60 | 2 | 75 | 0.008 | 0.048 | 0.120 | 0.57 | 41885 | 670 | 0.10 |
| 0.80 | 2 | 100 | 0.010 | 0.065 | 0.160 | 0.79 | 40290 | 805 | 0.10 |
| 1.00 | 2 | 100 | 0.013 | 0.081 | 0.200 | 1.00 | 31830 | 830 | 0.10 |
| 1.50 | 2 | 100 | 0.019 | 0.121 | 0.300 | 1.47 | 21655 | 825 | 0.20 |
| 2.00 | 2 | 100 | 0.025 | 0.162 | 0.400 | 1.99 | 15995 | 800 | 0.20 |

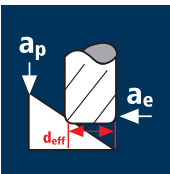
Acciaio da
utensile temprato
56 - 60 HRC



| d1 [mm] | z | v_c [m/min] | f_z [mm] | a_p [mm] | a_e [mm] | d_{eff} [mm] | n [min ⁻¹] | v_r [mm/min] | r [mm] |
|---------|---|---------------|------------|------------|------------|----------------|------------------------|----------------|--------|
| 0.20 | 2 | 22 | 0.003 | 0.016 | 0.040 | 0.17 | 41195 | 220 | 0.05 |
| 0.40 | 2 | 51 | 0.004 | 0.032 | 0.080 | 0.39 | 41625 | 375 | 0.05 |
| 0.50 | 2 | 60 | 0.004 | 0.032 | 0.080 | 0.49 | 38975 | 350 | 0.05 |
| 0.60 | 2 | 60 | 0.007 | 0.048 | 0.120 | 0.57 | 33505 | 480 | 0.10 |
| 0.80 | 2 | 60 | 0.009 | 0.065 | 0.160 | 0.79 | 24175 | 435 | 0.10 |
| 1.00 | 2 | 60 | 0.012 | 0.081 | 0.200 | 1.00 | 19100 | 445 | 0.10 |
| 1.50 | 2 | 60 | 0.017 | 0.121 | 0.300 | 1.47 | 12990 | 445 | 0.20 |
| 2.00 | 2 | 60 | 0.023 | 0.162 | 0.400 | 1.99 | 9595 | 430 | 0.20 |

Applicazione

Materiale



Acciaio da
utensile temprato
42 - 48 HRC



| d1 [mm] | z | v_c [m/min] | f_z [mm] | a_p [mm] | a_e [mm] | d_{eff} [mm] | n [min ⁻¹] | v_r [mm/min] | β [°] |
|---------|---|---------------|------------|------------|------------|----------------|------------------------|----------------|-------------|
| 0.20 | 2 | 26 | 0.010 | 0.008 | 0.008 | 0.20 | 41380 | 830 | 45° |
| 0.40 | 2 | 53 | 0.016 | 0.016 | 0.016 | 0.40 | 42175 | 1350 | 45° |
| 0.50 | 2 | 66 | 0.020 | 0.022 | 0.022 | 0.50 | 42015 | 1680 | 45° |
| 0.60 | 2 | 79 | 0.020 | 0.026 | 0.026 | 0.60 | 41910 | 1675 | 45° |
| 0.80 | 2 | 106 | 0.022 | 0.034 | 0.034 | 0.80 | 42175 | 1855 | 45° |
| 1.00 | 2 | 132 | 0.028 | 0.042 | 0.042 | 1.00 | 42015 | 2355 | 45° |
| 1.50 | 2 | 198 | 0.034 | 0.064 | 0.064 | 1.50 | 42015 | 2855 | 45° |
| 2.00 | 2 | 263 | 0.038 | 0.084 | 0.084 | 1.99 | 42070 | 3195 | 45° |

Acciaio da
utensile temprato
48 - 52 HRC



| d1 [mm] | z | v_c [m/min] | f_z [mm] | a_p [mm] | a_e [mm] | d_{eff} [mm] | n [min ⁻¹] | v_r [mm/min] | β [°] |
|---------|---|---------------|------------|------------|------------|----------------|------------------------|----------------|-------------|
| 0.20 | 2 | 26 | 0.010 | 0.008 | 0.008 | 0.20 | 41380 | 830 | 45° |
| 0.40 | 2 | 53 | 0.016 | 0.016 | 0.016 | 0.40 | 42175 | 1350 | 45° |
| 0.50 | 2 | 66 | 0.020 | 0.022 | 0.022 | 0.50 | 42015 | 1680 | 45° |
| 0.60 | 2 | 79 | 0.020 | 0.026 | 0.026 | 0.60 | 41910 | 1675 | 45° |
| 0.80 | 2 | 106 | 0.020 | 0.034 | 0.034 | 0.80 | 42175 | 1685 | 45° |
| 1.00 | 2 | 132 | 0.026 | 0.042 | 0.042 | 1.00 | 42015 | 2185 | 45° |
| 1.50 | 2 | 198 | 0.032 | 0.064 | 0.064 | 1.50 | 42015 | 2690 | 45° |
| 2.00 | 2 | 250 | 0.036 | 0.084 | 0.084 | 1.99 | 39990 | 2880 | 45° |

Acciaio da
utensile temprato
52 - 56 HRC



| d1 [mm] | z | v_c [m/min] | f_z [mm] | a_p [mm] | a_e [mm] | d_{eff} [mm] | n [min ⁻¹] | v_r [mm/min] | β [°] |
|---------|---|---------------|------------|------------|------------|----------------|------------------------|----------------|-------------|
| 0.20 | 2 | 26 | 0.010 | 0.008 | 0.008 | 0.20 | 41380 | 830 | 45° |
| 0.40 | 2 | 53 | 0.014 | 0.016 | 0.016 | 0.40 | 42175 | 1180 | 45° |
| 0.50 | 2 | 66 | 0.018 | 0.022 | 0.022 | 0.50 | 42015 | 1515 | 45° |
| 0.60 | 2 | 79 | 0.018 | 0.026 | 0.026 | 0.60 | 41910 | 1510 | 45° |
| 0.80 | 2 | 106 | 0.020 | 0.034 | 0.034 | 0.80 | 42175 | 1685 | 45° |
| 1.00 | 2 | 132 | 0.026 | 0.042 | 0.042 | 1.00 | 42015 | 2185 | 45° |
| 1.50 | 2 | 198 | 0.030 | 0.064 | 0.064 | 1.50 | 42015 | 2520 | 45° |
| 2.00 | 2 | 200 | 0.034 | 0.084 | 0.084 | 1.99 | 31990 | 2175 | 45° |

Acciaio da
utensile temprato
56 - 60 HRC



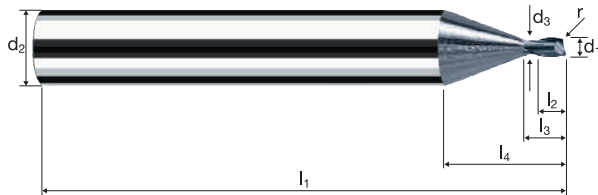
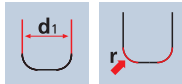
| d1 [mm] | z | v_c [m/min] | f_z [mm] | a_p [mm] | a_e [mm] | d_{eff} [mm] | n [min ⁻¹] | v_r [mm/min] | β [°] |
|---------|---|---------------|------------|------------|------------|----------------|------------------------|----------------|-------------|
| 0.20 | 2 | 26 | 0.008 | 0.008 | 0.008 | 0.20 | 41380 | 660 | 45° |
| 0.40 | 2 | 53 | 0.012 | 0.016 | 0.016 | 0.40 | 42175 | 1010 | 45° |
| 0.50 | 2 | 66 | 0.016 | 0.022 | 0.022 | 0.50 | 42015 | 1345 | 45° |
| 0.60 | 2 | 79 | 0.016 | 0.026 | 0.026 | 0.60 | 41910 | 1340 | 45° |
| 0.80 | 2 | 106 | 0.018 | 0.034 | 0.034 | 0.80 | 42175 | 1520 | 45° |
| 1.00 | 2 | 132 | 0.022 | 0.042 | 0.042 | 1.00 | 42015 | 1850 | 45° |
| 1.50 | 2 | 150 | 0.028 | 0.064 | 0.064 | 1.50 | 31830 | 1785 | 45° |
| 2.00 | 2 | 150 | 0.030 | 0.084 | 0.084 | 1.99 | 23995 | 1440 | 45° |

Frese toriche MicroX

Gambo \varnothing 6mm, scarico cilindrico, 2xd



HM λ 25°
XA γ -10°

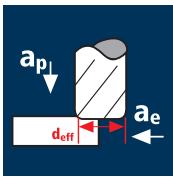


ReTool®

| | | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--------------|--------------|-------------|-------------------|----------------|-------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Inox Stainless | Ti Titanium | Cobalt-Chrome Copper |
|-------------|----------------|-----------------|-----------------|--------------|--------------|-------------|-------------------|----------------|-------------------------|

| Esempio: N° Ordine | | | | | | | | | | | X-AL |
|-----------------------|------------------|-------------|-------|-------|-------|-------|-------|----------------|----------|-----|-------|
| Rivestimento | | | | | | | | | | | X6531 |
| Articolo | | | | | | | | | | | EUR |
| Codice- \varnothing | | | | | | | | | | | |
| \varnothing Code | d_1 0/-0.01 | d_2 h4 | d_3 | l_1 | l_2 | l_3 | l_4 | r 0/+0.01 | α | z | |
| 020 | 0.20 | 6.00 | 0.18 | 57 | 0.20 | 0.40 | 17.34 | 0.050 | 14.5° | 2 | 83.00 |
| 040 | 0.40 | 6.00 | 0.35 | 57 | 0.40 | 0.80 | 17.26 | 0.050 | 14.0° | 2 | 76.00 |
| 048 | 0.50 | 6.00 | 0.45 | 57 | 0.50 | 1.00 | 12.01 | 0.050 | 13.7° | 2 | 76.00 |
| 042 | 0.40 | 6.00 | 0.35 | 57 | 0.40 | 0.80 | 17.26 | 0.100 | 14.0° | 2 | 76.00 |
| 050 | 0.50 | 6.00 | 0.45 | 57 | 0.50 | 1.00 | 12.01 | 0.100 | 13.8° | 2 | 76.00 |
| 060 | 0.60 | 6.00 | 0.55 | 57 | 0.60 | 1.20 | 12.03 | 0.100 | 13.5° | 2 | 76.00 |
| 080 | 0.80 | 6.00 | 0.75 | 57 | 0.80 | 1.60 | 12.05 | 0.100 | 13.0° | 2 | 76.00 |
| 098 | 1.00 | 6.00 | 0.95 | 57 | 1.00 | 2.00 | 12.08 | 0.100 | 12.5° | 2 | 76.00 |
| 082 | 0.80 | 6.00 | 0.75 | 57 | 0.80 | 1.60 | 12.05 | 0.200 | 13.1° | 2 | 76.00 |
| 100 | 1.00 | 6.00 | 0.95 | 57 | 1.00 | 2.00 | 12.08 | 0.200 | 12.6° | 2 | 76.00 |
| 120 | 1.50 | 6.00 | 1.40 | 57 | 1.50 | 3.00 | 12.24 | 0.200 | 11.2° | 2 | 76.00 |
| 140 | 2.00 | 6.00 | 1.90 | 57 | 2.00 | 4.00 | 12.31 | 0.200 | 9.9° | 2 | 76.00 |
| 101 | 1.00 | 6.00 | 0.95 | 57 | 1.00 | 2.00 | 12.08 | 0.300 | 12.7° | 2 | 76.00 |
| 145 | 2.00 | 6.00 | 1.90 | 57 | 2.00 | 4.00 | 12.31 | 0.500 | 10.2° | 2 | 76.00 |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



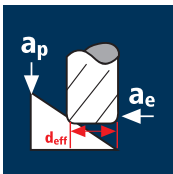
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | r [mm] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|-----------|
| 0.20 | 2 | 21 | 0.003 | 0.011 | 0.040 | 0.16 | 41780 | 210 | 0.05 |
| 0.40 | 2 | 50 | 0.005 | 0.021 | 0.080 | 0.38 | 41885 | 420 | 0.05 |
| 0.50 | 2 | 58 | 0.006 | 0.027 | 0.100 | 0.44 | 41960 | 530 | 0.10 |
| 0.80 | 2 | 100 | 0.011 | 0.043 | 0.160 | 0.76 | 41885 | 950 | 0.10 |
| 1.00 | 2 | 115 | 0.014 | 0.054 | 0.200 | 0.87 | 42075 | 1165 | 0.20 |
| 1.50 | 2 | 140 | 0.020 | 0.080 | 0.300 | 1.42 | 31385 | 1265 | 0.20 |
| 2.00 | 2 | 140 | 0.028 | 0.107 | 0.400 | 1.95 | 22855 | 1265 | 0.20 |
| 2.50 | 2 | 140 | 0.034 | 0.134 | 0.500 | 2.48 | 17970 | 1225 | 0.20 |
| 3.00 | 2 | 140 | 0.040 | 0.161 | 0.600 | 2.99 | 14905 | 1200 | 0.20 |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|------|
| 0.20 | 2 | 21 | 0.002 | 0.011 | 0.040 | 0.16 | 41780 | 200 | 0.05 |
| 0.40 | 2 | 50 | 0.005 | 0.021 | 0.080 | 0.38 | 41885 | 400 | 0.05 |
| 0.50 | 2 | 58 | 0.006 | 0.027 | 0.100 | 0.44 | 41960 | 505 | 0.10 |
| 0.80 | 2 | 100 | 0.011 | 0.043 | 0.160 | 0.76 | 41885 | 905 | 0.10 |
| 1.00 | 2 | 115 | 0.013 | 0.054 | 0.200 | 0.87 | 42075 | 1110 | 0.20 |
| 1.50 | 2 | 120 | 0.019 | 0.080 | 0.300 | 1.42 | 26900 | 1035 | 0.20 |
| 2.00 | 2 | 120 | 0.026 | 0.107 | 0.400 | 1.95 | 19590 | 1035 | 0.20 |
| 2.50 | 2 | 120 | 0.032 | 0.134 | 0.500 | 2.48 | 15400 | 1000 | 0.20 |
| 3.00 | 2 | 120 | 0.038 | 0.161 | 0.600 | 2.99 | 12775 | 980 | 0.20 |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|-----|------|
| 0.20 | 2 | 21 | 0.002 | 0.011 | 0.040 | 0.16 | 41780 | 165 | 0.05 |
| 0.40 | 2 | 50 | 0.004 | 0.021 | 0.080 | 0.38 | 41885 | 335 | 0.05 |
| 0.50 | 2 | 58 | 0.005 | 0.027 | 0.100 | 0.44 | 41960 | 420 | 0.10 |
| 0.80 | 2 | 100 | 0.009 | 0.043 | 0.160 | 0.76 | 41885 | 755 | 0.10 |
| 1.00 | 2 | 100 | 0.011 | 0.054 | 0.200 | 0.87 | 36585 | 805 | 0.20 |
| 1.50 | 2 | 100 | 0.016 | 0.080 | 0.300 | 1.42 | 22415 | 715 | 0.20 |
| 2.00 | 2 | 100 | 0.022 | 0.107 | 0.400 | 1.95 | 16325 | 720 | 0.20 |
| 2.50 | 2 | 100 | 0.027 | 0.134 | 0.500 | 2.48 | 12835 | 695 | 0.20 |
| 3.00 | 2 | 100 | 0.032 | 0.161 | 0.600 | 2.99 | 10645 | 680 | 0.20 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|-----|------|
| 0.20 | 2 | 21 | 0.002 | 0.011 | 0.040 | 0.16 | 41780 | 150 | 0.05 |
| 0.40 | 2 | 50 | 0.004 | 0.021 | 0.080 | 0.38 | 41885 | 300 | 0.05 |
| 0.50 | 2 | 58 | 0.004 | 0.027 | 0.100 | 0.44 | 41960 | 380 | 0.10 |
| 0.80 | 2 | 60 | 0.008 | 0.043 | 0.160 | 0.76 | 25130 | 405 | 0.10 |
| 1.00 | 2 | 60 | 0.010 | 0.054 | 0.200 | 0.87 | 21950 | 435 | 0.20 |
| 1.50 | 2 | 60 | 0.014 | 0.080 | 0.300 | 1.42 | 13450 | 385 | 0.20 |
| 2.00 | 2 | 60 | 0.020 | 0.107 | 0.400 | 1.95 | 9795 | 390 | 0.20 |
| 2.50 | 2 | 60 | 0.024 | 0.134 | 0.500 | 2.48 | 7700 | 375 | 0.20 |
| 3.00 | 2 | 60 | 0.029 | 0.161 | 0.600 | 2.99 | 6385 | 370 | 0.20 |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|----------|
| 0.20 | 2 | 26 | 0.010 | 0.008 | 0.008 | 0.20 | 41380 | 830 | 45° |
| 0.40 | 2 | 53 | 0.016 | 0.016 | 0.016 | 0.40 | 42175 | 1350 | 45° |
| 0.50 | 2 | 66 | 0.020 | 0.022 | 0.022 | 0.50 | 42015 | 1680 | 45° |
| 0.80 | 2 | 106 | 0.022 | 0.034 | 0.034 | 0.80 | 42175 | 1855 | 45° |
| 1.00 | 2 | 132 | 0.028 | 0.042 | 0.042 | 1.00 | 42015 | 2355 | 45° |
| 1.50 | 2 | 198 | 0.034 | 0.064 | 0.064 | 1.50 | 42015 | 2855 | 45° |
| 2.00 | 2 | 263 | 0.038 | 0.084 | 0.084 | 1.99 | 42070 | 3195 | 45° |
| 2.50 | 2 | 300 | 0.040 | 0.106 | 0.106 | 2.48 | 38505 | 3080 | 45° |
| 3.00 | 2 | 300 | 0.046 | 0.126 | 0.126 | 2.97 | 32155 | 2960 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.20 | 2 | 26 | 0.010 | 0.008 | 0.008 | 0.20 | 41380 | 830 | 45° |
| 0.40 | 2 | 53 | 0.016 | 0.016 | 0.016 | 0.40 | 42175 | 1350 | 45° |
| 0.50 | 2 | 66 | 0.020 | 0.022 | 0.022 | 0.50 | 42015 | 1680 | 45° |
| 0.80 | 2 | 106 | 0.020 | 0.034 | 0.034 | 0.80 | 42175 | 1685 | 45° |
| 1.00 | 2 | 132 | 0.026 | 0.042 | 0.042 | 1.00 | 42015 | 2185 | 45° |
| 1.50 | 2 | 198 | 0.032 | 0.064 | 0.064 | 1.50 | 42015 | 2690 | 45° |
| 2.00 | 2 | 250 | 0.036 | 0.084 | 0.084 | 1.99 | 39990 | 2880 | 45° |
| 2.50 | 2 | 250 | 0.038 | 0.106 | 0.106 | 2.48 | 32090 | 2440 | 45° |
| 3.00 | 2 | 250 | 0.044 | 0.126 | 0.126 | 2.97 | 26795 | 2360 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.20 | 2 | 26 | 0.010 | 0.008 | 0.008 | 0.20 | 41380 | 830 | 45° |
| 0.40 | 2 | 53 | 0.014 | 0.016 | 0.016 | 0.40 | 42175 | 1180 | 45° |
| 0.50 | 2 | 66 | 0.018 | 0.022 | 0.022 | 0.50 | 42015 | 1515 | 45° |
| 0.80 | 2 | 106 | 0.020 | 0.034 | 0.034 | 0.80 | 42175 | 1685 | 45° |
| 1.00 | 2 | 132 | 0.026 | 0.042 | 0.042 | 1.00 | 42015 | 2185 | 45° |
| 1.50 | 2 | 198 | 0.030 | 0.064 | 0.064 | 1.50 | 42015 | 2520 | 45° |
| 2.00 | 2 | 200 | 0.034 | 0.084 | 0.084 | 1.99 | 31990 | 2175 | 45° |
| 2.50 | 2 | 200 | 0.036 | 0.106 | 0.106 | 2.48 | 25670 | 1850 | 45° |
| 3.00 | 2 | 200 | 0.042 | 0.126 | 0.126 | 2.97 | 21435 | 1800 | 45° |

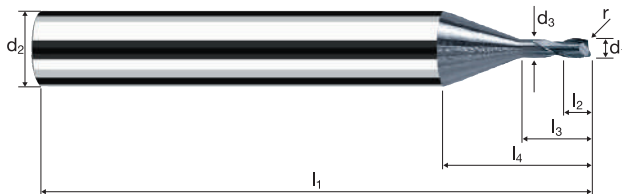
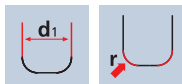
| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.20 | 2 | 26 | 0.008 | 0.008 | 0.008 | 0.20 | 41380 | 660 | 45° |
| 0.40 | 2 | 53 | 0.012 | 0.016 | 0.016 | 0.40 | 42175 | 1010 | 45° |
| 0.50 | 2 | 66 | 0.016 | 0.022 | 0.022 | 0.50 | 42015 | 1345 | 45° |
| 0.80 | 2 | 106 | 0.018 | 0.034 | 0.034 | 0.80 | 42175 | 1520 | 45° |
| 1.00 | 2 | 132 | 0.022 | 0.042 | 0.042 | 1.00 | 42015 | 1850 | 45° |
| 1.50 | 2 | 150 | 0.028 | 0.064 | 0.064 | 1.50 | 31830 | 1785 | 45° |
| 2.00 | 2 | 150 | 0.030 | 0.084 | 0.084 | 1.99 | 23995 | 1440 | 45° |
| 2.50 | 2 | 150 | 0.032 | 0.106 | 0.106 | 2.48 | 19255 | 1230 | 45° |
| 3.00 | 2 | 150 | 0.036 | 0.126 | 0.126 | 2.97 | 16075 | 1155 | 45° |

Frese toriche MicroX

Gambo ø 6mm, scarico cilindrico, 3xd



HM λ 25°
XA γ -10°



| | | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--------------|--------------|-------------|-------------------|----------------|-------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Inox Stainless | Ti Titanium | Cobalt-Chrome Copper |
|-------------|----------------|-----------------|-----------------|--------------|--------------|-------------|-------------------|----------------|-------------------------|

| Esempio: N° Ordine | | | | | | | | | | | X-AL |
|-----------------------|---------------------------|----------------------|----------------|----------------|----------------|----------------|----------------|--------------|-------|---|-------|
| Rivestimento | | | | | | | | | | | X6532 |
| Articolo | | | | | | | | | | | EUR |
| Codice-ø | | | | | | | | | | | |
| Ø Code | d ₁ 0/-0.01 | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r 0/+0.01 | α | z | |
| 020 | 0.20 | 6.00 | 0.18 | 57 | 0.20 | 0.60 | 17.54 | 0.050 | 14.3° | 2 | 83.00 |
| 040 | 0.40 | 6.00 | 0.35 | 57 | 0.40 | 1.20 | 17.66 | 0.050 | 13.5° | 2 | 76.00 |
| 048 | 0.50 | 6.00 | 0.45 | 57 | 0.50 | 1.50 | 12.51 | 0.050 | 13.2° | 2 | 76.00 |
| 042 | 0.40 | 6.00 | 0.35 | 57 | 0.40 | 1.20 | 17.66 | 0.100 | 13.6° | 2 | 76.00 |
| 050 | 0.50 | 6.00 | 0.45 | 57 | 0.50 | 1.50 | 12.51 | 0.100 | 13.2° | 2 | 76.00 |
| 060 | 0.60 | 6.00 | 0.55 | 57 | 0.60 | 1.80 | 12.63 | 0.100 | 12.9° | 2 | 76.00 |
| 080 | 0.80 | 6.00 | 0.75 | 57 | 0.80 | 2.40 | 12.85 | 0.100 | 12.2° | 2 | 76.00 |
| 098 | 1.00 | 6.00 | 0.95 | 57 | 1.00 | 3.00 | 13.08 | 0.100 | 11.5° | 2 | 76.00 |
| 082 | 0.80 | 6.00 | 0.75 | 57 | 0.80 | 2.40 | 12.85 | 0.200 | 12.3° | 2 | 76.00 |
| 100 | 1.00 | 6.00 | 0.95 | 57 | 1.00 | 3.00 | 13.08 | 0.200 | 11.6° | 2 | 76.00 |
| 108 | 1.20 | 6.00 | 1.10 | 57 | 1.20 | 3.60 | 13.40 | 0.200 | 10.9° | 2 | 76.00 |
| 120 | 1.50 | 6.00 | 1.40 | 57 | 1.50 | 4.50 | 13.74 | 0.200 | 10.0° | 2 | 76.00 |
| 140 | 2.00 | 6.00 | 1.90 | 57 | 2.00 | 6.00 | 14.31 | 0.200 | 8.6° | 2 | 76.00 |
| 160 | 2.50 | 6.00 | 2.30 | 57 | 2.50 | 7.50 | 15.06 | 0.200 | 7.2° | 2 | 76.00 |
| 180 | 3.00 | 6.00 | 2.80 | 57 | 3.00 | 9.00 | 15.63 | 0.200 | 6.0° | 2 | 76.00 |

| Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _z [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _t [mm/min] | r [mm] |
|--|--|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|--------|
| | Acciaio da utensile temprato 42 - 48 HRC | 1.00 | 2 | 98 | 0.014 | 0.054 | 0.200 | 0.74 | 42155 | 1170 | 0.30 |
| | | 2.00 | 2 | 140 | 0.028 | 0.107 | 0.400 | 1.62 | 27510 | 1525 | 0.50 |
| | | 2.50 | 2 | 140 | 0.034 | 0.134 | 0.500 | 2.18 | 20440 | 1390 | 0.50 |
| | | 3.00 | 2 | 140 | 0.040 | 0.161 | 0.600 | 2.74 | 16265 | 1310 | 0.50 |
| Acciaio da utensile temprato 48 - 52 HRC | Acciaio da utensile temprato 48 - 52 HRC | 1.00 | 2 | 98 | 0.013 | 0.054 | 0.200 | 0.74 | 42155 | 1115 | 0.30 |
| | | 2.00 | 2 | 120 | 0.026 | 0.107 | 0.400 | 1.62 | 23580 | 1245 | 0.50 |
| | | 2.50 | 2 | 120 | 0.032 | 0.134 | 0.500 | 2.18 | 17520 | 1135 | 0.50 |
| | | 3.00 | 2 | 120 | 0.038 | 0.161 | 0.600 | 2.74 | 13940 | 1070 | 0.50 |
| Acciaio da utensile temprato 52 - 56 HRC | Acciaio da utensile temprato 52 - 56 HRC | 1.00 | 2 | 98 | 0.011 | 0.054 | 0.200 | 0.74 | 42155 | 925 | 0.30 |
| | | 2.00 | 2 | 100 | 0.022 | 0.107 | 0.400 | 1.62 | 19650 | 865 | 0.50 |
| | | 2.50 | 2 | 100 | 0.027 | 0.134 | 0.500 | 2.18 | 14600 | 790 | 0.50 |
| | | 3.00 | 2 | 100 | 0.032 | 0.161 | 0.600 | 2.74 | 11615 | 745 | 0.50 |
| Acciaio da utensile temprato 56 - 60 HRC | Acciaio da utensile temprato 56 - 60 HRC | 1.00 | 2 | 60 | 0.010 | 0.054 | 0.200 | 0.74 | 25810 | 510 | 0.30 |
| | | 2.00 | 2 | 60 | 0.020 | 0.107 | 0.400 | 1.62 | 11790 | 465 | 0.50 |
| | | 2.50 | 2 | 60 | 0.024 | 0.134 | 0.500 | 2.18 | 8760 | 425 | 0.50 |
| | | 3.00 | 2 | 60 | 0.029 | 0.161 | 0.600 | 2.74 | 6970 | 400 | 0.50 |

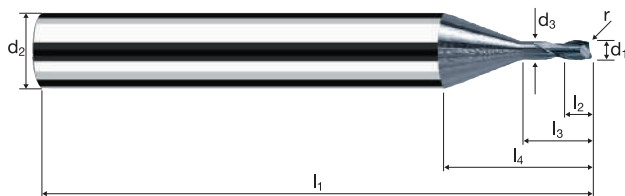
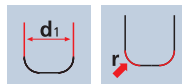
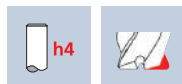
| Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _z [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _t [mm/min] | β [°] |
|--|--|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
| | Acciaio da utensile temprato 42 - 48 HRC | 1.00 | 2 | 129 | 0.028 | 0.042 | 0.042 | 0.98 | 41900 | 2345 | 45° |
| | | 2.00 | 2 | 263 | 0.034 | 0.100 | 0.100 | 1.99 | 42070 | 2860 | 45° |
| | | 2.50 | 2 | 300 | 0.036 | 0.126 | 0.126 | 2.50 | 38195 | 2750 | 45° |
| | | 3.00 | 2 | 300 | 0.042 | 0.152 | 0.152 | 3.00 | 31830 | 2675 | 45° |
| Acciaio da utensile temprato 48 - 52 HRC | Acciaio da utensile temprato 48 - 52 HRC | 1.00 | 2 | 129 | 0.026 | 0.042 | 0.042 | 0.98 | 41900 | 2180 | 45° |
| | | 2.00 | 2 | 250 | 0.032 | 0.100 | 0.100 | 1.99 | 39990 | 2560 | 45° |
| | | 2.50 | 2 | 250 | 0.034 | 0.126 | 0.126 | 2.50 | 31830 | 2165 | 45° |
| | | 3.00 | 2 | 250 | 0.040 | 0.152 | 0.152 | 3.00 | 26525 | 2120 | 45° |
| Acciaio da utensile temprato 52 - 56 HRC | Acciaio da utensile temprato 52 - 56 HRC | 1.00 | 2 | 129 | 0.026 | 0.042 | 0.042 | 0.98 | 41900 | 2180 | 45° |
| | | 2.00 | 2 | 200 | 0.030 | 0.100 | 0.100 | 1.99 | 31990 | 1920 | 45° |
| | | 2.50 | 2 | 200 | 0.032 | 0.126 | 0.126 | 2.50 | 25465 | 1630 | 45° |
| | | 3.00 | 2 | 200 | 0.038 | 0.152 | 0.152 | 3.00 | 21220 | 1615 | 45° |
| Acciaio da utensile temprato 56 - 60 HRC | Acciaio da utensile temprato 56 - 60 HRC | 1.00 | 2 | 129 | 0.022 | 0.042 | 0.042 | 0.98 | 41900 | 1845 | 45° |
| | | 2.00 | 2 | 150 | 0.028 | 0.100 | 0.100 | 1.99 | 23995 | 1345 | 45° |
| | | 2.50 | 2 | 150 | 0.028 | 0.126 | 0.126 | 2.50 | 19100 | 1070 | 45° |
| | | 3.00 | 2 | 150 | 0.034 | 0.152 | 0.152 | 3.00 | 15915 | 1080 | 45° |

Frese toriche MicroX

Gambo ø 6mm, scarico cilindrico, 3xd



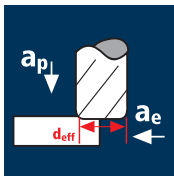
HM λ 25°
XA γ -10°



| | | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--------------|--------------|-------------|-------------------|----------------|-------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Inox Stainless | Ti Titanium | Cobalt-Chrome Copper |
|-------------|----------------|-----------------|-----------------|--------------|--------------|-------------|-------------------|----------------|-------------------------|

| Ø Code | Esempio: N° Ordine | | | | | | | | | | | X-AL |
|-----------|---------------------------|----------------------------------|----------------|----------------|----------------|----------------|----------------|--------------|-------|---|-------|------|
| | d ₁ 0/-0.01 | d ₂ h ₄ | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r 0/+0.01 | α | z | X6532 | EUR |
| 101 | 1.00 | 6.00 | 0.95 | 57 | 1.00 | 3.00 | 13.08 | 0.300 | 11.7° | 2 | 76.00 | |
| 145 | 2.00 | 6.00 | 1.90 | 57 | 2.00 | 6.00 | 14.31 | 0.500 | 8.7° | 2 | 76.00 | |
| 165 | 2.50 | 6.00 | 2.30 | 57 | 2.50 | 7.50 | 15.06 | 0.500 | 7.3° | 2 | 76.00 | |
| 185 | 3.00 | 6.00 | 2.80 | 57 | 3.00 | 9.00 | 15.63 | 0.500 | 6.1° | 2 | 76.00 | |
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Applicazione



Materiale

Acciaio da utensile temprato 42 - 48 HRC

Acciaio da utensile temprato 48 - 52 HRC

Acciaio da utensile temprato 52 - 56 HRC

Acciaio da utensile temprato 56 - 60 HRC

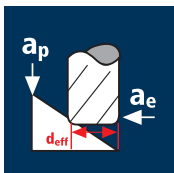
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _s [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | r [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|--------|
| 0.20 | 2 | 20 | 0.003 | 0.008 | 0.040 | 0.15 | 42440 | 215 | 0.05 |
| 0.40 | 2 | 49 | 0.005 | 0.016 | 0.080 | 0.37 | 42155 | 425 | 0.05 |
| 0.50 | 2 | 62 | 0.005 | 0.016 | 0.080 | 0.47 | 41990 | 425 | 0.05 |
| 0.60 | 2 | 70 | 0.008 | 0.024 | 0.120 | 0.53 | 42040 | 635 | 0.10 |
| 0.80 | 2 | 99 | 0.010 | 0.032 | 0.160 | 0.75 | 42015 | 845 | 0.10 |
| 1.00 | 2 | 127 | 0.013 | 0.040 | 0.200 | 0.96 | 42110 | 1060 | 0.10 |
| 1.50 | 2 | 140 | 0.019 | 0.060 | 0.300 | 1.39 | 32060 | 1210 | 0.20 |
| 2.00 | 2 | 140 | 0.026 | 0.080 | 0.400 | 1.92 | 23210 | 1230 | 0.20 |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|------|
| 0.20 | 2 | 20 | 0.002 | 0.008 | 0.040 | 0.15 | 42440 | 205 | 0.05 |
| 0.40 | 2 | 49 | 0.005 | 0.016 | 0.080 | 0.37 | 42155 | 405 | 0.05 |
| 0.50 | 2 | 62 | 0.005 | 0.016 | 0.080 | 0.47 | 41990 | 405 | 0.05 |
| 0.60 | 2 | 70 | 0.007 | 0.024 | 0.120 | 0.53 | 42040 | 605 | 0.10 |
| 0.80 | 2 | 99 | 0.010 | 0.032 | 0.160 | 0.75 | 42015 | 805 | 0.10 |
| 1.00 | 2 | 120 | 0.012 | 0.040 | 0.200 | 0.96 | 39790 | 955 | 0.10 |
| 1.50 | 2 | 120 | 0.018 | 0.060 | 0.300 | 1.39 | 27480 | 990 | 0.20 |
| 2.00 | 2 | 120 | 0.025 | 0.080 | 0.400 | 1.92 | 19895 | 1005 | 0.20 |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|-----|------|
| 0.20 | 2 | 20 | 0.002 | 0.008 | 0.040 | 0.15 | 42440 | 170 | 0.05 |
| 0.40 | 2 | 49 | 0.004 | 0.016 | 0.080 | 0.37 | 42155 | 335 | 0.05 |
| 0.50 | 2 | 62 | 0.004 | 0.016 | 0.080 | 0.47 | 41990 | 335 | 0.05 |
| 0.60 | 2 | 70 | 0.006 | 0.024 | 0.120 | 0.53 | 42040 | 505 | 0.10 |
| 0.80 | 2 | 99 | 0.008 | 0.032 | 0.160 | 0.75 | 42015 | 670 | 0.10 |
| 1.00 | 2 | 100 | 0.010 | 0.040 | 0.200 | 0.96 | 33155 | 665 | 0.10 |
| 1.50 | 2 | 100 | 0.015 | 0.060 | 0.300 | 1.39 | 22900 | 685 | 0.20 |
| 2.00 | 2 | 100 | 0.021 | 0.080 | 0.400 | 1.92 | 16580 | 695 | 0.20 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|-----|------|
| 0.20 | 2 | 20 | 0.002 | 0.008 | 0.040 | 0.15 | 42440 | 155 | 0.05 |
| 0.40 | 2 | 49 | 0.004 | 0.016 | 0.080 | 0.37 | 42155 | 305 | 0.05 |
| 0.50 | 2 | 60 | 0.004 | 0.016 | 0.080 | 0.47 | 40635 | 295 | 0.05 |
| 0.60 | 2 | 60 | 0.005 | 0.024 | 0.120 | 0.53 | 36035 | 390 | 0.10 |
| 0.80 | 2 | 60 | 0.007 | 0.032 | 0.160 | 0.75 | 25465 | 365 | 0.10 |
| 1.00 | 2 | 60 | 0.009 | 0.040 | 0.200 | 0.96 | 19895 | 360 | 0.10 |
| 1.50 | 2 | 60 | 0.014 | 0.060 | 0.300 | 1.39 | 13740 | 370 | 0.20 |
| 2.00 | 2 | 60 | 0.019 | 0.080 | 0.400 | 1.92 | 9945 | 375 | 0.20 |

Applicazione



Materiale

Acciaio da utensile temprato 42 - 48 HRC

Acciaio da utensile temprato 48 - 52 HRC

Acciaio da utensile temprato 52 - 56 HRC

Acciaio da utensile temprato 56 - 60 HRC

| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _s [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
| 0.20 | 2 | 26 | 0.010 | 0.008 | 0.008 | 0.20 | 41380 | 830 | 45° |
| 0.40 | 2 | 53 | 0.016 | 0.016 | 0.016 | 0.40 | 42175 | 1350 | 45° |
| 0.50 | 2 | 66 | 0.020 | 0.022 | 0.022 | 0.50 | 42015 | 1680 | 45° |
| 0.60 | 2 | 79 | 0.020 | 0.026 | 0.026 | 0.60 | 41910 | 1675 | 45° |
| 0.80 | 2 | 106 | 0.022 | 0.034 | 0.034 | 0.80 | 42175 | 1855 | 45° |
| 1.00 | 2 | 132 | 0.028 | 0.042 | 0.042 | 1.00 | 42015 | 2355 | 45° |
| 1.50 | 2 | 198 | 0.034 | 0.064 | 0.064 | 1.50 | 42015 | 2855 | 45° |
| 2.00 | 2 | 263 | 0.038 | 0.084 | 0.084 | 1.99 | 42070 | 3195 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.20 | 2 | 26 | 0.010 | 0.008 | 0.008 | 0.20 | 41380 | 830 | 45° |
| 0.40 | 2 | 53 | 0.016 | 0.016 | 0.016 | 0.40 | 42175 | 1350 | 45° |
| 0.50 | 2 | 66 | 0.020 | 0.022 | 0.022 | 0.50 | 42015 | 1680 | 45° |
| 0.60 | 2 | 79 | 0.020 | 0.026 | 0.026 | 0.60 | 41910 | 1675 | 45° |
| 0.80 | 2 | 106 | 0.020 | 0.034 | 0.034 | 0.80 | 42175 | 1685 | 45° |
| 1.00 | 2 | 132 | 0.026 | 0.042 | 0.042 | 1.00 | 42015 | 2185 | 45° |
| 1.50 | 2 | 198 | 0.032 | 0.064 | 0.064 | 1.50 | 42015 | 2690 | 45° |
| 2.00 | 2 | 250 | 0.036 | 0.084 | 0.084 | 1.99 | 39990 | 2880 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.20 | 2 | 26 | 0.010 | 0.008 | 0.008 | 0.20 | 41380 | 830 | 45° |
| 0.40 | 2 | 53 | 0.014 | 0.016 | 0.016 | 0.40 | 42175 | 1180 | 45° |
| 0.50 | 2 | 66 | 0.018 | 0.022 | 0.022 | 0.50 | 42015 | 1515 | 45° |
| 0.60 | 2 | 79 | 0.018 | 0.026 | 0.026 | 0.60 | 41910 | 1510 | 45° |
| 0.80 | 2 | 106 | 0.020 | 0.034 | 0.034 | 0.80 | 42175 | 1685 | 45° |
| 1.00 | 2 | 132 | 0.026 | 0.042 | 0.042 | 1.00 | 42015 | 2185 | 45° |
| 1.50 | 2 | 198 | 0.030 | 0.064 | 0.064 | 1.50 | 42015 | 2520 | 45° |
| 2.00 | 2 | 200 | 0.034 | 0.084 | 0.084 | 1.99 | 31990 | 2175 | 45° |

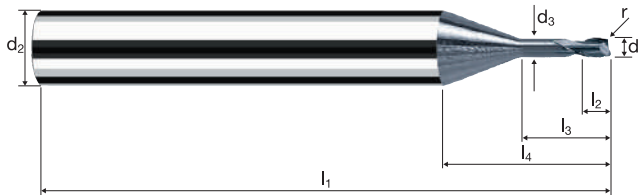
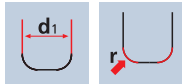
| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.20 | 2 | 26 | 0.008 | 0.008 | 0.008 | 0.20 | 41380 | 660 | 45° |
| 0.40 | 2 | 53 | 0.012 | 0.016 | 0.016 | 0.40 | 42175 | 1010 | 45° |
| 0.50 | 2 | 66 | 0.016 | 0.022 | 0.022 | 0.50 | 42015 | 1345 | 45° |
| 0.60 | 2 | 79 | 0.016 | 0.026 | 0.026 | 0.60 | 41910 | 1340 | 45° |
| 0.80 | 2 | 106 | 0.018 | 0.034 | 0.034 | 0.80 | 42175 | 1520 | 45° |
| 1.00 | 2 | 132 | 0.022 | 0.042 | 0.042 | 1.00 | 42015 | 1850 | 45° |
| 1.50 | 2 | 150 | 0.028 | 0.064 | 0.064 | 1.50 | 31830 | 1785 | 45° |
| 2.00 | 2 | 150 | 0.030 | 0.084 | 0.084 | 1.99 | 23995 | 1440 | 45° |

Frese toriche MicroX

Gambo ø 6mm, scarico cilindrico, 4xd



HM
XA λ 25°
 γ -10°

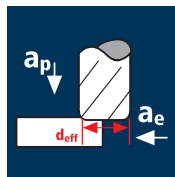


ReTool®

| | | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--------------|--------------|-------------|-------------------|----------------|-------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Inox Stainless | Ti Titanium | Cobalt-Chrome Copper |
|-------------|----------------|-----------------|-----------------|--------------|--------------|-------------|-------------------|----------------|-------------------------|

| Esempio: N° Ordine | | | | | | | | | | | X-AL |
|--------------------------------------|---------------------------|----------------------|----------------|----------------|----------------|----------------|----------------|--------------|-------|---|-------|
| Rivestimento Articolo Codice-ø | | | | | | | | | | | |
| X 6533 020 | | | | | | | | | | | |
| Ø Code | d ₁ 0/-0.01 | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r 0/+0.01 | α | z | EUR |
| 020 | 0.20 | 6.00 | 0.18 | 57 | 0.20 | 0.80 | 17.74 | 0.050 | 14.1° | 2 | 83.00 |
| 040 | 0.40 | 6.00 | 0.35 | 57 | 0.40 | 1.60 | 18.06 | 0.050 | 13.1° | 2 | 76.00 |
| 048 | 0.50 | 6.00 | 0.45 | 57 | 0.50 | 2.00 | 13.01 | 0.050 | 12.6° | 2 | 76.00 |
| 042 | 0.40 | 6.00 | 0.35 | 57 | 0.40 | 1.60 | 18.06 | 0.100 | 13.1° | 2 | 76.00 |
| 050 | 0.50 | 6.00 | 0.45 | 57 | 0.50 | 2.00 | 13.01 | 0.100 | 12.7° | 2 | 76.00 |
| 060 | 0.60 | 6.00 | 0.55 | 57 | 0.60 | 2.40 | 13.23 | 0.100 | 12.3° | 2 | 76.00 |
| 080 | 0.80 | 6.00 | 0.75 | 57 | 0.80 | 3.20 | 13.65 | 0.100 | 11.4° | 2 | 76.00 |
| 098 | 1.00 | 6.00 | 0.95 | 57 | 1.00 | 4.00 | 14.08 | 0.100 | 10.7° | 2 | 76.00 |
| 082 | 0.80 | 6.00 | 0.75 | 57 | 0.80 | 3.20 | 13.65 | 0.200 | 11.5° | 2 | 76.00 |
| 100 | 1.00 | 6.00 | 0.95 | 57 | 1.00 | 4.00 | 14.08 | 0.200 | 10.7° | 2 | 76.00 |
| 120 | 1.50 | 6.00 | 1.40 | 57 | 1.50 | 6.00 | 15.24 | 0.200 | 8.9° | 2 | 76.00 |
| 140 | 2.00 | 6.00 | 1.90 | 61 | 2.00 | 8.00 | 16.31 | 0.200 | 7.4° | 2 | 76.00 |
| 101 | 1.00 | 6.00 | 0.95 | 57 | 1.00 | 4.00 | 14.08 | 0.300 | 10.8° | 2 | 76.00 |
| 145 | 2.00 | 6.00 | 1.90 | 61 | 2.00 | 8.00 | 16.31 | 0.500 | 7.5° | 2 | 76.00 |

Applicazione



Materiale

Acciaio da utensile temprato
42 - 48 HRC

| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _c [mm/min] | r [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|--------|
| 0.20 | 2 | 20 | 0.003 | 0.006 | 0.040 | 0.15 | 42440 | 215 | 0.05 |
| 0.40 | 2 | 49 | 0.005 | 0.013 | 0.080 | 0.37 | 42155 | 425 | 0.05 |
| 0.50 | 2 | 54 | 0.006 | 0.016 | 0.100 | 0.41 | 41925 | 530 | 0.10 |
| 0.80 | 2 | 96 | 0.010 | 0.026 | 0.160 | 0.73 | 41860 | 845 | 0.10 |
| 1.00 | 2 | 108 | 0.013 | 0.032 | 0.200 | 0.82 | 41925 | 1055 | 0.20 |
| 1.50 | 2 | 140 | 0.019 | 0.048 | 0.300 | 1.36 | 32765 | 1240 | 0.20 |
| 2.00 | 2 | 140 | 0.025 | 0.064 | 0.400 | 1.89 | 23580 | 1190 | 0.20 |
| 2.50 | 2 | 140 | 0.032 | 0.080 | 0.500 | 2.42 | 18415 | 1160 | 0.20 |
| 3.00 | 2 | 140 | 0.039 | 0.096 | 0.600 | 2.94 | 15160 | 1185 | 0.20 |

Acciaio da utensile temprato
48 - 52 HRC

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|------|
| 0.20 | 2 | 20 | 0.002 | 0.006 | 0.040 | 0.15 | 42440 | 205 | 0.05 |
| 0.40 | 2 | 49 | 0.005 | 0.013 | 0.080 | 0.37 | 42155 | 405 | 0.05 |
| 0.50 | 2 | 54 | 0.006 | 0.016 | 0.100 | 0.41 | 41925 | 505 | 0.10 |
| 0.80 | 2 | 96 | 0.010 | 0.026 | 0.160 | 0.73 | 41860 | 805 | 0.10 |
| 1.00 | 2 | 108 | 0.012 | 0.032 | 0.200 | 0.82 | 41925 | 1005 | 0.20 |
| 1.50 | 2 | 120 | 0.018 | 0.048 | 0.300 | 1.36 | 28085 | 1010 | 0.20 |
| 2.00 | 2 | 120 | 0.024 | 0.064 | 0.400 | 1.89 | 20210 | 970 | 0.20 |
| 2.50 | 2 | 120 | 0.030 | 0.080 | 0.500 | 2.42 | 15785 | 945 | 0.20 |
| 3.00 | 2 | 120 | 0.037 | 0.096 | 0.600 | 2.94 | 12990 | 965 | 0.20 |

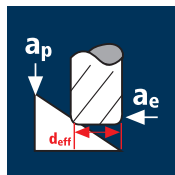
Acciaio da utensile temprato
52 - 56 HRC

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|-----|------|
| 0.20 | 2 | 20 | 0.002 | 0.006 | 0.040 | 0.15 | 42440 | 170 | 0.05 |
| 0.40 | 2 | 49 | 0.004 | 0.013 | 0.080 | 0.37 | 42155 | 335 | 0.05 |
| 0.50 | 2 | 54 | 0.005 | 0.016 | 0.100 | 0.41 | 41925 | 420 | 0.10 |
| 0.80 | 2 | 96 | 0.008 | 0.026 | 0.160 | 0.73 | 41860 | 670 | 0.10 |
| 1.00 | 2 | 100 | 0.010 | 0.032 | 0.200 | 0.82 | 38820 | 775 | 0.20 |
| 1.50 | 2 | 100 | 0.015 | 0.048 | 0.300 | 1.36 | 23405 | 700 | 0.20 |
| 2.00 | 2 | 100 | 0.020 | 0.064 | 0.400 | 1.89 | 16840 | 675 | 0.20 |
| 2.50 | 2 | 100 | 0.025 | 0.080 | 0.500 | 2.42 | 13155 | 660 | 0.20 |
| 3.00 | 2 | 100 | 0.031 | 0.096 | 0.600 | 2.94 | 10825 | 670 | 0.20 |

Acciaio da utensile temprato
56 - 60 HRC

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|-----|------|
| 0.20 | 2 | 20 | 0.002 | 0.006 | 0.040 | 0.15 | 42440 | 155 | 0.05 |
| 0.40 | 2 | 49 | 0.004 | 0.013 | 0.080 | 0.37 | 42155 | 305 | 0.05 |
| 0.50 | 2 | 54 | 0.004 | 0.016 | 0.100 | 0.41 | 41925 | 375 | 0.10 |
| 0.80 | 2 | 60 | 0.007 | 0.026 | 0.160 | 0.73 | 26160 | 375 | 0.10 |
| 1.00 | 2 | 60 | 0.009 | 0.032 | 0.200 | 0.82 | 23290 | 420 | 0.20 |
| 1.50 | 2 | 60 | 0.014 | 0.048 | 0.300 | 1.36 | 14045 | 380 | 0.20 |
| 2.00 | 2 | 60 | 0.018 | 0.064 | 0.400 | 1.89 | 10105 | 365 | 0.20 |
| 2.50 | 2 | 60 | 0.023 | 0.080 | 0.500 | 2.42 | 7890 | 355 | 0.20 |
| 3.00 | 2 | 60 | 0.028 | 0.096 | 0.600 | 2.94 | 6495 | 360 | 0.20 |

Applicazione



Materiale

Acciaio da utensile temprato
42 - 48 HRC

| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _c [mm/min] | β [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
| 0.20 | 2 | 26 | 0.010 | 0.008 | 0.008 | 0.20 | 41380 | 830 | 45° |
| 0.40 | 2 | 53 | 0.016 | 0.016 | 0.016 | 0.40 | 42175 | 1350 | 45° |
| 0.50 | 2 | 66 | 0.020 | 0.022 | 0.022 | 0.50 | 42015 | 1680 | 45° |
| 0.80 | 2 | 106 | 0.022 | 0.034 | 0.034 | 0.80 | 42175 | 1855 | 45° |
| 1.00 | 2 | 132 | 0.028 | 0.042 | 0.042 | 1.00 | 42015 | 2355 | 45° |
| 1.50 | 2 | 198 | 0.034 | 0.064 | 0.064 | 1.50 | 42015 | 2855 | 45° |
| 2.00 | 2 | 263 | 0.038 | 0.084 | 0.084 | 1.99 | 42070 | 3195 | 45° |
| 2.50 | 2 | 300 | 0.040 | 0.106 | 0.106 | 2.48 | 38505 | 3080 | 45° |
| 3.00 | 2 | 300 | 0.046 | 0.126 | 0.126 | 2.97 | 32155 | 2960 | 45° |

Acciaio da utensile temprato
48 - 52 HRC

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.20 | 2 | 26 | 0.010 | 0.008 | 0.008 | 0.20 | 41380 | 830 | 45° |
| 0.40 | 2 | 53 | 0.016 | 0.016 | 0.016 | 0.40 | 42175 | 1350 | 45° |
| 0.50 | 2 | 66 | 0.020 | 0.022 | 0.022 | 0.50 | 42015 | 1680 | 45° |
| 0.80 | 2 | 106 | 0.020 | 0.034 | 0.034 | 0.80 | 42175 | 1685 | 45° |
| 1.00 | 2 | 132 | 0.026 | 0.042 | 0.042 | 1.00 | 42015 | 2185 | 45° |
| 1.50 | 2 | 198 | 0.032 | 0.064 | 0.064 | 1.50 | 42015 | 2690 | 45° |
| 2.00 | 2 | 250 | 0.036 | 0.084 | 0.084 | 1.99 | 39990 | 2880 | 45° |
| 2.50 | 2 | 250 | 0.038 | 0.106 | 0.106 | 2.48 | 32090 | 2440 | 45° |
| 3.00 | 2 | 250 | 0.044 | 0.126 | 0.126 | 2.97 | 26795 | 2360 | 45° |

Acciaio da utensile temprato
52 - 56 HRC

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.20 | 2 | 26 | 0.010 | 0.008 | 0.008 | 0.20 | 41380 | 830 | 45° |
| 0.40 | 2 | 53 | 0.014 | 0.016 | 0.016 | 0.40 | 42175 | 1180 | 45° |
| 0.50 | 2 | 66 | 0.018 | 0.022 | 0.022 | 0.50 | 42015 | 1515 | 45° |
| 0.80 | 2 | 106 | 0.020 | 0.034 | 0.034 | 0.80 | 42175 | 1685 | 45° |
| 1.00 | 2 | 132 | 0.026 | 0.042 | 0.042 | 1.00 | 42015 | 2185 | 45° |
| 1.50 | 2 | 198 | 0.030 | 0.064 | 0.064 | 1.50 | 42015 | 2520 | 45° |
| 2.00 | 2 | 200 | 0.034 | 0.084 | 0.084 | 1.99 | 31990 | 2175 | 45° |
| 2.50 | 2 | 200 | 0.036 | 0.106 | 0.106 | 2.48 | 25670 | 1850 | 45° |
| 3.00 | 2 | 200 | 0.042 | 0.126 | 0.126 | 2.97 | 21435 | 1800 | 45° |

Acciaio da utensile temprato
56 - 60 HRC

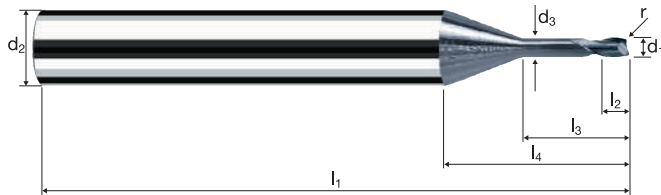
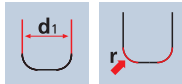
| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.20 | 2 | 26 | 0.008 | 0.008 | 0.008 | 0.20 | 41380 | 660 | 45° |
| 0.40 | 2 | 53 | 0.012 | 0.016 | 0.016 | 0.40 | 42175 | 1010 | 45° |
| 0.50 | 2 | 66 | 0.016 | 0.022 | 0.022 | 0.50 | 42015 | 1345 | 45° |
| 0.80 | 2 | 106 | 0.018 | 0.034 | 0.034 | 0.80 | 42175 | 1520 | 45° |
| 1.00 | 2 | 132 | 0.022 | 0.042 | 0.042 | 1.00 | 42015 | 1850 | 45° |
| 1.50 | 2 | 150 | 0.028 | 0.064 | 0.064 | 1.50 | 31830 | 1785 | 45° |
| 2.00 | 2 | 150 | 0.030 | 0.084 | 0.084 | 1.99 | 23995 | 1440 | 45° |
| 2.50 | 2 | 150 | 0.032 | 0.106 | 0.106 | 2.48 | 19255 | 1230 | 45° |
| 3.00 | 2 | 150 | 0.036 | 0.126 | 0.126 | 2.97 | 16075 | 1155 | 45° |

Frese toriche MicroX

Gambo ø 6mm, scarico cilindrico, 5xd



HM
XA λ 25°
 γ -10°



ReTool®

| | | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--------------|--------------|-------------|-------------------|----------------|-------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Inox Stainless | Ti Titanium | Cobalt-Chrome Copper |
|-------------|----------------|-----------------|-----------------|--------------|--------------|-------------|-------------------|----------------|-------------------------|

| Esempio: N° Ordine | | | | | | | | | | | X-AL |
|--------------------------------------|---------------------------|----------------------|----------------|----------------|----------------|----------------|----------------|--------------|-------|---|-------|
| Rivestimento Articolo Codice-ø | | | | | | | | | | | |
| X 6534 020 | | | | | | | | | | | |
| Ø Code | d ₁ 0/-0.01 | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r 0/+0.01 | α | z | EUR |
| 020 | 0.20 | 6.00 | 0.18 | 57 | 0.20 | 1.00 | 17.94 | 0.050 | 13.8° | 2 | 83.00 |
| 040 | 0.40 | 6.00 | 0.35 | 57 | 0.40 | 2.00 | 18.46 | 0.050 | 12.7° | 2 | 76.00 |
| 048 | 0.50 | 6.00 | 0.45 | 57 | 0.50 | 2.50 | 13.51 | 0.050 | 12.2° | 2 | 76.00 |
| 042 | 0.40 | 6.00 | 0.35 | 57 | 0.40 | 2.00 | 18.46 | 0.100 | 12.7° | 2 | 76.00 |
| 050 | 0.50 | 6.00 | 0.45 | 57 | 0.50 | 2.50 | 13.51 | 0.100 | 12.2° | 2 | 76.00 |
| 060 | 0.60 | 6.00 | 0.55 | 57 | 0.60 | 3.00 | 13.83 | 0.100 | 11.7° | 2 | 76.00 |
| 080 | 0.80 | 6.00 | 0.75 | 57 | 0.80 | 4.00 | 14.45 | 0.100 | 10.8° | 2 | 76.00 |
| 098 | 1.00 | 6.00 | 0.95 | 57 | 1.00 | 5.00 | 15.08 | 0.100 | 9.9° | 2 | 76.00 |
| 082 | 0.80 | 6.00 | 0.75 | 57 | 0.80 | 4.00 | 14.45 | 0.200 | 10.9° | 2 | 76.00 |
| 100 | 1.00 | 6.00 | 0.95 | 57 | 1.00 | 5.00 | 15.08 | 0.200 | 9.9° | 2 | 76.00 |
| 108 | 1.20 | 6.00 | 1.10 | 57 | 1.20 | 6.00 | 15.80 | 0.200 | 9.2° | 2 | 76.00 |
| 120 | 1.50 | 6.00 | 1.40 | 61 | 1.50 | 7.50 | 16.74 | 0.200 | 8.1° | 2 | 76.00 |
| 140 | 2.00 | 6.00 | 1.90 | 61 | 2.00 | 10.00 | 18.31 | 0.200 | 6.6° | 2 | 76.00 |
| 160 | 2.50 | 6.00 | 2.30 | 61 | 2.50 | 12.50 | 20.06 | 0.200 | 5.3° | 2 | 76.00 |
| 180 | 3.00 | 6.00 | 2.80 | 66 | 3.00 | 15.00 | 21.63 | 0.200 | 4.2° | 2 | 76.00 |

| Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _z [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _t [mm/min] | r [mm] |
|--|--|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|--------|
| | Acciaio da utensile temprato 42 - 48 HRC | 1.00 | 2 | 88 | 0.013 | 0.032 | 0.200 | 0.67 | 41810 | 1055 | 0.30 |
| | | 2.00 | 2 | 140 | 0.025 | 0.064 | 0.400 | 1.49 | 29910 | 1505 | 0.50 |
| | | 2.50 | 2 | 140 | 0.032 | 0.080 | 0.500 | 2.04 | 21845 | 1375 | 0.50 |
| | | 3.00 | 2 | 140 | 0.039 | 0.096 | 0.600 | 2.59 | 17205 | 1345 | 0.50 |
| Acciaio da utensile temprato 48 - 52 HRC | Acciaio da utensile temprato 48 - 52 HRC | 1.00 | 2 | 88 | 0.012 | 0.032 | 0.200 | 0.67 | 41810 | 1005 | 0.30 |
| | | 2.00 | 2 | 120 | 0.024 | 0.064 | 0.400 | 1.49 | 25635 | 1230 | 0.50 |
| | | 2.50 | 2 | 120 | 0.030 | 0.080 | 0.500 | 2.04 | 18725 | 1125 | 0.50 |
| | | 3.00 | 2 | 120 | 0.037 | 0.096 | 0.600 | 2.59 | 14750 | 1095 | 0.50 |
| Acciaio da utensile temprato 52 - 56 HRC | Acciaio da utensile temprato 52 - 56 HRC | 1.00 | 2 | 88 | 0.010 | 0.032 | 0.200 | 0.67 | 41810 | 835 | 0.30 |
| | | 2.00 | 2 | 100 | 0.020 | 0.064 | 0.400 | 1.49 | 21365 | 855 | 0.50 |
| | | 2.50 | 2 | 100 | 0.025 | 0.080 | 0.500 | 2.04 | 15605 | 780 | 0.50 |
| | | 3.00 | 2 | 100 | 0.031 | 0.096 | 0.600 | 2.59 | 12290 | 760 | 0.50 |
| Acciaio da utensile temprato 56 - 60 HRC | Acciaio da utensile temprato 56 - 60 HRC | 1.00 | 2 | 60 | 0.009 | 0.032 | 0.200 | 0.67 | 28505 | 515 | 0.30 |
| | | 2.00 | 2 | 60 | 0.018 | 0.064 | 0.400 | 1.49 | 12820 | 460 | 0.50 |
| | | 2.50 | 2 | 60 | 0.023 | 0.080 | 0.500 | 2.04 | 9360 | 420 | 0.50 |
| | | 3.00 | 2 | 60 | 0.028 | 0.096 | 0.600 | 2.59 | 7375 | 410 | 0.50 |

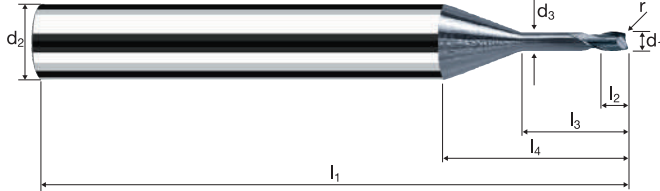
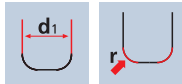
| Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _z [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _t [mm/min] | β [°] |
|--|--|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
| | Acciaio da utensile temprato 42 - 48 HRC | 1.00 | 2 | 129 | 0.028 | 0.042 | 0.042 | 0.98 | 41900 | 2345 | 45° |
| | | 2.00 | 2 | 263 | 0.034 | 0.100 | 0.100 | 1.99 | 42070 | 2860 | 45° |
| | | 2.50 | 2 | 300 | 0.036 | 0.126 | 0.126 | 2.50 | 38195 | 2750 | 45° |
| | | 3.00 | 2 | 300 | 0.042 | 0.152 | 0.152 | 3.00 | 31830 | 2675 | 45° |
| Acciaio da utensile temprato 48 - 52 HRC | Acciaio da utensile temprato 48 - 52 HRC | 1.00 | 2 | 129 | 0.026 | 0.042 | 0.042 | 0.98 | 41900 | 2180 | 45° |
| | | 2.00 | 2 | 250 | 0.032 | 0.100 | 0.100 | 1.99 | 39990 | 2560 | 45° |
| | | 2.50 | 2 | 250 | 0.034 | 0.126 | 0.126 | 2.50 | 31830 | 2165 | 45° |
| | | 3.00 | 2 | 250 | 0.040 | 0.152 | 0.152 | 3.00 | 26525 | 2120 | 45° |
| Acciaio da utensile temprato 52 - 56 HRC | Acciaio da utensile temprato 52 - 56 HRC | 1.00 | 2 | 129 | 0.026 | 0.042 | 0.042 | 0.98 | 41900 | 2180 | 45° |
| | | 2.00 | 2 | 200 | 0.030 | 0.100 | 0.100 | 1.99 | 31990 | 1920 | 45° |
| | | 2.50 | 2 | 200 | 0.032 | 0.126 | 0.126 | 2.50 | 25465 | 1630 | 45° |
| | | 3.00 | 2 | 200 | 0.038 | 0.152 | 0.152 | 3.00 | 21220 | 1615 | 45° |
| Acciaio da utensile temprato 56 - 60 HRC | Acciaio da utensile temprato 56 - 60 HRC | 1.00 | 2 | 129 | 0.022 | 0.042 | 0.042 | 0.98 | 41900 | 1845 | 45° |
| | | 2.00 | 2 | 150 | 0.028 | 0.100 | 0.100 | 1.99 | 23995 | 1345 | 45° |
| | | 2.50 | 2 | 150 | 0.028 | 0.126 | 0.126 | 2.50 | 19100 | 1070 | 45° |
| | | 3.00 | 2 | 150 | 0.034 | 0.152 | 0.152 | 3.00 | 15915 | 1080 | 45° |

Frese toriche MicroX

Gambo ø 6mm, scarico cilindrico, 5xd



HM λ 25°
XA γ -10°

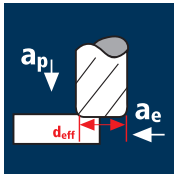


ReTool®

| | | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--------------|--------------|-------------|-------------------|----------------|-------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Inox Stainless | Ti Titanium | Cobalt-Chrome Copper |
|-------------|----------------|-----------------|-----------------|--------------|--------------|-------------|-------------------|----------------|-------------------------|

| Esempio: N° Ordine | | | | | | | | | | | X-AL |
|-----------------------|---------------|----------|------|----|------|-------|-------|--------------|-------|---|-------|
| Rivestimento | | | | | | | | | | | |
| Articolo | | | | | | | | | | | |
| Codice-ø | | | | | | | | | | | |
| Ø Code | d1 0/-0.01 | d2 h4 | d3 | l1 | l2 | l3 | l4 | r 0/+0.01 | α | z | EUR |
| 101 | 1.00 | 6.00 | 0.95 | 57 | 1.00 | 5.00 | 15.08 | 0.300 | 10.1° | 2 | 76.00 |
| 145 | 2.00 | 6.00 | 1.90 | 61 | 2.00 | 10.00 | 18.31 | 0.500 | 6.7° | 2 | 76.00 |
| 165 | 2.50 | 6.00 | 2.30 | 61 | 2.50 | 12.50 | 20.06 | 0.500 | 5.4° | 2 | 76.00 |
| 185 | 3.00 | 6.00 | 2.80 | 66 | 3.00 | 15.00 | 21.63 | 0.500 | 4.3° | 2 | 76.00 |
| | | | | | | | | | | | |
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Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



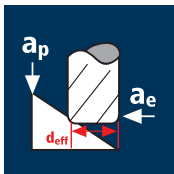
| d1 [mm] | z | v _c [m/min] | f _z [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | r [mm] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|-----------|
| 0.20 | 2 | 20 | 0.003 | 0.006 | 0.040 | 0.15 | 42440 | 215 | 0.05 |
| 0.40 | 2 | 49 | 0.005 | 0.013 | 0.080 | 0.37 | 42155 | 425 | 0.05 |
| 0.50 | 2 | 62 | 0.006 | 0.016 | 0.100 | 0.47 | 41990 | 530 | 0.05 |
| 0.60 | 2 | 69 | 0.008 | 0.019 | 0.120 | 0.52 | 42235 | 640 | 0.10 |
| 0.80 | 2 | 96 | 0.010 | 0.026 | 0.160 | 0.73 | 41860 | 845 | 0.10 |
| 1.00 | 2 | 125 | 0.013 | 0.032 | 0.200 | 0.95 | 41885 | 1055 | 0.10 |
| 1.50 | 2 | 140 | 0.015 | 0.038 | 0.240 | 1.33 | 33505 | 1015 | 0.20 |
| 2.00 | 2 | 140 | 0.019 | 0.048 | 0.300 | 1.86 | 23960 | 905 | 0.20 |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|-----|------|
| 0.20 | 2 | 20 | 0.002 | 0.006 | 0.040 | 0.15 | 42440 | 205 | 0.05 |
| 0.40 | 2 | 49 | 0.005 | 0.013 | 0.080 | 0.37 | 42155 | 405 | 0.05 |
| 0.50 | 2 | 62 | 0.006 | 0.016 | 0.100 | 0.47 | 41990 | 505 | 0.05 |
| 0.60 | 2 | 69 | 0.007 | 0.019 | 0.120 | 0.52 | 42235 | 610 | 0.10 |
| 0.80 | 2 | 96 | 0.010 | 0.026 | 0.160 | 0.73 | 41860 | 805 | 0.10 |
| 1.00 | 2 | 120 | 0.012 | 0.032 | 0.200 | 0.95 | 40210 | 965 | 0.10 |
| 1.50 | 2 | 120 | 0.014 | 0.038 | 0.240 | 1.33 | 28720 | 825 | 0.20 |
| 2.00 | 2 | 120 | 0.018 | 0.048 | 0.300 | 1.86 | 20535 | 740 | 0.20 |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|-----|------|
| 0.20 | 2 | 20 | 0.002 | 0.006 | 0.040 | 0.15 | 42440 | 170 | 0.05 |
| 0.40 | 2 | 49 | 0.004 | 0.013 | 0.080 | 0.37 | 42155 | 335 | 0.05 |
| 0.50 | 2 | 62 | 0.005 | 0.016 | 0.100 | 0.47 | 41990 | 420 | 0.05 |
| 0.60 | 2 | 69 | 0.006 | 0.019 | 0.120 | 0.52 | 42235 | 505 | 0.10 |
| 0.80 | 2 | 96 | 0.008 | 0.026 | 0.160 | 0.73 | 41860 | 670 | 0.10 |
| 1.00 | 2 | 100 | 0.010 | 0.032 | 0.200 | 0.95 | 33505 | 670 | 0.10 |
| 1.50 | 2 | 100 | 0.012 | 0.038 | 0.240 | 1.33 | 23935 | 575 | 0.20 |
| 2.00 | 2 | 100 | 0.015 | 0.048 | 0.300 | 1.86 | 17115 | 515 | 0.20 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|-----|------|
| 0.20 | 2 | 20 | 0.002 | 0.006 | 0.040 | 0.15 | 42440 | 155 | 0.05 |
| 0.40 | 2 | 49 | 0.004 | 0.013 | 0.080 | 0.37 | 42155 | 305 | 0.05 |
| 0.50 | 2 | 60 | 0.004 | 0.016 | 0.100 | 0.47 | 40635 | 365 | 0.05 |
| 0.60 | 2 | 60 | 0.005 | 0.019 | 0.120 | 0.52 | 36730 | 395 | 0.10 |
| 0.80 | 2 | 60 | 0.007 | 0.026 | 0.160 | 0.73 | 26160 | 375 | 0.10 |
| 1.00 | 2 | 60 | 0.009 | 0.032 | 0.200 | 0.95 | 20105 | 360 | 0.10 |
| 1.50 | 2 | 60 | 0.011 | 0.038 | 0.240 | 1.33 | 14360 | 310 | 0.20 |
| 2.00 | 2 | 60 | 0.014 | 0.048 | 0.300 | 1.86 | 10270 | 275 | 0.20 |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



| d1 [mm] | z | v _c [m/min] | f _z [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|----------|
| 0.20 | 2 | 26 | 0.010 | 0.008 | 0.008 | 0.20 | 41380 | 830 | 45° |
| 0.40 | 2 | 53 | 0.016 | 0.016 | 0.016 | 0.40 | 42175 | 1350 | 45° |
| 0.50 | 2 | 66 | 0.020 | 0.022 | 0.022 | 0.50 | 42015 | 1680 | 45° |
| 0.60 | 2 | 79 | 0.020 | 0.026 | 0.026 | 0.60 | 41910 | 1675 | 45° |
| 0.80 | 2 | 106 | 0.022 | 0.034 | 0.034 | 0.80 | 42175 | 1855 | 45° |
| 1.00 | 2 | 132 | 0.028 | 0.042 | 0.042 | 1.00 | 42015 | 2355 | 45° |
| 1.50 | 2 | 198 | 0.034 | 0.064 | 0.064 | 1.50 | 42015 | 2855 | 45° |
| 2.00 | 2 | 263 | 0.038 | 0.084 | 0.084 | 1.99 | 42070 | 3195 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.20 | 2 | 26 | 0.010 | 0.008 | 0.008 | 0.20 | 41380 | 830 | 45° |
| 0.40 | 2 | 53 | 0.016 | 0.016 | 0.016 | 0.40 | 42175 | 1350 | 45° |
| 0.50 | 2 | 66 | 0.020 | 0.022 | 0.022 | 0.50 | 42015 | 1680 | 45° |
| 0.60 | 2 | 79 | 0.020 | 0.026 | 0.026 | 0.60 | 41910 | 1675 | 45° |
| 0.80 | 2 | 106 | 0.020 | 0.034 | 0.034 | 0.80 | 42175 | 1685 | 45° |
| 1.00 | 2 | 132 | 0.026 | 0.042 | 0.042 | 1.00 | 42015 | 2185 | 45° |
| 1.50 | 2 | 198 | 0.032 | 0.064 | 0.064 | 1.50 | 42015 | 2690 | 45° |
| 2.00 | 2 | 250 | 0.036 | 0.084 | 0.084 | 1.99 | 39990 | 2880 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.20 | 2 | 26 | 0.010 | 0.008 | 0.008 | 0.20 | 41380 | 830 | 45° |
| 0.40 | 2 | 53 | 0.014 | 0.016 | 0.016 | 0.40 | 42175 | 1180 | 45° |
| 0.50 | 2 | 66 | 0.018 | 0.022 | 0.022 | 0.50 | 42015 | 1515 | 45° |
| 0.60 | 2 | 79 | 0.018 | 0.026 | 0.026 | 0.60 | 41910 | 1510 | 45° |
| 0.80 | 2 | 106 | 0.020 | 0.034 | 0.034 | 0.80 | 42175 | 1685 | 45° |
| 1.00 | 2 | 132 | 0.026 | 0.042 | 0.042 | 1.00 | 42015 | 2185 | 45° |
| 1.50 | 2 | 198 | 0.030 | 0.064 | 0.064 | 1.50 | 42015 | 2520 | 45° |
| 2.00 | 2 | 200 | 0.034 | 0.084 | 0.084 | 1.99 | 31990 | 2175 | 45° |

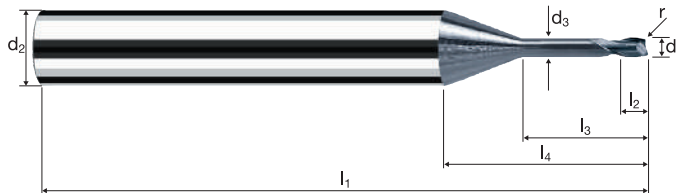
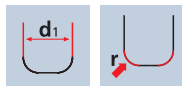
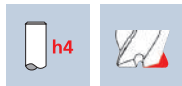
| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.20 | 2 | 26 | 0.008 | 0.008 | 0.008 | 0.20 | 41380 | 660 | 45° |
| 0.40 | 2 | 53 | 0.012 | 0.016 | 0.016 | 0.40 | 42175 | 1010 | 45° |
| 0.50 | 2 | 66 | 0.016 | 0.022 | 0.022 | 0.50 | 42015 | 1345 | 45° |
| 0.60 | 2 | 79 | 0.016 | 0.026 | 0.026 | 0.60 | 41910 | 1340 | 45° |
| 0.80 | 2 | 106 | 0.018 | 0.034 | 0.034 | 0.80 | 42175 | 1520 | 45° |
| 1.00 | 2 | 132 | 0.022 | 0.042 | 0.042 | 1.00 | 42015 | 1850 | 45° |
| 1.50 | 2 | 150 | 0.028 | 0.064 | 0.064 | 1.50 | 31830 | 1785 | 45° |
| 2.00 | 2 | 150 | 0.030 | 0.084 | 0.084 | 1.99 | 23995 | 1440 | 45° |

Frese toriche MicroX

Gambo ø 6mm, scarico cilindrico, 6xd



HM
XA λ 25°
 γ -10°

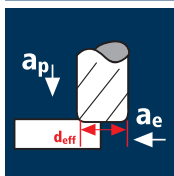


ReTool®

| | | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--------------|--------------|-------------|-------------------|----------------|-------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Inox Stainless | Ti Titanium | Cobalt-Chrome Copper |
|-------------|----------------|-----------------|-----------------|--------------|--------------|-------------|-------------------|----------------|-------------------------|

| Esempio: N° Ordine | | | | | | | | | | | X-AL |
|-----------------------|---------------------------|----------------------|----------------|----------------|----------------|----------------|----------------|--------------|-------|---|-------|
| | | | | | | | | | | | X6535 |
| | | | | | | | | | | | EUR |
| Ø Code | d ₁ 0/-0.01 | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r 0/+0.01 | α | z | |
| 020 | 0.20 | 6.00 | 0.18 | 57 | 0.20 | 1.20 | 18.14 | 0.050 | 13.6° | 2 | 83.00 |
| 040 | 0.40 | 6.00 | 0.35 | 57 | 0.40 | 2.40 | 18.86 | 0.050 | 12.3° | 2 | 76.00 |
| 048 | 0.50 | 6.00 | 0.45 | 57 | 0.50 | 3.00 | 14.01 | 0.050 | 11.7° | 2 | 76.00 |
| 042 | 0.40 | 6.00 | 0.35 | 57 | 0.40 | 2.40 | 18.86 | 0.100 | 12.3° | 2 | 76.00 |
| 050 | 0.50 | 6.00 | 0.45 | 57 | 0.50 | 3.00 | 14.01 | 0.100 | 11.8° | 2 | 76.00 |
| 060 | 0.60 | 6.00 | 0.55 | 57 | 0.60 | 3.60 | 14.43 | 0.100 | 11.2° | 2 | 76.00 |
| 080 | 0.80 | 6.00 | 0.75 | 57 | 0.80 | 4.80 | 15.25 | 0.100 | 10.2° | 2 | 76.00 |
| 098 | 1.00 | 6.00 | 0.95 | 57 | 1.00 | 6.00 | 16.08 | 0.100 | 9.3° | 2 | 76.00 |
| 082 | 0.80 | 6.00 | 0.75 | 57 | 0.80 | 4.80 | 15.25 | 0.200 | 10.3° | 2 | 76.00 |
| 100 | 1.00 | 6.00 | 0.95 | 57 | 1.00 | 6.00 | 16.08 | 0.200 | 9.4° | 2 | 76.00 |
| 120 | 1.50 | 6.00 | 1.40 | 61 | 1.50 | 9.00 | 18.24 | 0.200 | 7.4° | 2 | 76.00 |
| 140 | 2.00 | 6.00 | 1.90 | 66 | 2.00 | 12.00 | 20.31 | 0.200 | 5.9° | 2 | 76.00 |
| 101 | 1.00 | 6.00 | 0.95 | 57 | 1.00 | 6.00 | 16.08 | 0.300 | 9.4° | 2 | 76.00 |
| 145 | 2.00 | 6.00 | 1.90 | 66 | 2.00 | 12.00 | 20.31 | 0.500 | 6.0° | 2 | 76.00 |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



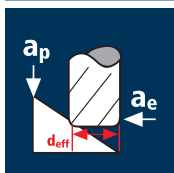
Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _s [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | r [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|--------|
| 0.20 | 2 | 18 | 0.003 | 0.004 | 0.040 | 0.14 | 40925 | 205 | 0.05 |
| 0.40 | 2 | 46 | 0.005 | 0.008 | 0.080 | 0.35 | 41835 | 420 | 0.05 |
| 0.50 | 2 | 51 | 0.006 | 0.010 | 0.100 | 0.39 | 41625 | 525 | 0.10 |
| 0.80 | 2 | 94 | 0.010 | 0.016 | 0.160 | 0.71 | 42140 | 850 | 0.10 |
| 1.00 | 2 | 102 | 0.013 | 0.020 | 0.200 | 0.77 | 42165 | 1065 | 0.20 |
| 1.50 | 2 | 140 | 0.019 | 0.030 | 0.300 | 1.31 | 34020 | 1285 | 0.20 |
| 2.00 | 2 | 140 | 0.025 | 0.040 | 0.400 | 1.84 | 24220 | 1220 | 0.20 |
| 2.50 | 2 | 140 | 0.032 | 0.050 | 0.500 | 2.36 | 18885 | 1190 | 0.20 |
| 3.00 | 2 | 140 | 0.038 | 0.060 | 0.600 | 2.89 | 15420 | 1165 | 0.20 |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|------|
| 0.20 | 2 | 18 | 0.002 | 0.004 | 0.040 | 0.14 | 40925 | 195 | 0.05 |
| 0.40 | 2 | 46 | 0.005 | 0.008 | 0.080 | 0.35 | 41835 | 400 | 0.05 |
| 0.50 | 2 | 51 | 0.006 | 0.010 | 0.100 | 0.39 | 41625 | 500 | 0.10 |
| 0.80 | 2 | 94 | 0.010 | 0.016 | 0.160 | 0.71 | 42140 | 810 | 0.10 |
| 1.00 | 2 | 102 | 0.012 | 0.020 | 0.200 | 0.77 | 42165 | 1010 | 0.20 |
| 1.50 | 2 | 120 | 0.018 | 0.030 | 0.300 | 1.31 | 29160 | 1050 | 0.20 |
| 2.00 | 2 | 120 | 0.024 | 0.040 | 0.400 | 1.84 | 20760 | 995 | 0.20 |
| 2.50 | 2 | 120 | 0.030 | 0.050 | 0.500 | 2.36 | 16185 | 970 | 0.20 |
| 3.00 | 2 | 120 | 0.036 | 0.060 | 0.600 | 2.89 | 13215 | 950 | 0.20 |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|-----|------|
| 0.20 | 2 | 18 | 0.002 | 0.004 | 0.040 | 0.14 | 40925 | 165 | 0.05 |
| 0.40 | 2 | 46 | 0.004 | 0.008 | 0.080 | 0.35 | 41835 | 335 | 0.05 |
| 0.50 | 2 | 51 | 0.005 | 0.010 | 0.100 | 0.39 | 41625 | 415 | 0.10 |
| 0.80 | 2 | 94 | 0.008 | 0.016 | 0.160 | 0.71 | 42140 | 675 | 0.10 |
| 1.00 | 2 | 100 | 0.010 | 0.020 | 0.200 | 0.77 | 41340 | 825 | 0.20 |
| 1.50 | 2 | 100 | 0.015 | 0.030 | 0.300 | 1.31 | 24300 | 730 | 0.20 |
| 2.00 | 2 | 100 | 0.020 | 0.040 | 0.400 | 1.84 | 17300 | 690 | 0.20 |
| 2.50 | 2 | 100 | 0.025 | 0.050 | 0.500 | 2.36 | 13490 | 675 | 0.20 |
| 3.00 | 2 | 100 | 0.030 | 0.060 | 0.600 | 2.89 | 11015 | 660 | 0.20 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|-----|------|
| 0.20 | 2 | 18 | 0.002 | 0.004 | 0.040 | 0.14 | 40925 | 145 | 0.05 |
| 0.40 | 2 | 46 | 0.004 | 0.008 | 0.080 | 0.35 | 41835 | 300 | 0.05 |
| 0.50 | 2 | 51 | 0.004 | 0.010 | 0.100 | 0.39 | 41625 | 375 | 0.10 |
| 0.80 | 2 | 60 | 0.007 | 0.016 | 0.160 | 0.71 | 26900 | 385 | 0.10 |
| 1.00 | 2 | 60 | 0.009 | 0.020 | 0.200 | 0.77 | 24805 | 445 | 0.20 |
| 1.50 | 2 | 60 | 0.014 | 0.030 | 0.300 | 1.31 | 14580 | 395 | 0.20 |
| 2.00 | 2 | 60 | 0.018 | 0.040 | 0.400 | 1.84 | 10380 | 375 | 0.20 |
| 2.50 | 2 | 60 | 0.023 | 0.050 | 0.500 | 2.36 | 8095 | 365 | 0.20 |
| 3.00 | 2 | 60 | 0.027 | 0.060 | 0.600 | 2.89 | 6610 | 355 | 0.20 |

| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _s [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
| 0.20 | 2 | 26 | 0.010 | 0.008 | 0.008 | 0.20 | 41380 | 830 | 45° |
| 0.40 | 2 | 53 | 0.016 | 0.016 | 0.016 | 0.40 | 42175 | 1350 | 45° |
| 0.50 | 2 | 66 | 0.020 | 0.022 | 0.022 | 0.50 | 42015 | 1680 | 45° |
| 0.80 | 2 | 106 | 0.022 | 0.034 | 0.034 | 0.80 | 42175 | 1855 | 45° |
| 1.00 | 2 | 132 | 0.028 | 0.042 | 0.042 | 1.00 | 42015 | 2355 | 45° |
| 1.50 | 2 | 198 | 0.034 | 0.064 | 0.064 | 1.50 | 42015 | 2855 | 45° |
| 2.00 | 2 | 263 | 0.038 | 0.084 | 0.084 | 1.99 | 42070 | 3195 | 45° |
| 2.50 | 2 | 300 | 0.040 | 0.106 | 0.106 | 2.48 | 38505 | 3080 | 45° |
| 3.00 | 2 | 300 | 0.046 | 0.126 | 0.126 | 2.97 | 32155 | 2960 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.20 | 2 | 26 | 0.010 | 0.008 | 0.008 | 0.20 | 41380 | 830 | 45° |
| 0.40 | 2 | 53 | 0.016 | 0.016 | 0.016 | 0.40 | 42175 | 1350 | 45° |
| 0.50 | 2 | 66 | 0.020 | 0.022 | 0.022 | 0.50 | 42015 | 1680 | 45° |
| 0.80 | 2 | 106 | 0.020 | 0.034 | 0.034 | 0.80 | 42175 | 1685 | 45° |
| 1.00 | 2 | 132 | 0.026 | 0.042 | 0.042 | 1.00 | 42015 | 2185 | 45° |
| 1.50 | 2 | 198 | 0.032 | 0.064 | 0.064 | 1.50 | 42015 | 2690 | 45° |
| 2.00 | 2 | 250 | 0.036 | 0.084 | 0.084 | 1.99 | 39990 | 2880 | 45° |
| 2.50 | 2 | 250 | 0.038 | 0.106 | 0.106 | 2.48 | 32090 | 2440 | 45° |
| 3.00 | 2 | 250 | 0.044 | 0.126 | 0.126 | 2.97 | 26795 | 2360 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.20 | 2 | 26 | 0.010 | 0.008 | 0.008 | 0.20 | 41380 | 830 | 45° |
| 0.40 | 2 | 53 | 0.014 | 0.016 | 0.016 | 0.40 | 42175 | 1180 | 45° |
| 0.50 | 2 | 66 | 0.018 | 0.022 | 0.022 | 0.50 | 42015 | 1515 | 45° |
| 0.80 | 2 | 106 | 0.020 | 0.034 | 0.034 | 0.80 | 42175 | 1685 | 45° |
| 1.00 | 2 | 132 | 0.026 | 0.042 | 0.042 | 1.00 | 42015 | 2185 | 45° |
| 1.50 | 2 | 198 | 0.030 | 0.064 | 0.064 | 1.50 | 42015 | 2520 | 45° |
| 2.00 | 2 | 200 | 0.034 | 0.084 | 0.084 | 1.99 | 31990 | 2175 | 45° |
| 2.50 | 2 | 200 | 0.036 | 0.106 | 0.106 | 2.48 | 25670 | 1850 | 45° |
| 3.00 | 2 | 200 | 0.042 | 0.126 | 0.126 | 2.97 | 21435 | 1800 | 45° |

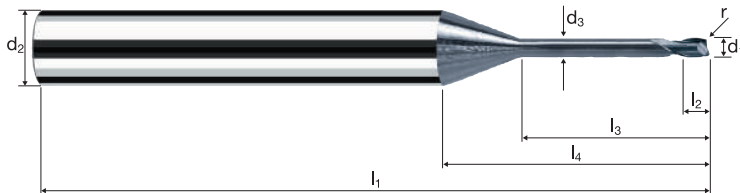
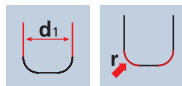
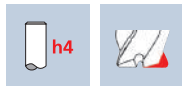
| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.20 | 2 | 26 | 0.008 | 0.008 | 0.008 | 0.20 | 41380 | 660 | 45° |
| 0.40 | 2 | 53 | 0.012 | 0.016 | 0.016 | 0.40 | 42175 | 1010 | 45° |
| 0.50 | 2 | 66 | 0.016 | 0.022 | 0.022 | 0.50 | 42015 | 1345 | 45° |
| 0.80 | 2 | 106 | 0.018 | 0.034 | 0.034 | 0.80 | 42175 | 1520 | 45° |
| 1.00 | 2 | 132 | 0.022 | 0.042 | 0.042 | 1.00 | 42015 | 1850 | 45° |
| 1.50 | 2 | 150 | 0.028 | 0.064 | 0.064 | 1.50 | 31830 | 1785 | 45° |
| 2.00 | 2 | 150 | 0.030 | 0.084 | 0.084 | 1.99 | 23995 | 1440 | 45° |
| 2.50 | 2 | 150 | 0.032 | 0.106 | 0.106 | 2.48 | 19255 | 1230 | 45° |
| 3.00 | 2 | 150 | 0.036 | 0.126 | 0.126 | 2.97 | 16075 | 1155 | 45° |

Frese toriche MicroX

Gambo ø 6mm, scarico cilindrico, 8xd



HM
XA λ 25°
 γ -10°



ReTool®

| | | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--------------|--------------|-------------|-------------------|----------------|-------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Inox Stainless | Ti Titanium | Cobalt-Chrome Copper |
|-------------|----------------|-----------------|-----------------|--------------|--------------|-------------|-------------------|----------------|-------------------------|

| Esempio: N° Ordine | | | | | | | | | | | X-AL |
|-----------------------|---------------------------|----------------------|----------------|----------------|----------------|----------------|----------------|--------------|-------|---|-------|
| | | | | | | | | | | | X6536 |
| | | | | | | | | | | | EUR |
| Ø Code | d ₁ 0/-0.01 | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r 0/+0.01 | α | z | |
| 020 | 0.20 | 6.00 | 0.18 | 57 | 0.20 | 1.60 | 18.22 | 0.050 | 13.2° | 2 | 83.00 |
| 040 | 0.40 | 6.00 | 0.35 | 57 | 0.40 | 3.20 | 19.16 | 0.050 | 11.6° | 2 | 76.00 |
| 048 | 0.50 | 6.00 | 0.45 | 57 | 0.50 | 4.00 | 15.01 | 0.050 | 11.0° | 2 | 76.00 |
| 042 | 0.40 | 6.00 | 0.35 | 57 | 0.40 | 3.20 | 19.16 | 0.100 | 11.6° | 2 | 76.00 |
| 050 | 0.50 | 6.00 | 0.45 | 57 | 0.50 | 4.00 | 15.01 | 0.100 | 11.1° | 2 | 76.00 |
| 060 | 0.60 | 6.00 | 0.55 | 57 | 0.60 | 4.80 | 15.63 | 0.100 | 10.3° | 2 | 76.00 |
| 080 | 0.80 | 6.00 | 0.75 | 57 | 0.80 | 6.40 | 16.85 | 0.100 | 9.2° | 2 | 76.00 |
| 098 | 1.00 | 6.00 | 0.95 | 61 | 1.00 | 8.00 | 18.08 | 0.100 | 8.3° | 2 | 76.00 |
| 082 | 0.80 | 6.00 | 0.75 | 57 | 0.80 | 6.40 | 16.85 | 0.200 | 9.3° | 2 | 76.00 |
| 100 | 1.00 | 6.00 | 0.95 | 61 | 1.00 | 8.00 | 18.08 | 0.200 | 8.3° | 2 | 76.00 |
| 108 | 1.20 | 6.00 | 1.10 | 61 | 1.20 | 9.60 | 19.40 | 0.200 | 7.3° | 2 | 76.00 |
| 120 | 1.50 | 6.00 | 1.40 | 61 | 1.50 | 12.00 | 21.24 | 0.200 | 6.4° | 2 | 76.00 |
| 140 | 2.00 | 6.00 | 1.90 | 66 | 2.00 | 16.00 | 24.31 | 0.200 | 4.9° | 2 | 76.00 |
| 160 | 2.50 | 6.00 | 2.30 | 69 | 2.50 | 20.00 | 27.56 | 0.200 | 3.8° | 2 | 76.00 |
| 180 | 3.00 | 6.00 | 2.80 | 75 | 3.00 | 24.00 | 30.63 | 0.200 | 2.9° | 2 | 76.00 |

| Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _z [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _t [mm/min] | r [mm] |
|---|---|------------|-----|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|-----------|
| | Acciaio da utensile temprato 42 - 48 HRC | 1.00 | 2 | 82 | 0.013 | 0.020 | 0.200 | 0.62 | 42100 | 1060 | 0.30 |
| | | 2.00 | 2 | 140 | 0.025 | 0.040 | 0.400 | 1.39 | 32060 | 1615 | 0.50 |
| | | 2.50 | 2 | 140 | 0.032 | 0.050 | 0.500 | 1.94 | 22970 | 1445 | 0.50 |
| | | 3.00 | 2 | 140 | 0.038 | 0.060 | 0.600 | 2.47 | 18040 | 1365 | 0.50 |
| Acciaio da utensile temprato 48 - 52 HRC | 1.00 | 2 | 82 | 0.012 | 0.020 | 0.200 | 0.62 | 42100 | 1010 | 0.30 | |
| | 2.00 | 2 | 120 | 0.024 | 0.040 | 0.400 | 1.39 | 27480 | 1320 | 0.50 | |
| | 2.50 | 2 | 120 | 0.030 | 0.050 | 0.500 | 1.94 | 19690 | 1180 | 0.50 | |
| | 3.00 | 2 | 120 | 0.036 | 0.060 | 0.600 | 2.47 | 15465 | 1115 | 0.50 | |
| Acciaio da utensile temprato 52 - 56 HRC | 1.00 | 2 | 82 | 0.010 | 0.020 | 0.200 | 0.62 | 42100 | 840 | 0.30 | |
| | 2.00 | 2 | 100 | 0.020 | 0.040 | 0.400 | 1.39 | 22900 | 915 | 0.50 | |
| | 2.50 | 2 | 100 | 0.025 | 0.050 | 0.500 | 1.94 | 16410 | 820 | 0.50 | |
| | 3.00 | 2 | 100 | 0.030 | 0.060 | 0.600 | 2.47 | 12885 | 775 | 0.50 | |
| Acciaio da utensile temprato 56 - 60 HRC | 1.00 | 2 | 60 | 0.009 | 0.020 | 0.200 | 0.62 | 30805 | 555 | 0.30 | |
| | 2.00 | 2 | 60 | 0.018 | 0.040 | 0.400 | 1.39 | 13740 | 495 | 0.50 | |
| | 2.50 | 2 | 60 | 0.023 | 0.050 | 0.500 | 1.94 | 9845 | 445 | 0.50 | |
| | 3.00 | 2 | 60 | 0.027 | 0.060 | 0.600 | 2.47 | 7730 | 420 | 0.50 | |

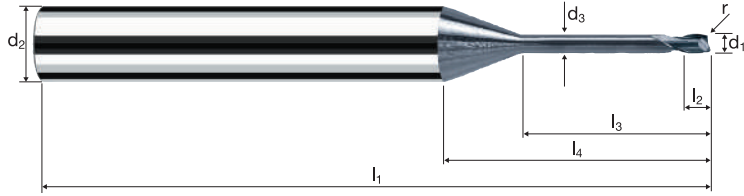
| Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _z [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _t [mm/min] | β [°] |
|---|---|------------|-----|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|----------|
| | Acciaio da utensile temprato 42 - 48 HRC | 1.00 | 2 | 129 | 0.028 | 0.042 | 0.042 | 0.98 | 41900 | 2345 | 45° |
| | | 2.00 | 2 | 263 | 0.034 | 0.100 | 0.100 | 1.99 | 42070 | 2860 | 45° |
| | | 2.50 | 2 | 300 | 0.036 | 0.126 | 0.126 | 2.50 | 38195 | 2750 | 45° |
| | | 3.00 | 2 | 300 | 0.042 | 0.152 | 0.152 | 3.00 | 31830 | 2675 | 45° |
| Acciaio da utensile temprato 48 - 52 HRC | 1.00 | 2 | 129 | 0.026 | 0.042 | 0.042 | 0.98 | 41900 | 2180 | 45° | |
| | 2.00 | 2 | 250 | 0.032 | 0.100 | 0.100 | 1.99 | 39990 | 2560 | 45° | |
| | 2.50 | 2 | 250 | 0.034 | 0.126 | 0.126 | 2.50 | 31830 | 2165 | 45° | |
| | 3.00 | 2 | 250 | 0.040 | 0.152 | 0.152 | 3.00 | 26525 | 2120 | 45° | |
| Acciaio da utensile temprato 52 - 56 HRC | 1.00 | 2 | 129 | 0.026 | 0.042 | 0.042 | 0.98 | 41900 | 2180 | 45° | |
| | 2.00 | 2 | 200 | 0.030 | 0.100 | 0.100 | 1.99 | 31990 | 1920 | 45° | |
| | 2.50 | 2 | 200 | 0.032 | 0.126 | 0.126 | 2.50 | 25465 | 1630 | 45° | |
| | 3.00 | 2 | 200 | 0.038 | 0.152 | 0.152 | 3.00 | 21220 | 1615 | 45° | |
| Acciaio da utensile temprato 56 - 60 HRC | 1.00 | 2 | 129 | 0.022 | 0.042 | 0.042 | 0.98 | 41900 | 1845 | 45° | |
| | 2.00 | 2 | 150 | 0.028 | 0.100 | 0.100 | 1.99 | 23995 | 1345 | 45° | |
| | 2.50 | 2 | 150 | 0.028 | 0.126 | 0.126 | 2.50 | 19100 | 1070 | 45° | |
| | 3.00 | 2 | 150 | 0.034 | 0.152 | 0.152 | 3.00 | 15915 | 1080 | 45° | |

Frese toriche MicroX

Gambo ø 6mm, scarico cilindrico, 8xd



HM
XA λ 25°
 γ -10°

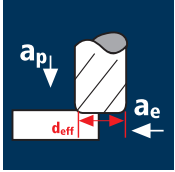


ReTool®

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|----------|-------------|--------------|--------------|-----------|-----------|----------|----------------|-------------|----------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Inox Stainless | Ti Titanium | Cobalt-Chrome Copper |
|----------|-------------|--------------|--------------|-----------|-----------|----------|----------------|-------------|----------------------|

| Esempio: N° Ordine | | | | | | | | | | | | X-AL |
|---|------------------------|-------------------|----------------|----------------|----------------|----------------|----------------|-----------|------|---|--|-------|
| Rivestimento X Articolo 6536 Codice-ø 101 | | | | | | | | | | | | X6536 |
| Ø Code | d ₁ 0/-0.01 | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r 0/+0.01 | α | z | | EUR |
| 101 | 1.00 | 6.00 | 0.95 | 61 | 1.00 | 8.00 | 18.08 | 0.300 | 8.3° | 2 | | 76.00 |
| 145 | 2.00 | 6.00 | 1.90 | 66 | 2.00 | 16.00 | 24.31 | 0.500 | 5.0° | 2 | | 76.00 |
| 165 | 2.50 | 6.00 | 2.30 | 69 | 2.50 | 20.00 | 27.56 | 0.500 | 3.9° | 2 | | 76.00 |
| 185 | 3.00 | 6.00 | 2.80 | 75 | 3.00 | 24.00 | 30.63 | 0.500 | 3.0° | 2 | | 76.00 |
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Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



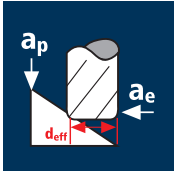
| d1 [mm] | z | v_c [m/min] | f_t [mm] | a_p [mm] | a_e [mm] | d_eff [mm] | n [min ⁻¹] | v_c [mm/min] | r [mm] |
|------------|---|----------------|-------------|-------------|-------------|---------------|---------------------------|-----------------|-----------|
| 0.20 | 2 | 17 | 0.003 | 0.003 | 0.040 | 0.13 | 41625 | 210 | 0.05 |
| 0.40 | 2 | 36 | 0.005 | 0.006 | 0.080 | 0.27 | 42440 | 430 | 0.10 |
| 0.50 | 2 | 50 | 0.006 | 0.008 | 0.100 | 0.38 | 41885 | 530 | 0.10 |
| 0.80 | 2 | 92 | 0.010 | 0.013 | 0.160 | 0.70 | 41835 | 845 | 0.10 |
| 1.00 | 2 | 100 | 0.013 | 0.016 | 0.200 | 0.76 | 41885 | 1055 | 0.20 |
| 1.50 | 2 | 140 | 0.019 | 0.024 | 0.300 | 1.29 | 34545 | 1305 | 0.20 |
| 2.00 | 2 | 140 | 0.025 | 0.032 | 0.400 | 1.82 | 24485 | 1235 | 0.20 |
| 2.50 | 2 | 140 | 0.032 | 0.040 | 0.500 | 2.34 | 19045 | 1200 | 0.20 |
| 3.00 | 2 | 140 | 0.038 | 0.048 | 0.600 | 2.86 | 15580 | 1180 | 0.20 |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|------|
| 0.20 | 2 | 17 | 0.002 | 0.003 | 0.040 | 0.13 | 41625 | 200 | 0.05 |
| 0.40 | 2 | 36 | 0.005 | 0.006 | 0.080 | 0.27 | 42440 | 405 | 0.10 |
| 0.50 | 2 | 50 | 0.006 | 0.008 | 0.100 | 0.38 | 41885 | 505 | 0.10 |
| 0.80 | 2 | 92 | 0.010 | 0.013 | 0.160 | 0.70 | 41835 | 805 | 0.10 |
| 1.00 | 2 | 100 | 0.012 | 0.016 | 0.200 | 0.76 | 41885 | 1005 | 0.20 |
| 1.50 | 2 | 120 | 0.018 | 0.024 | 0.300 | 1.29 | 29610 | 1065 | 0.20 |
| 2.00 | 2 | 120 | 0.024 | 0.032 | 0.400 | 1.82 | 20985 | 1005 | 0.20 |
| 2.50 | 2 | 120 | 0.030 | 0.040 | 0.500 | 2.34 | 16325 | 980 | 0.20 |
| 3.00 | 2 | 120 | 0.036 | 0.048 | 0.600 | 2.86 | 13355 | 960 | 0.20 |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|-----|------|
| 0.20 | 2 | 17 | 0.002 | 0.003 | 0.040 | 0.13 | 41625 | 165 | 0.05 |
| 0.40 | 2 | 36 | 0.004 | 0.006 | 0.080 | 0.27 | 42440 | 340 | 0.10 |
| 0.50 | 2 | 50 | 0.005 | 0.008 | 0.100 | 0.38 | 41885 | 420 | 0.10 |
| 0.80 | 2 | 92 | 0.008 | 0.013 | 0.160 | 0.70 | 41835 | 670 | 0.10 |
| 1.00 | 2 | 100 | 0.010 | 0.016 | 0.200 | 0.76 | 41885 | 840 | 0.20 |
| 1.50 | 2 | 100 | 0.015 | 0.024 | 0.300 | 1.29 | 24675 | 740 | 0.20 |
| 2.00 | 2 | 100 | 0.020 | 0.032 | 0.400 | 1.82 | 17490 | 700 | 0.20 |
| 2.50 | 2 | 100 | 0.025 | 0.040 | 0.500 | 2.34 | 13605 | 680 | 0.20 |
| 3.00 | 2 | 100 | 0.030 | 0.048 | 0.600 | 2.86 | 11130 | 670 | 0.20 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|-----|------|
| 0.20 | 2 | 17 | 0.002 | 0.003 | 0.040 | 0.13 | 41625 | 150 | 0.05 |
| 0.40 | 2 | 36 | 0.004 | 0.006 | 0.080 | 0.27 | 42440 | 305 | 0.10 |
| 0.50 | 2 | 50 | 0.004 | 0.008 | 0.100 | 0.38 | 41885 | 375 | 0.10 |
| 0.80 | 2 | 60 | 0.007 | 0.013 | 0.160 | 0.70 | 27285 | 395 | 0.10 |
| 1.00 | 2 | 60 | 0.009 | 0.016 | 0.200 | 0.76 | 25130 | 450 | 0.20 |
| 1.50 | 2 | 60 | 0.014 | 0.024 | 0.300 | 1.29 | 14805 | 400 | 0.20 |
| 2.00 | 2 | 60 | 0.018 | 0.032 | 0.400 | 1.82 | 10495 | 380 | 0.20 |
| 2.50 | 2 | 60 | 0.023 | 0.040 | 0.500 | 2.34 | 8160 | 365 | 0.20 |
| 3.00 | 2 | 60 | 0.027 | 0.048 | 0.600 | 2.86 | 6680 | 360 | 0.20 |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



| d1 [mm] | z | v_c [m/min] | f_t [mm] | a_p [mm] | a_e [mm] | d_eff [mm] | n [min ⁻¹] | v_c [mm/min] | β [°] |
|------------|---|----------------|-------------|-------------|-------------|---------------|---------------------------|-----------------|----------|
| 0.20 | 2 | 26 | 0.010 | 0.008 | 0.008 | 0.20 | 41380 | 830 | 45° |
| 0.40 | 2 | 53 | 0.016 | 0.016 | 0.016 | 0.40 | 42175 | 1350 | 45° |
| 0.50 | 2 | 66 | 0.020 | 0.022 | 0.022 | 0.50 | 42015 | 1680 | 45° |
| 0.80 | 2 | 106 | 0.022 | 0.034 | 0.034 | 0.80 | 42175 | 1855 | 45° |
| 1.00 | 2 | 132 | 0.028 | 0.042 | 0.042 | 1.00 | 42015 | 2355 | 45° |
| 1.50 | 2 | 198 | 0.030 | 0.050 | 0.050 | 1.50 | 42015 | 2520 | 45° |
| 2.00 | 2 | 264 | 0.034 | 0.064 | 0.064 | 2.00 | 42015 | 2855 | 45° |
| 2.50 | 2 | 300 | 0.038 | 0.084 | 0.084 | 2.49 | 38350 | 2915 | 45° |
| 3.00 | 2 | 300 | 0.040 | 0.106 | 0.106 | 2.98 | 32045 | 2565 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.20 | 2 | 26 | 0.010 | 0.008 | 0.008 | 0.20 | 41380 | 830 | 45° |
| 0.40 | 2 | 53 | 0.016 | 0.016 | 0.016 | 0.40 | 42175 | 1350 | 45° |
| 0.50 | 2 | 66 | 0.020 | 0.022 | 0.022 | 0.50 | 42015 | 1680 | 45° |
| 0.80 | 2 | 106 | 0.020 | 0.034 | 0.034 | 0.80 | 42175 | 1685 | 45° |
| 1.00 | 2 | 132 | 0.026 | 0.042 | 0.042 | 1.00 | 42015 | 2185 | 45° |
| 1.50 | 2 | 198 | 0.028 | 0.050 | 0.050 | 1.50 | 42015 | 2355 | 45° |
| 2.00 | 2 | 250 | 0.032 | 0.064 | 0.064 | 2.00 | 39790 | 2545 | 45° |
| 2.50 | 2 | 250 | 0.036 | 0.084 | 0.084 | 2.49 | 31960 | 2300 | 45° |
| 3.00 | 2 | 250 | 0.038 | 0.106 | 0.106 | 2.98 | 26705 | 2030 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.20 | 2 | 26 | 0.010 | 0.008 | 0.008 | 0.20 | 41380 | 830 | 45° |
| 0.40 | 2 | 53 | 0.014 | 0.016 | 0.016 | 0.40 | 42175 | 1180 | 45° |
| 0.50 | 2 | 66 | 0.018 | 0.022 | 0.022 | 0.50 | 42015 | 1515 | 45° |
| 0.80 | 2 | 106 | 0.020 | 0.034 | 0.034 | 0.80 | 42175 | 1685 | 45° |
| 1.00 | 2 | 132 | 0.026 | 0.042 | 0.042 | 1.00 | 42015 | 2185 | 45° |
| 1.50 | 2 | 198 | 0.028 | 0.050 | 0.050 | 1.50 | 42015 | 2355 | 45° |
| 2.00 | 2 | 200 | 0.030 | 0.064 | 0.064 | 2.00 | 31830 | 1910 | 45° |
| 2.50 | 2 | 200 | 0.034 | 0.084 | 0.084 | 2.49 | 25565 | 1740 | 45° |
| 3.00 | 2 | 200 | 0.036 | 0.106 | 0.106 | 2.98 | 21365 | 1540 | 45° |

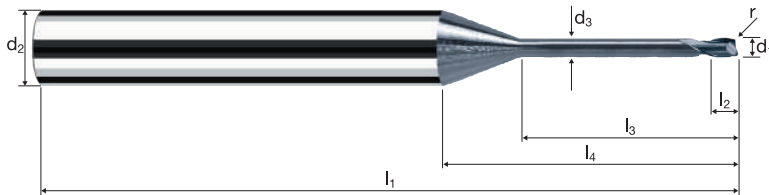
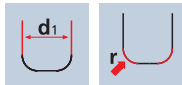
| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.20 | 2 | 26 | 0.008 | 0.008 | 0.008 | 0.20 | 41380 | 660 | 45° |
| 0.40 | 2 | 53 | 0.012 | 0.016 | 0.016 | 0.40 | 42175 | 1010 | 45° |
| 0.50 | 2 | 66 | 0.016 | 0.022 | 0.022 | 0.50 | 42015 | 1345 | 45° |
| 0.80 | 2 | 106 | 0.018 | 0.034 | 0.034 | 0.80 | 42175 | 1520 | 45° |
| 1.00 | 2 | 132 | 0.022 | 0.042 | 0.042 | 1.00 | 42015 | 1850 | 45° |
| 1.50 | 2 | 150 | 0.024 | 0.050 | 0.050 | 1.50 | 31830 | 1530 | 45° |
| 2.00 | 2 | 150 | 0.028 | 0.064 | 0.064 | 2.00 | 23875 | 1335 | 45° |
| 2.50 | 2 | 150 | 0.030 | 0.084 | 0.084 | 2.49 | 19175 | 1150 | 45° |
| 3.00 | 2 | 150 | 0.032 | 0.106 | 0.106 | 2.98 | 16020 | 1025 | 45° |

Frese toriche MicroX

Gambo ø 6mm, scarico cilindrico, 10xd



HM λ 25°
XA γ -10°



ReTool®

| | | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--------------|--------------|-------------|-------------------|----------------|-------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Inox Stainless | Ti Titanium | Cobalt-Chrome Copper |
|-------------|----------------|-----------------|-----------------|--------------|--------------|-------------|-------------------|----------------|-------------------------|

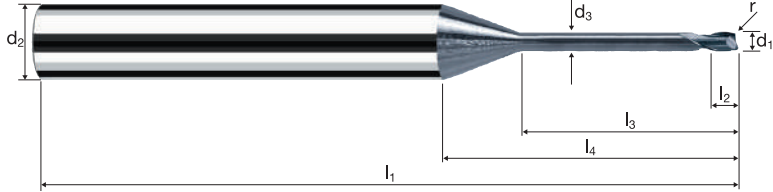
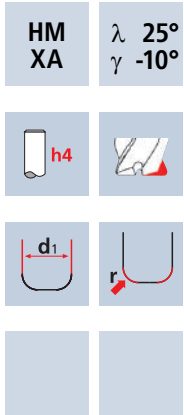
| Esempio: N° Ordine | | | | | | | | | | | X-AL |
|-----------------------|---------------------------|----------------------|----------------|----------------|----------------|----------------|----------------|--------------|-------|---|-------|
| Rivestimento | | | | | | | | | | | X6538 |
| Articolo | | | | | | | | | | | EUR |
| Codice-ø | | | | | | | | | | | |
| Ø Code | d ₁ 0/-0.01 | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r 0/+0.01 | α | z | |
| 020 | 0.20 | 6.00 | 0.18 | 57 | 0.20 | 2.00 | 18.62 | 0.050 | 12.8° | 2 | 83.00 |
| 040 | 0.40 | 6.00 | 0.35 | 57 | 0.40 | 4.00 | 19.96 | 0.050 | 11.0° | 2 | 76.00 |
| 048 | 0.50 | 6.00 | 0.45 | 57 | 0.50 | 5.00 | 16.01 | 0.050 | 10.2° | 2 | 76.00 |
| 042 | 0.40 | 6.00 | 0.35 | 57 | 0.40 | 4.00 | 19.96 | 0.100 | 11.0° | 2 | 76.00 |
| 050 | 0.50 | 6.00 | 0.45 | 57 | 0.50 | 5.00 | 16.01 | 0.100 | 10.3° | 2 | 76.00 |
| 060 | 0.60 | 6.00 | 0.55 | 57 | 0.60 | 6.00 | 16.83 | 0.100 | 9.6° | 2 | 76.00 |
| 080 | 0.80 | 6.00 | 0.75 | 61 | 0.80 | 8.00 | 18.45 | 0.100 | 8.4° | 2 | 76.00 |
| 098 | 1.00 | 6.00 | 0.95 | 61 | 1.00 | 10.00 | 20.08 | 0.100 | 7.4° | 2 | 76.00 |
| 082 | 0.80 | 6.00 | 0.75 | 61 | 0.80 | 8.00 | 18.45 | 0.200 | 8.5° | 2 | 76.00 |
| 100 | 1.00 | 6.00 | 0.95 | 61 | 1.00 | 10.00 | 20.08 | 0.200 | 7.4° | 2 | 76.00 |
| 120 | 1.50 | 6.00 | 1.40 | 66 | 1.50 | 15.00 | 24.24 | 0.200 | 5.5° | 2 | 76.00 |
| 140 | 2.00 | 6.00 | 1.90 | 69 | 2.00 | 20.00 | 28.31 | 0.200 | 4.2° | 2 | 76.00 |
| 160 | 2.50 | 6.00 | 2.30 | 75 | 2.50 | 25.00 | 32.56 | 0.200 | 3.2° | 2 | 76.00 |
| 180 | 3.00 | 6.00 | 2.80 | 80 | 3.00 | 30.00 | 36.63 | 0.200 | 2.4° | 2 | 76.00 |

| Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _z [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _t [mm/min] | r [mm] |
|--------------|---|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|--------|
| | Acciaio da utensile temprato 42 - 48 HRC | 1.00 | 2 | 78 | 0.013 | 0.016 | 0.200 | 0.59 | 42080 | 1060 | 0.30 |
| | | 2.00 | 2 | 140 | 0.025 | 0.032 | 0.400 | 1.35 | 33010 | 1665 | 0.50 |
| | | 2.50 | 2 | 140 | 0.032 | 0.040 | 0.500 | 1.89 | 23580 | 1485 | 0.50 |
| | | 3.00 | 2 | 140 | 0.038 | 0.048 | 0.600 | 2.43 | 18340 | 1385 | 0.50 |
| | | 1.00 | 2 | 78 | 0.012 | 0.016 | 0.200 | 0.59 | 42080 | 1010 | 0.30 |
| | | 2.00 | 2 | 120 | 0.024 | 0.032 | 0.400 | 1.35 | 28295 | 1360 | 0.50 |
| | | 2.50 | 2 | 120 | 0.030 | 0.040 | 0.500 | 1.89 | 20210 | 1215 | 0.50 |
| | | 3.00 | 2 | 120 | 0.036 | 0.048 | 0.600 | 2.43 | 15720 | 1130 | 0.50 |
| | | 1.00 | 2 | 78 | 0.010 | 0.016 | 0.200 | 0.59 | 42080 | 840 | 0.30 |
| | | 2.00 | 2 | 100 | 0.020 | 0.032 | 0.400 | 1.35 | 23580 | 945 | 0.50 |
| | | 2.50 | 2 | 100 | 0.025 | 0.040 | 0.500 | 1.89 | 16840 | 840 | 0.50 |
| | | 3.00 | 2 | 100 | 0.030 | 0.048 | 0.600 | 2.43 | 13100 | 785 | 0.50 |
| | | 1.00 | 2 | 60 | 0.009 | 0.016 | 0.200 | 0.59 | 32370 | 585 | 0.30 |
| | | 2.00 | 2 | 60 | 0.018 | 0.032 | 0.400 | 1.35 | 14145 | 510 | 0.50 |
| | | 2.50 | 2 | 60 | 0.023 | 0.040 | 0.500 | 1.89 | 10105 | 455 | 0.50 |
| | | 3.00 | 2 | 60 | 0.027 | 0.048 | 0.600 | 2.43 | 7860 | 425 | 0.50 |

| Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _z [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _t [mm/min] | β [°] |
|--------------|---|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
| | Acciaio da utensile temprato 42 - 48 HRC | 1.00 | 2 | 131 | 0.046 | 0.126 | 0.126 | 0.99 | 42120 | 3875 | 45° |
| | | 2.00 | 2 | 255 | 0.028 | 0.042 | 0.042 | 1.93 | 42055 | 2355 | 45° |
| | | 2.50 | 2 | 300 | 0.034 | 0.100 | 0.100 | 2.49 | 38350 | 2610 | 45° |
| | | 3.00 | 2 | 300 | 0.036 | 0.126 | 0.126 | 3.00 | 31830 | 2290 | 45° |
| | | 1.00 | 2 | 131 | 0.044 | 0.126 | 0.126 | 0.99 | 42120 | 3705 | 45° |
| | | 2.00 | 2 | 250 | 0.026 | 0.042 | 0.042 | 1.93 | 41230 | 2145 | 45° |
| | | 2.50 | 2 | 250 | 0.032 | 0.100 | 0.100 | 2.49 | 31960 | 2045 | 45° |
| | | 3.00 | 2 | 250 | 0.034 | 0.126 | 0.126 | 3.00 | 26525 | 1805 | 45° |
| | | 1.00 | 2 | 131 | 0.042 | 0.126 | 0.126 | 0.99 | 42120 | 3540 | 45° |
| | | 2.00 | 2 | 200 | 0.026 | 0.042 | 0.042 | 1.93 | 32985 | 1715 | 45° |
| | | 2.50 | 2 | 200 | 0.030 | 0.100 | 0.100 | 2.49 | 25565 | 1535 | 45° |
| | | 3.00 | 2 | 200 | 0.032 | 0.126 | 0.126 | 3.00 | 21220 | 1360 | 45° |
| | | 1.00 | 2 | 131 | 0.036 | 0.126 | 0.126 | 0.99 | 42120 | 3035 | 45° |
| | | 2.00 | 2 | 150 | 0.022 | 0.042 | 0.042 | 1.93 | 24740 | 1090 | 45° |
| | | 2.50 | 2 | 150 | 0.028 | 0.100 | 0.100 | 2.49 | 19175 | 1075 | 45° |
| | | 3.00 | 2 | 150 | 0.028 | 0.126 | 0.126 | 3.00 | 15915 | 890 | 45° |

Frese toriche MicroX

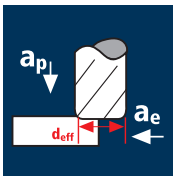
Gambo \varnothing 6mm, scarico cilindrico, 10xd



| | | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--------------|--------------|-------------|-------------------|----------------|-------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Inox Stainless | Ti Titanium | Cobalt-Chrome Copper |
|-------------|----------------|-----------------|-----------------|--------------|--------------|-------------|-------------------|----------------|-------------------------|

| Esempio: N° Ordine | | Rivestimento X | Articolo 6538 | Codice- \varnothing 101 | | | | | | | | | X-AL |
|-----------------------|------------------|--------------------------|-------------------------|-------------------------------------|-------|-------|-------|----------------|----------|-----|--|-------|------|
| \varnothing Code | d_1 0/-0.01 | d_2 h4 | d_3 | l_1 | l_2 | l_3 | l_4 | r 0/+0.01 | α | z | | EUR | |
| 101 | 1.00 | 6.00 | 0.95 | 61 | 1.00 | 10.00 | 20.08 | 0.300 | 7.5° | 2 | | 76.00 | |
| 145 | 2.00 | 6.00 | 1.90 | 69 | 2.00 | 20.00 | 28.31 | 0.500 | 4.3° | 2 | | 76.00 | |
| 165 | 2.50 | 6.00 | 2.30 | 75 | 2.50 | 25.00 | 32.56 | 0.500 | 3.2° | 2 | | 76.00 | |
| 185 | 3.00 | 6.00 | 2.80 | 80 | 3.00 | 30.00 | 36.63 | 0.500 | 2.5° | 2 | | 76.00 | |
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Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



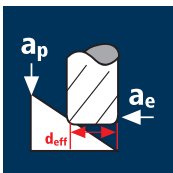
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | r [mm] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|-----------|
| 0.50 | 2 | 53 | 0.008 | 0.013 | 0.100 | 0.40 | 42175 | 640 | 0.10 |
| 0.60 | 2 | 67 | 0.009 | 0.016 | 0.120 | 0.51 | 41815 | 740 | 0.10 |
| 0.80 | 2 | 95 | 0.013 | 0.021 | 0.160 | 0.72 | 42000 | 1060 | 0.10 |
| 1.00 | 2 | 106 | 0.015 | 0.027 | 0.200 | 0.80 | 42175 | 1275 | 0.20 |
| 1.50 | 2 | 140 | 0.023 | 0.040 | 0.300 | 1.34 | 33255 | 1510 | 0.20 |
| 2.00 | 2 | 140 | 0.030 | 0.053 | 0.400 | 1.87 | 23830 | 1440 | 0.20 |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|------|
| 0.50 | 2 | 53 | 0.007 | 0.013 | 0.100 | 0.40 | 42175 | 605 | 0.10 |
| 0.60 | 2 | 67 | 0.008 | 0.016 | 0.120 | 0.51 | 41815 | 705 | 0.10 |
| 0.80 | 2 | 95 | 0.012 | 0.021 | 0.160 | 0.72 | 42000 | 1010 | 0.10 |
| 1.00 | 2 | 106 | 0.014 | 0.027 | 0.200 | 0.80 | 42175 | 1215 | 0.20 |
| 1.50 | 2 | 120 | 0.022 | 0.040 | 0.300 | 1.34 | 28505 | 1230 | 0.20 |
| 2.00 | 2 | 120 | 0.029 | 0.053 | 0.400 | 1.87 | 20425 | 1175 | 0.20 |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|-----|------|
| 0.50 | 2 | 53 | 0.006 | 0.013 | 0.100 | 0.40 | 42175 | 505 | 0.10 |
| 0.60 | 2 | 67 | 0.007 | 0.016 | 0.120 | 0.51 | 41815 | 585 | 0.10 |
| 0.80 | 2 | 95 | 0.010 | 0.021 | 0.160 | 0.72 | 42000 | 840 | 0.10 |
| 1.00 | 2 | 100 | 0.012 | 0.027 | 0.200 | 0.80 | 39790 | 955 | 0.20 |
| 1.50 | 2 | 100 | 0.018 | 0.040 | 0.300 | 1.34 | 23755 | 855 | 0.20 |
| 2.00 | 2 | 100 | 0.024 | 0.053 | 0.400 | 1.87 | 17020 | 815 | 0.20 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|-----|------|
| 0.50 | 2 | 53 | 0.005 | 0.013 | 0.100 | 0.40 | 42175 | 455 | 0.10 |
| 0.60 | 2 | 60 | 0.006 | 0.016 | 0.120 | 0.51 | 37450 | 470 | 0.10 |
| 0.80 | 2 | 60 | 0.009 | 0.021 | 0.160 | 0.72 | 26525 | 475 | 0.10 |
| 1.00 | 2 | 60 | 0.011 | 0.027 | 0.200 | 0.80 | 23875 | 515 | 0.20 |
| 1.50 | 2 | 60 | 0.016 | 0.040 | 0.300 | 1.34 | 14255 | 460 | 0.20 |
| 2.00 | 2 | 60 | 0.022 | 0.053 | 0.400 | 1.87 | 10215 | 440 | 0.20 |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|----------|
| 0.50 | 2 | 66 | 0.022 | 0.016 | 0.016 | 0.50 | 42015 | 1850 | 45° |
| 0.60 | 2 | 79 | 0.024 | 0.020 | 0.020 | 0.60 | 41910 | 2010 | 45° |
| 0.80 | 2 | 106 | 0.028 | 0.032 | 0.032 | 0.80 | 42175 | 2360 | 45° |
| 1.00 | 2 | 132 | 0.034 | 0.040 | 0.040 | 1.00 | 42015 | 2855 | 45° |
| 1.50 | 2 | 198 | 0.040 | 0.060 | 0.060 | 1.50 | 42015 | 3360 | 45° |
| 2.00 | 2 | 264 | 0.046 | 0.080 | 0.080 | 2.00 | 42015 | 3865 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 2 | 66 | 0.020 | 0.016 | 0.016 | 0.50 | 42015 | 1680 | 45° |
| 0.60 | 2 | 79 | 0.022 | 0.020 | 0.020 | 0.60 | 41910 | 1845 | 45° |
| 0.80 | 2 | 106 | 0.026 | 0.032 | 0.032 | 0.80 | 42175 | 2195 | 45° |
| 1.00 | 2 | 132 | 0.032 | 0.040 | 0.040 | 1.00 | 42015 | 2690 | 45° |
| 1.50 | 2 | 198 | 0.038 | 0.060 | 0.060 | 1.50 | 42015 | 3195 | 45° |
| 2.00 | 2 | 250 | 0.044 | 0.080 | 0.080 | 2.00 | 39790 | 3500 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 2 | 66 | 0.020 | 0.016 | 0.016 | 0.50 | 42015 | 1680 | 45° |
| 0.60 | 2 | 79 | 0.022 | 0.020 | 0.020 | 0.60 | 41910 | 1845 | 45° |
| 0.80 | 2 | 106 | 0.026 | 0.032 | 0.032 | 0.80 | 42175 | 2195 | 45° |
| 1.00 | 2 | 132 | 0.030 | 0.040 | 0.040 | 1.00 | 42015 | 2520 | 45° |
| 1.50 | 2 | 198 | 0.036 | 0.060 | 0.060 | 1.50 | 42015 | 3025 | 45° |
| 2.00 | 2 | 200 | 0.042 | 0.080 | 0.080 | 2.00 | 31830 | 2675 | 45° |

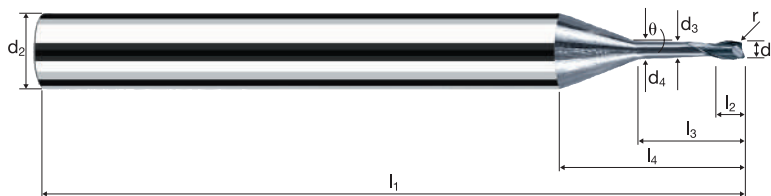
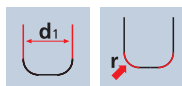
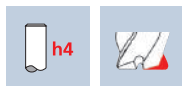
| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 2 | 66 | 0.018 | 0.016 | 0.016 | 0.50 | 42015 | 1515 | 45° |
| 0.60 | 2 | 79 | 0.020 | 0.020 | 0.020 | 0.60 | 41910 | 1675 | 45° |
| 0.80 | 2 | 106 | 0.022 | 0.032 | 0.032 | 0.80 | 42175 | 1855 | 45° |
| 1.00 | 2 | 132 | 0.028 | 0.040 | 0.040 | 1.00 | 42015 | 2355 | 45° |
| 1.50 | 2 | 150 | 0.032 | 0.060 | 0.060 | 1.50 | 31830 | 2035 | 45° |
| 2.00 | 2 | 150 | 0.036 | 0.080 | 0.080 | 2.00 | 23875 | 1720 | 45° |

Frese toriche MicroX

Gambo \varnothing 6mm, scarico conico 0.9°, 6xd



| | |
|----------|--------------------------------|
| HM XA | λ 25° γ -10° |
|----------|--------------------------------|

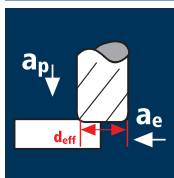


ReTool®

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|-------------|----------------|-----------------|-----------------|--------------|--------------|-------------|-------------------|----------------|-------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Inox Stainless | Ti Titanium | Cobalt-Chrome Copper |
|-------------|----------------|-----------------|-----------------|--------------|--------------|-------------|-------------------|----------------|-------------------------|

| Esempio: N° Ordine | | | | | | | | | | | | | X-AL |
|-----------------------|------------------|-------------|-------|-------|-------|-------|-------|-------|----------|----------------|----------|-----|-------|
| Rivestimento | | | | | | | | | | | | | X6735 |
| Articolo | | | | | | | | | | | | | EUR |
| Codice- \varnothing | | | | | | | | | | | | | |
| \varnothing Code | d_1 0/-0.01 | d_2 h4 | d_3 | d_4 | l_1 | l_2 | l_3 | l_4 | θ | r 0/+0.01 | α | z | |
| 050 | 0.50 | 6.00 | 0.45 | 0.53 | 57 | 0.40 | 3.00 | 13.87 | 0.9° | 0.100 | 11.8° | 2 | 80.00 |
| 060 | 0.60 | 6.00 | 0.55 | 0.65 | 57 | 0.50 | 3.60 | 14.24 | 0.9° | 0.100 | 11.1° | 2 | 80.00 |
| 080 | 0.80 | 6.00 | 0.75 | 0.88 | 57 | 0.65 | 4.80 | 15.01 | 0.9° | 0.100 | 10.2° | 2 | 80.00 |
| 100 | 1.00 | 6.00 | 0.95 | 1.11 | 57 | 0.80 | 6.00 | 15.78 | 0.9° | 0.200 | 9.4° | 2 | 80.00 |
| 120 | 1.50 | 6.00 | 1.40 | 1.65 | 61 | 1.20 | 9.00 | 17.78 | 0.9° | 0.200 | 7.4° | 2 | 80.00 |
| 140 | 2.00 | 6.00 | 1.90 | 2.23 | 66 | 1.60 | 12.00 | 19.69 | 0.9° | 0.200 | 5.9° | 2 | 80.00 |
| 145 | 2.00 | 6.00 | 1.90 | 2.23 | 66 | 1.60 | 12.00 | 19.69 | 0.9° | 0.500 | 6.0° | 2 | 80.00 |

Applicazione



Materiale

Acciaio da utensile temprato 42-48 HRC
Icons for material and application (X in blue box)

Table with 10 columns: d1, z, v_c, f_c, a_s, a_e, d_eff, n, v_t, r. Rows for d1 values from 0.50 to 3.00.

Acciaio da utensile temprato 48-52 HRC
Icons for material and application (X in blue box)

Table with 10 columns: d1, z, v_c, f_c, a_s, a_e, d_eff, n, v_t, r. Rows for d1 values from 0.50 to 3.00.

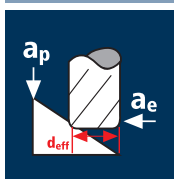
Acciaio da utensile temprato 52-56 HRC
Icons for material and application (X in blue box)

Table with 10 columns: d1, z, v_c, f_c, a_s, a_e, d_eff, n, v_t, r. Rows for d1 values from 0.50 to 3.00.

Acciaio da utensile temprato 56-60 HRC
Icons for material and application (X in blue box)

Table with 10 columns: d1, z, v_c, f_c, a_s, a_e, d_eff, n, v_t, r. Rows for d1 values from 0.50 to 3.00.

Applicazione



Materiale

Acciaio da utensile temprato 42-48 HRC
Icons for material and application (X in blue box)

Table with 10 columns: d1, z, v_c, f_c, a_s, a_e, d_eff, n, v_t, beta. Rows for d1 values from 0.50 to 3.00.

Acciaio da utensile temprato 48-52 HRC
Icons for material and application (X in blue box)

Table with 10 columns: d1, z, v_c, f_c, a_s, a_e, d_eff, n, v_t, beta. Rows for d1 values from 0.50 to 3.00.

Acciaio da utensile temprato 52-56 HRC
Icons for material and application (X in blue box)

Table with 10 columns: d1, z, v_c, f_c, a_s, a_e, d_eff, n, v_t, beta. Rows for d1 values from 0.50 to 3.00.

Acciaio da utensile temprato 56-60 HRC
Icons for material and application (X in blue box)

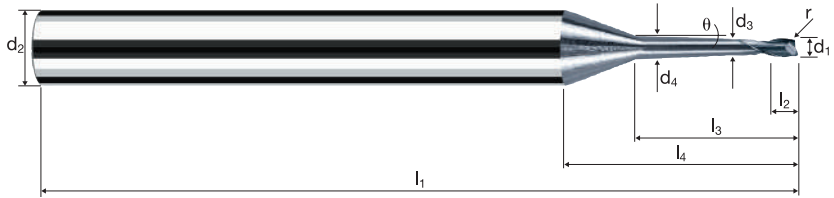
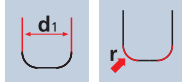
Table with 10 columns: d1, z, v_c, f_c, a_s, a_e, d_eff, n, v_t, beta. Rows for d1 values from 0.50 to 3.00.

Frese toriche MicroX

Gambo ø 6mm, scarico conico 0.9°, 8xd



HM λ 25°
XA γ -10°

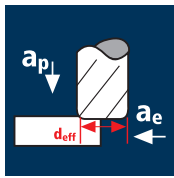


ReTool®

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|----------|-------------|--------------|--------------|-----------|-----------|----------|----------------|-------------|----------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Inox Stainless | Ti Titanium | Cobalt-Chrome Copper |
|----------|-------------|--------------|--------------|-----------|-----------|----------|----------------|-------------|----------------------|

| Esempio: N° Ordine | | | | | | | | | | | | | X-AL |
|--|------------------------|-------------------|----------------|----------------|----------------|----------------|----------------|----------------|------|-----------|-------|---|-------|
| Rivestimento X Articolo 6736 Codice-ø 050 | | | | | | | | | | | | | X6736 |
| Ø Code | d ₁ 0/-0.01 | d ₂ h4 | d ₃ | d ₄ | l ₁ | l ₂ | l ₃ | l ₄ | θ | r 0/+0.01 | α | z | EUR |
| 050 | 0.50 | 6.00 | 0.45 | 0.56 | 57 | 0.40 | 4.00 | 14.81 | 0.9° | 0.100 | 11.1° | 2 | 80.00 |
| 060 | 0.60 | 6.00 | 0.55 | 0.69 | 57 | 0.50 | 4.80 | 15.37 | 0.9° | 0.100 | 10.3° | 2 | 80.00 |
| 080 | 0.80 | 6.00 | 0.75 | 0.93 | 57 | 0.65 | 6.40 | 16.52 | 0.9° | 0.100 | 9.2° | 2 | 80.00 |
| 100 | 1.00 | 6.00 | 0.95 | 1.18 | 61 | 0.80 | 8.00 | 17.65 | 0.9° | 0.200 | 8.3° | 2 | 80.00 |
| 108 | 1.20 | 6.00 | 1.10 | 1.37 | 61 | 1.00 | 9.60 | 18.90 | 0.9° | 0.200 | 7.3° | 2 | 80.00 |
| 120 | 1.50 | 6.00 | 1.40 | 1.74 | 61 | 1.20 | 12.00 | 20.61 | 0.9° | 0.200 | 6.4° | 2 | 80.00 |
| 140 | 2.00 | 6.00 | 1.90 | 2.35 | 66 | 1.60 | 16.00 | 23.47 | 0.9° | 0.200 | 4.9° | 2 | 80.00 |
| 160 | 2.50 | 6.00 | 2.30 | 2.87 | 69 | 2.00 | 20.00 | 26.50 | 0.9° | 0.200 | 3.8° | 2 | 80.00 |
| 180 | 3.00 | 6.00 | 2.80 | 3.48 | 75 | 2.40 | 24.00 | 29.36 | 0.9° | 0.200 | 2.9° | 2 | 80.00 |
| 145 | 2.00 | 6.00 | 1.90 | 2.35 | 66 | 1.60 | 16.00 | 23.47 | 0.9° | 0.500 | 5.0° | 2 | 80.00 |
| 165 | 2.50 | 6.00 | 2.30 | 2.87 | 69 | 2.00 | 20.00 | 26.50 | 0.9° | 0.500 | 3.9° | 2 | 80.00 |
| 185 | 3.00 | 6.00 | 2.80 | 3.48 | 75 | 2.40 | 24.00 | 29.36 | 0.9° | 0.500 | 3.0° | 2 | 80.00 |
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Applicazione



Materiale

Acciaio da utensile temprato
42 - 48 HRC



| d1 [mm] | z | v_c [m/min] | f_z [mm] | a_p [mm] | a_e [mm] | d_{eff} [mm] | n [min ⁻¹] | v_r [mm/min] | r [mm] |
|---------|---|---------------|------------|------------|------------|----------------|------------------------|----------------|--------|
| 0.50 | 2 | 50 | 0.008 | 0.008 | 0.100 | 0.38 | 41885 | 635 | 0.10 |
| 0.60 | 2 | 65 | 0.009 | 0.010 | 0.120 | 0.49 | 42225 | 745 | 0.10 |
| 0.80 | 2 | 79 | 0.013 | 0.000 | 0.130 | 0.60 | 41910 | 1055 | 0.10 |
| 1.00 | 2 | 100 | 0.015 | 0.016 | 0.200 | 0.76 | 41885 | 1265 | 0.20 |
| 1.20 | 2 | 128 | 0.018 | 0.019 | 0.240 | 0.97 | 42005 | 1480 | 0.20 |
| 1.50 | 2 | 140 | 0.023 | 0.024 | 0.300 | 1.29 | 34545 | 1565 | 0.20 |
| 2.00 | 2 | 140 | 0.030 | 0.032 | 0.400 | 1.82 | 24485 | 1480 | 0.20 |
| 2.50 | 2 | 140 | 0.038 | 0.040 | 0.500 | 2.34 | 19045 | 1440 | 0.20 |
| 3.00 | 2 | 140 | 0.045 | 0.048 | 0.600 | 2.86 | 15580 | 1415 | 0.20 |

Acciaio da utensile temprato
48 - 52 HRC



| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|------|
| 0.50 | 2 | 50 | 0.007 | 0.008 | 0.100 | 0.38 | 41885 | 605 | 0.10 |
| 0.60 | 2 | 65 | 0.008 | 0.010 | 0.120 | 0.49 | 42225 | 710 | 0.10 |
| 0.80 | 2 | 79 | 0.012 | 0.000 | 0.130 | 0.60 | 41910 | 1005 | 0.10 |
| 1.00 | 2 | 100 | 0.014 | 0.016 | 0.200 | 0.76 | 41885 | 1205 | 0.20 |
| 1.20 | 2 | 120 | 0.017 | 0.019 | 0.240 | 0.97 | 39380 | 1325 | 0.20 |
| 1.50 | 2 | 120 | 0.022 | 0.024 | 0.300 | 1.29 | 29610 | 1280 | 0.20 |
| 2.00 | 2 | 120 | 0.029 | 0.032 | 0.400 | 1.82 | 20985 | 1210 | 0.20 |
| 2.50 | 2 | 120 | 0.036 | 0.040 | 0.500 | 2.34 | 16325 | 1175 | 0.20 |
| 3.00 | 2 | 120 | 0.043 | 0.048 | 0.600 | 2.86 | 13355 | 1155 | 0.20 |

Acciaio da utensile temprato
52 - 56 HRC



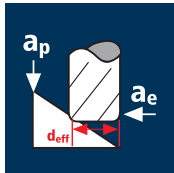
| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|------|
| 0.50 | 2 | 50 | 0.006 | 0.008 | 0.100 | 0.38 | 41885 | 505 | 0.10 |
| 0.60 | 2 | 65 | 0.007 | 0.010 | 0.120 | 0.49 | 42225 | 590 | 0.10 |
| 0.80 | 2 | 79 | 0.010 | 0.000 | 0.130 | 0.60 | 41910 | 840 | 0.10 |
| 1.00 | 2 | 100 | 0.012 | 0.016 | 0.200 | 0.76 | 41885 | 1005 | 0.20 |
| 1.20 | 2 | 100 | 0.014 | 0.019 | 0.240 | 0.97 | 32815 | 920 | 0.20 |
| 1.50 | 2 | 100 | 0.018 | 0.024 | 0.300 | 1.29 | 24675 | 890 | 0.20 |
| 2.00 | 2 | 100 | 0.024 | 0.032 | 0.400 | 1.82 | 17490 | 840 | 0.20 |
| 2.50 | 2 | 100 | 0.030 | 0.040 | 0.500 | 2.34 | 13605 | 815 | 0.20 |
| 3.00 | 2 | 100 | 0.036 | 0.048 | 0.600 | 2.86 | 11130 | 800 | 0.20 |

Acciaio da utensile temprato
56 - 60 HRC



| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|-----|------|
| 0.50 | 2 | 50 | 0.005 | 0.008 | 0.100 | 0.38 | 41885 | 450 | 0.10 |
| 0.60 | 2 | 60 | 0.006 | 0.010 | 0.120 | 0.49 | 38975 | 490 | 0.10 |
| 0.80 | 2 | 60 | 0.009 | 0.000 | 0.130 | 0.60 | 31830 | 575 | 0.10 |
| 1.00 | 2 | 60 | 0.011 | 0.016 | 0.200 | 0.76 | 25130 | 545 | 0.20 |
| 1.20 | 2 | 60 | 0.013 | 0.019 | 0.240 | 0.97 | 19690 | 495 | 0.20 |
| 1.50 | 2 | 60 | 0.016 | 0.024 | 0.300 | 1.29 | 14805 | 480 | 0.20 |
| 2.00 | 2 | 60 | 0.022 | 0.032 | 0.400 | 1.82 | 10495 | 455 | 0.20 |
| 2.50 | 2 | 60 | 0.027 | 0.040 | 0.500 | 2.34 | 8160 | 440 | 0.20 |
| 3.00 | 2 | 60 | 0.032 | 0.048 | 0.600 | 2.86 | 6680 | 435 | 0.20 |

Applicazione



Materiale

Acciaio da utensile temprato
42 - 48 HRC



| d1 [mm] | z | v_c [m/min] | f_z [mm] | a_p [mm] | a_e [mm] | d_{eff} [mm] | n [min ⁻¹] | v_r [mm/min] | β [°] |
|---------|---|---------------|------------|------------|------------|----------------|------------------------|----------------|-------------|
| 0.50 | 2 | 66 | 0.022 | 0.016 | 0.016 | 0.50 | 42015 | 1850 | 45° |
| 0.60 | 2 | 79 | 0.024 | 0.020 | 0.020 | 0.60 | 41910 | 2010 | 45° |
| 0.80 | 2 | 106 | 0.028 | 0.032 | 0.032 | 0.80 | 42175 | 2360 | 45° |
| 1.00 | 2 | 132 | 0.034 | 0.040 | 0.040 | 1.00 | 42015 | 2855 | 45° |
| 1.20 | 2 | 158 | 0.036 | 0.048 | 0.048 | 1.20 | 41910 | 3020 | 45° |
| 1.50 | 2 | 198 | 0.040 | 0.060 | 0.060 | 1.50 | 42015 | 3360 | 45° |
| 2.00 | 2 | 264 | 0.046 | 0.080 | 0.080 | 2.00 | 42015 | 3865 | 45° |
| 2.50 | 2 | 300 | 0.048 | 0.100 | 0.100 | 2.49 | 38350 | 3680 | 45° |
| 3.00 | 2 | 300 | 0.056 | 0.120 | 0.120 | 2.97 | 32155 | 3600 | 45° |

Acciaio da utensile temprato
48 - 52 HRC



| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 2 | 66 | 0.020 | 0.016 | 0.016 | 0.50 | 42015 | 1680 | 45° |
| 0.60 | 2 | 79 | 0.022 | 0.020 | 0.020 | 0.60 | 41910 | 1845 | 45° |
| 0.80 | 2 | 106 | 0.026 | 0.032 | 0.032 | 0.80 | 42175 | 2195 | 45° |
| 1.00 | 2 | 132 | 0.032 | 0.040 | 0.040 | 1.00 | 42015 | 2690 | 45° |
| 1.20 | 2 | 158 | 0.034 | 0.048 | 0.048 | 1.20 | 41910 | 2850 | 45° |
| 1.50 | 2 | 198 | 0.038 | 0.060 | 0.060 | 1.50 | 42015 | 3195 | 45° |
| 2.00 | 2 | 250 | 0.044 | 0.080 | 0.080 | 2.00 | 39790 | 3500 | 45° |
| 2.50 | 2 | 250 | 0.046 | 0.100 | 0.100 | 2.49 | 31960 | 2940 | 45° |
| 3.00 | 2 | 250 | 0.054 | 0.120 | 0.120 | 2.97 | 26795 | 2895 | 45° |

Acciaio da utensile temprato
52 - 56 HRC



| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 2 | 66 | 0.020 | 0.016 | 0.016 | 0.50 | 42015 | 1680 | 45° |
| 0.60 | 2 | 79 | 0.022 | 0.020 | 0.020 | 0.60 | 41910 | 1845 | 45° |
| 0.80 | 2 | 106 | 0.026 | 0.032 | 0.032 | 0.80 | 42175 | 2195 | 45° |
| 1.00 | 2 | 132 | 0.030 | 0.040 | 0.040 | 1.00 | 42015 | 2520 | 45° |
| 1.20 | 2 | 158 | 0.032 | 0.048 | 0.048 | 1.20 | 41910 | 2680 | 45° |
| 1.50 | 2 | 198 | 0.036 | 0.060 | 0.060 | 1.50 | 42015 | 3025 | 45° |
| 2.00 | 2 | 200 | 0.042 | 0.080 | 0.080 | 2.00 | 31830 | 2675 | 45° |
| 2.50 | 2 | 200 | 0.044 | 0.100 | 0.100 | 2.49 | 25565 | 2250 | 45° |
| 3.00 | 2 | 200 | 0.050 | 0.120 | 0.120 | 2.97 | 21435 | 2145 | 45° |

Acciaio da utensile temprato
56 - 60 HRC



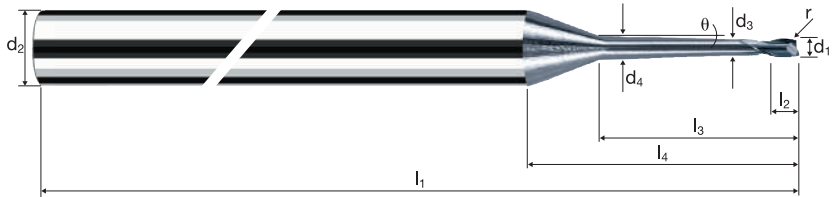
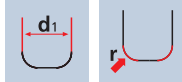
| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 2 | 66 | 0.018 | 0.016 | 0.016 | 0.50 | 42015 | 1515 | 45° |
| 0.60 | 2 | 79 | 0.020 | 0.020 | 0.020 | 0.60 | 41910 | 1675 | 45° |
| 0.80 | 2 | 106 | 0.022 | 0.032 | 0.032 | 0.80 | 42175 | 1855 | 45° |
| 1.00 | 2 | 132 | 0.028 | 0.040 | 0.040 | 1.00 | 42015 | 2355 | 45° |
| 1.20 | 2 | 150 | 0.028 | 0.048 | 0.048 | 1.20 | 39790 | 2230 | 45° |
| 1.50 | 2 | 150 | 0.032 | 0.060 | 0.060 | 1.50 | 31830 | 2035 | 45° |
| 2.00 | 2 | 150 | 0.036 | 0.080 | 0.080 | 2.00 | 23875 | 1720 | 45° |
| 2.50 | 2 | 150 | 0.038 | 0.100 | 0.100 | 2.49 | 19175 | 1455 | 45° |
| 3.00 | 2 | 150 | 0.044 | 0.120 | 0.120 | 2.97 | 16075 | 1415 | 45° |

Frese toriche MicroX

Gambo Ø 6mm, scarico conico 0.9°, 10xd



HM
XA λ 25°
 γ -10°

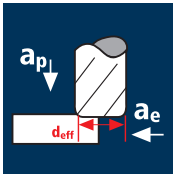


ReTool®

| | | | | | | | | | |
|----------|-------------|--------------|--------------|-----------|-----------|----------|-------------------|----------------|-------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Inox Stainless | Ti Titanium | Cobalt-Chrome Copper |
|----------|-------------|--------------|--------------|-----------|-----------|----------|-------------------|----------------|-------------------------|

| Esempio: N° Ordine | | | | | | | | | | | | | X-AL |
|---|---------------------------|-----------------------|----------------|----------------|----------------|----------------|----------------|----------------|------|--------------|-------|---|-------|
| Rivestimento: X Articolo: 6738 Codice-Ø: 050 | | | | | | | | | | | | | X6738 |
| Ø Code | d ₁ 0/-0.01 | d ₂ h/4 | d ₃ | d ₄ | l ₁ | l ₂ | l ₃ | l ₄ | θ | r 0/+0.01 | α | z | EUR |
| 050 | 0.50 | 6.00 | 0.45 | 0.59 | 57 | 0.40 | 5.00 | 15.75 | 0.9° | 0.100 | 10.4° | 2 | 80.00 |
| 060 | 0.60 | 6.00 | 0.55 | 0.72 | 57 | 0.50 | 6.00 | 16.51 | 0.9° | 0.100 | 9.6° | 2 | 80.00 |
| 080 | 0.80 | 6.00 | 0.75 | 0.98 | 61 | 0.65 | 8.00 | 18.03 | 0.9° | 0.100 | 8.6° | 2 | 80.00 |
| 100 | 1.00 | 6.00 | 0.95 | 1.24 | 61 | 0.80 | 10.00 | 19.54 | 0.9° | 0.200 | 7.6° | 2 | 80.00 |
| 108 | 1.20 | 6.00 | 1.10 | 1.45 | 66 | 1.00 | 12.00 | 21.15 | 0.9° | 0.200 | 6.8° | 2 | 80.00 |
| 120 | 1.50 | 6.00 | 1.40 | 1.83 | 66 | 1.20 | 15.00 | 23.44 | 0.9° | 0.200 | 5.8° | 2 | 80.00 |
| 140 | 2.00 | 6.00 | 1.90 | 2.48 | 69 | 1.60 | 20.00 | 27.23 | 0.9° | 0.200 | 4.4° | 2 | 80.00 |
| 160 | 2.50 | 6.00 | 2.30 | 3.02 | 75 | 2.00 | 25.00 | 31.22 | 0.9° | 0.200 | 3.4° | 2 | 80.00 |
| 180 | 3.00 | 6.00 | 2.80 | 3.67 | 75 | 2.40 | 30.00 | 35.01 | 0.9° | 0.200 | 2.6° | 2 | 80.00 |
| 145 | 2.00 | 6.00 | 1.90 | 2.48 | 69 | 1.60 | 20.00 | 27.23 | 0.9° | 0.500 | 4.4° | 2 | 80.00 |
| 165 | 2.50 | 6.00 | 2.30 | 3.02 | 75 | 2.00 | 25.00 | 31.22 | 0.9° | 0.500 | 3.4° | 2 | 80.00 |
| 185 | 3.00 | 6.00 | 2.80 | 3.67 | 75 | 2.40 | 30.00 | 35.01 | 0.9° | 0.500 | 2.6° | 2 | 80.00 |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



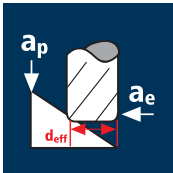
Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | r [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|--------|
| 0.50 | 2 | 49 | 0.008 | 0.007 | 0.100 | 0.37 | 42155 | 635 | 0.10 |
| 0.60 | 2 | 63 | 0.009 | 0.008 | 0.120 | 0.48 | 41780 | 735 | 0.10 |
| 0.80 | 2 | 91 | 0.013 | 0.011 | 0.160 | 0.69 | 41980 | 1060 | 0.10 |
| 1.00 | 2 | 98 | 0.015 | 0.013 | 0.200 | 0.74 | 42155 | 1275 | 0.20 |
| 1.20 | 2 | 127 | 0.018 | 0.016 | 0.240 | 0.96 | 42110 | 1485 | 0.20 |
| 1.50 | 2 | 140 | 0.023 | 0.020 | 0.300 | 1.27 | 35090 | 1590 | 0.20 |
| 2.00 | 2 | 140 | 0.030 | 0.027 | 0.400 | 1.80 | 24755 | 1495 | 0.20 |
| 2.50 | 2 | 140 | 0.038 | 0.033 | 0.500 | 2.32 | 19210 | 1450 | 0.20 |
| 3.00 | 2 | 140 | 0.045 | 0.040 | 0.600 | 2.84 | 15690 | 1425 | 0.20 |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|------|
| 0.50 | 2 | 49 | 0.007 | 0.007 | 0.100 | 0.37 | 42155 | 605 | 0.10 |
| 0.60 | 2 | 63 | 0.008 | 0.008 | 0.120 | 0.48 | 41780 | 700 | 0.10 |
| 0.80 | 2 | 91 | 0.012 | 0.011 | 0.160 | 0.69 | 41980 | 1010 | 0.10 |
| 1.00 | 2 | 98 | 0.014 | 0.013 | 0.200 | 0.74 | 42155 | 1215 | 0.20 |
| 1.20 | 2 | 120 | 0.017 | 0.016 | 0.240 | 0.96 | 39790 | 1335 | 0.20 |
| 1.50 | 2 | 120 | 0.022 | 0.020 | 0.300 | 1.27 | 30075 | 1300 | 0.20 |
| 2.00 | 2 | 120 | 0.029 | 0.027 | 0.400 | 1.80 | 21220 | 1220 | 0.20 |
| 2.50 | 2 | 120 | 0.036 | 0.033 | 0.500 | 2.32 | 16465 | 1185 | 0.20 |
| 3.00 | 2 | 120 | 0.043 | 0.040 | 0.600 | 2.84 | 13450 | 1160 | 0.20 |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|------|
| 0.50 | 2 | 49 | 0.006 | 0.007 | 0.100 | 0.37 | 42155 | 505 | 0.10 |
| 0.60 | 2 | 63 | 0.007 | 0.008 | 0.120 | 0.48 | 41780 | 585 | 0.10 |
| 0.80 | 2 | 91 | 0.010 | 0.011 | 0.160 | 0.69 | 41980 | 840 | 0.10 |
| 1.00 | 2 | 98 | 0.012 | 0.013 | 0.200 | 0.74 | 42155 | 1010 | 0.20 |
| 1.20 | 2 | 100 | 0.014 | 0.016 | 0.240 | 0.96 | 33155 | 930 | 0.20 |
| 1.50 | 2 | 100 | 0.018 | 0.020 | 0.300 | 1.27 | 25065 | 900 | 0.20 |
| 2.00 | 2 | 100 | 0.024 | 0.027 | 0.400 | 1.80 | 17685 | 850 | 0.20 |
| 2.50 | 2 | 100 | 0.030 | 0.033 | 0.500 | 2.32 | 13720 | 825 | 0.20 |
| 3.00 | 2 | 100 | 0.036 | 0.040 | 0.600 | 2.84 | 11210 | 805 | 0.20 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|-----|------|
| 0.50 | 2 | 49 | 0.005 | 0.007 | 0.100 | 0.37 | 42155 | 455 | 0.10 |
| 0.60 | 2 | 60 | 0.006 | 0.008 | 0.120 | 0.48 | 39790 | 500 | 0.10 |
| 0.80 | 2 | 60 | 0.009 | 0.011 | 0.160 | 0.69 | 27680 | 500 | 0.10 |
| 1.00 | 2 | 60 | 0.011 | 0.013 | 0.200 | 0.74 | 25810 | 555 | 0.20 |
| 1.20 | 2 | 60 | 0.013 | 0.016 | 0.240 | 0.96 | 19895 | 500 | 0.20 |
| 1.50 | 2 | 60 | 0.016 | 0.020 | 0.300 | 1.27 | 15040 | 485 | 0.20 |
| 2.00 | 2 | 60 | 0.022 | 0.027 | 0.400 | 1.80 | 10610 | 460 | 0.20 |
| 2.50 | 2 | 60 | 0.027 | 0.033 | 0.500 | 2.32 | 8230 | 445 | 0.20 |
| 3.00 | 2 | 60 | 0.032 | 0.040 | 0.600 | 2.84 | 6725 | 435 | 0.20 |

| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
| 0.50 | 2 | 66 | 0.022 | 0.016 | 0.016 | 0.50 | 42015 | 1850 | 45° |
| 0.60 | 2 | 79 | 0.024 | 0.020 | 0.020 | 0.60 | 41910 | 2010 | 45° |
| 0.80 | 2 | 106 | 0.028 | 0.032 | 0.032 | 0.80 | 42175 | 2360 | 45° |
| 1.00 | 2 | 132 | 0.034 | 0.040 | 0.040 | 1.00 | 42015 | 2855 | 45° |
| 1.20 | 2 | 158 | 0.036 | 0.048 | 0.048 | 1.20 | 41910 | 3020 | 45° |
| 1.50 | 2 | 198 | 0.040 | 0.060 | 0.060 | 1.50 | 42015 | 3360 | 45° |
| 2.00 | 2 | 264 | 0.046 | 0.080 | 0.080 | 2.00 | 42015 | 3865 | 45° |
| 2.50 | 2 | 300 | 0.048 | 0.100 | 0.100 | 2.49 | 38350 | 3680 | 45° |
| 3.00 | 2 | 300 | 0.056 | 0.120 | 0.120 | 2.97 | 32155 | 3600 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 2 | 66 | 0.020 | 0.016 | 0.016 | 0.50 | 42015 | 1680 | 45° |
| 0.60 | 2 | 79 | 0.022 | 0.020 | 0.020 | 0.60 | 41910 | 1845 | 45° |
| 0.80 | 2 | 106 | 0.026 | 0.032 | 0.032 | 0.80 | 42175 | 2195 | 45° |
| 1.00 | 2 | 132 | 0.032 | 0.040 | 0.040 | 1.00 | 42015 | 2690 | 45° |
| 1.20 | 2 | 158 | 0.034 | 0.048 | 0.048 | 1.20 | 41910 | 2850 | 45° |
| 1.50 | 2 | 198 | 0.038 | 0.060 | 0.060 | 1.50 | 42015 | 3195 | 45° |
| 2.00 | 2 | 250 | 0.044 | 0.080 | 0.080 | 2.00 | 39790 | 3500 | 45° |
| 2.50 | 2 | 250 | 0.046 | 0.100 | 0.100 | 2.49 | 31960 | 2940 | 45° |
| 3.00 | 2 | 250 | 0.054 | 0.120 | 0.120 | 2.97 | 26795 | 2895 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 2 | 66 | 0.020 | 0.016 | 0.016 | 0.50 | 42015 | 1680 | 45° |
| 0.60 | 2 | 79 | 0.022 | 0.020 | 0.020 | 0.60 | 41910 | 1845 | 45° |
| 0.80 | 2 | 106 | 0.026 | 0.032 | 0.032 | 0.80 | 42175 | 2195 | 45° |
| 1.00 | 2 | 132 | 0.030 | 0.040 | 0.040 | 1.00 | 42015 | 2520 | 45° |
| 1.20 | 2 | 158 | 0.032 | 0.048 | 0.048 | 1.20 | 41910 | 2680 | 45° |
| 1.50 | 2 | 198 | 0.036 | 0.060 | 0.060 | 1.50 | 42015 | 3025 | 45° |
| 2.00 | 2 | 200 | 0.042 | 0.080 | 0.080 | 2.00 | 31830 | 2675 | 45° |
| 2.50 | 2 | 200 | 0.044 | 0.100 | 0.100 | 2.49 | 25565 | 2250 | 45° |
| 3.00 | 2 | 200 | 0.050 | 0.120 | 0.120 | 2.97 | 21435 | 2145 | 45° |

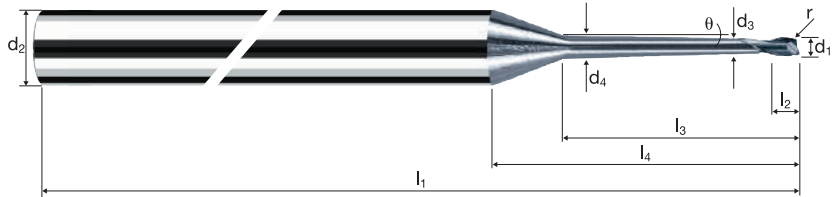
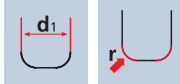
| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 2 | 66 | 0.018 | 0.016 | 0.016 | 0.50 | 42015 | 1515 | 45° |
| 0.60 | 2 | 79 | 0.020 | 0.020 | 0.020 | 0.60 | 41910 | 1675 | 45° |
| 0.80 | 2 | 106 | 0.022 | 0.032 | 0.032 | 0.80 | 42175 | 1855 | 45° |
| 1.00 | 2 | 132 | 0.028 | 0.040 | 0.040 | 1.00 | 42015 | 2355 | 45° |
| 1.20 | 2 | 150 | 0.028 | 0.048 | 0.048 | 1.20 | 39790 | 2230 | 45° |
| 1.50 | 2 | 150 | 0.032 | 0.060 | 0.060 | 1.50 | 31830 | 2035 | 45° |
| 2.00 | 2 | 150 | 0.036 | 0.080 | 0.080 | 2.00 | 23875 | 1720 | 45° |
| 2.50 | 2 | 150 | 0.038 | 0.100 | 0.100 | 2.49 | 19175 | 1455 | 45° |
| 3.00 | 2 | 150 | 0.044 | 0.120 | 0.120 | 2.97 | 16075 | 1415 | 45° |

Frese toriche MicroX

Gambo ø 6mm, scarico conico 0.9°, 12xd



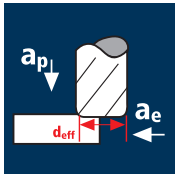
HM
XA λ 25°
 γ -10°



| | | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--------------|--------------|-------------|-------------------|----------------|-------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Inox Stainless | Ti Titanium | Cobalt-Chrome Copper |
|-------------|----------------|-----------------|-----------------|--------------|--------------|-------------|-------------------|----------------|-------------------------|

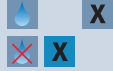
| Ø Code | Esempio: N° Ordine | | | | | | | | | | | | X-AL |
|-----------|---------------------------|----------------------|----------------|----------------|----------------|----------------|----------------|----------------|------|--------------|------|---|-------|
| | d ₁ 0/-0.01 | d ₂ h4 | d ₃ | d ₄ | l ₁ | l ₂ | l ₃ | l ₄ | θ | r 0/+0.01 | α | z | X6740 |
| | Rivestimento X | | | Articolo 6740 | | | Codice-ø 050 | | | | | | EUR |
| 050 | 0.50 | 6.00 | 0.45 | 0.63 | 57 | 0.40 | 6.00 | 16.68 | 0.9° | 0.100 | 9.9° | 2 | 80.00 |
| 060 | 0.60 | 6.00 | 0.55 | 0.76 | 57 | 0.50 | 7.20 | 17.64 | 0.9° | 0.100 | 8.9° | 2 | 80.00 |
| 080 | 0.80 | 6.00 | 0.75 | 1.03 | 61 | 0.65 | 9.60 | 19.53 | 0.9° | 0.100 | 7.9° | 2 | 80.00 |
| 100 | 1.00 | 6.00 | 0.95 | 1.30 | 66 | 0.80 | 12.00 | 21.43 | 0.9° | 0.200 | 7.0° | 2 | 80.00 |
| 108 | 1.20 | 6.00 | 1.10 | 1.52 | 66 | 1.00 | 14.40 | 23.42 | 0.9° | 0.200 | 6.2° | 2 | 80.00 |
| 120 | 1.50 | 6.00 | 1.40 | 1.93 | 69 | 1.20 | 18.00 | 26.25 | 0.9° | 0.200 | 5.1° | 2 | 80.00 |
| 140 | 2.00 | 6.00 | 1.90 | 2.60 | 75 | 1.60 | 24.00 | 31.00 | 0.9° | 0.200 | 3.9° | 2 | 80.00 |
| 160 | 2.50 | 6.00 | 2.30 | 3.18 | 80 | 2.00 | 30.00 | 35.92 | 0.9° | 0.200 | 2.9° | 2 | 80.00 |
| 180 | 3.00 | 6.00 | 2.80 | 3.86 | 87 | 2.40 | 36.00 | 40.65 | 0.9° | 0.200 | 2.2° | 2 | 80.00 |
| 145 | 2.00 | 6.00 | 1.90 | 2.60 | 75 | 1.60 | 24.00 | 31.00 | 0.9° | 0.500 | 3.9° | 2 | 80.00 |
| 165 | 2.50 | 6.00 | 2.30 | 3.18 | 80 | 2.00 | 30.00 | 35.92 | 0.9° | 0.500 | 2.9° | 2 | 80.00 |
| 185 | 3.00 | 6.00 | 2.80 | 3.86 | 87 | 2.40 | 36.00 | 40.65 | 0.9° | 0.500 | 2.2° | 2 | 80.00 |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



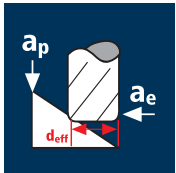
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _{ps} [mm] | a _s [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | r [mm] |
|------------|---|---------------------------|------------------------|-------------------------|------------------------|--------------------------|---------------------------|----------------------------|-----------|
| 0.50 | 2 | 48 | 0.008 | 0.005 | 0.100 | 0.36 | 42440 | 640 | 0.10 |
| 0.60 | 2 | 62 | 0.009 | 0.006 | 0.120 | 0.47 | 41990 | 740 | 0.10 |
| 0.80 | 2 | 90 | 0.013 | 0.009 | 0.160 | 0.68 | 42130 | 1060 | 0.10 |
| 1.00 | 2 | 96 | 0.015 | 0.011 | 0.200 | 0.73 | 41860 | 1265 | 0.20 |
| 1.20 | 2 | 124 | 0.018 | 0.013 | 0.240 | 0.94 | 41990 | 1480 | 0.20 |
| 1.50 | 2 | 140 | 0.023 | 0.016 | 0.300 | 1.26 | 35370 | 1605 | 0.20 |
| 2.00 | 2 | 140 | 0.030 | 0.021 | 0.400 | 1.78 | 25035 | 1515 | 0.20 |
| 2.50 | 2 | 140 | 0.038 | 0.027 | 0.500 | 2.30 | 19375 | 1465 | 0.20 |
| 3.00 | 2 | 140 | 0.045 | 0.032 | 0.600 | 2.82 | 15805 | 1435 | 0.20 |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|------|
| 0.50 | 2 | 48 | 0.007 | 0.005 | 0.100 | 0.36 | 42440 | 610 | 0.10 |
| 0.60 | 2 | 62 | 0.008 | 0.006 | 0.120 | 0.47 | 41990 | 705 | 0.10 |
| 0.80 | 2 | 90 | 0.012 | 0.009 | 0.160 | 0.68 | 42130 | 1010 | 0.10 |
| 1.00 | 2 | 96 | 0.014 | 0.011 | 0.200 | 0.73 | 41860 | 1205 | 0.20 |
| 1.20 | 2 | 120 | 0.017 | 0.013 | 0.240 | 0.94 | 40635 | 1365 | 0.20 |
| 1.50 | 2 | 120 | 0.022 | 0.016 | 0.300 | 1.26 | 30315 | 1310 | 0.20 |
| 2.00 | 2 | 120 | 0.029 | 0.021 | 0.400 | 1.78 | 21460 | 1235 | 0.20 |
| 2.50 | 2 | 120 | 0.036 | 0.027 | 0.500 | 2.30 | 16605 | 1195 | 0.20 |
| 3.00 | 2 | 120 | 0.043 | 0.032 | 0.600 | 2.82 | 13545 | 1170 | 0.20 |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|------|
| 0.50 | 2 | 48 | 0.006 | 0.005 | 0.100 | 0.36 | 42440 | 510 | 0.10 |
| 0.60 | 2 | 62 | 0.007 | 0.006 | 0.120 | 0.47 | 41990 | 590 | 0.10 |
| 0.80 | 2 | 90 | 0.010 | 0.009 | 0.160 | 0.68 | 42130 | 845 | 0.10 |
| 1.00 | 2 | 96 | 0.012 | 0.011 | 0.200 | 0.73 | 41860 | 1005 | 0.20 |
| 1.20 | 2 | 100 | 0.014 | 0.013 | 0.240 | 0.94 | 33865 | 950 | 0.20 |
| 1.50 | 2 | 100 | 0.018 | 0.016 | 0.300 | 1.26 | 25265 | 910 | 0.20 |
| 2.00 | 2 | 100 | 0.024 | 0.021 | 0.400 | 1.78 | 17885 | 860 | 0.20 |
| 2.50 | 2 | 100 | 0.030 | 0.027 | 0.500 | 2.30 | 13840 | 830 | 0.20 |
| 3.00 | 2 | 100 | 0.036 | 0.032 | 0.600 | 2.82 | 11290 | 815 | 0.20 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|-----|------|
| 0.50 | 2 | 48 | 0.005 | 0.005 | 0.100 | 0.36 | 42440 | 460 | 0.10 |
| 0.60 | 2 | 60 | 0.006 | 0.006 | 0.120 | 0.47 | 40635 | 510 | 0.10 |
| 0.80 | 2 | 60 | 0.009 | 0.009 | 0.160 | 0.68 | 28085 | 505 | 0.10 |
| 1.00 | 2 | 60 | 0.011 | 0.011 | 0.200 | 0.73 | 26160 | 565 | 0.20 |
| 1.20 | 2 | 60 | 0.013 | 0.013 | 0.240 | 0.94 | 20320 | 510 | 0.20 |
| 1.50 | 2 | 60 | 0.016 | 0.016 | 0.300 | 1.26 | 15160 | 490 | 0.20 |
| 2.00 | 2 | 60 | 0.022 | 0.021 | 0.400 | 1.78 | 10730 | 465 | 0.20 |
| 2.50 | 2 | 60 | 0.027 | 0.027 | 0.500 | 2.30 | 8305 | 450 | 0.20 |
| 3.00 | 2 | 60 | 0.032 | 0.032 | 0.600 | 2.82 | 6775 | 440 | 0.20 |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _{ps} [mm] | a _s [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|------------|---|---------------------------|------------------------|-------------------------|------------------------|--------------------------|---------------------------|----------------------------|----------|
| 0.50 | 2 | 65 | 0.018 | 0.012 | 0.012 | 0.49 | 42225 | 1520 | 45° |
| 0.60 | 2 | 78 | 0.018 | 0.012 | 0.012 | 0.59 | 42080 | 1515 | 45° |
| 0.80 | 2 | 106 | 0.020 | 0.020 | 0.020 | 0.80 | 42175 | 1685 | 45° |
| 1.00 | 2 | 131 | 0.026 | 0.026 | 0.026 | 0.99 | 42120 | 2190 | 45° |
| 1.20 | 2 | 157 | 0.028 | 0.030 | 0.030 | 1.19 | 41995 | 2350 | 45° |
| 1.50 | 2 | 197 | 0.030 | 0.038 | 0.038 | 1.49 | 42085 | 2525 | 45° |
| 2.00 | 2 | 264 | 0.034 | 0.050 | 0.050 | 2.00 | 42015 | 2855 | 45° |
| 2.50 | 2 | 300 | 0.036 | 0.062 | 0.062 | 2.50 | 38195 | 2750 | 45° |
| 3.00 | 2 | 300 | 0.042 | 0.076 | 0.076 | 3.00 | 31830 | 2675 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 2 | 65 | 0.018 | 0.012 | 0.012 | 0.49 | 42225 | 1520 | 45° |
| 0.60 | 2 | 78 | 0.018 | 0.012 | 0.012 | 0.59 | 42080 | 1515 | 45° |
| 0.80 | 2 | 106 | 0.020 | 0.020 | 0.020 | 0.80 | 42175 | 1685 | 45° |
| 1.00 | 2 | 131 | 0.024 | 0.026 | 0.026 | 0.99 | 42120 | 2020 | 45° |
| 1.20 | 2 | 157 | 0.026 | 0.030 | 0.030 | 1.19 | 41995 | 2185 | 45° |
| 1.50 | 2 | 197 | 0.028 | 0.038 | 0.038 | 1.49 | 42085 | 2355 | 45° |
| 2.00 | 2 | 250 | 0.032 | 0.050 | 0.050 | 2.00 | 39790 | 2545 | 45° |
| 2.50 | 2 | 250 | 0.034 | 0.062 | 0.062 | 2.50 | 31830 | 2165 | 45° |
| 3.00 | 2 | 250 | 0.040 | 0.076 | 0.076 | 3.00 | 26525 | 2120 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 2 | 65 | 0.016 | 0.012 | 0.012 | 0.49 | 42225 | 1350 | 45° |
| 0.60 | 2 | 78 | 0.016 | 0.012 | 0.012 | 0.59 | 42080 | 1345 | 45° |
| 0.80 | 2 | 106 | 0.018 | 0.020 | 0.020 | 0.80 | 42175 | 1520 | 45° |
| 1.00 | 2 | 131 | 0.024 | 0.026 | 0.026 | 0.99 | 42120 | 2020 | 45° |
| 1.20 | 2 | 157 | 0.026 | 0.030 | 0.030 | 1.19 | 41995 | 2185 | 45° |
| 1.50 | 2 | 197 | 0.028 | 0.038 | 0.038 | 1.49 | 42085 | 2355 | 45° |
| 2.00 | 2 | 200 | 0.030 | 0.050 | 0.050 | 2.00 | 31830 | 1910 | 45° |
| 2.50 | 2 | 200 | 0.032 | 0.062 | 0.062 | 2.50 | 25465 | 1630 | 45° |
| 3.00 | 2 | 200 | 0.038 | 0.076 | 0.076 | 3.00 | 21220 | 1615 | 45° |

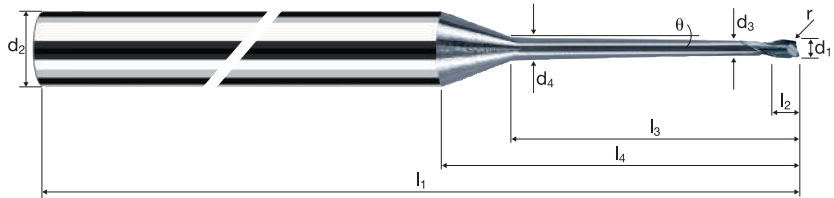
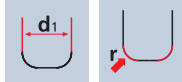
| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 2 | 65 | 0.014 | 0.012 | 0.012 | 0.49 | 42225 | 1180 | 45° |
| 0.60 | 2 | 78 | 0.014 | 0.012 | 0.012 | 0.59 | 42080 | 1180 | 45° |
| 0.80 | 2 | 106 | 0.016 | 0.020 | 0.020 | 0.80 | 42175 | 1350 | 45° |
| 1.00 | 2 | 131 | 0.020 | 0.026 | 0.026 | 0.99 | 42120 | 1685 | 45° |
| 1.20 | 2 | 150 | 0.022 | 0.030 | 0.030 | 1.19 | 40125 | 1765 | 45° |
| 1.50 | 2 | 150 | 0.024 | 0.038 | 0.038 | 1.49 | 32045 | 1540 | 45° |
| 2.00 | 2 | 150 | 0.028 | 0.050 | 0.050 | 2.00 | 23875 | 1335 | 45° |
| 2.50 | 2 | 150 | 0.028 | 0.062 | 0.062 | 2.50 | 19100 | 1070 | 45° |
| 3.00 | 2 | 150 | 0.034 | 0.076 | 0.076 | 3.00 | 15915 | 1080 | 45° |

Frese toriche MicroX

Gambo ø 6mm, scarico conico 0.9°, 15xd



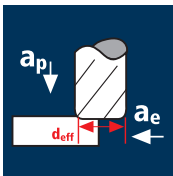
HM λ 25°
XA γ -10°



| | | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--------------|--------------|-------------|-------------------|----------------|-------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Inox Stainless | Ti Titanium | Cobalt-Chrome Copper |
|-------------|----------------|-----------------|-----------------|--------------|--------------|-------------|-------------------|----------------|-------------------------|

| Esempio: N° Ordine | | | | | | | | | | | | | X-AL |
|--------------------------------------|---------------------------|----------------------|----------------|----------------|----------------|----------------|----------------|----------------|------|--------------|------|---|-------|
| Rivestimento Articolo Codice-ø | | | | | | | | | | | | | |
| X 6742 050 | | | | | | | | | | | | | X6742 |
| Ø Code | d ₁ 0/-0.01 | d ₂ h4 | d ₃ | d ₄ | l ₁ | l ₂ | l ₃ | l ₄ | θ | r 0/+0.01 | α | z | EUR |
| 050 | 0.50 | 6.00 | 0.45 | 0.67 | 61 | 0.40 | 7.50 | 18.10 | 0.9° | 0.100 | 9.1° | 2 | 80.00 |
| 060 | 0.60 | 6.00 | 0.55 | 0.82 | 61 | 0.50 | 9.00 | 19.32 | 0.9° | 0.100 | 8.1° | 2 | 80.00 |
| 080 | 0.80 | 6.00 | 0.75 | 1.11 | 66 | 0.65 | 12.00 | 21.78 | 0.9° | 0.100 | 7.1° | 2 | 80.00 |
| 100 | 1.00 | 6.00 | 0.95 | 1.40 | 66 | 0.80 | 15.00 | 24.24 | 0.9° | 0.200 | 6.1° | 2 | 80.00 |
| 108 | 1.20 | 6.00 | 1.10 | 1.63 | 69 | 1.00 | 18.00 | 26.81 | 0.9° | 0.200 | 5.3° | 2 | 80.00 |
| 120 | 1.50 | 6.00 | 1.40 | 2.07 | 75 | 1.20 | 22.50 | 30.49 | 0.9° | 0.200 | 4.4° | 2 | 80.00 |
| 140 | 2.00 | 6.00 | 1.90 | 2.79 | 80 | 1.60 | 30.00 | 36.65 | 0.9° | 0.200 | 3.3° | 2 | 80.00 |
| 160 | 2.50 | 6.00 | 2.30 | 3.42 | 87 | 2.00 | 37.50 | 42.97 | 0.9° | 0.200 | 2.4° | 2 | 80.00 |
| 180 | 3.00 | 6.00 | 2.80 | 4.14 | 100 | 2.40 | 45.00 | 49.13 | 0.9° | 0.200 | 1.8° | 2 | 80.00 |
| 145 | 2.00 | 6.00 | 1.90 | 2.79 | 80 | 1.60 | 30.00 | 36.65 | 0.9° | 0.500 | 3.3° | 2 | 80.00 |
| 165 | 2.50 | 6.00 | 2.30 | 3.42 | 87 | 2.00 | 37.50 | 42.97 | 0.9° | 0.500 | 2.4° | 2 | 80.00 |
| 185 | 3.00 | 6.00 | 2.80 | 4.14 | 100 | 2.40 | 45.00 | 49.13 | 0.9° | 0.500 | 1.8° | 2 | 80.00 |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

Applicazione



Materiale

Acciaio da utensile temprato
42 - 48 HRC



Acciaio da utensile temprato
48 - 52 HRC



Acciaio da utensile temprato
52 - 56 HRC



Acciaio da utensile temprato
56 - 60 HRC



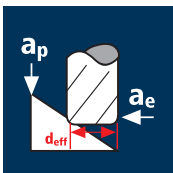
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _t [mm/min] | r [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|--------|
| 0.50 | 2 | 48 | 0.008 | 0.004 | 0.100 | 0.36 | 42440 | 640 | 0.10 |
| 0.60 | 2 | 61 | 0.009 | 0.005 | 0.120 | 0.46 | 42210 | 745 | 0.10 |
| 0.80 | 2 | 88 | 0.013 | 0.006 | 0.160 | 0.67 | 41810 | 1055 | 0.10 |
| 1.00 | 2 | 94 | 0.015 | 0.008 | 0.200 | 0.71 | 42140 | 1275 | 0.20 |
| 1.50 | 2 | 140 | 0.023 | 0.012 | 0.300 | 1.24 | 35940 | 1630 | 0.20 |
| 2.00 | 2 | 140 | 0.030 | 0.016 | 0.400 | 1.76 | 25320 | 1530 | 0.20 |
| 2.50 | 2 | 140 | 0.038 | 0.020 | 0.500 | 2.27 | 19630 | 1485 | 0.20 |
| 3.00 | 2 | 140 | 0.045 | 0.024 | 0.600 | 2.79 | 15975 | 1450 | 0.20 |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|------|
| 0.50 | 2 | 48 | 0.007 | 0.004 | 0.100 | 0.36 | 42440 | 610 | 0.10 |
| 0.60 | 2 | 61 | 0.008 | 0.005 | 0.120 | 0.46 | 42210 | 710 | 0.10 |
| 0.80 | 2 | 88 | 0.012 | 0.006 | 0.160 | 0.67 | 41810 | 1005 | 0.10 |
| 1.00 | 2 | 94 | 0.014 | 0.008 | 0.200 | 0.71 | 42140 | 1215 | 0.20 |
| 1.50 | 2 | 120 | 0.022 | 0.012 | 0.300 | 1.24 | 30805 | 1330 | 0.20 |
| 2.00 | 2 | 120 | 0.029 | 0.016 | 0.400 | 1.76 | 21705 | 1250 | 0.20 |
| 2.50 | 2 | 120 | 0.036 | 0.020 | 0.500 | 2.27 | 16825 | 1210 | 0.20 |
| 3.00 | 2 | 120 | 0.043 | 0.024 | 0.600 | 2.79 | 13690 | 1185 | 0.20 |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|------|
| 0.50 | 2 | 48 | 0.006 | 0.004 | 0.100 | 0.36 | 42440 | 510 | 0.10 |
| 0.60 | 2 | 61 | 0.007 | 0.005 | 0.120 | 0.46 | 42210 | 590 | 0.10 |
| 0.80 | 2 | 88 | 0.010 | 0.006 | 0.160 | 0.67 | 41810 | 835 | 0.10 |
| 1.00 | 2 | 94 | 0.012 | 0.008 | 0.200 | 0.71 | 42140 | 1010 | 0.20 |
| 1.50 | 2 | 100 | 0.018 | 0.012 | 0.300 | 1.24 | 25670 | 925 | 0.20 |
| 2.00 | 2 | 100 | 0.024 | 0.016 | 0.400 | 1.76 | 18085 | 870 | 0.20 |
| 2.50 | 2 | 100 | 0.030 | 0.020 | 0.500 | 2.27 | 14020 | 840 | 0.20 |
| 3.00 | 2 | 100 | 0.036 | 0.024 | 0.600 | 2.79 | 11410 | 820 | 0.20 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|-----|------|
| 0.50 | 2 | 48 | 0.005 | 0.004 | 0.100 | 0.36 | 42440 | 460 | 0.10 |
| 0.60 | 2 | 60 | 0.006 | 0.005 | 0.120 | 0.46 | 41520 | 525 | 0.10 |
| 0.80 | 2 | 60 | 0.009 | 0.006 | 0.160 | 0.67 | 28505 | 515 | 0.10 |
| 1.00 | 2 | 60 | 0.011 | 0.008 | 0.200 | 0.71 | 26900 | 580 | 0.20 |
| 1.50 | 2 | 60 | 0.016 | 0.012 | 0.300 | 1.24 | 15400 | 500 | 0.20 |
| 2.00 | 2 | 60 | 0.022 | 0.016 | 0.400 | 1.76 | 10850 | 470 | 0.20 |
| 2.50 | 2 | 60 | 0.027 | 0.020 | 0.500 | 2.27 | 8415 | 455 | 0.20 |
| 3.00 | 2 | 60 | 0.032 | 0.024 | 0.600 | 2.79 | 6845 | 445 | 0.20 |

Applicazione



Materiale

Acciaio da utensile temprato
42 - 48 HRC



Acciaio da utensile temprato
48 - 52 HRC



Acciaio da utensile temprato
52 - 56 HRC



Acciaio da utensile temprato
56 - 60 HRC



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _t [mm/min] | β [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
| 0.50 | 2 | 65 | 0.018 | 0.012 | 0.012 | 0.49 | 42225 | 1520 | 45° |
| 0.60 | 2 | 78 | 0.018 | 0.012 | 0.012 | 0.59 | 42080 | 1515 | 45° |
| 0.80 | 2 | 106 | 0.020 | 0.020 | 0.020 | 0.80 | 42175 | 1685 | 45° |
| 1.00 | 2 | 131 | 0.026 | 0.026 | 0.026 | 0.99 | 42120 | 2190 | 45° |
| 1.50 | 2 | 197 | 0.030 | 0.038 | 0.038 | 1.49 | 42085 | 2525 | 45° |
| 2.00 | 2 | 264 | 0.034 | 0.050 | 0.050 | 2.00 | 42015 | 2855 | 45° |
| 2.50 | 2 | 300 | 0.036 | 0.062 | 0.062 | 2.50 | 38195 | 2750 | 45° |
| 3.00 | 2 | 300 | 0.042 | 0.076 | 0.076 | 3.00 | 31830 | 2675 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 2 | 65 | 0.018 | 0.012 | 0.012 | 0.49 | 42225 | 1520 | 45° |
| 0.60 | 2 | 78 | 0.018 | 0.012 | 0.012 | 0.59 | 42080 | 1515 | 45° |
| 0.80 | 2 | 106 | 0.020 | 0.020 | 0.020 | 0.80 | 42175 | 1685 | 45° |
| 1.00 | 2 | 131 | 0.024 | 0.026 | 0.026 | 0.99 | 42120 | 2020 | 45° |
| 1.50 | 2 | 197 | 0.028 | 0.038 | 0.038 | 1.49 | 42085 | 2355 | 45° |
| 2.00 | 2 | 250 | 0.032 | 0.050 | 0.050 | 2.00 | 39790 | 2545 | 45° |
| 2.50 | 2 | 250 | 0.034 | 0.062 | 0.062 | 2.50 | 31830 | 2165 | 45° |
| 3.00 | 2 | 250 | 0.040 | 0.076 | 0.076 | 3.00 | 26525 | 2120 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 2 | 65 | 0.016 | 0.012 | 0.012 | 0.49 | 42225 | 1350 | 45° |
| 0.60 | 2 | 78 | 0.016 | 0.012 | 0.012 | 0.59 | 42080 | 1345 | 45° |
| 0.80 | 2 | 106 | 0.018 | 0.020 | 0.020 | 0.80 | 42175 | 1520 | 45° |
| 1.00 | 2 | 131 | 0.024 | 0.026 | 0.026 | 0.99 | 42120 | 2020 | 45° |
| 1.50 | 2 | 197 | 0.028 | 0.038 | 0.038 | 1.49 | 42085 | 2355 | 45° |
| 2.00 | 2 | 200 | 0.030 | 0.050 | 0.050 | 2.00 | 31830 | 1910 | 45° |
| 2.50 | 2 | 200 | 0.032 | 0.062 | 0.062 | 2.50 | 25465 | 1630 | 45° |
| 3.00 | 2 | 200 | 0.038 | 0.076 | 0.076 | 3.00 | 21220 | 1615 | 45° |

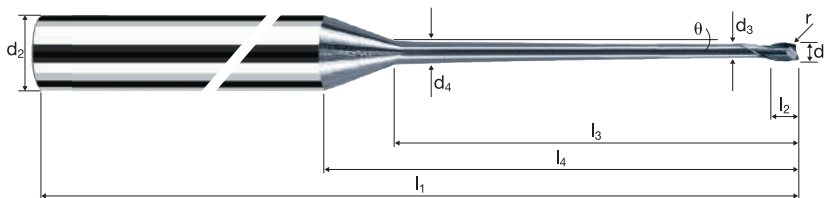
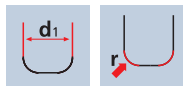
| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 2 | 65 | 0.014 | 0.012 | 0.012 | 0.49 | 42225 | 1180 | 45° |
| 0.60 | 2 | 78 | 0.014 | 0.012 | 0.012 | 0.59 | 42080 | 1180 | 45° |
| 0.80 | 2 | 106 | 0.016 | 0.020 | 0.020 | 0.80 | 42175 | 1350 | 45° |
| 1.00 | 2 | 131 | 0.020 | 0.026 | 0.026 | 0.99 | 42120 | 1685 | 45° |
| 1.50 | 2 | 150 | 0.024 | 0.038 | 0.038 | 1.49 | 32045 | 1540 | 45° |
| 2.00 | 2 | 150 | 0.028 | 0.050 | 0.050 | 2.00 | 23875 | 1335 | 45° |
| 2.50 | 2 | 150 | 0.028 | 0.062 | 0.062 | 2.50 | 19100 | 1070 | 45° |
| 3.00 | 2 | 150 | 0.034 | 0.076 | 0.076 | 3.00 | 15915 | 1080 | 45° |

Frese toriche MicroX

Gambo ø 6mm, scarico conico 0.9°, 20xd



HM λ 25°
XA γ -10°

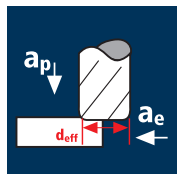


ReTool®

| | | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--------------|--------------|-------------|-------------------|----------------|-------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Inox Stainless | Ti Titanium | Cobalt-Chrome Copper |
|-------------|----------------|-----------------|-----------------|--------------|--------------|-------------|-------------------|----------------|-------------------------|

| Esempio: N° Ordine | | | | | | | | | | | | | X-AL |
|--|---------------------------|----------------------|----------------|----------------|----------------|----------------|----------------|----------------|------|--------------|------|---|-------|
| Rivestimento X Articolo 6744 Codice-ø 050 | | | | | | | | | | | | | |
| Ø Code | d ₁ 0/-0.01 | d ₂ h4 | d ₃ | d ₄ | l ₁ | l ₂ | l ₃ | l ₄ | θ | r 0/+0.01 | α | z | EUR |
| 050 | 0.50 | 6.00 | 0.45 | 0.75 | 61 | 0.40 | 10.00 | 20.45 | 0.9° | 0.100 | 7.8° | 2 | 88.00 |
| 060 | 0.60 | 6.00 | 0.55 | 0.91 | 66 | 0.50 | 12.00 | 22.16 | 0.9° | 0.100 | 7.0° | 2 | 88.00 |
| 080 | 0.80 | 6.00 | 0.75 | 1.23 | 69 | 0.65 | 16.00 | 25.56 | 0.9° | 0.100 | 5.8° | 2 | 88.00 |
| 100 | 1.00 | 6.00 | 0.95 | 1.55 | 69 | 0.80 | 20.00 | 28.96 | 0.9° | 0.200 | 4.9° | 2 | 88.00 |
| 120 | 1.50 | 6.00 | 1.40 | 2.30 | 80 | 1.20 | 30.00 | 37.56 | 0.9° | 0.200 | 3.4° | 2 | 88.00 |
| 140 | 2.00 | 6.00 | 1.90 | 3.11 | 87 | 1.60 | 40.00 | 46.05 | 0.9° | 0.200 | 2.5° | 2 | 88.00 |
| 160 | 2.50 | 6.00 | 2.30 | 3.81 | 100 | 2.00 | 50.00 | 54.74 | 0.9° | 0.200 | 1.8° | 2 | 88.00 |
| 180 | 3.00 | 6.00 | 2.80 | 4.61 | 100 | 2.40 | 60.00 | 63.25 | 0.9° | 0.200 | 1.4° | 2 | 88.00 |
| 145 | 2.00 | 6.00 | 1.90 | 3.11 | 87 | 1.60 | 40.00 | 46.05 | 0.9° | 0.500 | 2.5° | 2 | 88.00 |
| 165 | 2.50 | 6.00 | 2.30 | 3.81 | 100 | 2.00 | 50.00 | 54.74 | 0.9° | 0.500 | 1.8° | 2 | 88.00 |
| 185 | 3.00 | 6.00 | 2.80 | 4.61 | 100 | 2.40 | 60.00 | 63.25 | 0.9° | 0.500 | 1.4° | 2 | 88.00 |
| | | | | | | | | | | | | | |
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Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



| d1 [mm] | z | v_c [m/min] | f_z [mm] | a_p [mm] | a_e [mm] | d_eff [mm] | n [min ⁻¹] | v_r [mm/min] | r [mm] |
|---------|---|-------------|----------|----------|----------|------------|------------------------|--------------|--------|
| 0.50 | 4 | 58 | 0.016 | 0.030 | 0.100 | 0.44 | 41960 | 2685 | 0.10 |
| 0.80 | 4 | 102 | 0.026 | 0.050 | 0.160 | 0.77 | 42165 | 4385 | 0.10 |
| 1.00 | 4 | 117 | 0.034 | 0.060 | 0.200 | 0.89 | 41845 | 5690 | 0.20 |
| 1.20 | 4 | 140 | 0.040 | 0.070 | 0.240 | 1.10 | 40510 | 6480 | 0.20 |
| 1.50 | 4 | 140 | 0.050 | 0.090 | 0.300 | 1.43 | 31165 | 6235 | 0.20 |
| 2.00 | 4 | 140 | 0.066 | 0.120 | 0.400 | 1.97 | 22620 | 5970 | 0.20 |
| 2.50 | 4 | 140 | 0.084 | 0.150 | 0.500 | 2.49 | 17895 | 6015 | 0.20 |
| 3.00 | 4 | 140 | 0.100 | 0.180 | 0.600 | 3.00 | 14855 | 5940 | 0.20 |

Acciaio da
utensile temprato
48 - 52 HRC



| d1 [mm] | z | v_c [m/min] | f_z [mm] | a_p [mm] | a_e [mm] | d_eff [mm] | n [min ⁻¹] | v_r [mm/min] | r [mm] |
|---------|---|-------------|----------|----------|----------|------------|------------------------|--------------|--------|
| 0.50 | 4 | 58 | 0.016 | 0.030 | 0.100 | 0.44 | 41960 | 2685 | 0.10 |
| 0.80 | 4 | 102 | 0.024 | 0.050 | 0.160 | 0.77 | 42165 | 4050 | 0.10 |
| 1.00 | 4 | 117 | 0.032 | 0.060 | 0.200 | 0.89 | 41845 | 5355 | 0.20 |
| 1.20 | 4 | 120 | 0.038 | 0.070 | 0.240 | 1.10 | 34725 | 5280 | 0.20 |
| 1.50 | 4 | 120 | 0.048 | 0.090 | 0.300 | 1.43 | 26710 | 5130 | 0.20 |
| 2.00 | 4 | 120 | 0.062 | 0.120 | 0.400 | 1.97 | 19390 | 4810 | 0.20 |
| 2.50 | 4 | 120 | 0.080 | 0.150 | 0.500 | 2.49 | 15340 | 4910 | 0.20 |
| 3.00 | 4 | 120 | 0.096 | 0.180 | 0.600 | 3.00 | 12730 | 4890 | 0.20 |

Acciaio da
utensile temprato
52 - 56 HRC



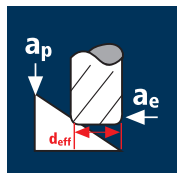
| d1 [mm] | z | v_c [m/min] | f_z [mm] | a_p [mm] | a_e [mm] | d_eff [mm] | n [min ⁻¹] | v_r [mm/min] | r [mm] |
|---------|---|-------------|----------|----------|----------|------------|------------------------|--------------|--------|
| 0.50 | 4 | 58 | 0.014 | 0.030 | 0.100 | 0.44 | 41960 | 2350 | 0.10 |
| 0.80 | 4 | 100 | 0.022 | 0.050 | 0.160 | 0.77 | 41340 | 3640 | 0.10 |
| 1.00 | 4 | 100 | 0.030 | 0.060 | 0.200 | 0.89 | 35765 | 4290 | 0.20 |
| 1.20 | 4 | 100 | 0.036 | 0.070 | 0.240 | 1.10 | 28935 | 4165 | 0.20 |
| 1.50 | 4 | 100 | 0.044 | 0.090 | 0.300 | 1.43 | 22260 | 3920 | 0.20 |
| 2.00 | 4 | 100 | 0.058 | 0.120 | 0.400 | 1.97 | 16160 | 3750 | 0.20 |
| 2.50 | 4 | 100 | 0.074 | 0.150 | 0.500 | 2.49 | 12785 | 3785 | 0.20 |
| 3.00 | 4 | 100 | 0.088 | 0.180 | 0.600 | 3.00 | 10610 | 3735 | 0.20 |

Acciaio da
utensile temprato
56 - 60 HRC



| d1 [mm] | z | v_c [m/min] | f_z [mm] | a_p [mm] | a_e [mm] | d_eff [mm] | n [min ⁻¹] | v_r [mm/min] | r [mm] |
|---------|---|-------------|----------|----------|----------|------------|------------------------|--------------|--------|
| 0.50 | 4 | 58 | 0.012 | 0.030 | 0.100 | 0.44 | 41960 | 2015 | 0.10 |
| 0.80 | 4 | 60 | 0.020 | 0.050 | 0.160 | 0.77 | 24805 | 1985 | 0.10 |
| 1.00 | 4 | 60 | 0.028 | 0.060 | 0.200 | 0.89 | 21460 | 2405 | 0.20 |
| 1.20 | 4 | 60 | 0.032 | 0.070 | 0.240 | 1.10 | 17360 | 2220 | 0.20 |
| 1.50 | 4 | 60 | 0.040 | 0.090 | 0.300 | 1.43 | 13355 | 2135 | 0.20 |
| 2.00 | 4 | 60 | 0.052 | 0.120 | 0.400 | 1.97 | 9695 | 2015 | 0.20 |
| 2.50 | 4 | 60 | 0.068 | 0.150 | 0.500 | 2.49 | 7670 | 2085 | 0.20 |
| 3.00 | 4 | 60 | 0.080 | 0.180 | 0.600 | 3.00 | 6365 | 2035 | 0.20 |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



| d1 [mm] | z | v_c [m/min] | f_z [mm] | a_p [mm] | a_e [mm] | d_eff [mm] | n [min ⁻¹] | v_r [mm/min] | β [°] |
|---------|---|-------------|----------|----------|----------|------------|------------------------|--------------|-------|
| 0.50 | 4 | 66 | 0.020 | 0.022 | 0.022 | 0.50 | 42015 | 3360 | 45° |
| 0.80 | 4 | 106 | 0.022 | 0.034 | 0.034 | 0.80 | 42175 | 3710 | 45° |
| 1.00 | 4 | 132 | 0.028 | 0.042 | 0.042 | 1.00 | 42015 | 4705 | 45° |
| 1.20 | 4 | 158 | 0.030 | 0.050 | 0.050 | 1.20 | 41910 | 5030 | 45° |
| 1.50 | 4 | 198 | 0.034 | 0.064 | 0.064 | 1.50 | 42015 | 5715 | 45° |
| 2.00 | 4 | 263 | 0.038 | 0.084 | 0.084 | 1.99 | 42070 | 6395 | 45° |
| 2.50 | 4 | 300 | 0.040 | 0.106 | 0.106 | 2.48 | 38505 | 6160 | 45° |
| 3.00 | 4 | 300 | 0.046 | 0.126 | 0.126 | 2.97 | 32155 | 5915 | 45° |

Acciaio da
utensile temprato
48 - 52 HRC



| d1 [mm] | z | v_c [m/min] | f_z [mm] | a_p [mm] | a_e [mm] | d_eff [mm] | n [min ⁻¹] | v_r [mm/min] | β [°] |
|---------|---|-------------|----------|----------|----------|------------|------------------------|--------------|-------|
| 0.50 | 4 | 66 | 0.020 | 0.022 | 0.022 | 0.50 | 42015 | 3360 | 45° |
| 0.80 | 4 | 106 | 0.020 | 0.034 | 0.034 | 0.80 | 42175 | 3375 | 45° |
| 1.00 | 4 | 132 | 0.026 | 0.042 | 0.042 | 1.00 | 42015 | 4370 | 45° |
| 1.20 | 4 | 158 | 0.028 | 0.050 | 0.050 | 1.20 | 41910 | 4695 | 45° |
| 1.50 | 4 | 198 | 0.032 | 0.064 | 0.064 | 1.50 | 42015 | 5380 | 45° |
| 2.00 | 4 | 250 | 0.036 | 0.084 | 0.084 | 1.99 | 39990 | 5760 | 45° |
| 2.50 | 4 | 250 | 0.038 | 0.106 | 0.106 | 2.48 | 32090 | 4875 | 45° |
| 3.00 | 4 | 250 | 0.044 | 0.126 | 0.126 | 2.97 | 26795 | 4715 | 45° |

Acciaio da
utensile temprato
52 - 56 HRC



| d1 [mm] | z | v_c [m/min] | f_z [mm] | a_p [mm] | a_e [mm] | d_eff [mm] | n [min ⁻¹] | v_r [mm/min] | β [°] |
|---------|---|-------------|----------|----------|----------|------------|------------------------|--------------|-------|
| 0.50 | 4 | 66 | 0.018 | 0.022 | 0.022 | 0.50 | 42015 | 3025 | 45° |
| 0.80 | 4 | 106 | 0.020 | 0.034 | 0.034 | 0.80 | 42175 | 3375 | 45° |
| 1.00 | 4 | 132 | 0.026 | 0.042 | 0.042 | 1.00 | 42015 | 4370 | 45° |
| 1.20 | 4 | 158 | 0.028 | 0.050 | 0.050 | 1.20 | 41910 | 4695 | 45° |
| 1.50 | 4 | 198 | 0.030 | 0.064 | 0.064 | 1.50 | 42015 | 5040 | 45° |
| 2.00 | 4 | 200 | 0.034 | 0.084 | 0.084 | 1.99 | 31990 | 4350 | 45° |
| 2.50 | 4 | 200 | 0.036 | 0.106 | 0.106 | 2.48 | 25670 | 3695 | 45° |
| 3.00 | 4 | 200 | 0.042 | 0.126 | 0.126 | 2.97 | 21435 | 3600 | 45° |

Acciaio da
utensile temprato
56 - 60 HRC



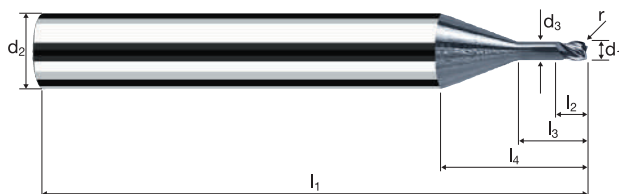
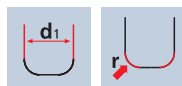
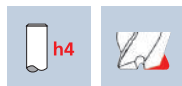
| d1 [mm] | z | v_c [m/min] | f_z [mm] | a_p [mm] | a_e [mm] | d_eff [mm] | n [min ⁻¹] | v_r [mm/min] | β [°] |
|---------|---|-------------|----------|----------|----------|------------|------------------------|--------------|-------|
| 0.50 | 4 | 66 | 0.016 | 0.022 | 0.022 | 0.50 | 42015 | 2690 | 45° |
| 0.80 | 4 | 106 | 0.018 | 0.034 | 0.034 | 0.80 | 42175 | 3035 | 45° |
| 1.00 | 4 | 132 | 0.022 | 0.042 | 0.042 | 1.00 | 42015 | 3695 | 45° |
| 1.20 | 4 | 150 | 0.024 | 0.050 | 0.050 | 1.20 | 39790 | 3820 | 45° |
| 1.50 | 4 | 150 | 0.028 | 0.064 | 0.064 | 1.50 | 31830 | 3565 | 45° |
| 2.00 | 4 | 150 | 0.030 | 0.084 | 0.084 | 1.99 | 23995 | 2880 | 45° |
| 2.50 | 4 | 150 | 0.032 | 0.106 | 0.106 | 2.48 | 19255 | 2465 | 45° |
| 3.00 | 4 | 150 | 0.036 | 0.126 | 0.126 | 2.97 | 16075 | 2315 | 45° |

Frese toriche MicroX

Gambo \varnothing 6mm, scarico cilindrico, 3xd



| | |
|----------|-------------------------------|
| HM XA | λ 30° γ -5° |
|----------|-------------------------------|

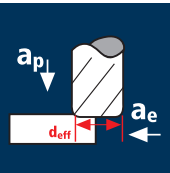


ReTool®

| | | | | | | | |
|----------------|-----------------|-----------------|--------------|--------------|-------------|----------------|-------|
| Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Ti Titanium | GG(G) |
|----------------|-----------------|-----------------|--------------|--------------|-------------|----------------|-------|

| Esempio: N° Ordine | | | | | | | | | | | X-AL |
|-------------------------------------|------------------|-------------|-------|-------|-------|-------|-------|----------------|----------|-----|-------|
| Rivestimento X | | | | | | | | | | | X6632 |
| Articolo 6632 | | | | | | | | | | | EUR |
| Codice- \varnothing 050 | | | | | | | | | | | EUR |
| \varnothing Code | d_1 0/-0.01 | d_2 h4 | d_3 | l_1 | l_2 | l_3 | l_4 | r 0/+0.01 | α | z | EUR |
| 050 | 0.50 | 6.00 | 0.45 | 57 | 0.50 | 1.50 | 12.51 | 0.100 | 13.2° | 4 | 76.00 |
| 080 | 0.80 | 6.00 | 0.75 | 57 | 0.80 | 2.40 | 12.85 | 0.100 | 12.2° | 4 | 76.00 |
| 100 | 1.00 | 6.00 | 0.95 | 57 | 1.00 | 3.00 | 13.08 | 0.200 | 11.6° | 4 | 76.00 |
| 108 | 1.20 | 6.00 | 1.10 | 57 | 1.20 | 3.60 | 13.40 | 0.200 | 10.9° | 4 | 76.00 |
| 120 | 1.50 | 6.00 | 1.40 | 57 | 1.50 | 4.50 | 13.74 | 0.200 | 10.0° | 4 | 76.00 |
| 140 | 2.00 | 6.00 | 1.90 | 57 | 2.00 | 6.00 | 14.31 | 0.200 | 8.6° | 4 | 76.00 |
| 160 | 2.50 | 6.00 | 2.30 | 57 | 2.50 | 7.50 | 15.06 | 0.200 | 7.2° | 4 | 76.00 |
| 180 | 3.00 | 6.00 | 2.80 | 57 | 3.00 | 9.00 | 15.63 | 0.200 | 6.0° | 4 | 76.00 |
| 145 | 2.00 | 6.00 | 1.90 | 57 | 2.00 | 6.00 | 14.31 | 0.500 | 8.7° | 4 | 76.00 |
| 165 | 2.50 | 6.00 | 2.30 | 57 | 2.50 | 7.50 | 15.06 | 0.500 | 7.3° | 4 | 76.00 |
| 185 | 3.00 | 6.00 | 2.80 | 57 | 3.00 | 9.00 | 15.63 | 0.500 | 6.1° | 4 | 76.00 |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



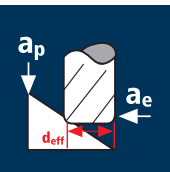
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _s [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _c [mm/min] | r [mm] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|-----------|
| 0.50 | 4 | 58 | 0.016 | 0.030 | 0.100 | 0.44 | 41960 | 2685 | 0.10 |
| 0.80 | 4 | 100 | 0.026 | 0.040 | 0.160 | 0.76 | 41885 | 4355 | 0.10 |
| 1.00 | 4 | 113 | 0.034 | 0.050 | 0.200 | 0.86 | 41825 | 5690 | 0.20 |
| 1.20 | 4 | 140 | 0.040 | 0.060 | 0.240 | 1.09 | 40885 | 6540 | 0.20 |
| 1.50 | 4 | 140 | 0.050 | 0.080 | 0.300 | 1.42 | 31385 | 6275 | 0.20 |
| 2.00 | 4 | 140 | 0.066 | 0.100 | 0.400 | 1.95 | 22855 | 6035 | 0.20 |
| 2.50 | 4 | 140 | 0.084 | 0.130 | 0.500 | 2.47 | 18040 | 6060 | 0.20 |
| 3.00 | 4 | 140 | 0.100 | 0.150 | 0.600 | 2.99 | 14905 | 5960 | 0.20 |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|------|
| 0.50 | 4 | 58 | 0.016 | 0.030 | 0.100 | 0.44 | 41960 | 2685 | 0.10 |
| 0.80 | 4 | 100 | 0.024 | 0.040 | 0.160 | 0.76 | 41885 | 4020 | 0.10 |
| 1.00 | 4 | 113 | 0.032 | 0.050 | 0.200 | 0.86 | 41825 | 5355 | 0.20 |
| 1.20 | 4 | 120 | 0.038 | 0.060 | 0.240 | 1.09 | 35045 | 5325 | 0.20 |
| 1.50 | 4 | 120 | 0.048 | 0.080 | 0.300 | 1.42 | 26900 | 5165 | 0.20 |
| 2.00 | 4 | 120 | 0.062 | 0.100 | 0.400 | 1.95 | 19590 | 4860 | 0.20 |
| 2.50 | 4 | 120 | 0.080 | 0.130 | 0.500 | 2.47 | 15465 | 4950 | 0.20 |
| 3.00 | 4 | 120 | 0.096 | 0.150 | 0.600 | 2.99 | 12775 | 4905 | 0.20 |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|------|
| 0.50 | 4 | 58 | 0.014 | 0.030 | 0.100 | 0.44 | 41960 | 2350 | 0.10 |
| 0.80 | 4 | 100 | 0.022 | 0.040 | 0.160 | 0.76 | 41885 | 3685 | 0.10 |
| 1.00 | 4 | 100 | 0.030 | 0.050 | 0.200 | 0.86 | 37015 | 4440 | 0.20 |
| 1.20 | 4 | 100 | 0.036 | 0.060 | 0.240 | 1.09 | 29205 | 4205 | 0.20 |
| 1.50 | 4 | 100 | 0.044 | 0.080 | 0.300 | 1.42 | 22415 | 3945 | 0.20 |
| 2.00 | 4 | 100 | 0.058 | 0.100 | 0.400 | 1.95 | 16325 | 3785 | 0.20 |
| 2.50 | 4 | 100 | 0.074 | 0.130 | 0.500 | 2.47 | 12885 | 3815 | 0.20 |
| 3.00 | 4 | 100 | 0.088 | 0.150 | 0.600 | 2.99 | 10645 | 3745 | 0.20 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|------|
| 0.50 | 4 | 58 | 0.012 | 0.030 | 0.100 | 0.44 | 41960 | 2015 | 0.10 |
| 0.80 | 4 | 60 | 0.020 | 0.040 | 0.160 | 0.76 | 25130 | 2010 | 0.10 |
| 1.00 | 4 | 60 | 0.028 | 0.050 | 0.200 | 0.86 | 22210 | 2485 | 0.20 |
| 1.20 | 4 | 60 | 0.032 | 0.060 | 0.240 | 1.09 | 17520 | 2245 | 0.20 |
| 1.50 | 4 | 60 | 0.040 | 0.080 | 0.300 | 1.42 | 13450 | 2150 | 0.20 |
| 2.00 | 4 | 60 | 0.052 | 0.100 | 0.400 | 1.95 | 9795 | 2035 | 0.20 |
| 2.50 | 4 | 60 | 0.068 | 0.130 | 0.500 | 2.47 | 7730 | 2105 | 0.20 |
| 3.00 | 4 | 60 | 0.080 | 0.150 | 0.600 | 2.99 | 6385 | 2045 | 0.20 |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _s [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _c [mm/min] | β [°] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|----------|
| 0.50 | 4 | 66 | 0.020 | 0.020 | 0.020 | 0.50 | 42015 | 3360 | 45° |
| 0.80 | 4 | 106 | 0.022 | 0.032 | 0.032 | 0.80 | 42175 | 3710 | 45° |
| 1.00 | 4 | 132 | 0.028 | 0.042 | 0.042 | 1.00 | 42015 | 4705 | 45° |
| 1.20 | 4 | 158 | 0.030 | 0.050 | 0.050 | 1.20 | 41910 | 5030 | 45° |
| 1.50 | 4 | 198 | 0.034 | 0.062 | 0.062 | 1.50 | 42015 | 5715 | 45° |
| 2.00 | 4 | 264 | 0.038 | 0.082 | 0.082 | 2.00 | 42015 | 6385 | 45° |
| 2.50 | 4 | 300 | 0.040 | 0.102 | 0.102 | 2.49 | 38350 | 6135 | 45° |
| 3.00 | 4 | 300 | 0.046 | 0.122 | 0.122 | 2.97 | 32155 | 5915 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 4 | 66 | 0.020 | 0.020 | 0.020 | 0.50 | 42015 | 3360 | 45° |
| 0.80 | 4 | 106 | 0.020 | 0.032 | 0.032 | 0.80 | 42175 | 3375 | 45° |
| 1.00 | 4 | 132 | 0.026 | 0.042 | 0.042 | 1.00 | 42015 | 4370 | 45° |
| 1.20 | 4 | 158 | 0.028 | 0.050 | 0.050 | 1.20 | 41910 | 4695 | 45° |
| 1.50 | 4 | 198 | 0.032 | 0.062 | 0.062 | 1.50 | 42015 | 5380 | 45° |
| 2.00 | 4 | 250 | 0.036 | 0.082 | 0.082 | 2.00 | 39790 | 5730 | 45° |
| 2.50 | 4 | 250 | 0.038 | 0.102 | 0.102 | 2.49 | 31960 | 4860 | 45° |
| 3.00 | 4 | 250 | 0.044 | 0.122 | 0.122 | 2.97 | 26795 | 4715 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 4 | 66 | 0.018 | 0.020 | 0.020 | 0.50 | 42015 | 3025 | 45° |
| 0.80 | 4 | 106 | 0.020 | 0.032 | 0.032 | 0.80 | 42175 | 3375 | 45° |
| 1.00 | 4 | 132 | 0.026 | 0.042 | 0.042 | 1.00 | 42015 | 4370 | 45° |
| 1.20 | 4 | 158 | 0.028 | 0.050 | 0.050 | 1.20 | 41910 | 4695 | 45° |
| 1.50 | 4 | 198 | 0.030 | 0.062 | 0.062 | 1.50 | 42015 | 5040 | 45° |
| 2.00 | 4 | 200 | 0.034 | 0.082 | 0.082 | 2.00 | 31830 | 4330 | 45° |
| 2.50 | 4 | 200 | 0.036 | 0.102 | 0.102 | 2.49 | 25565 | 3680 | 45° |
| 3.00 | 4 | 200 | 0.042 | 0.122 | 0.122 | 2.97 | 21435 | 3600 | 45° |

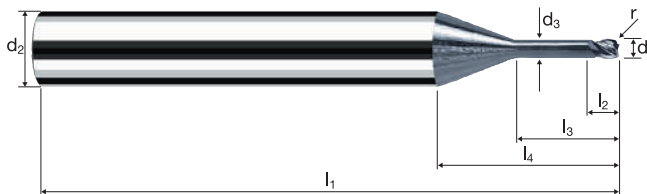
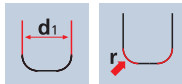
| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 0.50 | 4 | 66 | 0.016 | 0.020 | 0.020 | 0.50 | 42015 | 2690 | 45° |
| 0.80 | 4 | 106 | 0.018 | 0.032 | 0.032 | 0.80 | 42175 | 3035 | 45° |
| 1.00 | 4 | 132 | 0.022 | 0.042 | 0.042 | 1.00 | 42015 | 3695 | 45° |
| 1.20 | 4 | 150 | 0.024 | 0.050 | 0.050 | 1.20 | 39790 | 3820 | 45° |
| 1.50 | 4 | 150 | 0.028 | 0.062 | 0.062 | 1.50 | 31830 | 3565 | 45° |
| 2.00 | 4 | 150 | 0.030 | 0.082 | 0.082 | 2.00 | 23875 | 2865 | 45° |
| 2.50 | 4 | 150 | 0.032 | 0.102 | 0.102 | 2.49 | 19175 | 2455 | 45° |
| 3.00 | 4 | 150 | 0.036 | 0.122 | 0.122 | 2.97 | 16075 | 2315 | 45° |

Frese toriche MicroX

Gambo ø 6mm, scarico cilindrico, 5xd



HM λ 30°
XA γ -5°

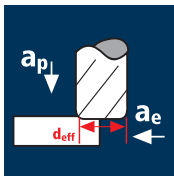


ReTool®

| | | | | | | | |
|----------|-----------|-----------|-------|-------|------|----------|-------|
| Rm | Rm | Rm | HRC | HRC | HRC | Ti | GG(G) |
| 850-1100 | 1100-1300 | 1300-1500 | 48-56 | 56-60 | > 60 | Titanium | |

| Esempio: N° Ordine | | | | | | | | | | | X-AL |
|--|---------------------------|----------------------|----------------|----------------|----------------|----------------|----------------|--------------|-------|---|-------|
| Rivestimento X Articolo 6634 Codice-ø 050 | | | | | | | | | | | |
| Ø Code | d ₁ 0/-0.01 | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r 0/+0.01 | α | z | EUR |
| 050 | 0.50 | 6.00 | 0.45 | 57 | 0.50 | 2.50 | 13.51 | 0.100 | 12.2° | 4 | 76.00 |
| 080 | 0.80 | 6.00 | 0.75 | 57 | 0.80 | 4.00 | 14.45 | 0.100 | 10.8° | 4 | 76.00 |
| 100 | 1.00 | 6.00 | 0.95 | 57 | 1.00 | 5.00 | 15.08 | 0.200 | 9.9° | 4 | 76.00 |
| 108 | 1.20 | 6.00 | 1.10 | 57 | 1.20 | 6.00 | 15.80 | 0.200 | 9.2° | 4 | 76.00 |
| 120 | 1.50 | 6.00 | 1.40 | 61 | 1.50 | 7.50 | 16.74 | 0.200 | 8.1° | 4 | 76.00 |
| 140 | 2.00 | 6.00 | 1.90 | 61 | 2.00 | 10.00 | 18.31 | 0.200 | 6.6° | 4 | 76.00 |
| 160 | 2.50 | 6.00 | 2.30 | 61 | 2.50 | 12.50 | 20.06 | 0.200 | 5.3° | 4 | 76.00 |
| 180 | 3.00 | 6.00 | 2.80 | 66 | 3.00 | 15.00 | 21.63 | 0.200 | 4.2° | 4 | 76.00 |
| 145 | 2.00 | 6.00 | 1.90 | 61 | 2.00 | 10.00 | 18.31 | 0.500 | 6.7° | 4 | 76.00 |
| 165 | 2.50 | 6.00 | 2.30 | 61 | 2.50 | 12.50 | 20.06 | 0.500 | 5.4° | 4 | 76.00 |
| 185 | 3.00 | 6.00 | 2.80 | 66 | 3.00 | 15.00 | 21.63 | 0.500 | 4.3° | 4 | 76.00 |
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Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



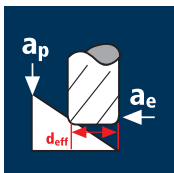
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _f [mm/min] | r [mm] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|-----------|
| 1.00 | 2 | 117 | 0.026 | 0.060 | 0.200 | 0.89 | 41845 | 2175 | 0.20 |
| 1.20 | 2 | 140 | 0.030 | 0.070 | 0.240 | 1.10 | 40510 | 2430 | 0.20 |
| 1.50 | 2 | 140 | 0.038 | 0.090 | 0.300 | 1.43 | 31165 | 2370 | 0.20 |
| 2.00 | 2 | 140 | 0.050 | 0.120 | 0.400 | 1.97 | 22620 | 2260 | 0.20 |
| 2.50 | 2 | 140 | 0.062 | 0.150 | 0.500 | 2.49 | 17895 | 2220 | 0.20 |
| 3.00 | 2 | 140 | 0.076 | 0.180 | 0.600 | 3.00 | 14855 | 2260 | 0.20 |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|------|
| 1.00 | 2 | 117 | 0.024 | 0.060 | 0.200 | 0.89 | 41845 | 2010 | 0.20 |
| 1.20 | 2 | 120 | 0.028 | 0.070 | 0.240 | 1.10 | 34725 | 1945 | 0.20 |
| 1.50 | 2 | 120 | 0.036 | 0.090 | 0.300 | 1.43 | 26710 | 1925 | 0.20 |
| 2.00 | 2 | 120 | 0.048 | 0.120 | 0.400 | 1.97 | 19390 | 1860 | 0.20 |
| 2.50 | 2 | 120 | 0.058 | 0.150 | 0.500 | 2.49 | 15340 | 1780 | 0.20 |
| 3.00 | 2 | 120 | 0.072 | 0.180 | 0.600 | 3.00 | 12730 | 1835 | 0.20 |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|------|
| 1.00 | 2 | 100 | 0.022 | 0.060 | 0.200 | 0.89 | 35765 | 1575 | 0.20 |
| 1.20 | 2 | 100 | 0.026 | 0.070 | 0.240 | 1.10 | 28935 | 1505 | 0.20 |
| 1.50 | 2 | 100 | 0.034 | 0.090 | 0.300 | 1.43 | 22260 | 1515 | 0.20 |
| 2.00 | 2 | 100 | 0.044 | 0.120 | 0.400 | 1.97 | 16160 | 1420 | 0.20 |
| 2.50 | 2 | 100 | 0.054 | 0.150 | 0.500 | 2.49 | 12785 | 1380 | 0.20 |
| 3.00 | 2 | 100 | 0.066 | 0.180 | 0.600 | 3.00 | 10610 | 1400 | 0.20 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|-----|------|
| 1.00 | 2 | 60 | 0.020 | 0.060 | 0.200 | 0.89 | 21460 | 860 | 0.20 |
| 1.20 | 2 | 60 | 0.024 | 0.070 | 0.240 | 1.10 | 17360 | 835 | 0.20 |
| 1.50 | 2 | 60 | 0.030 | 0.090 | 0.300 | 1.43 | 13355 | 800 | 0.20 |
| 2.00 | 2 | 60 | 0.040 | 0.120 | 0.400 | 1.97 | 9695 | 775 | 0.20 |
| 2.50 | 2 | 60 | 0.050 | 0.150 | 0.500 | 2.49 | 7670 | 765 | 0.20 |
| 3.00 | 2 | 60 | 0.060 | 0.180 | 0.600 | 3.00 | 6365 | 765 | 0.20 |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _f [mm/min] | β [°] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|----------|
| 1.00 | 2 | 132 | 0.022 | 0.042 | 0.042 | 1.00 | 42015 | 1850 | 45° |
| 1.20 | 2 | 158 | 0.024 | 0.050 | 0.050 | 1.20 | 41910 | 2010 | 45° |
| 1.50 | 2 | 198 | 0.028 | 0.062 | 0.062 | 1.50 | 42015 | 2355 | 45° |
| 2.00 | 2 | 264 | 0.030 | 0.082 | 0.082 | 2.00 | 42015 | 2520 | 45° |
| 2.50 | 2 | 300 | 0.032 | 0.102 | 0.102 | 2.49 | 38350 | 2455 | 45° |
| 3.00 | 2 | 300 | 0.036 | 0.122 | 0.122 | 2.97 | 32155 | 2315 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 1.00 | 2 | 132 | 0.020 | 0.042 | 0.042 | 1.00 | 42015 | 1680 | 45° |
| 1.20 | 2 | 158 | 0.022 | 0.050 | 0.050 | 1.20 | 41910 | 1845 | 45° |
| 1.50 | 2 | 198 | 0.026 | 0.062 | 0.062 | 1.50 | 42015 | 2185 | 45° |
| 2.00 | 2 | 250 | 0.028 | 0.082 | 0.082 | 2.00 | 39790 | 2230 | 45° |
| 2.50 | 2 | 250 | 0.030 | 0.102 | 0.102 | 2.49 | 31960 | 1920 | 45° |
| 3.00 | 2 | 250 | 0.034 | 0.122 | 0.122 | 2.97 | 26795 | 1820 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 1.00 | 2 | 132 | 0.020 | 0.042 | 0.042 | 1.00 | 42015 | 1680 | 45° |
| 1.20 | 2 | 158 | 0.022 | 0.050 | 0.050 | 1.20 | 41910 | 1845 | 45° |
| 1.50 | 2 | 198 | 0.026 | 0.062 | 0.062 | 1.50 | 42015 | 2185 | 45° |
| 2.00 | 2 | 200 | 0.028 | 0.082 | 0.082 | 2.00 | 31830 | 1785 | 45° |
| 2.50 | 2 | 200 | 0.028 | 0.102 | 0.102 | 2.49 | 25565 | 1430 | 45° |
| 3.00 | 2 | 200 | 0.032 | 0.122 | 0.122 | 2.97 | 21435 | 1370 | 45° |

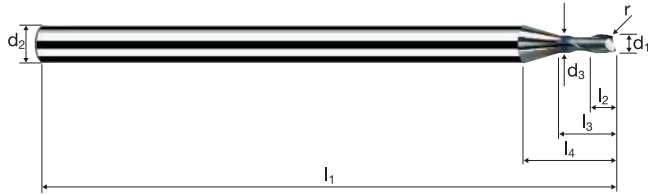
| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 1.00 | 2 | 132 | 0.018 | 0.042 | 0.042 | 1.00 | 42015 | 1515 | 45° |
| 1.20 | 2 | 150 | 0.020 | 0.050 | 0.050 | 1.20 | 39790 | 1590 | 45° |
| 1.50 | 2 | 150 | 0.022 | 0.062 | 0.062 | 1.50 | 31830 | 1400 | 45° |
| 2.00 | 2 | 150 | 0.024 | 0.082 | 0.082 | 2.00 | 23875 | 1145 | 45° |
| 2.50 | 2 | 150 | 0.026 | 0.102 | 0.102 | 2.49 | 19175 | 995 | 45° |
| 3.00 | 2 | 150 | 0.028 | 0.122 | 0.122 | 2.97 | 16075 | 900 | 45° |

Frese toriche MicroX (Microcut-T3H)

Gambo \emptyset 3mm, scarico cilindrico, 3xd



HM λ 25°
XA γ -10°



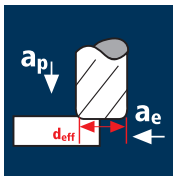
ToolSchool

ReTool®

| | | | | | | | |
|-----------------------|------------------------|------------------------|---------------------|---------------------|--------------------|--------------------------|-----------------------|
| Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Inox Stainless | Ti Titanium |
|-----------------------|------------------------|------------------------|---------------------|---------------------|--------------------|--------------------------|-----------------------|

| Esempio: N° Ordine | | | | | | | | | | | DURO-S |
|---|---------------------|-------------|-------|-------|-------|-------|-------|----------------|----------|-----|--------------|
| Rivestimento D Articolo 5762 Codice- \emptyset 100 | | | | | | | | | | | D5762 |
| \emptyset Code | d_1 ± 0.01 | d_2 h6 | d_3 | l_1 | l_2 | l_3 | l_4 | r 0/+0.03 | α | z | EUR |
| 100 | 1.00 | 3.00 | 0.95 | 50 | 1.20 | 3.00 | 7.22 | 0.200 | 8.5° | 2 | 76.00 |
| 108 | 1.20 | 3.00 | 1.10 | 50 | 1.44 | 3.60 | 7.54 | 0.200 | 7.4° | 2 | 76.00 |
| 120 | 1.50 | 3.00 | 1.40 | 50 | 1.80 | 4.50 | 7.88 | 0.200 | 5.9° | 2 | 76.00 |
| 140 | 2.00 | 3.00 | 1.90 | 50 | 2.40 | 6.00 | 8.45 | 0.200 | 3.7° | 2 | 76.00 |
| 160 | 2.50 | 3.00 | 2.30 | 50 | 3.00 | 7.50 | 9.20 | 0.200 | 1.7° | 2 | 76.00 |
| 180 | 3.00 | 3.00 | 2.80 | 50 | 3.60 | 8.56 | 9.00 | 0.200 | 0.0° | 2 | 76.00 |
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Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



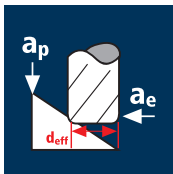
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | r [mm] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|-----------|
| 1.00 | 2 | 113 | 0.026 | 0.050 | 0.200 | 0.86 | 41825 | 2175 | 0.20 |
| 1.20 | 2 | 140 | 0.030 | 0.060 | 0.240 | 1.09 | 40885 | 2455 | 0.20 |
| 1.50 | 2 | 140 | 0.038 | 0.080 | 0.300 | 1.42 | 31385 | 2385 | 0.20 |
| 2.00 | 2 | 140 | 0.050 | 0.100 | 0.400 | 1.95 | 22855 | 2285 | 0.20 |
| 2.50 | 2 | 140 | 0.062 | 0.130 | 0.500 | 2.47 | 18040 | 2235 | 0.20 |
| 3.00 | 2 | 140 | 0.076 | 0.150 | 0.600 | 2.99 | 14905 | 2265 | 0.20 |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|------|
| 1.00 | 2 | 113 | 0.024 | 0.050 | 0.200 | 0.86 | 41825 | 2010 | 0.20 |
| 1.20 | 2 | 120 | 0.028 | 0.060 | 0.240 | 1.09 | 35045 | 1960 | 0.20 |
| 1.50 | 2 | 120 | 0.036 | 0.080 | 0.300 | 1.42 | 26900 | 1935 | 0.20 |
| 2.00 | 2 | 120 | 0.048 | 0.100 | 0.400 | 1.95 | 19590 | 1880 | 0.20 |
| 2.50 | 2 | 120 | 0.058 | 0.130 | 0.500 | 2.47 | 15465 | 1795 | 0.20 |
| 3.00 | 2 | 120 | 0.072 | 0.150 | 0.600 | 2.99 | 12775 | 1840 | 0.20 |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|------|
| 1.00 | 2 | 100 | 0.022 | 0.050 | 0.200 | 0.86 | 37015 | 1630 | 0.20 |
| 1.20 | 2 | 100 | 0.026 | 0.060 | 0.240 | 1.09 | 29205 | 1520 | 0.20 |
| 1.50 | 2 | 100 | 0.034 | 0.080 | 0.300 | 1.42 | 22415 | 1525 | 0.20 |
| 2.00 | 2 | 100 | 0.044 | 0.100 | 0.400 | 1.95 | 16325 | 1435 | 0.20 |
| 2.50 | 2 | 100 | 0.054 | 0.130 | 0.500 | 2.47 | 12885 | 1390 | 0.20 |
| 3.00 | 2 | 100 | 0.066 | 0.150 | 0.600 | 2.99 | 10645 | 1405 | 0.20 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|-----|------|
| 1.00 | 2 | 60 | 0.020 | 0.050 | 0.200 | 0.86 | 22210 | 890 | 0.20 |
| 1.20 | 2 | 60 | 0.024 | 0.060 | 0.240 | 1.09 | 17520 | 840 | 0.20 |
| 1.50 | 2 | 60 | 0.030 | 0.080 | 0.300 | 1.42 | 13450 | 805 | 0.20 |
| 2.00 | 2 | 60 | 0.040 | 0.100 | 0.400 | 1.95 | 9795 | 785 | 0.20 |
| 2.50 | 2 | 60 | 0.050 | 0.130 | 0.500 | 2.47 | 7730 | 775 | 0.20 |
| 3.00 | 2 | 60 | 0.060 | 0.150 | 0.600 | 2.99 | 6385 | 765 | 0.20 |

Applicazione



Materiale

Acciaio da
utensile temprato
42 - 48 HRC



Acciaio da
utensile temprato
48 - 52 HRC



Acciaio da
utensile temprato
52 - 56 HRC



Acciaio da
utensile temprato
56 - 60 HRC



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|--------------------------|---------------------------|----------------------------|----------|
| 1.00 | 2 | 132 | 0.022 | 0.040 | 0.040 | 1.00 | 42015 | 1850 | 45° |
| 1.20 | 2 | 158 | 0.024 | 0.048 | 0.048 | 1.20 | 41910 | 2010 | 45° |
| 1.50 | 2 | 198 | 0.028 | 0.060 | 0.060 | 1.50 | 42015 | 2355 | 45° |
| 2.00 | 2 | 264 | 0.030 | 0.080 | 0.080 | 2.00 | 42015 | 2520 | 45° |
| 2.50 | 2 | 300 | 0.032 | 0.100 | 0.100 | 2.49 | 38350 | 2455 | 45° |
| 3.00 | 2 | 300 | 0.036 | 0.120 | 0.120 | 2.97 | 32155 | 2315 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 1.00 | 2 | 132 | 0.020 | 0.040 | 0.040 | 1.00 | 42015 | 1680 | 45° |
| 1.20 | 2 | 158 | 0.022 | 0.048 | 0.048 | 1.20 | 41910 | 1845 | 45° |
| 1.50 | 2 | 198 | 0.026 | 0.060 | 0.060 | 1.50 | 42015 | 2185 | 45° |
| 2.00 | 2 | 250 | 0.028 | 0.080 | 0.080 | 2.00 | 39790 | 2230 | 45° |
| 2.50 | 2 | 250 | 0.030 | 0.100 | 0.100 | 2.49 | 31960 | 1920 | 45° |
| 3.00 | 2 | 250 | 0.034 | 0.120 | 0.120 | 2.97 | 26795 | 1820 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 1.00 | 2 | 132 | 0.020 | 0.040 | 0.040 | 1.00 | 42015 | 1680 | 45° |
| 1.20 | 2 | 158 | 0.022 | 0.048 | 0.048 | 1.20 | 41910 | 1845 | 45° |
| 1.50 | 2 | 198 | 0.026 | 0.060 | 0.060 | 1.50 | 42015 | 2185 | 45° |
| 2.00 | 2 | 200 | 0.028 | 0.080 | 0.080 | 2.00 | 31830 | 1785 | 45° |
| 2.50 | 2 | 200 | 0.028 | 0.100 | 0.100 | 2.49 | 25565 | 1430 | 45° |
| 3.00 | 2 | 200 | 0.032 | 0.120 | 0.120 | 2.97 | 21435 | 1370 | 45° |

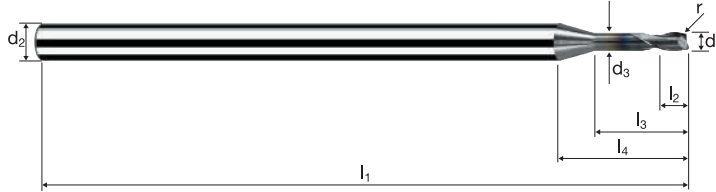
| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 1.00 | 2 | 132 | 0.018 | 0.040 | 0.040 | 1.00 | 42015 | 1515 | 45° |
| 1.20 | 2 | 150 | 0.020 | 0.048 | 0.048 | 1.20 | 39790 | 1590 | 45° |
| 1.50 | 2 | 150 | 0.022 | 0.060 | 0.060 | 1.50 | 31830 | 1400 | 45° |
| 2.00 | 2 | 150 | 0.024 | 0.080 | 0.080 | 2.00 | 23875 | 1145 | 45° |
| 2.50 | 2 | 150 | 0.026 | 0.100 | 0.100 | 2.49 | 19175 | 995 | 45° |
| 3.00 | 2 | 150 | 0.028 | 0.120 | 0.120 | 2.97 | 16075 | 900 | 45° |

Frese toriche MicroX (Microcut-T5H)

Gambo ø 3mm, scarico cilindrico, 5xd



| | |
|-----------|---------------|
| HM | λ 25° |
| XA | γ -10° |



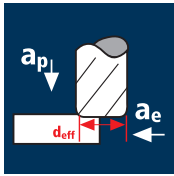
ToolSchool

ReTool®

| | | | | | | | |
|-----------------------|------------------------|------------------------|---------------------|---------------------|--------------------|--------------------------|-----------------------|
| Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Inox Stainless | Ti Titanium |
|-----------------------|------------------------|------------------------|---------------------|---------------------|--------------------|--------------------------|-----------------------|




| Esempio: N° Ordine Rivestimento D Articolo 5764 Codice-ø 100 | | | | | | | | | | | | DURO-S |
|--|-------------------------|----------------------|----------------|----------------|----------------|----------------|----------------|--------------|------|---|--|--------------|
| Ø Code | d ₁ ±0.01 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r 0/+0.03 | α | z | | D5764 |
| | | | | | | | | | | | | EUR |
| 100 | 1.00 | 3.00 | 0.95 | 50 | 1.20 | 5.00 | 9.22 | 0.200 | 6.6° | 2 | | 76.00 |
| 108 | 1.20 | 3.00 | 1.10 | 50 | 1.44 | 6.00 | 9.94 | 0.200 | 5.5° | 2 | | 76.00 |
| 120 | 1.50 | 3.00 | 1.40 | 50 | 1.80 | 7.50 | 10.88 | 0.200 | 4.2° | 2 | | 76.00 |
| 140 | 2.00 | 3.00 | 1.90 | 50 | 2.40 | 10.00 | 12.45 | 0.200 | 2.5° | 2 | | 76.00 |
| 160 | 2.50 | 3.00 | 2.30 | 50 | 3.00 | 12.50 | 14.20 | 0.200 | 1.1° | 2 | | 76.00 |
| 180 | 3.00 | 3.00 | 2.80 | 50 | 3.60 | 14.56 | 15.00 | 0.200 | 0.0° | 2 | | 76.00 |
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Applicazione



Materiale



Acciaio
850 - 1100 N/mm²

Acciaio
1100 - 1300 N/mm²

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]

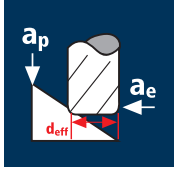
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _f [mm/min] | r [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|--------|
| 1.00 | 2 | 121 | 0.036 | 0.080 | 0.200 | 0.92 | 41865 | 3015 | 0.20 |
| 1.20 | 2 | 152 | 0.042 | 0.100 | 0.240 | 1.15 | 42070 | 3535 | 0.20 |
| 1.50 | 2 | 180 | 0.054 | 0.120 | 0.300 | 1.47 | 38975 | 4210 | 0.20 |
| 2.00 | 2 | 180 | 0.072 | 0.160 | 0.400 | 1.99 | 28790 | 4145 | 0.20 |
| 2.50 | 2 | 180 | 0.090 | 0.200 | 0.500 | 2.50 | 22920 | 4125 | 0.20 |
| 3.00 | 2 | 180 | 0.108 | 0.240 | 0.600 | 2.99 | 19160 | 4140 | 0.20 |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|------|
| 1.00 | 2 | 121 | 0.032 | 0.080 | 0.200 | 0.92 | 41865 | 2680 | 0.20 |
| 1.20 | 2 | 152 | 0.038 | 0.100 | 0.240 | 1.15 | 42070 | 3195 | 0.20 |
| 1.50 | 2 | 160 | 0.048 | 0.120 | 0.300 | 1.47 | 34645 | 3325 | 0.20 |
| 2.00 | 2 | 160 | 0.064 | 0.160 | 0.400 | 1.99 | 25595 | 3275 | 0.20 |
| 2.50 | 2 | 160 | 0.082 | 0.200 | 0.500 | 2.50 | 20370 | 3340 | 0.20 |
| 3.00 | 2 | 160 | 0.098 | 0.240 | 0.600 | 2.99 | 17035 | 3340 | 0.20 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|------|
| 1.00 | 2 | 80 | 0.032 | 0.080 | 0.200 | 0.92 | 27680 | 1770 | 0.20 |
| 1.20 | 2 | 80 | 0.038 | 0.100 | 0.240 | 1.15 | 22145 | 1685 | 0.20 |
| 1.50 | 2 | 80 | 0.048 | 0.120 | 0.300 | 1.47 | 17325 | 1665 | 0.20 |
| 2.00 | 2 | 80 | 0.064 | 0.160 | 0.400 | 1.99 | 12795 | 1640 | 0.20 |
| 2.50 | 2 | 80 | 0.082 | 0.200 | 0.500 | 2.50 | 10185 | 1670 | 0.20 |
| 3.00 | 2 | 80 | 0.098 | 0.240 | 0.600 | 2.99 | 8515 | 1670 | 0.20 |




| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|------|
| 1.00 | 2 | 60 | 0.026 | 0.080 | 0.200 | 0.92 | 20760 | 1080 | 0.20 |
| 1.20 | 2 | 60 | 0.030 | 0.100 | 0.240 | 1.15 | 16605 | 995 | 0.20 |
| 1.50 | 2 | 60 | 0.038 | 0.120 | 0.300 | 1.47 | 12990 | 985 | 0.20 |
| 2.00 | 2 | 60 | 0.050 | 0.160 | 0.400 | 1.99 | 9595 | 960 | 0.20 |
| 2.50 | 2 | 60 | 0.064 | 0.200 | 0.500 | 2.50 | 7640 | 980 | 0.20 |
| 3.00 | 2 | 60 | 0.076 | 0.240 | 0.600 | 2.99 | 6385 | 970 | 0.20 |

Applicazione



Materiale



Acciaio
850 - 1100 N/mm²

Acciaio
1100 - 1300 N/mm²

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]

| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _f [mm/min] | β [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
| 1.00 | 2 | 132 | 0.028 | 0.042 | 0.042 | 1.00 | 42015 | 2355 | 45° |
| 1.20 | 2 | 158 | 0.030 | 0.050 | 0.050 | 1.20 | 41910 | 2515 | 45° |
| 1.50 | 2 | 198 | 0.034 | 0.064 | 0.064 | 1.50 | 42015 | 2855 | 45° |
| 2.00 | 2 | 263 | 0.038 | 0.084 | 0.084 | 1.99 | 42070 | 3195 | 45° |
| 2.50 | 2 | 300 | 0.040 | 0.106 | 0.106 | 2.48 | 38505 | 3080 | 45° |
| 3.00 | 2 | 300 | 0.046 | 0.126 | 0.126 | 2.97 | 32155 | 2960 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 1.00 | 2 | 132 | 0.026 | 0.042 | 0.042 | 1.00 | 42015 | 2185 | 45° |
| 1.20 | 2 | 158 | 0.028 | 0.050 | 0.050 | 1.20 | 41910 | 2345 | 45° |
| 1.50 | 2 | 198 | 0.030 | 0.064 | 0.064 | 1.50 | 42015 | 2520 | 45° |
| 2.00 | 2 | 250 | 0.034 | 0.084 | 0.084 | 1.99 | 39990 | 2720 | 45° |
| 2.50 | 2 | 250 | 0.036 | 0.106 | 0.106 | 2.48 | 32090 | 2310 | 45° |
| 3.00 | 2 | 250 | 0.042 | 0.126 | 0.126 | 2.97 | 26795 | 2250 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 1.00 | 2 | 120 | 0.022 | 0.042 | 0.042 | 1.00 | 38195 | 1680 | 45° |
| 1.20 | 2 | 120 | 0.024 | 0.050 | 0.050 | 1.20 | 31830 | 1530 | 45° |
| 1.50 | 2 | 120 | 0.028 | 0.064 | 0.064 | 1.50 | 25465 | 1425 | 45° |
| 2.00 | 2 | 120 | 0.030 | 0.084 | 0.084 | 1.99 | 19195 | 1150 | 45° |
| 2.50 | 2 | 120 | 0.032 | 0.106 | 0.106 | 2.48 | 15400 | 985 | 45° |
| 3.00 | 2 | 120 | 0.036 | 0.126 | 0.126 | 2.97 | 12860 | 925 | 45° |

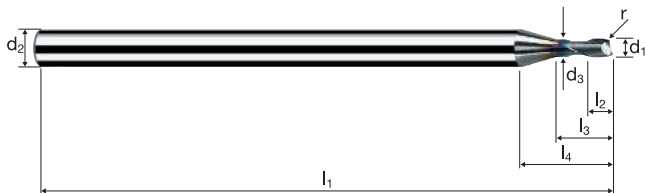
| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 1.00 | 2 | 100 | 0.020 | 0.042 | 0.042 | 1.00 | 31830 | 1275 | 45° |
| 1.20 | 2 | 100 | 0.022 | 0.050 | 0.050 | 1.20 | 26525 | 1165 | 45° |
| 1.50 | 2 | 100 | 0.024 | 0.064 | 0.064 | 1.50 | 21220 | 1020 | 45° |
| 2.00 | 2 | 100 | 0.026 | 0.084 | 0.084 | 1.99 | 15995 | 830 | 45° |
| 2.50 | 2 | 100 | 0.028 | 0.106 | 0.106 | 2.48 | 12835 | 720 | 45° |
| 3.00 | 2 | 100 | 0.032 | 0.126 | 0.126 | 2.97 | 10720 | 685 | 45° |

Frese toriche Microcut

Gambo ø 3mm, scarico cilindrico, 3xd



HM λ 25°
MG10 γ 6°

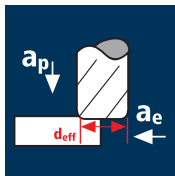


ReTool®

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|-------------|----------------|-----------------|-----------------|--|--|--|-------------------|----------------|--|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | | | | Inox Stainless | Ti Titanium | Cobalt-Chrome Gold / Platinum Copper |
|-------------|----------------|-----------------|-----------------|--|--|--|-------------------|----------------|--|

| Esempio: N° Ordine | | | | | | | | | | | MICRO |
|--------------------|-------------------------|----------------------|----------------|----------------|----------------|----------------|----------------|--------------|------|---|-------|
| | | | | | | | | | | | M5752 |
| | | | | | | | | | | | EUR |
| Ø Code | d ₁ ±0.01 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r 0/+0.03 | α | z | |
| 100 | 1.00 | 3.00 | 0.95 | 50 | 1.20 | 3.00 | 7.22 | 0.200 | 8.5° | 2 | 76.00 |
| 108 | 1.20 | 3.00 | 1.10 | 50 | 1.44 | 3.60 | 7.54 | 0.200 | 7.4° | 2 | 76.00 |
| 120 | 1.50 | 3.00 | 1.40 | 50 | 1.80 | 4.50 | 7.88 | 0.200 | 5.9° | 2 | 76.00 |
| 140 | 2.00 | 3.00 | 1.90 | 50 | 2.40 | 6.00 | 8.45 | 0.200 | 3.7° | 2 | 76.00 |
| 160 | 2.50 | 3.00 | 2.30 | 50 | 3.00 | 7.50 | 9.20 | 0.200 | 1.7° | 2 | 76.00 |
| 180 | 3.00 | 3.00 | 2.80 | 50 | 3.60 | 8.56 | 9.00 | 0.200 | 0.0° | 2 | 76.00 |
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Applicazione



Materiale

Acciaio
850 - 1100 N/mm²

Acciaio
1100 - 1300 N/mm²

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]

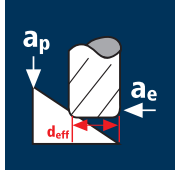
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _s [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | r [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|--------|
| 1.00 | 2 | 119 | 0.036 | 0.070 | 0.200 | 0.90 | 42090 | 3030 | 0.20 |
| 1.20 | 2 | 148 | 0.042 | 0.080 | 0.240 | 1.12 | 42060 | 3535 | 0.20 |
| 1.50 | 2 | 180 | 0.054 | 0.110 | 0.300 | 1.46 | 39245 | 4240 | 0.20 |
| 2.00 | 2 | 180 | 0.072 | 0.140 | 0.400 | 1.98 | 28935 | 4165 | 0.20 |
| 2.50 | 2 | 180 | 0.090 | 0.180 | 0.500 | 2.50 | 22920 | 4125 | 0.20 |
| 3.00 | 2 | 180 | 0.108 | 0.210 | 0.600 | 3.00 | 19100 | 4125 | 0.20 |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|------|
| 1.00 | 2 | 119 | 0.032 | 0.070 | 0.200 | 0.90 | 42090 | 2695 | 0.20 |
| 1.20 | 2 | 148 | 0.038 | 0.080 | 0.240 | 1.12 | 42060 | 3195 | 0.20 |
| 1.50 | 2 | 160 | 0.048 | 0.110 | 0.300 | 1.46 | 34885 | 3350 | 0.20 |
| 2.00 | 2 | 160 | 0.064 | 0.140 | 0.400 | 1.98 | 25720 | 3290 | 0.20 |
| 2.50 | 2 | 160 | 0.082 | 0.180 | 0.500 | 2.50 | 20370 | 3340 | 0.20 |
| 3.00 | 2 | 160 | 0.098 | 0.210 | 0.600 | 3.00 | 16975 | 3325 | 0.20 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|------|
| 1.00 | 2 | 80 | 0.032 | 0.070 | 0.200 | 0.90 | 28295 | 1810 | 0.20 |
| 1.20 | 2 | 80 | 0.038 | 0.080 | 0.240 | 1.12 | 22735 | 1730 | 0.20 |
| 1.50 | 2 | 80 | 0.048 | 0.110 | 0.300 | 1.46 | 17440 | 1675 | 0.20 |
| 2.00 | 2 | 80 | 0.064 | 0.140 | 0.400 | 1.98 | 12860 | 1645 | 0.20 |
| 2.50 | 2 | 80 | 0.082 | 0.180 | 0.500 | 2.50 | 10185 | 1670 | 0.20 |
| 3.00 | 2 | 80 | 0.098 | 0.210 | 0.600 | 3.00 | 8490 | 1665 | 0.20 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|------|
| 1.00 | 2 | 60 | 0.026 | 0.070 | 0.200 | 0.90 | 21220 | 1105 | 0.20 |
| 1.20 | 2 | 60 | 0.030 | 0.080 | 0.240 | 1.12 | 17050 | 1025 | 0.20 |
| 1.50 | 2 | 60 | 0.038 | 0.110 | 0.300 | 1.46 | 13080 | 995 | 0.20 |
| 2.00 | 2 | 60 | 0.050 | 0.140 | 0.400 | 1.98 | 9645 | 965 | 0.20 |
| 2.50 | 2 | 60 | 0.064 | 0.180 | 0.500 | 2.50 | 7640 | 980 | 0.20 |
| 3.00 | 2 | 60 | 0.076 | 0.210 | 0.600 | 3.00 | 6365 | 970 | 0.20 |

Applicazione



Materiale

Acciaio
850 - 1100 N/mm²

Acciaio
1100 - 1300 N/mm²

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]

| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _s [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
| 1.00 | 2 | 132 | 0.022 | 0.040 | 0.040 | 1.00 | 42015 | 1850 | 45° |
| 1.20 | 2 | 158 | 0.024 | 0.048 | 0.048 | 1.20 | 41910 | 2010 | 45° |
| 1.50 | 2 | 198 | 0.028 | 0.060 | 0.060 | 1.50 | 42015 | 2355 | 45° |
| 2.00 | 2 | 264 | 0.030 | 0.080 | 0.080 | 2.00 | 42015 | 2520 | 45° |
| 2.50 | 2 | 300 | 0.032 | 0.100 | 0.100 | 2.49 | 38350 | 2455 | 45° |
| 3.00 | 2 | 300 | 0.036 | 0.120 | 0.120 | 2.97 | 32155 | 2315 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 1.00 | 2 | 132 | 0.020 | 0.040 | 0.040 | 1.00 | 42015 | 1680 | 45° |
| 1.20 | 2 | 158 | 0.022 | 0.048 | 0.048 | 1.20 | 41910 | 1845 | 45° |
| 1.50 | 2 | 198 | 0.026 | 0.060 | 0.060 | 1.50 | 42015 | 2185 | 45° |
| 2.00 | 2 | 250 | 0.028 | 0.080 | 0.080 | 2.00 | 39790 | 2230 | 45° |
| 2.50 | 2 | 250 | 0.028 | 0.100 | 0.100 | 2.49 | 31960 | 1790 | 45° |
| 3.00 | 2 | 250 | 0.032 | 0.120 | 0.120 | 2.97 | 26795 | 1715 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 1.00 | 2 | 120 | 0.018 | 0.040 | 0.040 | 1.00 | 38195 | 1375 | 45° |
| 1.20 | 2 | 120 | 0.020 | 0.048 | 0.048 | 1.20 | 31830 | 1275 | 45° |
| 1.50 | 2 | 120 | 0.022 | 0.060 | 0.060 | 1.50 | 25465 | 1120 | 45° |
| 2.00 | 2 | 120 | 0.024 | 0.080 | 0.080 | 2.00 | 19100 | 915 | 45° |
| 2.50 | 2 | 120 | 0.026 | 0.100 | 0.100 | 2.49 | 15340 | 800 | 45° |
| 3.00 | 2 | 120 | 0.028 | 0.120 | 0.120 | 2.97 | 12860 | 720 | 45° |

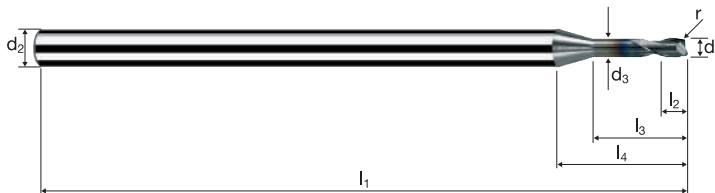
| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 1.00 | 2 | 100 | 0.016 | 0.040 | 0.040 | 1.00 | 31830 | 1020 | 45° |
| 1.20 | 2 | 100 | 0.016 | 0.048 | 0.048 | 1.20 | 26525 | 850 | 45° |
| 1.50 | 2 | 100 | 0.020 | 0.060 | 0.060 | 1.50 | 21220 | 850 | 45° |
| 2.00 | 2 | 100 | 0.022 | 0.080 | 0.080 | 2.00 | 15915 | 700 | 45° |
| 2.50 | 2 | 100 | 0.022 | 0.100 | 0.100 | 2.49 | 12785 | 560 | 45° |
| 3.00 | 2 | 100 | 0.026 | 0.120 | 0.120 | 2.97 | 10720 | 555 | 45° |

Frese toriche Microcut

Gambo ø 3mm, scarico cilindrico, 5xd



| | |
|------|---------------|
| HM | λ 25° |
| MG10 | γ 6° |

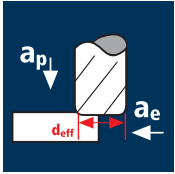


ReTool®

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|----------|-------------|--------------|--------------|--|--|--|----------------|-------------|--------------------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | | | | Inox Stainless | Ti Titanium | Cobalt-Chrome Gold / Platinum Copper |
|----------|-------------|--------------|--------------|--|--|--|----------------|-------------|--------------------------------------|

| | | | | | | | | | | | | MICRO |
|--------------------|----------------------|-------------------|----------------|----------------|----------------|----------------|----------------|-----------|------|---|--|-------|
| Esempio: N° Ordine | | | | | | | | | | | | |
| Rivestimento | | | | | | | | | | | | |
| Articolo | | | | | | | | | | | | |
| Codice-ø | | | | | | | | | | | | |
| Ø Code | d ₁ ±0.01 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r 0/+0.03 | α | z | | EUR |
| 100 | 1.00 | 3.00 | 0.95 | 50 | 1.20 | 5.00 | 9.22 | 0.200 | 6.6° | 2 | | 76.00 |
| 108 | 1.20 | 3.00 | 1.10 | 50 | 1.44 | 6.00 | 9.94 | 0.200 | 5.5° | 2 | | 76.00 |
| 120 | 1.50 | 3.00 | 1.40 | 50 | 1.80 | 7.50 | 10.88 | 0.200 | 4.2° | 2 | | 76.00 |
| 140 | 2.00 | 3.00 | 1.90 | 50 | 2.40 | 10.00 | 12.45 | 0.200 | 2.5° | 2 | | 76.00 |
| 160 | 2.50 | 3.00 | 2.30 | 50 | 3.00 | 12.50 | 14.20 | 0.200 | 1.1° | 2 | | 76.00 |
| 180 | 3.00 | 3.00 | 2.80 | 50 | 3.60 | 14.56 | 15.00 | 0.200 | 0.0° | 2 | | 76.00 |
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Applicazione



Materiale

Acciaio
850 - 1100 N/mm²

Acciaio
1100 - 1300 N/mm²

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]

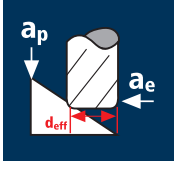
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | r [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|--------|
| 1.00 | 2 | 113 | 0.036 | 0.050 | 0.200 | 0.86 | 41825 | 3010 | 0.20 |
| 1.20 | 2 | 144 | 0.042 | 0.060 | 0.240 | 1.09 | 42050 | 3530 | 0.20 |
| 1.50 | 2 | 180 | 0.054 | 0.080 | 0.300 | 1.42 | 40350 | 4360 | 0.20 |
| 2.00 | 2 | 180 | 0.072 | 0.100 | 0.400 | 1.95 | 29380 | 4230 | 0.20 |
| 2.50 | 2 | 180 | 0.090 | 0.130 | 0.500 | 2.47 | 23195 | 4175 | 0.20 |
| 3.00 | 2 | 180 | 0.108 | 0.150 | 0.600 | 2.99 | 19160 | 4140 | 0.20 |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|------|
| 1.00 | 2 | 113 | 0.032 | 0.050 | 0.200 | 0.86 | 41825 | 2675 | 0.20 |
| 1.20 | 2 | 144 | 0.038 | 0.060 | 0.240 | 1.09 | 42050 | 3195 | 0.20 |
| 1.50 | 2 | 160 | 0.048 | 0.080 | 0.300 | 1.42 | 35865 | 3445 | 0.20 |
| 2.00 | 2 | 160 | 0.064 | 0.100 | 0.400 | 1.95 | 26120 | 3345 | 0.20 |
| 2.50 | 2 | 160 | 0.082 | 0.130 | 0.500 | 2.47 | 20620 | 3380 | 0.20 |
| 3.00 | 2 | 160 | 0.098 | 0.150 | 0.600 | 2.99 | 17035 | 3340 | 0.20 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|------|
| 1.00 | 2 | 80 | 0.032 | 0.050 | 0.200 | 0.86 | 29610 | 1895 | 0.20 |
| 1.20 | 2 | 80 | 0.038 | 0.060 | 0.240 | 1.09 | 23360 | 1775 | 0.20 |
| 1.50 | 2 | 80 | 0.048 | 0.080 | 0.300 | 1.42 | 17935 | 1720 | 0.20 |
| 2.00 | 2 | 80 | 0.064 | 0.100 | 0.400 | 1.95 | 13060 | 1670 | 0.20 |
| 2.50 | 2 | 80 | 0.082 | 0.130 | 0.500 | 2.47 | 10310 | 1690 | 0.20 |
| 3.00 | 2 | 80 | 0.098 | 0.150 | 0.600 | 2.99 | 8515 | 1670 | 0.20 |

| | | | | | | | | | |
|------|---|----|-------|-------|-------|------|-------|------|------|
| 1.00 | 2 | 60 | 0.026 | 0.050 | 0.200 | 0.86 | 22210 | 1155 | 0.20 |
| 1.20 | 2 | 60 | 0.030 | 0.060 | 0.240 | 1.09 | 17520 | 1050 | 0.20 |
| 1.50 | 2 | 60 | 0.038 | 0.080 | 0.300 | 1.42 | 13450 | 1020 | 0.20 |
| 2.00 | 2 | 60 | 0.050 | 0.100 | 0.400 | 1.95 | 9795 | 980 | 0.20 |
| 2.50 | 2 | 60 | 0.064 | 0.130 | 0.500 | 2.47 | 7730 | 990 | 0.20 |
| 3.00 | 2 | 60 | 0.076 | 0.150 | 0.600 | 2.99 | 6385 | 970 | 0.20 |

Applicazione



Materiale

Acciaio
850 - 1100 N/mm²

Acciaio
1100 - 1300 N/mm²

Inox normal
[Cr-Ni/1.4301]
[Cr-Ni-Mo/1.4571]

Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]

| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | d _{eff} [mm] | n [min ⁻¹] | v _r [mm/min] | β [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|-----------------------|------------------------|-------------------------|-------|
| 1.00 | 2 | 131 | 0.022 | 0.038 | 0.038 | 0.99 | 42120 | 1855 | 45° |
| 1.20 | 2 | 158 | 0.024 | 0.046 | 0.046 | 1.20 | 41910 | 2010 | 45° |
| 1.50 | 2 | 198 | 0.028 | 0.058 | 0.058 | 1.50 | 42015 | 2355 | 45° |
| 2.00 | 2 | 264 | 0.030 | 0.076 | 0.076 | 2.00 | 42015 | 2520 | 45° |
| 2.50 | 2 | 300 | 0.032 | 0.096 | 0.096 | 2.49 | 38350 | 2455 | 45° |
| 3.00 | 2 | 300 | 0.036 | 0.114 | 0.114 | 2.98 | 32045 | 2305 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 1.00 | 2 | 131 | 0.020 | 0.038 | 0.038 | 0.99 | 42120 | 1685 | 45° |
| 1.20 | 2 | 158 | 0.022 | 0.046 | 0.046 | 1.20 | 41910 | 1845 | 45° |
| 1.50 | 2 | 198 | 0.026 | 0.058 | 0.058 | 1.50 | 42015 | 2185 | 45° |
| 2.00 | 2 | 250 | 0.028 | 0.076 | 0.076 | 2.00 | 39790 | 2230 | 45° |
| 2.50 | 2 | 250 | 0.028 | 0.096 | 0.096 | 2.49 | 31960 | 1790 | 45° |
| 3.00 | 2 | 250 | 0.032 | 0.114 | 0.114 | 2.98 | 26705 | 1710 | 45° |

| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 1.00 | 2 | 120 | 0.018 | 0.038 | 0.038 | 0.99 | 38585 | 1390 | 45° |
| 1.20 | 2 | 120 | 0.020 | 0.046 | 0.046 | 1.20 | 31830 | 1275 | 45° |
| 1.50 | 2 | 120 | 0.022 | 0.058 | 0.058 | 1.50 | 25465 | 1120 | 45° |
| 2.00 | 2 | 120 | 0.024 | 0.076 | 0.076 | 2.00 | 19100 | 915 | 45° |
| 2.50 | 2 | 120 | 0.026 | 0.096 | 0.096 | 2.49 | 15340 | 800 | 45° |
| 3.00 | 2 | 120 | 0.028 | 0.114 | 0.114 | 2.98 | 12820 | 720 | 45° |

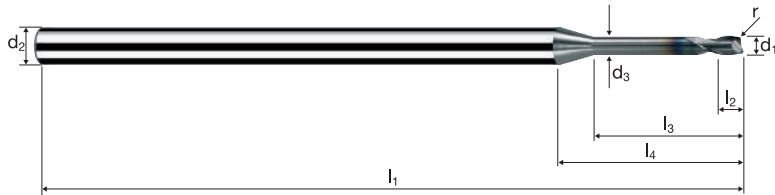
| | | | | | | | | | |
|------|---|-----|-------|-------|-------|------|-------|------|-----|
| 1.00 | 2 | 100 | 0.016 | 0.038 | 0.038 | 0.99 | 32155 | 1030 | 45° |
| 1.20 | 2 | 100 | 0.016 | 0.046 | 0.046 | 1.20 | 26525 | 850 | 45° |
| 1.50 | 2 | 100 | 0.020 | 0.058 | 0.058 | 1.50 | 21220 | 850 | 45° |
| 2.00 | 2 | 100 | 0.022 | 0.076 | 0.076 | 2.00 | 15915 | 700 | 45° |
| 2.50 | 2 | 100 | 0.022 | 0.096 | 0.096 | 2.49 | 12785 | 560 | 45° |
| 3.00 | 2 | 100 | 0.026 | 0.114 | 0.114 | 2.98 | 10680 | 555 | 45° |

Frese toriche Microcut

Gambo ø 3mm, scarico cilindrico, 8xd



HM λ 25°
MG10 γ 6°



ReTool®

| | | | | | | | | | |
|----------|-------------|--------------|--------------|--|--|--|----------------|-------------|--|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | | | | Inox Stainless | Ti Titanium | Cobalt-Chrome Gold / Platinum Copper |
|----------|-------------|--------------|--------------|--|--|--|----------------|-------------|--|






| Esempio: N° Ordine | | | | | | | | | | | MICRO | |
|--------------------|----------------------|-------------------|----------------|----------------|----------------|----------------|----------------|-----------|------|---|---------------|--------------|
| Rivestimento M | | | | | | | | | | | Articolo 5756 | Codice-ø 100 |
| Ø Code | d ₁ ±0.01 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r 0/+0.03 | α | z | EUR | |
| 100 | 1.00 | 3.00 | 0.95 | 50 | 1.20 | 8.00 | 12.22 | 0.200 | 4.9° | 2 | 76.00 | |
| 108 | 1.20 | 3.00 | 1.10 | 50 | 1.44 | 9.60 | 13.54 | 0.200 | 4.0° | 2 | 76.00 | |
| 120 | 1.50 | 3.00 | 1.40 | 60 | 1.80 | 12.00 | 15.38 | 0.200 | 3.0° | 2 | 76.00 | |
| 140 | 2.00 | 3.00 | 1.90 | 60 | 2.40 | 16.00 | 18.45 | 0.200 | 1.7° | 2 | 76.00 | |
| 160 | 2.50 | 3.00 | 2.30 | 60 | 3.00 | 20.00 | 21.70 | 0.200 | 0.7° | 2 | 76.00 | |
| 180 | 3.00 | 3.00 | 2.80 | 60 | 3.60 | 23.56 | 24.00 | 0.200 | 0.0° | 2 | 76.00 | |
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Frese per alluminio e rame




A taglienti lisci, cilindrico

Esecuzione normale



| | | | | | | | | | |
|------------------|--|--------------------|--------------------------|-------------------------|------------------|------------------------------|---------------------|-------------------------------|-----|
| N° 15520 / 15620 |  | AX (AX-NV2) | X-Generation X | Sgrossatura Finitura | d, 2 – 20 90° | Al Aluminium Alloy | Cu Copper | Plastic Thermoplast | 587 |
| N° 15525 / 15625 |  | AX (AX-NV2) | X-Generation X | Sgrossatura Finitura | d, 6 – 20 90° | Al Aluminium Alloy | Cu Copper | Plastic Thermoplast | 589 |
| N° 15530 / 15630 |  | AX (AX-NV3) | X-Generation X | Sgrossatura Finitura | d, 3 – 20 90° | Al Aluminium Alloy | Cu Copper | Plastic Thermoplast | 591 |
| N° 15535 / 15635 |  | AX (AX-NV3) | X-Generation X | Sgrossatura Finitura | d, 6 – 20 90° | Al Aluminium Alloy | Cu Copper | Plastic Thermoplast | 593 |
| N° 5272 / 5500 |  | | Favara® F | Sgrossatura Finitura | d, 2 – 20 45° | Al Aluminium Alloy | Cu Copper | Plastic Thermoplast | 595 |

III

Esecuzione medio-lunga









| | | | | | | | | | |
|------------------|---|--------------------|--------------------------|-------------------------|------------------|------------------------------|---------------------|-------------------------------|-----|
| N° 15550 / 15650 |  | AX (AX-NV2) | X-Generation X | Sgrossatura Finitura | d, 3 – 20 90° | Al Aluminium Alloy | Cu Copper | Plastic Thermoplast | 597 |
| N° 15557 / 15657 |  | AX (AX-NV3) | X-Generation X | Sgrossatura Finitura | d, 3 – 20 90° | Al Aluminium Alloy | Cu Copper | Plastic Thermoplast | 599 |
| N° 15560 / 15660 |  | AX (AX-NV3) | X-Generation X | Sgrossatura Finitura | d, 3 – 20 90° | Al Aluminium Alloy | Cu Copper | Plastic Thermoplast | 601 |

Esecuzione lunga

| | | | | | | | | | |
|------------------|--|--------------------|--------------------------|-------------------------|------------------|------------------------------|---------------------|-------------------------------|-----|
| N° 15559 / 15659 |  | AX (AX-NV3) | X-Generation X | Sgrossatura Finitura | d, 6 – 20 90° | Al Aluminium Alloy | Cu Copper | Plastic Thermoplast | 603 |
| N° 15561 / 15661 |  | AX (AX-V3) | X-Generation X | Sgrossatura Finitura | d, 6 – 20 90° | Al Aluminium Alloy | Cu Copper | Plastic Thermoplast | 605 |

Frese per alluminio e rame




A taglienti lisci, torico

| Esecuzione 2xd – 5xd | | | | | | | | | | |
|----------------------|--|-------------|--------------------------|-------------------------|--------------------------------|------------------------------|--|--|--|-----|
| N° 15572 |  | AX (AX-RV2) | X-Generation X | Sgrossatura Finitura | r 1.5, 2.5, 4.0 | Al Aluminium Alloy | | | | 607 |
| N° 15573 |  | AX (AX-RV2) | X-Generation X | Sgrossatura Finitura | r 0.5, 1.0, 1.5, 2.0, 2.5, 4.0 | Al Aluminium Alloy | | | | 609 |
| N° 15574 |  | AX (AX-RV2) | X-Generation X | Sgrossatura Finitura | r 1.0, 1.5, 2.0, 2.5, 4.0 | Al Aluminium Alloy | | | | 613 |
| N° 15575 |  | AX (AX-RV2) | X-Generation X | Sgrossatura Finitura | r 1.0, 2.5, 4.0 | Al Aluminium Alloy | | | | 617 |
| N° 15582 |  | AX (AX-RV3) | X-Generation X | Sgrossatura Finitura | r 2.5, 4.0 | Al Aluminium Alloy | | | | 619 |
| N° 15583 |  | AX (AX-RV3) | X-Generation X | Sgrossatura Finitura | r 0.5, 1.0, 1.5, 2.0, 2.5, 4.0 | Al Aluminium Alloy | | | | 621 |
| N° 15584 |  | AX (AX-RV3) | X-Generation X | Sgrossatura Finitura | r 1.0, 2.5, 4.0 | Al Aluminium Alloy | | | | 625 |
| N° 15585 |  | AX (AX-RV3) | X-Generation X | Sgrossatura Finitura | r 1.0, 2.5, 4.0 | Al Aluminium Alloy | | | | 627 |




Frese per alluminio e rame

Profilata, cilindrica



Esecuzione normale

| | | | | | | | | | |
|------------------|--|-------------------|---------------------------------|-------------------------|------------------|------------------------------|---------------------|--|-----|
| N° 15500 / 15600 |  | AX-FPS | X-Generation X | Sgrossatura Finitura | d, 6 – 25 r | Al Aluminium Alloy | | | 629 |
| N° 5297 / 5397 |  | AX (AX-FP) | X-Generation X | Sgrossatura Finitura | d, 6 – 20 45° | Al Aluminium Alloy | Cu Copper | | 631 |
| N° 0391 |  | | HSS | Sgrossatura Finitura | d, 6 – 25 45° | Al Aluminium Alloy | Cu Copper | | 633 |

Esecuzione medio-lunga

| | | | | | | | | | |
|------------------|--|-------------------|---------------------------------|-------------------------|-------------------|------------------------------|---------------------|--|-----|
| N° 15506 / 15606 |  | AX-FPS | X-Generation X | Sgrossatura Finitura | d, 6 – 20 r | Al Aluminium Alloy | | | 635 |
| N° 15297 / 15397 |  | AX (AX-FP) | X-Generation X | Sgrossatura Finitura | d, 6 – 20 45° | Al Aluminium Alloy | Cu Copper | | 637 |
| N° 0393 |  | | HSS | Sgrossatura Finitura | d, 10 – 25 45° | Al Aluminium Alloy | Cu Copper | | 639 |

Esecuzione medio-lunga con scarico

| | | | | | | | | | |
|------------------|--|-------------------|---------------------------------|-------------------------|------------------|------------------------------|---------------------|--|-----|
| N° 15505 / 15605 |  | AX-FPS | X-Generation X | Sgrossatura Finitura | d, 6 – 25 r | Al Aluminium Alloy | | | 641 |
| N° 15298 / 15398 |  | AX (AX-FP) | X-Generation X | Sgrossatura Finitura | d, 6 – 25 45° | Al Aluminium Alloy | Cu Copper | | 643 |

Esecuzione 5.2xd

| | | | | | | | | | |
|------------------|--|---------------|---------------------------------|-------------------------|----------------|------------------------------|--|--|-----|
| N° 15507 / 15607 |  | AX-FPS | X-Generation X | Sgrossatura Finitura | d, 6 – 20 r | Al Aluminium Alloy | | | 645 |
|------------------|--|---------------|---------------------------------|-------------------------|----------------|------------------------------|--|--|-----|

Frese per alluminio e rame

Profilata, torico

Esecuzione normale

N° 15502



AX-FPS (AX-RFPS)

X-Generation

X

Sgrossatura

r 0.5, 1.0,

2.0, 2.5,

3.0, 4.0

Finitura

5.0

Al
Aluminium
Alloy

647

Frese per alluminio e rame

Finitura, cilindrico

Esecuzione normale

N° 15589



MulticutXA



Sgrossatura

d, 6 – 20

Finitura

r

Al
Aluminium
Alloy

651

Esecuzione medio-lunga

N° 15590



MulticutXA



Sgrossatura

d, 6 – 20

Finitura

r

Al
Aluminium
Alloy

653

Esecuzione 5.2xd

N° 15510



AX
new!



Sgrossatura

d, 6 – 20

Finitura

r

Al
Aluminium
Alloy

Cu
Copper

655

III



Frese per alluminio e rame

Finitura, torico

Esecuzione 5.2xd

N° 15512



AX
new!

X-Generation

X

Sgrossatura



Finitura



r 1.0, 2.5



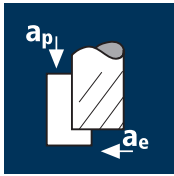
Al
Aluminium
Alloy

Cu
Copper

657

III

Applicazione



Materiale

Alluminio malleabile
Costruzione integrale Al



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 3.00 | 2 | 396 | 0.055 | 4.500 | 1.800 | 42015 | 4620 | 37.4 |
| 4.00 | 2 | 528 | 0.075 | 6.000 | 2.400 | 42015 | 6305 | 90.8 |
| 5.00 | 2 | 550 | 0.090 | 7.500 | 3.000 | 35015 | 6305 | 141.8 |
| 6.00 | 2 | 550 | 0.120 | 9.000 | 3.600 | 29180 | 7005 | 226.9 |
| 8.00 | 2 | 550 | 0.160 | 12.000 | 4.800 | 21885 | 7005 | 403.4 |
| 10.00 | 2 | 550 | 0.200 | 15.000 | 6.000 | 17505 | 7005 | 630.3 |
| 12.00 | 2 | 550 | 0.220 | 18.000 | 7.200 | 14590 | 6420 | 831.9 |
| 16.00 | 2 | 550 | 0.245 | 24.000 | 9.600 | 10940 | 5360 | 1235.3 |
| 20.00 | 2 | 550 | 0.285 | 30.000 | 12.000 | 8755 | 4990 | 1796.2 |

Rame non legato



| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|--------|
| 3.00 | 2 | 396 | 0.030 | 4.500 | 1.800 | 42015 | 2520 | 20.4 |
| 4.00 | 2 | 400 | 0.060 | 6.000 | 2.400 | 31830 | 3820 | 55.0 |
| 5.00 | 2 | 400 | 0.070 | 7.500 | 3.000 | 25465 | 3565 | 80.2 |
| 6.00 | 2 | 400 | 0.095 | 9.000 | 3.600 | 21220 | 4030 | 130.6 |
| 8.00 | 2 | 400 | 0.130 | 12.000 | 4.800 | 15915 | 4140 | 238.4 |
| 10.00 | 2 | 400 | 0.160 | 15.000 | 6.000 | 12730 | 4075 | 366.7 |
| 12.00 | 2 | 400 | 0.175 | 18.000 | 7.200 | 10610 | 3715 | 481.3 |
| 16.00 | 2 | 400 | 0.195 | 24.000 | 9.600 | 7960 | 3105 | 715.1 |
| 20.00 | 2 | 400 | 0.230 | 30.000 | 12.000 | 6365 | 2930 | 1054.2 |

Materiali termoplastici



| | | | | | | | | |
|-------|---|------|-------|--------|--------|-------|-------|--------|
| 3.00 | 2 | 396 | 0.035 | 4.500 | 1.800 | 42015 | 2940 | 23.8 |
| 4.00 | 2 | 528 | 0.075 | 6.000 | 2.400 | 42015 | 6305 | 90.8 |
| 5.00 | 2 | 660 | 0.090 | 7.500 | 3.000 | 42015 | 7565 | 170.2 |
| 6.00 | 2 | 792 | 0.120 | 9.000 | 3.600 | 42015 | 10085 | 326.7 |
| 8.00 | 2 | 1000 | 0.160 | 12.000 | 4.800 | 39790 | 12730 | 733.4 |
| 10.00 | 2 | 1000 | 0.200 | 15.000 | 6.000 | 31830 | 12730 | 1145.9 |
| 12.00 | 2 | 1000 | 0.220 | 18.000 | 7.200 | 26525 | 11670 | 1512.6 |
| 16.00 | 2 | 1000 | 0.245 | 24.000 | 9.600 | 19895 | 9750 | 2246.0 |
| 20.00 | 2 | 1000 | 0.285 | 30.000 | 12.000 | 15915 | 9070 | 3265.9 |

Legia per fonderia Al



| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|--------|
| 3.00 | 2 | 396 | 0.055 | 4.500 | 1.800 | 42015 | 4620 | 37.4 |
| 4.00 | 2 | 440 | 0.075 | 6.000 | 2.400 | 35015 | 5250 | 75.6 |
| 5.00 | 2 | 440 | 0.090 | 7.500 | 3.000 | 28010 | 5040 | 113.4 |
| 6.00 | 2 | 440 | 0.120 | 9.000 | 3.600 | 23345 | 5600 | 181.5 |
| 8.00 | 2 | 440 | 0.160 | 12.000 | 4.800 | 17505 | 5600 | 322.7 |
| 10.00 | 2 | 440 | 0.200 | 15.000 | 6.000 | 14005 | 5600 | 504.2 |
| 12.00 | 2 | 440 | 0.220 | 18.000 | 7.200 | 11670 | 5135 | 665.5 |
| 16.00 | 2 | 440 | 0.245 | 24.000 | 9.600 | 8755 | 4290 | 988.2 |
| 20.00 | 2 | 440 | 0.285 | 30.000 | 12.000 | 7005 | 3990 | 1437.0 |



Alluminio malleabile
Costruzione integrale Al



| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|--------|
| 3.00 | 2 | 396 | 0.025 | 3.000 | 3.000 | 42015 | 2100 | 18.9 |
| 4.00 | 2 | 450 | 0.055 | 4.000 | 4.000 | 35810 | 3940 | 63.0 |
| 5.00 | 2 | 450 | 0.065 | 5.000 | 5.000 | 28650 | 3725 | 93.1 |
| 6.00 | 2 | 450 | 0.085 | 6.000 | 6.000 | 23875 | 4060 | 146.1 |
| 8.00 | 2 | 450 | 0.110 | 8.000 | 8.000 | 17905 | 3940 | 252.1 |
| 10.00 | 2 | 450 | 0.140 | 10.000 | 10.000 | 14325 | 4010 | 401.1 |
| 12.00 | 2 | 450 | 0.155 | 12.000 | 12.000 | 11935 | 3700 | 532.9 |
| 16.00 | 2 | 450 | 0.170 | 16.000 | 16.000 | 8950 | 3045 | 779.2 |
| 20.00 | 2 | 450 | 0.200 | 20.000 | 20.000 | 7160 | 2865 | 1145.9 |

Rame non legato



| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|-------|
| 3.00 | 2 | 350 | 0.020 | 3.000 | 3.000 | 37135 | 1485 | 13.4 |
| 4.00 | 2 | 350 | 0.045 | 4.000 | 4.000 | 27850 | 2505 | 40.1 |
| 5.00 | 2 | 350 | 0.050 | 5.000 | 5.000 | 22280 | 2230 | 55.7 |
| 6.00 | 2 | 350 | 0.070 | 6.000 | 6.000 | 18570 | 2600 | 93.6 |
| 8.00 | 2 | 350 | 0.090 | 8.000 | 8.000 | 13925 | 2505 | 160.4 |
| 10.00 | 2 | 350 | 0.110 | 10.000 | 10.000 | 11140 | 2450 | 245.1 |
| 12.00 | 2 | 350 | 0.125 | 12.000 | 12.000 | 9285 | 2320 | 334.2 |
| 16.00 | 2 | 350 | 0.135 | 16.000 | 16.000 | 6965 | 1880 | 481.3 |
| 20.00 | 2 | 350 | 0.160 | 20.000 | 20.000 | 5570 | 1785 | 713.0 |

Materiali termoplastici



| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|--------|
| 3.00 | 2 | 396 | 0.025 | 3.000 | 3.000 | 42015 | 2100 | 18.9 |
| 4.00 | 2 | 528 | 0.055 | 4.000 | 4.000 | 42015 | 4620 | 73.9 |
| 5.00 | 2 | 660 | 0.065 | 5.000 | 5.000 | 42015 | 5460 | 136.6 |
| 6.00 | 2 | 792 | 0.085 | 6.000 | 6.000 | 42015 | 7145 | 257.1 |
| 8.00 | 2 | 800 | 0.110 | 8.000 | 8.000 | 31830 | 7005 | 448.2 |
| 10.00 | 2 | 800 | 0.140 | 10.000 | 10.000 | 25465 | 7130 | 713.0 |
| 12.00 | 2 | 800 | 0.155 | 12.000 | 12.000 | 21220 | 6580 | 947.3 |
| 16.00 | 2 | 800 | 0.170 | 16.000 | 16.000 | 15915 | 5410 | 1385.3 |
| 20.00 | 2 | 800 | 0.200 | 20.000 | 20.000 | 12730 | 5095 | 2037.2 |

Legia per fonderia Al



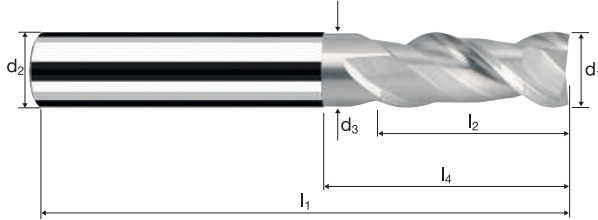
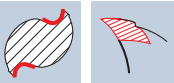
| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|-------|
| 3.00 | 2 | 360 | 0.025 | 3.000 | 3.000 | 38195 | 1910 | 17.2 |
| 4.00 | 2 | 360 | 0.055 | 4.000 | 4.000 | 28650 | 3150 | 50.4 |
| 5.00 | 2 | 360 | 0.065 | 5.000 | 5.000 | 22920 | 2980 | 74.5 |
| 6.00 | 2 | 360 | 0.085 | 6.000 | 6.000 | 19100 | 3245 | 116.9 |
| 8.00 | 2 | 360 | 0.110 | 8.000 | 8.000 | 14325 | 3150 | 201.7 |
| 10.00 | 2 | 360 | 0.140 | 10.000 | 10.000 | 11460 | 3210 | 320.9 |
| 12.00 | 2 | 360 | 0.155 | 12.000 | 12.000 | 9550 | 2960 | 426.3 |
| 16.00 | 2 | 360 | 0.170 | 16.000 | 16.000 | 7160 | 2435 | 623.4 |
| 20.00 | 2 | 360 | 0.200 | 20.000 | 20.000 | 5730 | 2290 | 916.7 |

Frese cilindriche AX (AX-NV2)

A taglienti lisci, esecuzione normale con scarico corto



HM λ 40°
MG10 γ 20°



Sgrossatura

Finitura



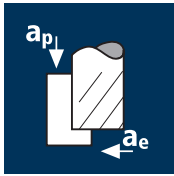
ReTool®

| | | | | | | | | |
|----------|--|--------------------|--------------------|-------------------|--|-----------|---------------------|--|
| Rm < 850 | | Al Aluminium > 99% | Al Aluminium Alloy | Al Aluminium Cast | | Cu Copper | Plastic Thermoplast | |
|----------|--|--------------------|--------------------|-------------------|--|-----------|---------------------|--|



| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | α | z | CELERO | |
|------------|-------------------|-------------------|----------------|----------------|----------------|----------------|----------------|------|---|--------------|---------------|
| | | | | | | | | | | EUR | EUR |
| | | | | | | | | | | 15620 | C15620 |
| | | | | | | | | | | 15520 | C15520 |
| 140 | 2.00 | 6.00 | 1.90 | 57 | 7.00 | 10.00 | 18.31 | 7.0° | 2 | 50.40 | 63.00 |
| 180 | 3.00 | 6.00 | 2.80 | 57 | 8.00 | 14.00 | 20.63 | 4.5° | 2 | 50.40 | 63.00 |
| 220 | 4.00 | 6.00 | 3.70 | 57 | 11.00 | 16.00 | 20.95 | 3.0° | 2 | 50.40 | 63.00 |
| 260 | 5.00 | 6.00 | 4.60 | 57 | 13.00 | 18.00 | 21.27 | 1.5° | 2 | 50.40 | 63.00 |
| 300 | 6.00 | 6.00 | 5.50 | 57 | 13.00 | 19.34 | 20.00 | 0.0° | 2 | 50.40 | 63.00 |
| 391 | 8.00 | 8.00 | 7.40 | 63 | 19.00 | 25.29 | 26.00 | 0.0° | 2 | 63.00 | 79.00 |
| 450 | 10.00 | 10.00 | 9.20 | 72 | 22.00 | 30.20 | 31.00 | 0.0° | 2 | 86.00 | 107.00 |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 26.00 | 36.13 | 37.00 | 0.0° | 2 | 106.00 | 132.00 |
| 610 | 16.00 | 16.00 | 15.00 | 92 | 32.00 | 42.13 | 43.00 | 0.0° | 2 | 165.00 | 207.00 |
| 682 | 20.00 | 20.00 | 19.00 | 104 | 38.00 | 52.13 | 53.00 | 0.0° | 2 | 241.00 | 302.00 |

Applicazione



Materiale

Alluminio malleabile
Costruzione integrale Al



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 6.00 | 2 | 650 | 0.065 | 9.000 | 3.300 | 34485 | 4485 | 133.1 |
| 8.00 | 2 | 650 | 0.090 | 12.000 | 4.400 | 25865 | 4655 | 245.8 |
| 10.00 | 2 | 650 | 0.110 | 15.000 | 5.500 | 20690 | 4550 | 375.5 |
| 12.00 | 2 | 650 | 0.120 | 18.000 | 6.600 | 17240 | 4140 | 491.6 |
| 16.00 | 2 | 650 | 0.135 | 24.000 | 8.800 | 12930 | 3490 | 737.4 |
| 20.00 | 2 | 650 | 0.155 | 30.000 | 11.000 | 10345 | 3205 | 1058.3 |

Rame non legato



| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|-------|
| 6.00 | 2 | 500 | 0.050 | 9.000 | 3.300 | 26525 | 2655 | 78.8 |
| 8.00 | 2 | 500 | 0.070 | 12.000 | 4.400 | 19895 | 2785 | 147.1 |
| 10.00 | 2 | 500 | 0.090 | 15.000 | 5.500 | 15915 | 2865 | 236.3 |
| 12.00 | 2 | 500 | 0.095 | 18.000 | 6.600 | 13265 | 2520 | 299.4 |
| 16.00 | 2 | 500 | 0.105 | 24.000 | 8.800 | 9945 | 2090 | 441.2 |
| 20.00 | 2 | 500 | 0.125 | 30.000 | 11.000 | 7960 | 1990 | 656.5 |

Materiali termoplastici

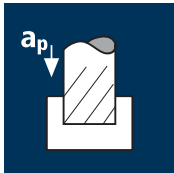


| | | | | | | | | |
|-------|---|------|-------|--------|--------|-------|------|--------|
| 6.00 | 2 | 792 | 0.065 | 9.000 | 3.300 | 42015 | 5460 | 162.2 |
| 8.00 | 2 | 1056 | 0.090 | 12.000 | 4.400 | 42015 | 7565 | 399.3 |
| 10.00 | 2 | 1200 | 0.110 | 15.000 | 5.500 | 38195 | 8405 | 693.3 |
| 12.00 | 2 | 1200 | 0.120 | 18.000 | 6.600 | 31830 | 7640 | 907.6 |
| 16.00 | 2 | 1200 | 0.135 | 24.000 | 8.800 | 23875 | 6445 | 1361.3 |
| 20.00 | 2 | 1200 | 0.155 | 30.000 | 11.000 | 19100 | 5920 | 1953.8 |

Lega per fonderia Al



| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|-------|
| 6.00 | 2 | 520 | 0.065 | 9.000 | 3.300 | 27585 | 3585 | 106.5 |
| 8.00 | 2 | 520 | 0.090 | 12.000 | 4.400 | 20690 | 3725 | 196.6 |
| 10.00 | 2 | 520 | 0.110 | 15.000 | 5.500 | 16550 | 3640 | 300.4 |
| 12.00 | 2 | 520 | 0.120 | 18.000 | 6.600 | 13795 | 3310 | 393.3 |
| 16.00 | 2 | 520 | 0.135 | 24.000 | 8.800 | 10345 | 2795 | 589.9 |
| 20.00 | 2 | 520 | 0.155 | 30.000 | 11.000 | 8275 | 2565 | 846.6 |



Alluminio malleabile
Costruzione integrale Al



| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|-------|
| 6.00 | 2 | 550 | 0.045 | 5.400 | 6.000 | 29180 | 2625 | 85.1 |
| 8.00 | 2 | 550 | 0.060 | 7.200 | 8.000 | 21885 | 2625 | 151.3 |
| 10.00 | 2 | 550 | 0.075 | 9.000 | 10.000 | 17505 | 2625 | 236.3 |
| 12.00 | 2 | 550 | 0.085 | 10.800 | 12.000 | 14590 | 2480 | 321.4 |
| 16.00 | 2 | 550 | 0.095 | 14.400 | 16.000 | 10940 | 2080 | 479.0 |
| 20.00 | 2 | 550 | 0.110 | 18.000 | 20.000 | 8755 | 1925 | 693.3 |

Rame non legato



| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|-------|
| 6.00 | 2 | 450 | 0.040 | 5.400 | 6.000 | 23875 | 1910 | 61.9 |
| 8.00 | 2 | 450 | 0.050 | 7.200 | 8.000 | 17905 | 1790 | 103.1 |
| 10.00 | 2 | 450 | 0.060 | 9.000 | 10.000 | 14325 | 1720 | 154.7 |
| 12.00 | 2 | 450 | 0.070 | 10.800 | 12.000 | 11935 | 1670 | 216.6 |
| 16.00 | 2 | 450 | 0.075 | 14.400 | 16.000 | 8950 | 1345 | 309.4 |
| 20.00 | 2 | 450 | 0.090 | 18.000 | 20.000 | 7160 | 1290 | 464.1 |

Materiali termoplastici



| | | | | | | | | |
|-------|---|------|-------|--------|--------|-------|------|--------|
| 6.00 | 2 | 792 | 0.045 | 5.400 | 6.000 | 42015 | 3780 | 122.5 |
| 8.00 | 2 | 1000 | 0.060 | 7.200 | 8.000 | 39790 | 4775 | 275.0 |
| 10.00 | 2 | 1000 | 0.075 | 9.000 | 10.000 | 31830 | 4775 | 429.7 |
| 12.00 | 2 | 1000 | 0.085 | 10.800 | 12.000 | 26525 | 4510 | 584.4 |
| 16.00 | 2 | 1000 | 0.095 | 14.400 | 16.000 | 19895 | 3780 | 870.9 |
| 20.00 | 2 | 1000 | 0.110 | 18.000 | 20.000 | 15915 | 3500 | 1260.5 |

Lega per fonderia Al



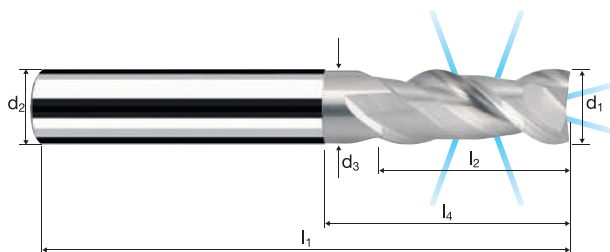
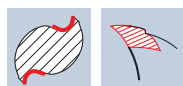
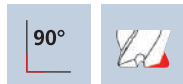
| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|-------|
| 6.00 | 2 | 440 | 0.045 | 5.400 | 6.000 | 23345 | 2100 | 68.1 |
| 8.00 | 2 | 440 | 0.060 | 7.200 | 8.000 | 17505 | 2100 | 121.0 |
| 10.00 | 2 | 440 | 0.075 | 9.000 | 10.000 | 14005 | 2100 | 189.1 |
| 12.00 | 2 | 440 | 0.085 | 10.800 | 12.000 | 11670 | 1985 | 257.1 |
| 16.00 | 2 | 440 | 0.095 | 14.400 | 16.000 | 8755 | 1665 | 383.2 |
| 20.00 | 2 | 440 | 0.110 | 18.000 | 20.000 | 7005 | 1540 | 554.6 |

Frese cilindriche AX (AX-NV2)



A taglienti lisci, esecuzione normale con scarico corto, con canale di raffreddamento integrato

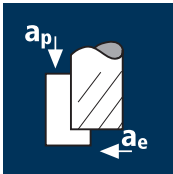
HM λ 40°
MG10 γ 20°



| | | | | | |
|----------|--------------------|--------------------|-------------------|-----------|---------------------|
| Rm < 850 | Al Aluminium > 99% | Al Aluminium Alloy | Al Aluminium Cast | Cu Copper | Plastic Thermoplast |
|----------|--------------------|--------------------|-------------------|-----------|---------------------|

| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | z | CELERO | |
|---|-------------------|-------------------|----------------|----------------|----------------|----------------|----------------|---|--------|--------|
| | | | | | | | | | EUR | EUR |
| Esempio: Rivestimento C, Articolo 15525, Codice-Ø 300 | | | | | | | | | | |
| 300 | 6.00 | 6.00 | 5.50 | 57 | 13.00 | 19.34 | 20.00 | 2 | 63.00 | 76.00 |
| 391 | 8.00 | 8.00 | 7.40 | 63 | 19.00 | 25.29 | 26.00 | 2 | 79.00 | 94.00 |
| 450 | 10.00 | 10.00 | 9.20 | 72 | 22.00 | 30.20 | 31.00 | 2 | 107.00 | 128.00 |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 26.00 | 36.13 | 37.00 | 2 | 132.00 | 159.00 |
| 610 | 16.00 | 16.00 | 15.00 | 92 | 32.00 | 42.13 | 43.00 | 2 | 207.00 | 248.00 |
| 682 | 20.00 | 20.00 | 19.00 | 104 | 38.00 | 52.13 | 53.00 | 2 | 302.00 | 362.00 |

Applicazione



Materiale

Alluminio malleabile
Costruzione integrale Al



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 3.00 | 3 | 396 | 0.050 | 4.500 | 1.400 | 42015 | 6305 | 39.7 |
| 4.00 | 3 | 528 | 0.065 | 6.000 | 1.800 | 42015 | 8195 | 88.5 |
| 5.00 | 3 | 550 | 0.085 | 7.500 | 2.300 | 35015 | 8930 | 154.0 |
| 6.00 | 3 | 550 | 0.110 | 9.000 | 2.700 | 29180 | 9630 | 234.0 |
| 8.00 | 3 | 550 | 0.135 | 12.000 | 3.600 | 21885 | 8865 | 382.9 |
| 10.00 | 3 | 550 | 0.165 | 15.000 | 4.500 | 17505 | 8665 | 585.0 |
| 12.00 | 3 | 550 | 0.200 | 18.000 | 5.400 | 14590 | 8755 | 850.8 |
| 16.00 | 3 | 550 | 0.215 | 24.000 | 7.200 | 10940 | 7060 | 1219.5 |
| 20.00 | 3 | 550 | 0.250 | 30.000 | 9.000 | 8755 | 6565 | 1772.6 |

Rame non legato



| | | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|------|--------|
| 3.00 | 3 | 396 | 0.040 | 4.500 | 1.350 | 42015 | 5040 | 30.6 |
| 4.00 | 3 | 400 | 0.050 | 6.000 | 1.800 | 31830 | 4775 | 51.6 |
| 5.00 | 3 | 400 | 0.070 | 7.500 | 2.250 | 25465 | 5350 | 90.2 |
| 6.00 | 3 | 400 | 0.090 | 9.000 | 2.700 | 21220 | 5730 | 139.2 |
| 8.00 | 3 | 400 | 0.110 | 12.000 | 3.600 | 15915 | 5250 | 226.9 |
| 10.00 | 3 | 400 | 0.130 | 15.000 | 4.500 | 12730 | 4965 | 335.2 |
| 12.00 | 3 | 400 | 0.160 | 18.000 | 5.400 | 10610 | 5095 | 495.0 |
| 16.00 | 3 | 400 | 0.170 | 24.000 | 7.200 | 7960 | 4060 | 701.3 |
| 20.00 | 3 | 400 | 0.200 | 30.000 | 9.000 | 6365 | 3820 | 1031.3 |

Materiali termoplastici



| | | | | | | | | |
|-------|---|------|-------|--------|-------|-------|-------|--------|
| 3.00 | 3 | 396 | 0.050 | 4.500 | 1.350 | 42015 | 6305 | 38.3 |
| 4.00 | 3 | 528 | 0.065 | 6.000 | 1.800 | 42015 | 8195 | 88.5 |
| 5.00 | 3 | 660 | 0.085 | 7.500 | 2.250 | 42015 | 10715 | 180.8 |
| 6.00 | 3 | 792 | 0.110 | 9.000 | 2.700 | 42015 | 13865 | 336.9 |
| 8.00 | 3 | 1000 | 0.135 | 12.000 | 3.600 | 39790 | 16115 | 696.1 |
| 10.00 | 3 | 1000 | 0.165 | 15.000 | 4.500 | 31830 | 15755 | 1063.6 |
| 12.00 | 3 | 1000 | 0.200 | 18.000 | 5.400 | 26525 | 15915 | 1547.0 |
| 16.00 | 3 | 1000 | 0.215 | 24.000 | 7.200 | 19895 | 12830 | 2217.3 |
| 20.00 | 3 | 1000 | 0.250 | 30.000 | 9.000 | 15915 | 11935 | 3222.9 |

Lega per fonderia Al



| | | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|------|--------|
| 3.00 | 3 | 396 | 0.050 | 4.500 | 1.350 | 42015 | 6305 | 38.3 |
| 4.00 | 3 | 440 | 0.065 | 6.000 | 1.800 | 35015 | 6830 | 73.7 |
| 5.00 | 3 | 440 | 0.085 | 7.500 | 2.250 | 28010 | 7145 | 120.5 |
| 6.00 | 3 | 440 | 0.110 | 9.000 | 2.700 | 23345 | 7705 | 187.2 |
| 8.00 | 3 | 440 | 0.135 | 12.000 | 3.600 | 17505 | 7090 | 306.3 |
| 10.00 | 3 | 440 | 0.165 | 15.000 | 4.500 | 14005 | 6935 | 468.0 |
| 12.00 | 3 | 440 | 0.200 | 18.000 | 5.400 | 11670 | 7005 | 680.7 |
| 16.00 | 3 | 440 | 0.215 | 24.000 | 7.200 | 8755 | 5645 | 975.6 |
| 20.00 | 3 | 440 | 0.250 | 30.000 | 9.000 | 7055 | 5250 | 1418.1 |



Alluminio malleabile
Costruzione integrale Al



| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|-------|
| 3.00 | 3 | 396 | 0.035 | 1.800 | 3.000 | 42015 | 4410 | 23.8 |
| 4.00 | 3 | 450 | 0.045 | 2.400 | 4.000 | 35810 | 4835 | 46.4 |
| 5.00 | 3 | 450 | 0.060 | 3.000 | 5.000 | 28650 | 5155 | 77.3 |
| 6.00 | 3 | 450 | 0.075 | 3.600 | 6.000 | 23875 | 5370 | 116.0 |
| 8.00 | 3 | 450 | 0.095 | 4.800 | 8.000 | 17905 | 5105 | 196.0 |
| 10.00 | 3 | 450 | 0.115 | 6.000 | 10.000 | 14325 | 4940 | 296.5 |
| 12.00 | 3 | 450 | 0.140 | 7.200 | 12.000 | 11935 | 5015 | 433.2 |
| 16.00 | 3 | 450 | 0.150 | 9.600 | 16.000 | 8950 | 4030 | 618.8 |
| 20.00 | 3 | 450 | 0.175 | 12.000 | 20.000 | 7160 | 3760 | 902.4 |

Rame non legato



| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|-------|
| 3.00 | 3 | 350 | 0.030 | 1.800 | 3.000 | 37135 | 3340 | 18.0 |
| 4.00 | 3 | 350 | 0.035 | 2.400 | 4.000 | 27850 | 2925 | 28.1 |
| 5.00 | 3 | 350 | 0.050 | 3.000 | 5.000 | 22280 | 3340 | 50.1 |
| 6.00 | 3 | 350 | 0.060 | 3.600 | 6.000 | 18570 | 3340 | 72.2 |
| 8.00 | 3 | 350 | 0.075 | 4.800 | 8.000 | 13925 | 3135 | 120.3 |
| 10.00 | 3 | 350 | 0.090 | 6.000 | 10.000 | 11140 | 3010 | 180.5 |
| 12.00 | 3 | 350 | 0.110 | 7.200 | 12.000 | 9285 | 3065 | 264.7 |
| 16.00 | 3 | 350 | 0.120 | 9.600 | 16.000 | 6965 | 2505 | 385.0 |
| 20.00 | 3 | 350 | 0.140 | 12.000 | 20.000 | 5570 | 2340 | 561.5 |

Materiali termoplastici



| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|--------|
| 3.00 | 3 | 396 | 0.035 | 1.800 | 3.000 | 42015 | 4410 | 23.8 |
| 4.00 | 3 | 528 | 0.045 | 2.400 | 4.000 | 42015 | 5670 | 54.5 |
| 5.00 | 3 | 660 | 0.060 | 3.000 | 5.000 | 42015 | 7565 | 113.4 |
| 6.00 | 3 | 792 | 0.075 | 3.600 | 6.000 | 42015 | 9455 | 204.2 |
| 8.00 | 3 | 800 | 0.095 | 4.800 | 8.000 | 31830 | 9070 | 348.4 |
| 10.00 | 3 | 800 | 0.115 | 6.000 | 10.000 | 25465 | 8785 | 527.1 |
| 12.00 | 3 | 800 | 0.140 | 7.200 | 12.000 | 21220 | 8915 | 770.1 |
| 16.00 | 3 | 800 | 0.150 | 9.600 | 16.000 | 15915 | 7160 | 1100.1 |
| 20.00 | 3 | 800 | 0.175 | 12.000 | 20.000 | 12730 | 6685 | 1604.3 |

Lega per fonderia Al



| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|-------|
| 3.00 | 3 | 360 | 0.035 | 1.800 | 3.000 | 38195 | 4010 | 21.7 |
| 4.00 | 3 | 360 | 0.045 | 2.400 | 4.000 | 28650 | 3865 | 37.1 |
| 5.00 | 3 | 360 | 0.060 | 3.000 | 5.000 | 22920 | 4125 | 61.9 |
| 6.00 | 3 | 360 | 0.075 | 3.600 | 6.000 | 19100 | 4295 | 92.8 |
| 8.00 | 3 | 360 | 0.095 | 4.800 | 8.000 | 14325 | 4080 | 156.8 |
| 10.00 | 3 | 360 | 0.115 | 6.000 | 10.000 | 11460 | 3955 | 237.2 |
| 12.00 | 3 | 360 | 0.140 | 7.200 | 12.000 | 9550 | 4010 | 346.5 |
| 16.00 | 3 | 360 | 0.150 | 9.600 | 16.000 | 7160 | 3225 | 495.0 |
| 20.00 | 3 | 360 | 0.175 | 12.000 | 20.000 | 5730 | 3010 | 721.9 |

Frese cilindriche AX (AX-NV3)

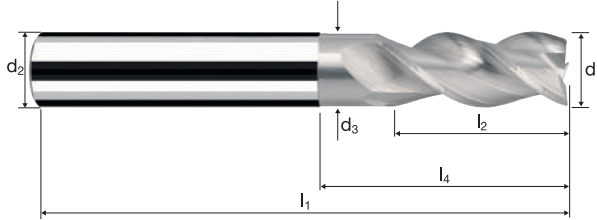
A taglienti lisci, esecuzione normale con scarico corto



HM MG10 λ 40°
 γ 20°

90°

Vario



Sgrossatura **Finitura**

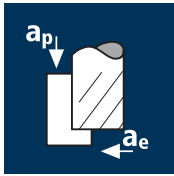


Rm < 850 **Al** Aluminium > 99% **Al** Aluminium Alloy **Al** Aluminium Cast **Cu** Copper **Plastic** Thermoplast



| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | α | z | CELERO | |
|---|----------------------|----------------------|----------------|----------------|----------------|----------------|----------------|------|---|--------------|---------------|
| | | | | | | | | | | EUR | EUR |
| Esempio: N° Ordine Rivestimento C Articolo 15530 Codice-ø 180 | | | | | | | | | | 15630 | C15630 |
| | | | | | | | | | | 15530 | C15530 |
| 180 | 3.00 | 6.00 | 2.80 | 57 | 8.00 | 14.00 | 20.63 | 4.5° | 3 | 50.40 | 63.00 |
| 220 | 4.00 | 6.00 | 3.70 | 57 | 11.00 | 16.00 | 20.95 | 3.0° | 3 | 50.40 | 63.00 |
| 260 | 5.00 | 6.00 | 4.60 | 57 | 13.00 | 18.00 | 21.27 | 1.5° | 3 | 50.40 | 63.00 |
| 300 | 6.00 | 6.00 | 5.50 | 57 | 13.00 | 19.34 | 20.00 | 0.0° | 3 | 50.40 | 63.00 |
| 391 | 8.00 | 8.00 | 7.40 | 63 | 19.00 | 25.29 | 26.00 | 0.0° | 3 | 63.00 | 79.00 |
| 450 | 10.00 | 10.00 | 9.20 | 72 | 22.00 | 30.20 | 31.00 | 0.0° | 3 | 86.00 | 107.00 |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 26.00 | 36.13 | 37.00 | 0.0° | 3 | 106.00 | 132.00 |
| 610 | 16.00 | 16.00 | 15.00 | 92 | 32.00 | 42.13 | 43.00 | 0.0° | 3 | 165.00 | 207.00 |
| 682 | 20.00 | 20.00 | 19.00 | 104 | 38.00 | 52.13 | 53.00 | 0.0° | 3 | 241.00 | 302.00 |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
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Applicazione



Materiale

Alluminio malleabile
Costruzione integrale Al



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 6.00 | 3 | 650 | 0.060 | 9.000 | 2.400 | 34485 | 6205 | 134.1 |
| 8.00 | 3 | 650 | 0.075 | 12.000 | 3.200 | 25865 | 5820 | 223.5 |
| 10.00 | 3 | 650 | 0.090 | 15.000 | 4.000 | 20690 | 5585 | 335.2 |
| 12.00 | 3 | 650 | 0.110 | 18.000 | 4.800 | 17240 | 5690 | 491.6 |
| 16.00 | 3 | 650 | 0.120 | 24.000 | 6.400 | 12930 | 4655 | 715.1 |
| 20.00 | 3 | 650 | 0.140 | 30.000 | 8.000 | 10345 | 4345 | 1042.8 |

Rame non legato



| | | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|------|-------|
| 6.00 | 3 | 500 | 0.050 | 9.000 | 2.400 | 26525 | 3980 | 85.9 |
| 8.00 | 3 | 500 | 0.060 | 12.000 | 3.200 | 19895 | 3580 | 137.5 |
| 10.00 | 3 | 500 | 0.070 | 15.000 | 4.000 | 15915 | 3340 | 200.5 |
| 12.00 | 3 | 500 | 0.090 | 18.000 | 4.800 | 13265 | 3580 | 309.4 |
| 16.00 | 3 | 500 | 0.095 | 24.000 | 6.400 | 9945 | 2835 | 435.4 |
| 20.00 | 3 | 500 | 0.110 | 30.000 | 8.000 | 7960 | 2625 | 630.3 |

Materiali termoplastici



| | | | | | | | | |
|-------|---|------|-------|--------|-------|-------|-------|--------|
| 6.00 | 3 | 792 | 0.060 | 9.000 | 2.400 | 42015 | 7565 | 163.4 |
| 8.00 | 3 | 1056 | 0.075 | 12.000 | 3.200 | 42015 | 9455 | 363.0 |
| 10.00 | 3 | 1200 | 0.090 | 15.000 | 4.000 | 38195 | 10315 | 618.8 |
| 12.00 | 3 | 1200 | 0.110 | 18.000 | 4.800 | 31830 | 10505 | 907.6 |
| 16.00 | 3 | 1200 | 0.120 | 24.000 | 6.400 | 23875 | 8595 | 1320.1 |
| 20.00 | 3 | 1200 | 0.140 | 30.000 | 8.000 | 19100 | 8020 | 1925.1 |

Lega per fonderia Al



| | | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|------|-------|
| 6.00 | 3 | 520 | 0.060 | 9.000 | 2.400 | 27585 | 4965 | 107.3 |
| 8.00 | 3 | 520 | 0.075 | 12.000 | 3.200 | 20690 | 4655 | 178.8 |
| 10.00 | 3 | 520 | 0.090 | 15.000 | 4.000 | 16550 | 4470 | 268.1 |
| 12.00 | 3 | 520 | 0.110 | 18.000 | 4.800 | 13795 | 4550 | 393.3 |
| 16.00 | 3 | 520 | 0.120 | 24.000 | 6.400 | 10345 | 3725 | 572.0 |
| 20.00 | 3 | 520 | 0.140 | 30.000 | 8.000 | 8275 | 3475 | 834.2 |



Alluminio malleabile
Costruzione integrale Al



| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|-------|
| 6.00 | 3 | 550 | 0.040 | 3.000 | 6.000 | 29180 | 3500 | 63.0 |
| 8.00 | 3 | 550 | 0.050 | 4.000 | 8.000 | 21885 | 3285 | 105.0 |
| 10.00 | 3 | 550 | 0.065 | 5.000 | 10.000 | 17505 | 3415 | 170.7 |
| 12.00 | 3 | 550 | 0.075 | 6.000 | 12.000 | 14590 | 3285 | 236.3 |
| 16.00 | 3 | 550 | 0.085 | 8.000 | 16.000 | 10940 | 2790 | 357.1 |
| 20.00 | 3 | 550 | 0.095 | 10.000 | 20.000 | 8755 | 2495 | 499.0 |

Rame non legato



| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|-------|
| 6.00 | 3 | 450 | 0.035 | 3.000 | 6.000 | 23875 | 2505 | 45.1 |
| 8.00 | 3 | 450 | 0.040 | 4.000 | 8.000 | 17905 | 2150 | 68.8 |
| 10.00 | 3 | 450 | 0.050 | 5.000 | 10.000 | 14325 | 2150 | 107.4 |
| 12.00 | 3 | 450 | 0.060 | 6.000 | 12.000 | 11935 | 2150 | 154.7 |
| 16.00 | 3 | 450 | 0.065 | 8.000 | 16.000 | 8950 | 1745 | 223.5 |
| 20.00 | 3 | 450 | 0.075 | 10.000 | 20.000 | 7160 | 1610 | 322.3 |

Materiali termoplastici



| | | | | | | | | |
|-------|---|------|-------|--------|--------|-------|------|-------|
| 6.00 | 3 | 792 | 0.040 | 3.000 | 6.000 | 42015 | 5040 | 90.8 |
| 8.00 | 3 | 1000 | 0.050 | 4.000 | 8.000 | 39790 | 5970 | 191.0 |
| 10.00 | 3 | 1000 | 0.065 | 5.000 | 10.000 | 31830 | 6205 | 310.4 |
| 12.00 | 3 | 1000 | 0.075 | 6.000 | 12.000 | 26525 | 5970 | 429.7 |
| 16.00 | 3 | 1000 | 0.085 | 8.000 | 16.000 | 19895 | 5075 | 649.4 |
| 20.00 | 3 | 1000 | 0.095 | 10.000 | 20.000 | 15915 | 4535 | 907.2 |

Lega per fonderia Al



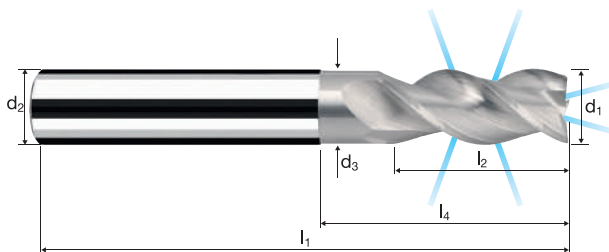
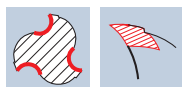
| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|-------|
| 6.00 | 3 | 440 | 0.040 | 3.000 | 6.000 | 23345 | 2800 | 50.4 |
| 8.00 | 3 | 440 | 0.050 | 4.000 | 8.000 | 17505 | 2625 | 84.0 |
| 10.00 | 3 | 440 | 0.065 | 5.000 | 10.000 | 14005 | 2730 | 136.6 |
| 12.00 | 3 | 440 | 0.075 | 6.000 | 12.000 | 11670 | 2625 | 189.1 |
| 16.00 | 3 | 440 | 0.085 | 8.000 | 16.000 | 8755 | 2230 | 285.7 |
| 20.00 | 3 | 440 | 0.095 | 10.000 | 20.000 | 7005 | 1995 | 399.2 |

Frese cilindriche AX (AX-NV3)

A taglienti lisci, esecuzione normale con scarico corto, con canale di raffreddamento integrato



HM λ 40°
MG10 γ 20°

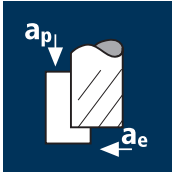


| | | | | | | |
|----------|--|--------------------|--------------------|-------------------|-----------|---------------------|
| Rm < 850 | | Al Aluminium > 99% | Al Aluminium Alloy | Al Aluminium Cast | Cu Copper | Plastic Thermoplast |
|----------|--|--------------------|--------------------|-------------------|-----------|---------------------|

| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | z | CELERO | |
|--------|-------------------|-------------------|----------------|----------------|----------------|----------------|----------------|---|--------|--------|
| | | | | | | | | | EUR | EUR |
| 300 | 6.00 | 6.00 | 5.50 | 57 | 13.00 | 19.34 | 20.00 | 3 | 63.00 | 76.00 |
| 391 | 8.00 | 8.00 | 7.40 | 63 | 19.00 | 25.29 | 26.00 | 3 | 79.00 | 94.00 |
| 450 | 10.00 | 10.00 | 9.20 | 72 | 22.00 | 30.20 | 31.00 | 3 | 107.00 | 128.00 |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 26.00 | 36.13 | 37.00 | 3 | 132.00 | 159.00 |
| 610 | 16.00 | 16.00 | 15.00 | 92 | 32.00 | 42.13 | 43.00 | 3 | 207.00 | 248.00 |
| 682 | 20.00 | 20.00 | 19.00 | 104 | 38.00 | 52.13 | 53.00 | 3 | 302.00 | 362.00 |
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Applicazione

Materiale



Alluminio malleabile
Costruzione integrale Al



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 3.00 | 2 | 396 | 0.040 | 4.500 | 1.400 | 42015 | 3360 | 21.2 |
| 4.00 | 2 | 528 | 0.055 | 6.000 | 1.800 | 42015 | 4620 | 49.9 |
| 5.00 | 2 | 550 | 0.070 | 7.500 | 2.300 | 35015 | 4900 | 84.6 |
| 6.00 | 2 | 550 | 0.090 | 9.000 | 2.700 | 29180 | 5250 | 127.6 |
| 8.00 | 2 | 550 | 0.120 | 12.000 | 3.600 | 21885 | 5250 | 226.9 |
| 10.00 | 2 | 550 | 0.150 | 15.000 | 4.500 | 17505 | 5250 | 354.5 |
| 12.00 | 2 | 550 | 0.165 | 18.000 | 5.400 | 14590 | 4815 | 468.0 |
| 16.00 | 2 | 550 | 0.185 | 24.000 | 7.200 | 10940 | 4050 | 699.6 |
| 20.00 | 2 | 550 | 0.215 | 30.000 | 9.000 | 8755 | 3765 | 1016.3 |

Rame non legato



| | | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|------|-------|
| 3.00 | 2 | 396 | 0.030 | 4.500 | 1.350 | 42015 | 2520 | 15.3 |
| 4.00 | 2 | 400 | 0.045 | 6.000 | 1.800 | 31830 | 2865 | 30.9 |
| 5.00 | 2 | 400 | 0.055 | 7.500 | 2.250 | 25465 | 2800 | 47.3 |
| 6.00 | 2 | 400 | 0.070 | 9.000 | 2.700 | 21220 | 2970 | 72.2 |
| 8.00 | 2 | 400 | 0.095 | 12.000 | 3.600 | 15915 | 3025 | 130.6 |
| 10.00 | 2 | 400 | 0.120 | 15.000 | 4.500 | 12730 | 3055 | 206.3 |
| 12.00 | 2 | 400 | 0.130 | 18.000 | 5.400 | 10610 | 2760 | 268.1 |
| 16.00 | 2 | 400 | 0.150 | 24.000 | 7.200 | 7960 | 2385 | 412.5 |
| 20.00 | 2 | 400 | 0.170 | 30.000 | 9.000 | 6365 | 2165 | 584.4 |

Materiali termoplastici



| | | | | | | | | |
|-------|---|------|-------|--------|-------|-------|------|--------|
| 3.00 | 2 | 396 | 0.040 | 4.500 | 1.350 | 42015 | 3360 | 20.4 |
| 4.00 | 2 | 528 | 0.055 | 6.000 | 1.800 | 42015 | 4620 | 49.9 |
| 5.00 | 2 | 660 | 0.070 | 7.500 | 2.250 | 42015 | 5880 | 99.3 |
| 6.00 | 2 | 792 | 0.090 | 9.000 | 2.700 | 42015 | 7565 | 183.8 |
| 8.00 | 2 | 1000 | 0.120 | 12.000 | 3.600 | 39790 | 9550 | 412.5 |
| 10.00 | 2 | 1000 | 0.150 | 15.000 | 4.500 | 31830 | 9550 | 644.6 |
| 12.00 | 2 | 1000 | 0.165 | 18.000 | 5.400 | 26525 | 8755 | 850.8 |
| 16.00 | 2 | 1000 | 0.185 | 24.000 | 7.200 | 19895 | 7360 | 1272.0 |
| 20.00 | 2 | 1000 | 0.215 | 30.000 | 9.000 | 15915 | 6845 | 1847.8 |

Legia per fonderia Al



| | | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|------|-------|
| 3.00 | 2 | 396 | 0.040 | 4.500 | 1.350 | 42015 | 3360 | 20.4 |
| 4.00 | 2 | 440 | 0.055 | 6.000 | 1.800 | 35015 | 3850 | 41.6 |
| 5.00 | 2 | 440 | 0.070 | 7.500 | 2.250 | 28010 | 3920 | 66.2 |
| 6.00 | 2 | 440 | 0.090 | 9.000 | 2.700 | 23345 | 4200 | 102.1 |
| 8.00 | 2 | 440 | 0.120 | 12.000 | 3.600 | 17505 | 4200 | 181.5 |
| 10.00 | 2 | 440 | 0.150 | 15.000 | 4.500 | 14005 | 4200 | 283.6 |
| 12.00 | 2 | 440 | 0.165 | 18.000 | 5.400 | 11670 | 3850 | 374.4 |
| 16.00 | 2 | 440 | 0.185 | 24.000 | 7.200 | 8755 | 3240 | 559.7 |
| 20.00 | 2 | 440 | 0.215 | 30.000 | 9.000 | 7005 | 3010 | 813.0 |



Alluminio malleabile
Costruzione integrale Al



| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|-------|
| 3.00 | 2 | 396 | 0.030 | 1.500 | 3.000 | 42015 | 2520 | 11.3 |
| 4.00 | 2 | 450 | 0.040 | 2.000 | 4.000 | 35810 | 2865 | 22.9 |
| 5.00 | 2 | 450 | 0.050 | 2.500 | 5.000 | 28650 | 2865 | 35.8 |
| 6.00 | 2 | 450 | 0.065 | 3.000 | 6.000 | 23875 | 3105 | 55.9 |
| 8.00 | 2 | 450 | 0.085 | 4.000 | 8.000 | 17905 | 3045 | 97.4 |
| 10.00 | 2 | 450 | 0.105 | 5.000 | 10.000 | 14325 | 3010 | 150.4 |
| 12.00 | 2 | 450 | 0.115 | 6.000 | 12.000 | 11935 | 2745 | 197.7 |
| 16.00 | 2 | 450 | 0.130 | 8.000 | 16.000 | 8950 | 2330 | 297.9 |
| 20.00 | 2 | 450 | 0.150 | 10.000 | 20.000 | 7160 | 2150 | 429.7 |

Rame non legato



| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|-------|
| 3.00 | 2 | 350 | 0.025 | 1.500 | 3.000 | 37135 | 1855 | 8.4 |
| 4.00 | 2 | 350 | 0.030 | 2.000 | 4.000 | 27850 | 1670 | 13.4 |
| 5.00 | 2 | 350 | 0.040 | 2.500 | 5.000 | 22280 | 1785 | 22.3 |
| 6.00 | 2 | 350 | 0.050 | 3.000 | 6.000 | 18570 | 1855 | 33.4 |
| 8.00 | 2 | 350 | 0.070 | 4.000 | 8.000 | 13925 | 1950 | 62.4 |
| 10.00 | 2 | 350 | 0.085 | 5.000 | 10.000 | 11140 | 1895 | 94.7 |
| 12.00 | 2 | 350 | 0.090 | 6.000 | 12.000 | 9285 | 1670 | 120.3 |
| 16.00 | 2 | 350 | 0.105 | 8.000 | 16.000 | 6965 | 1460 | 187.2 |
| 20.00 | 2 | 350 | 0.120 | 10.000 | 20.000 | 5570 | 1335 | 267.4 |

Materiali termoplastici



| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|-------|
| 3.00 | 2 | 396 | 0.030 | 1.500 | 3.000 | 42015 | 2520 | 11.3 |
| 4.00 | 2 | 528 | 0.040 | 2.000 | 4.000 | 42015 | 3360 | 26.9 |
| 5.00 | 2 | 660 | 0.050 | 2.500 | 5.000 | 42015 | 4200 | 52.5 |
| 6.00 | 2 | 792 | 0.065 | 3.000 | 6.000 | 42015 | 5460 | 98.3 |
| 8.00 | 2 | 800 | 0.085 | 4.000 | 8.000 | 31830 | 5410 | 173.2 |
| 10.00 | 2 | 800 | 0.105 | 5.000 | 10.000 | 25465 | 5350 | 267.4 |
| 12.00 | 2 | 800 | 0.115 | 6.000 | 12.000 | 21220 | 4880 | 351.4 |
| 16.00 | 2 | 800 | 0.130 | 8.000 | 16.000 | 15915 | 4140 | 529.7 |
| 20.00 | 2 | 800 | 0.150 | 10.000 | 20.000 | 12730 | 3820 | 763.9 |

Legia per fonderia Al



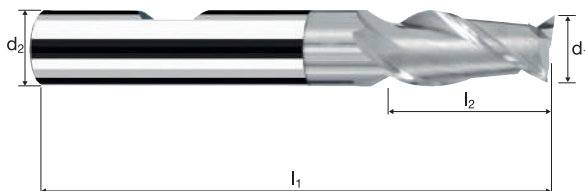
| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|-------|
| 3.00 | 2 | 360 | 0.030 | 1.500 | 3.000 | 38195 | 2290 | 10.3 |
| 4.00 | 2 | 360 | 0.040 | 2.000 | 4.000 | 28650 | 2290 | 18.3 |
| 5.00 | 2 | 360 | 0.050 | 2.500 | 5.000 | 22920 | 2290 | 28.6 |
| 6.00 | 2 | 360 | 0.065 | 3.000 | 6.000 | 19100 | 2485 | 44.7 |
| 8.00 | 2 | 360 | 0.085 | 4.000 | 8.000 | 14325 | 2435 | 77.9 |
| 10.00 | 2 | 360 | 0.105 | 5.000 | 10.000 | 11460 | 2405 | 120.3 |
| 12.00 | 2 | 360 | 0.115 | 6.000 | 12.000 | 9550 | 2195 | 158.1 |
| 16.00 | 2 | 360 | 0.130 | 8.000 | 16.000 | 7160 | 1860 | 238.4 |
| 20.00 | 2 | 360 | 0.150 | 10.000 | 20.000 | 5730 | 1720 | 343.8 |

Frese cilindriche

A taglienti lisci, esecuzione normale



HM λ 40°
MG10 γ 18°

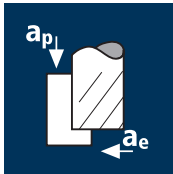


ReTool®

| | | | | | | | |
|-------------|--|--------------------------|--------------------------|-------------------------|--|--------------|------------------------|
| Rm < 850 | | Al Aluminium > 99% | Al Aluminium Alloy | Al Aluminium Cast | | Cu Copper | Plastic Thermoplast |
|-------------|--|--------------------------|--------------------------|-------------------------|--|--------------|------------------------|

| Esempio: N° Ordine | | | | | | | | | | CELERO |
|-----------------------|----------------------|----------------------|----------------|----------------|----------------|------|------|---|--|--------|
| | | | | | | | | | | C5500 |
| | | | | | | | | | | C5272 |
| Ø Code | d ₁ e8 | d ₂ h6 | l ₁ | l ₂ | l ₄ | 45° | α | z | | EUR |
| 140 | 2.00 | 6.00 | 54 | 6.00 | 15.32 | 0.10 | 8.0° | 2 | | 46.20 |
| 180 | 3.00 | 6.00 | 57 | 7.00 | 14.96 | 0.10 | 6.0° | 2 | | 46.20 |
| 220 | 4.00 | 6.00 | 57 | 8.00 | 14.59 | 0.10 | 4.5° | 2 | | 46.20 |
| 260 | 5.00 | 6.00 | 57 | 10.00 | 14.72 | 0.15 | 2.5° | 2 | | 46.20 |
| 300 | 6.00 | 6.00 | 57 | 10.00 | - | 0.15 | 0.0° | 2 | | 46.20 |
| 391 | 8.00 | 8.00 | 63 | 16.00 | - | 0.15 | 0.0° | 2 | | 57.70 |
| 450 | 10.00 | 10.00 | 72 | 19.00 | - | 0.20 | 0.0° | 2 | | 78.00 |
| 501 | 12.00 | 12.00 | 83 | 22.00 | - | 0.20 | 0.0° | 2 | | 97.00 |
| 610 | 16.00 | 16.00 | 92 | 26.00 | - | 0.20 | 0.0° | 2 | | 152.00 |
| 682 | 20.00 | 20.00 | 104 | 32.00 | - | 0.20 | 0.0° | 2 | | 221.00 |

Applicazione



Materiale

Alluminio malleabile
Costruzione integrale Al



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 3.00 | 2 | 396 | 0.050 | 4.500 | 1.200 | 42015 | 4200 | 22.7 |
| 4.00 | 2 | 528 | 0.065 | 6.000 | 1.600 | 42015 | 5460 | 52.4 |
| 5.00 | 2 | 550 | 0.080 | 7.500 | 2.000 | 35015 | 5600 | 84.0 |
| 6.00 | 2 | 550 | 0.110 | 9.000 | 2.400 | 29180 | 6420 | 138.7 |
| 8.00 | 2 | 550 | 0.145 | 12.000 | 3.200 | 21885 | 6345 | 243.7 |
| 10.00 | 2 | 550 | 0.180 | 15.000 | 4.000 | 17505 | 6305 | 378.2 |
| 12.00 | 2 | 550 | 0.195 | 18.000 | 4.800 | 14590 | 5690 | 491.6 |
| 16.00 | 2 | 550 | 0.220 | 24.000 | 6.400 | 10940 | 4815 | 739.5 |
| 20.00 | 2 | 550 | 0.255 | 30.000 | 8.000 | 8755 | 4465 | 1071.4 |

Rame non legato



| | | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|------|-------|
| 3.00 | 2 | 396 | 0.040 | 4.500 | 1.200 | 42015 | 3360 | 18.2 |
| 4.00 | 2 | 400 | 0.050 | 6.000 | 1.600 | 31830 | 3185 | 30.6 |
| 5.00 | 2 | 400 | 0.065 | 7.500 | 2.000 | 25465 | 3310 | 49.7 |
| 6.00 | 2 | 400 | 0.090 | 9.000 | 2.400 | 21220 | 3820 | 82.5 |
| 8.00 | 2 | 400 | 0.115 | 12.000 | 3.200 | 15915 | 3660 | 140.6 |
| 10.00 | 2 | 400 | 0.145 | 15.000 | 4.000 | 12730 | 3690 | 221.5 |
| 12.00 | 2 | 400 | 0.155 | 18.000 | 4.800 | 10610 | 3290 | 284.2 |
| 16.00 | 2 | 400 | 0.175 | 24.000 | 6.400 | 7960 | 2785 | 427.8 |
| 20.00 | 2 | 400 | 0.205 | 30.000 | 8.000 | 6365 | 2610 | 626.4 |

Materiali termoplastici



| | | | | | | | | |
|-------|---|------|-------|--------|-------|-------|-------|--------|
| 3.00 | 2 | 396 | 0.050 | 4.500 | 1.200 | 42015 | 4200 | 22.7 |
| 4.00 | 2 | 528 | 0.065 | 6.000 | 1.600 | 42015 | 5460 | 52.4 |
| 5.00 | 2 | 660 | 0.080 | 7.500 | 2.000 | 42015 | 6725 | 100.8 |
| 6.00 | 2 | 792 | 0.110 | 9.000 | 2.400 | 42015 | 9245 | 199.7 |
| 8.00 | 2 | 1000 | 0.145 | 12.000 | 3.200 | 39790 | 11540 | 443.1 |
| 10.00 | 2 | 1000 | 0.180 | 15.000 | 4.000 | 31830 | 11460 | 687.5 |
| 12.00 | 2 | 1000 | 0.195 | 18.000 | 4.800 | 26525 | 10345 | 893.8 |
| 16.00 | 2 | 1000 | 0.220 | 24.000 | 6.400 | 19895 | 8755 | 1344.5 |
| 20.00 | 2 | 1000 | 0.255 | 30.000 | 8.000 | 15915 | 8115 | 1948.1 |

Lega per fonderia Al



| | | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|------|-------|
| 3.00 | 2 | 396 | 0.050 | 4.500 | 1.200 | 42015 | 4200 | 22.7 |
| 4.00 | 2 | 440 | 0.065 | 6.000 | 1.600 | 35015 | 4550 | 43.7 |
| 5.00 | 2 | 440 | 0.080 | 7.500 | 2.000 | 28010 | 4480 | 67.2 |
| 6.00 | 2 | 440 | 0.110 | 9.000 | 2.400 | 23345 | 5135 | 110.9 |
| 8.00 | 2 | 440 | 0.145 | 12.000 | 3.200 | 17505 | 5075 | 195.0 |
| 10.00 | 2 | 440 | 0.180 | 15.000 | 4.000 | 14005 | 5040 | 302.5 |
| 12.00 | 2 | 440 | 0.195 | 18.000 | 4.800 | 11670 | 4550 | 393.3 |
| 16.00 | 2 | 440 | 0.220 | 24.000 | 6.400 | 8755 | 3850 | 591.6 |
| 20.00 | 2 | 440 | 0.255 | 30.000 | 8.000 | 7005 | 3570 | 857.1 |



Alluminio malleabile
Costruzione integrale Al



| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|-------|
| 3.00 | 2 | 396 | 0.035 | 2.100 | 3.000 | 42015 | 2940 | 18.5 |
| 4.00 | 2 | 450 | 0.045 | 2.800 | 4.000 | 35810 | 3225 | 36.1 |
| 5.00 | 2 | 450 | 0.055 | 3.500 | 5.000 | 28650 | 3150 | 55.1 |
| 6.00 | 2 | 450 | 0.075 | 4.200 | 6.000 | 23875 | 3580 | 90.2 |
| 8.00 | 2 | 450 | 0.100 | 5.600 | 8.000 | 17905 | 3580 | 160.4 |
| 10.00 | 2 | 450 | 0.125 | 7.000 | 10.000 | 14325 | 3580 | 250.7 |
| 12.00 | 2 | 450 | 0.135 | 8.400 | 12.000 | 11935 | 3225 | 324.9 |
| 16.00 | 2 | 450 | 0.155 | 11.200 | 16.000 | 8950 | 2775 | 497.3 |
| 20.00 | 2 | 450 | 0.180 | 14.000 | 20.000 | 7160 | 2580 | 721.9 |

Rame non legato



| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|-------|
| 3.00 | 2 | 350 | 0.030 | 2.100 | 3.000 | 37135 | 2230 | 14.0 |
| 4.00 | 2 | 350 | 0.035 | 2.800 | 4.000 | 27850 | 1950 | 21.8 |
| 5.00 | 2 | 350 | 0.045 | 3.500 | 5.000 | 22280 | 2005 | 35.1 |
| 6.00 | 2 | 350 | 0.060 | 4.200 | 6.000 | 18570 | 2230 | 56.1 |
| 8.00 | 2 | 350 | 0.080 | 5.600 | 8.000 | 13925 | 2230 | 99.8 |
| 10.00 | 2 | 350 | 0.100 | 7.000 | 10.000 | 11140 | 2230 | 156.0 |
| 12.00 | 2 | 350 | 0.110 | 8.400 | 12.000 | 9285 | 2040 | 205.9 |
| 16.00 | 2 | 350 | 0.125 | 11.200 | 16.000 | 6965 | 1740 | 311.9 |
| 20.00 | 2 | 350 | 0.145 | 14.000 | 20.000 | 5570 | 1615 | 452.3 |

Materiali termoplastici



| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|--------|
| 3.00 | 2 | 396 | 0.035 | 2.100 | 3.000 | 42015 | 2940 | 18.5 |
| 4.00 | 2 | 528 | 0.045 | 2.800 | 4.000 | 42015 | 3780 | 42.4 |
| 5.00 | 2 | 660 | 0.055 | 3.500 | 5.000 | 42015 | 4620 | 80.9 |
| 6.00 | 2 | 792 | 0.075 | 4.200 | 6.000 | 42015 | 6305 | 158.8 |
| 8.00 | 2 | 800 | 0.100 | 5.600 | 8.000 | 31830 | 6365 | 285.2 |
| 10.00 | 2 | 800 | 0.125 | 7.000 | 10.000 | 25465 | 6365 | 445.6 |
| 12.00 | 2 | 800 | 0.135 | 8.400 | 12.000 | 21220 | 5730 | 577.5 |
| 16.00 | 2 | 800 | 0.155 | 11.200 | 16.000 | 15915 | 4935 | 884.1 |
| 20.00 | 2 | 800 | 0.180 | 14.000 | 20.000 | 12730 | 4585 | 1283.4 |

Lega per fonderia Al



| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|-------|
| 3.00 | 2 | 360 | 0.035 | 2.100 | 3.000 | 38195 | 2675 | 16.8 |
| 4.00 | 2 | 360 | 0.045 | 2.800 | 4.000 | 28650 | 2580 | 28.9 |
| 5.00 | 2 | 360 | 0.055 | 3.500 | 5.000 | 22920 | 2520 | 44.1 |
| 6.00 | 2 | 360 | 0.075 | 4.200 | 6.000 | 19100 | 2865 | 72.2 |
| 8.00 | 2 | 360 | 0.100 | 5.600 | 8.000 | 14325 | 2865 | 128.3 |
| 10.00 | 2 | 360 | 0.125 | 7.000 | 10.000 | 11460 | 2865 | 200.5 |
| 12.00 | 2 | 360 | 0.135 | 8.400 | 12.000 | 9550 | 2580 | 259.9 |
| 16.00 | 2 | 360 | 0.155 | 11.200 | 16.000 | 7160 | 2220 | 397.9 |
| 20.00 | 2 | 360 | 0.180 | 14.000 | 20.000 | 5730 | 2065 | 577.5 |

Frese cilindriche AX (AX-NV2)

A taglienti lisci, esecuzione medio-lunga con scarico

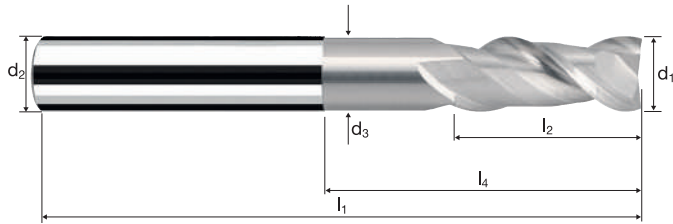


HM
MG10

λ 40°
 γ 20°

90°

Vario



Sgrossatura

Finitura



Rm < 850

Al Aluminium > 99%

Al Aluminium Alloy

Al Aluminium Cast

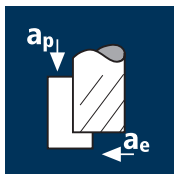
Cu Copper

Plastic Thermoplast

| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | α | z | CELERO | |
|--------|-------------------|-------------------|----------------|----------------|----------------|----------------|----------------|----------|---|--------|--------|
| | | | | | | | | | | 15650 | C15650 |
| | | | | | | | | | | 15550 | C15550 |
| EUR | EUR | | | | | | | | | | |
| 180 | 3.00 | 6.00 | 2.80 | 63 | 8.00 | 20.00 | 26.63 | 3.5° | 2 | 59.60 | 72.00 |
| 220 | 4.00 | 6.00 | 3.70 | 63 | 11.00 | 22.00 | 26.95 | 2.5° | 2 | 59.60 | 72.00 |
| 260 | 5.00 | 6.00 | 4.60 | 63 | 13.00 | 24.00 | 27.27 | 1.5° | 2 | 59.60 | 72.00 |
| 300 | 6.00 | 6.00 | 5.50 | 63 | 13.00 | 25.34 | 26.00 | 0.0° | 2 | 59.60 | 72.00 |
| 391 | 8.00 | 8.00 | 7.40 | 72 | 19.00 | 34.29 | 35.00 | 0.0° | 2 | 75.00 | 90.00 |
| 450 | 10.00 | 10.00 | 9.20 | 84 | 22.00 | 42.20 | 43.00 | 0.0° | 2 | 101.00 | 123.00 |
| 501 | 12.00 | 12.00 | 11.00 | 97 | 26.00 | 50.13 | 51.00 | 0.0° | 2 | 125.00 | 152.00 |
| 610 | 16.00 | 16.00 | 15.00 | 108 | 32.00 | 58.13 | 59.00 | 0.0° | 2 | 196.00 | 237.00 |
| 682 | 20.00 | 20.00 | 19.00 | 122 | 38.00 | 70.13 | 71.00 | 0.0° | 2 | 286.00 | 346.00 |

Applicazione

Materiale



Alluminio malleabile
Costruzione integrale Al



| d1 [mm] | z | v_c [m/min] | f_s [mm] | a_p [mm] | a_e [mm] | n [min ⁻¹] | v_r [mm/min] | Q [cm ³ /min] |
|------------|---|------------------|---------------|---------------|---------------|---------------------------|-------------------|-----------------------------|
| 3.00 | 3 | 396 | 0.045 | 4.500 | 0.900 | 42015 | 5670 | 23.0 |
| 4.00 | 3 | 528 | 0.060 | 6.000 | 1.200 | 42015 | 7565 | 54.5 |
| 5.00 | 3 | 550 | 0.075 | 7.500 | 1.500 | 35015 | 7880 | 88.6 |
| 6.00 | 3 | 550 | 0.100 | 9.000 | 1.800 | 29180 | 8755 | 141.8 |
| 8.00 | 3 | 550 | 0.120 | 12.000 | 2.400 | 21885 | 7880 | 226.9 |
| 10.00 | 3 | 550 | 0.150 | 15.000 | 3.000 | 17505 | 7880 | 354.5 |
| 12.00 | 3 | 550 | 0.180 | 18.000 | 3.600 | 14590 | 7880 | 510.5 |
| 16.00 | 3 | 550 | 0.190 | 24.000 | 4.800 | 10940 | 6235 | 718.5 |
| 20.00 | 3 | 550 | 0.225 | 30.000 | 6.000 | 8755 | 5910 | 1063.6 |

Rame non legato



| | | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|------|-------|
| 3.00 | 3 | 396 | 0.035 | 4.500 | 0.900 | 42015 | 4410 | 17.9 |
| 4.00 | 3 | 400 | 0.050 | 6.000 | 1.200 | 31830 | 4775 | 34.4 |
| 5.00 | 3 | 400 | 0.060 | 7.500 | 1.500 | 25465 | 4585 | 51.6 |
| 6.00 | 3 | 400 | 0.080 | 9.000 | 1.800 | 21220 | 5095 | 82.5 |
| 8.00 | 3 | 400 | 0.095 | 12.000 | 2.400 | 15915 | 4535 | 130.6 |
| 10.00 | 3 | 400 | 0.120 | 15.000 | 3.000 | 12730 | 4585 | 206.3 |
| 12.00 | 3 | 400 | 0.145 | 18.000 | 3.600 | 10610 | 4615 | 299.1 |
| 16.00 | 3 | 400 | 0.150 | 24.000 | 4.800 | 7960 | 3580 | 412.5 |
| 20.00 | 3 | 400 | 0.180 | 30.000 | 6.000 | 6365 | 3440 | 618.8 |

Materiali termoplastici



| | | | | | | | | |
|-------|---|------|-------|--------|-------|-------|-------|--------|
| 3.00 | 3 | 396 | 0.045 | 4.500 | 0.900 | 42015 | 5670 | 23.0 |
| 4.00 | 3 | 528 | 0.060 | 6.000 | 1.200 | 42015 | 7565 | 54.5 |
| 5.00 | 3 | 660 | 0.075 | 7.500 | 1.500 | 42015 | 9455 | 106.4 |
| 6.00 | 3 | 792 | 0.100 | 9.000 | 1.800 | 42015 | 12605 | 204.2 |
| 8.00 | 3 | 1000 | 0.120 | 12.000 | 2.400 | 39790 | 14325 | 412.5 |
| 10.00 | 3 | 1000 | 0.150 | 15.000 | 3.000 | 31830 | 14325 | 644.6 |
| 12.00 | 3 | 1000 | 0.180 | 18.000 | 3.600 | 26525 | 14325 | 928.2 |
| 16.00 | 3 | 1000 | 0.190 | 24.000 | 4.800 | 19895 | 11340 | 1306.3 |
| 20.00 | 3 | 1000 | 0.225 | 30.000 | 6.000 | 15915 | 10745 | 1933.7 |

Lega per fonderia Al



| | | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|------|-------|
| 3.00 | 3 | 396 | 0.045 | 4.500 | 0.900 | 42015 | 5670 | 23.0 |
| 4.00 | 3 | 440 | 0.060 | 6.000 | 1.200 | 35015 | 6305 | 45.4 |
| 5.00 | 3 | 440 | 0.075 | 7.500 | 1.500 | 28010 | 6305 | 70.9 |
| 6.00 | 3 | 440 | 0.100 | 9.000 | 1.800 | 23345 | 7005 | 113.4 |
| 8.00 | 3 | 440 | 0.120 | 12.000 | 2.400 | 17505 | 6305 | 181.5 |
| 10.00 | 3 | 440 | 0.150 | 15.000 | 3.000 | 14005 | 6305 | 283.6 |
| 12.00 | 3 | 440 | 0.180 | 18.000 | 3.600 | 11670 | 6305 | 408.4 |
| 16.00 | 3 | 440 | 0.190 | 24.000 | 4.800 | 8755 | 4990 | 574.8 |
| 20.00 | 3 | 440 | 0.225 | 30.000 | 6.000 | 7005 | 4725 | 850.8 |

Alluminio malleabile
Costruzione integrale Al



| | | | | | | | | |
|-------|---|-----|-------|-------|--------|-------|------|-------|
| 3.00 | 3 | 396 | 0.030 | 1.350 | 3.000 | 42015 | 3780 | 15.3 |
| 4.00 | 3 | 450 | 0.040 | 1.800 | 4.000 | 35810 | 4295 | 30.9 |
| 5.00 | 3 | 450 | 0.055 | 2.250 | 5.000 | 28650 | 4725 | 53.2 |
| 6.00 | 3 | 450 | 0.070 | 2.700 | 6.000 | 23875 | 5015 | 81.2 |
| 8.00 | 3 | 450 | 0.085 | 3.600 | 8.000 | 17905 | 4565 | 131.5 |
| 10.00 | 3 | 450 | 0.105 | 4.500 | 10.000 | 14325 | 4510 | 203.0 |
| 12.00 | 3 | 450 | 0.125 | 5.400 | 12.000 | 11935 | 4475 | 290.1 |
| 16.00 | 3 | 450 | 0.135 | 7.200 | 16.000 | 8950 | 3625 | 417.7 |
| 20.00 | 3 | 450 | 0.160 | 9.000 | 20.000 | 7160 | 3440 | 618.8 |

Rame non legato



| | | | | | | | | |
|-------|---|-----|-------|-------|--------|-------|------|-------|
| 3.00 | 3 | 350 | 0.025 | 1.350 | 3.000 | 37135 | 2785 | 11.3 |
| 4.00 | 3 | 350 | 0.030 | 1.800 | 4.000 | 27850 | 2505 | 18.0 |
| 5.00 | 3 | 350 | 0.045 | 2.250 | 5.000 | 22280 | 3010 | 33.8 |
| 6.00 | 3 | 350 | 0.055 | 2.700 | 6.000 | 18570 | 3065 | 49.6 |
| 8.00 | 3 | 350 | 0.070 | 3.600 | 8.000 | 13925 | 2925 | 84.2 |
| 10.00 | 3 | 350 | 0.085 | 4.500 | 10.000 | 11140 | 2840 | 127.8 |
| 12.00 | 3 | 350 | 0.100 | 5.400 | 12.000 | 9285 | 2785 | 180.5 |
| 16.00 | 3 | 350 | 0.110 | 7.200 | 16.000 | 6965 | 2300 | 264.7 |
| 20.00 | 3 | 350 | 0.130 | 9.000 | 20.000 | 5570 | 2170 | 391.0 |

Materiali termoplastici



| | | | | | | | | |
|-------|---|-----|-------|-------|--------|-------|------|--------|
| 3.00 | 3 | 396 | 0.030 | 1.350 | 3.000 | 42015 | 3780 | 15.3 |
| 4.00 | 3 | 528 | 0.040 | 1.800 | 4.000 | 42015 | 5040 | 36.3 |
| 5.00 | 3 | 660 | 0.055 | 2.250 | 5.000 | 42015 | 6935 | 78.0 |
| 6.00 | 3 | 792 | 0.070 | 2.700 | 6.000 | 42015 | 8825 | 142.9 |
| 8.00 | 3 | 800 | 0.085 | 3.600 | 8.000 | 31830 | 8115 | 233.8 |
| 10.00 | 3 | 800 | 0.105 | 4.500 | 10.000 | 25465 | 8020 | 361.0 |
| 12.00 | 3 | 800 | 0.125 | 5.400 | 12.000 | 21220 | 7960 | 515.7 |
| 16.00 | 3 | 800 | 0.135 | 7.200 | 16.000 | 15915 | 6445 | 742.6 |
| 20.00 | 3 | 800 | 0.160 | 9.000 | 20.000 | 12730 | 6110 | 1100.1 |

Lega per fonderia Al



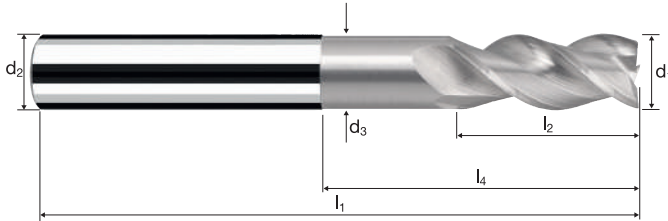
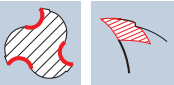
| | | | | | | | | |
|-------|---|-----|-------|-------|--------|-------|------|-------|
| 3.00 | 3 | 360 | 0.030 | 1.350 | 3.000 | 38195 | 3440 | 13.9 |
| 4.00 | 3 | 360 | 0.040 | 1.800 | 4.000 | 28650 | 3440 | 24.8 |
| 5.00 | 3 | 360 | 0.055 | 2.250 | 5.000 | 22920 | 3780 | 42.5 |
| 6.00 | 3 | 360 | 0.070 | 2.700 | 6.000 | 19100 | 4010 | 65.0 |
| 8.00 | 3 | 360 | 0.085 | 3.600 | 8.000 | 14325 | 3655 | 105.2 |
| 10.00 | 3 | 360 | 0.105 | 4.500 | 10.000 | 11460 | 3610 | 162.4 |
| 12.00 | 3 | 360 | 0.125 | 5.400 | 12.000 | 9550 | 3580 | 232.0 |
| 16.00 | 3 | 360 | 0.135 | 7.200 | 16.000 | 7160 | 2900 | 334.1 |
| 20.00 | 3 | 360 | 0.160 | 9.000 | 20.000 | 5730 | 2750 | 495.0 |

Frese cilindriche AX (AX-NV3)

A taglienti lisci, esecuzione medio-lunga con scarico



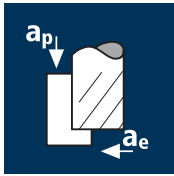
HM
MG10 λ 40°
 γ 20°



| | | | | | | | | | |
|-------------|--|--|--------------------------|--------------------------|-------------------------|--|--------------|------------------------|--|
| Rm < 850 | | | Al Aluminium > 99% | Al Aluminium Alloy | Al Aluminium Cast | | Cu Copper | Plastic Thermoplast | |
|-------------|--|--|--------------------------|--------------------------|-------------------------|--|--------------|------------------------|--|

| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | α | z | CELERO | |
|-----------------------|----------------------|----------------------|-------------------|-------------------|-----------------|----------------|----------------|------|---|--------|--------|
| | | | | | | | | | | EUR | EUR |
| Esempio: N° Ordine | | | Rivestimento C | Articolo 15557 | Codice-Ø 180 | | | | | 15657 | C15657 |
| | | | | | | | | | | 15557 | C15557 |
| 180 | 3.00 | 6.00 | 2.80 | 63 | 8.00 | 20.00 | 26.63 | 3.5° | 3 | 59.60 | 72.00 |
| 220 | 4.00 | 6.00 | 3.70 | 63 | 11.00 | 22.00 | 26.95 | 2.5° | 3 | 59.60 | 72.00 |
| 260 | 5.00 | 6.00 | 4.60 | 63 | 13.00 | 24.00 | 27.27 | 1.5° | 3 | 59.60 | 72.00 |
| 300 | 6.00 | 6.00 | 5.50 | 63 | 13.00 | 25.34 | 26.00 | 0.0° | 3 | 59.60 | 72.00 |
| 391 | 8.00 | 8.00 | 7.40 | 72 | 19.00 | 34.29 | 35.00 | 0.0° | 3 | 75.00 | 90.00 |
| 450 | 10.00 | 10.00 | 9.20 | 84 | 22.00 | 42.20 | 43.00 | 0.0° | 3 | 101.00 | 123.00 |
| 501 | 12.00 | 12.00 | 11.00 | 97 | 26.00 | 50.13 | 51.00 | 0.0° | 3 | 125.00 | 152.00 |
| 610 | 16.00 | 16.00 | 15.00 | 108 | 32.00 | 58.13 | 59.00 | 0.0° | 3 | 196.00 | 237.00 |
| 682 | 20.00 | 20.00 | 19.00 | 122 | 38.00 | 70.13 | 71.00 | 0.0° | 3 | 286.00 | 346.00 |
| | | | | | | | | | | | |
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Applicazione



Materiale

Alluminio malleabile
Costruzione integrale Al



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 3.00 | 3 | 396 | 0.035 | 7.500 | 0.600 | 42015 | 4410 | 19.9 |
| 4.00 | 3 | 528 | 0.045 | 10.000 | 0.800 | 42015 | 5670 | 45.4 |
| 5.00 | 3 | 550 | 0.060 | 12.500 | 1.000 | 35015 | 6305 | 78.8 |
| 6.00 | 3 | 550 | 0.075 | 15.000 | 1.200 | 29180 | 6565 | 118.2 |
| 8.00 | 3 | 550 | 0.095 | 20.000 | 1.600 | 21885 | 6235 | 199.6 |
| 10.00 | 3 | 550 | 0.115 | 25.000 | 2.000 | 17505 | 6040 | 302.0 |
| 12.00 | 3 | 550 | 0.140 | 30.000 | 2.400 | 14590 | 6125 | 441.2 |
| 16.00 | 3 | 550 | 0.150 | 40.000 | 3.200 | 10940 | 4925 | 630.3 |
| 20.00 | 3 | 550 | 0.175 | 50.000 | 4.000 | 8755 | 4595 | 919.1 |

Rame non legato



| | | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|------|-------|
| 3.00 | 3 | 396 | 0.030 | 7.500 | 0.600 | 42015 | 3780 | 17.0 |
| 4.00 | 3 | 400 | 0.035 | 10.000 | 0.800 | 31830 | 3340 | 26.7 |
| 5.00 | 3 | 400 | 0.050 | 12.500 | 1.000 | 25465 | 3820 | 47.7 |
| 6.00 | 3 | 400 | 0.060 | 15.000 | 1.200 | 21220 | 3820 | 68.8 |
| 8.00 | 3 | 400 | 0.075 | 20.000 | 1.600 | 15915 | 3580 | 114.6 |
| 10.00 | 3 | 400 | 0.090 | 25.000 | 2.000 | 12730 | 3440 | 171.9 |
| 12.00 | 3 | 400 | 0.110 | 30.000 | 2.400 | 10610 | 3500 | 252.1 |
| 16.00 | 3 | 400 | 0.120 | 40.000 | 3.200 | 7960 | 2865 | 366.7 |
| 20.00 | 3 | 400 | 0.140 | 50.000 | 4.000 | 6365 | 2675 | 534.8 |

Materiali termoplastici



| | | | | | | | | |
|-------|---|------|-------|--------|-------|-------|-------|--------|
| 3.00 | 3 | 396 | 0.035 | 7.500 | 0.600 | 42015 | 4410 | 19.9 |
| 4.00 | 3 | 528 | 0.045 | 10.000 | 0.800 | 42015 | 5670 | 45.4 |
| 5.00 | 3 | 660 | 0.060 | 12.500 | 1.000 | 42015 | 7565 | 94.5 |
| 6.00 | 3 | 792 | 0.075 | 15.000 | 1.200 | 42015 | 9455 | 170.2 |
| 8.00 | 3 | 1000 | 0.095 | 20.000 | 1.600 | 39790 | 11340 | 362.9 |
| 10.00 | 3 | 1000 | 0.115 | 25.000 | 2.000 | 31830 | 10980 | 549.1 |
| 12.00 | 3 | 1000 | 0.140 | 30.000 | 2.400 | 26525 | 11140 | 802.1 |
| 16.00 | 3 | 1000 | 0.150 | 40.000 | 3.200 | 19895 | 8950 | 1145.9 |
| 20.00 | 3 | 1000 | 0.175 | 50.000 | 4.000 | 15915 | 8355 | 1671.1 |

Legia per fonderia Al



| | | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|------|-------|
| 3.00 | 3 | 396 | 0.035 | 7.500 | 0.600 | 42015 | 4410 | 19.9 |
| 4.00 | 3 | 440 | 0.045 | 10.000 | 0.800 | 35015 | 4725 | 37.8 |
| 5.00 | 3 | 440 | 0.060 | 12.500 | 1.000 | 28010 | 5040 | 63.0 |
| 6.00 | 3 | 440 | 0.075 | 15.000 | 1.200 | 23345 | 5250 | 94.5 |
| 8.00 | 3 | 440 | 0.095 | 20.000 | 1.600 | 17505 | 4990 | 159.7 |
| 10.00 | 3 | 440 | 0.115 | 25.000 | 2.000 | 14005 | 4830 | 241.6 |
| 12.00 | 3 | 440 | 0.140 | 30.000 | 2.400 | 11670 | 4900 | 352.9 |
| 16.00 | 3 | 440 | 0.150 | 40.000 | 3.200 | 8755 | 3940 | 504.2 |
| 20.00 | 3 | 440 | 0.175 | 50.000 | 4.000 | 7005 | 3675 | 735.3 |

Alluminio malleabile
Costruzione integrale Al



| | | | | | | | | |
|-------|---|-----|-------|-------|--------|-------|------|-------|
| 3.00 | 3 | 396 | 0.025 | 1.200 | 3.000 | 42015 | 3150 | 11.3 |
| 4.00 | 3 | 450 | 0.030 | 1.600 | 4.000 | 35810 | 3225 | 20.6 |
| 5.00 | 3 | 450 | 0.040 | 2.000 | 5.000 | 28650 | 3440 | 34.4 |
| 6.00 | 3 | 450 | 0.055 | 2.400 | 6.000 | 23875 | 3940 | 56.7 |
| 8.00 | 3 | 450 | 0.065 | 3.200 | 8.000 | 17905 | 3490 | 89.4 |
| 10.00 | 3 | 450 | 0.080 | 4.000 | 10.000 | 14325 | 3440 | 137.5 |
| 12.00 | 3 | 450 | 0.100 | 4.800 | 12.000 | 11935 | 3580 | 206.3 |
| 16.00 | 3 | 450 | 0.105 | 6.400 | 16.000 | 8950 | 2820 | 288.8 |
| 20.00 | 3 | 450 | 0.125 | 8.000 | 20.000 | 7160 | 2685 | 429.7 |

Rame non legato



| | | | | | | | | |
|-------|---|-----|-------|-------|--------|-------|------|-------|
| 3.00 | 3 | 350 | 0.020 | 1.200 | 3.000 | 37135 | 2230 | 8.0 |
| 4.00 | 3 | 350 | 0.025 | 1.600 | 4.000 | 27850 | 2090 | 13.4 |
| 5.00 | 3 | 350 | 0.030 | 2.000 | 5.000 | 22280 | 2005 | 20.1 |
| 6.00 | 3 | 350 | 0.045 | 2.400 | 6.000 | 18570 | 2505 | 36.1 |
| 8.00 | 3 | 350 | 0.050 | 3.200 | 8.000 | 13925 | 2090 | 53.5 |
| 10.00 | 3 | 350 | 0.065 | 4.000 | 10.000 | 11140 | 2170 | 86.9 |
| 12.00 | 3 | 350 | 0.080 | 4.800 | 12.000 | 9285 | 2230 | 128.3 |
| 16.00 | 3 | 350 | 0.085 | 6.400 | 16.000 | 6965 | 1775 | 181.8 |
| 20.00 | 3 | 350 | 0.100 | 8.000 | 20.000 | 5570 | 1670 | 267.4 |

Materiali termoplastici



| | | | | | | | | |
|-------|---|-----|-------|-------|--------|-------|------|-------|
| 3.00 | 3 | 396 | 0.025 | 1.200 | 3.000 | 42015 | 3150 | 11.3 |
| 4.00 | 3 | 528 | 0.030 | 1.600 | 4.000 | 42015 | 3780 | 24.2 |
| 5.00 | 3 | 660 | 0.040 | 2.000 | 5.000 | 42015 | 5040 | 50.4 |
| 6.00 | 3 | 792 | 0.055 | 2.400 | 6.000 | 42015 | 6935 | 99.8 |
| 8.00 | 3 | 800 | 0.065 | 3.200 | 8.000 | 31830 | 6205 | 158.9 |
| 10.00 | 3 | 800 | 0.080 | 4.000 | 10.000 | 25465 | 6110 | 244.5 |
| 12.00 | 3 | 800 | 0.100 | 4.800 | 12.000 | 21220 | 6365 | 366.7 |
| 16.00 | 3 | 800 | 0.105 | 6.400 | 16.000 | 15915 | 5015 | 513.4 |
| 20.00 | 3 | 800 | 0.125 | 8.000 | 20.000 | 12730 | 4775 | 763.9 |

Legia per fonderia Al



| | | | | | | | | |
|-------|---|-----|-------|-------|--------|-------|------|-------|
| 3.00 | 3 | 360 | 0.025 | 1.200 | 3.000 | 38195 | 2865 | 10.3 |
| 4.00 | 3 | 360 | 0.030 | 1.600 | 4.000 | 28650 | 2580 | 16.5 |
| 5.00 | 3 | 360 | 0.040 | 2.000 | 5.000 | 22920 | 2750 | 27.5 |
| 6.00 | 3 | 360 | 0.055 | 2.400 | 6.000 | 19100 | 3150 | 45.4 |
| 8.00 | 3 | 360 | 0.065 | 3.200 | 8.000 | 14325 | 2795 | 71.5 |
| 10.00 | 3 | 360 | 0.080 | 4.000 | 10.000 | 11460 | 2750 | 110.0 |
| 12.00 | 3 | 360 | 0.100 | 4.800 | 12.000 | 9550 | 2865 | 165.0 |
| 16.00 | 3 | 360 | 0.105 | 6.400 | 16.000 | 7160 | 2255 | 231.0 |
| 20.00 | 3 | 360 | 0.125 | 8.000 | 20.000 | 5730 | 2150 | 343.8 |

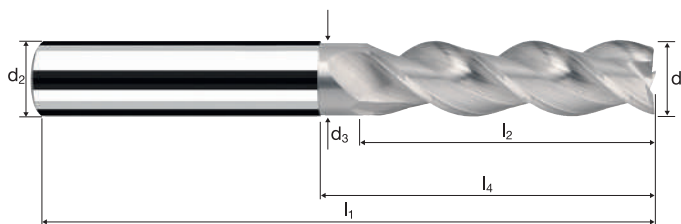
Frese cilindriche AX (AX-NV3)

A taglienti lisci, esecuzione medio-lunga con scarico corto



HM
MG10

λ 40°
 γ 20°



Sgrossatura Finitura

ReTool®

Rm < 850

Al Aluminium > 99%

Al Aluminium Alloy

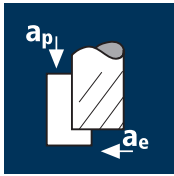
Al Aluminium Cast

Cu Copper

Plastic Thermoplast

| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | α | z | CELERO | | |
|--|----------------------|----------------------|----------------|----------------|----------------|----------------|----------------|------|---|--------|--------|--------|
| | | | | | | | | | | EUR | EUR | |
| Esempio: N° Ordine | | | | | | | | | | | 15660 | C15660 |
| Rivestimento C Articolo 15560 Codice-ø 180 | | | | | | | | | | | 15560 | C15560 |
| 180 | 3.00 | 6.00 | 2.80 | 63 | 14.00 | 20.00 | 26.63 | 3.5° | 3 | 59.60 | 72.00 | |
| 220 | 4.00 | 6.00 | 3.70 | 63 | 17.00 | 22.00 | 26.95 | 2.5° | 3 | 59.60 | 72.00 | |
| 260 | 5.00 | 6.00 | 4.60 | 63 | 19.00 | 24.00 | 27.27 | 1.5° | 3 | 59.60 | 72.00 | |
| 300 | 6.00 | 6.00 | 5.50 | 63 | 19.00 | 25.34 | 26.00 | 0.0° | 3 | 59.60 | 72.00 | |
| 391 | 8.00 | 8.00 | 7.40 | 72 | 28.00 | 34.29 | 35.00 | 0.0° | 3 | 75.00 | 90.00 | |
| 450 | 10.00 | 10.00 | 9.20 | 84 | 34.00 | 42.20 | 43.00 | 0.0° | 3 | 101.00 | 123.00 | |
| 501 | 12.00 | 12.00 | 11.00 | 97 | 40.00 | 50.13 | 51.00 | 0.0° | 3 | 125.00 | 152.00 | |
| 610 | 16.00 | 16.00 | 15.00 | 108 | 48.00 | 58.13 | 59.00 | 0.0° | 3 | 196.00 | 237.00 | |
| 682 | 20.00 | 20.00 | 19.00 | 122 | 56.00 | 70.13 | 71.00 | 0.0° | 3 | 286.00 | 346.00 | |

Applicazione



Materiale

Alluminio malleabile
Costruzione integrale Al



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 6.00 | 3 | 550 | 0.085 | 9.000 | 1.500 | 29180 | 7440 | 100.4 |
| 8.00 | 3 | 550 | 0.105 | 12.000 | 2.000 | 21885 | 6895 | 165.4 |
| 10.00 | 3 | 550 | 0.135 | 15.000 | 2.500 | 17505 | 7090 | 265.9 |
| 12.00 | 3 | 550 | 0.160 | 18.000 | 3.000 | 14590 | 7005 | 378.2 |
| 16.00 | 3 | 550 | 0.170 | 24.000 | 4.000 | 10940 | 5580 | 535.7 |
| 20.00 | 3 | 550 | 0.200 | 30.000 | 5.000 | 8755 | 5250 | 787.8 |

Rame non legato



| | | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|------|-------|
| 6.00 | 3 | 400 | 0.070 | 9.000 | 1.500 | 21220 | 4455 | 60.2 |
| 8.00 | 3 | 400 | 0.085 | 12.000 | 2.000 | 15915 | 4060 | 97.4 |
| 10.00 | 3 | 400 | 0.110 | 15.000 | 2.500 | 12730 | 4200 | 157.6 |
| 12.00 | 3 | 400 | 0.130 | 18.000 | 3.000 | 10610 | 4140 | 223.5 |
| 16.00 | 3 | 400 | 0.135 | 24.000 | 4.000 | 7960 | 3225 | 309.4 |
| 20.00 | 3 | 400 | 0.160 | 30.000 | 5.000 | 6365 | 3055 | 458.4 |

Materiali termoplastici



| | | | | | | | | |
|-------|---|------|-------|--------|-------|-------|-------|--------|
| 6.00 | 3 | 792 | 0.085 | 9.000 | 1.500 | 42015 | 10715 | 144.6 |
| 8.00 | 3 | 1000 | 0.105 | 12.000 | 2.000 | 39790 | 12535 | 300.8 |
| 10.00 | 3 | 1000 | 0.135 | 15.000 | 2.500 | 31830 | 12890 | 483.4 |
| 12.00 | 3 | 1000 | 0.160 | 18.000 | 3.000 | 26525 | 12730 | 687.5 |
| 16.00 | 3 | 1000 | 0.170 | 24.000 | 4.000 | 19895 | 10145 | 974.0 |
| 20.00 | 3 | 1000 | 0.200 | 30.000 | 5.000 | 15915 | 9550 | 1432.4 |

Lega per fonderia Al



| | | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|------|-------|
| 6.00 | 3 | 440 | 0.085 | 9.000 | 1.500 | 23345 | 5950 | 80.4 |
| 8.00 | 3 | 440 | 0.105 | 12.000 | 2.000 | 17505 | 5515 | 132.4 |
| 10.00 | 3 | 440 | 0.135 | 15.000 | 2.500 | 14005 | 5670 | 212.7 |
| 12.00 | 3 | 440 | 0.160 | 18.000 | 3.000 | 11670 | 5600 | 302.5 |
| 16.00 | 3 | 440 | 0.170 | 24.000 | 4.000 | 8755 | 4465 | 428.6 |
| 20.00 | 3 | 440 | 0.200 | 30.000 | 5.000 | 7005 | 4200 | 630.3 |



Alluminio malleabile
Costruzione integrale Al



| | | | | | | | | |
|-------|---|-----|-------|-------|--------|-------|------|-------|
| 6.00 | 3 | 450 | 0.060 | 2.100 | 6.000 | 23875 | 4295 | 54.1 |
| 8.00 | 3 | 450 | 0.075 | 2.800 | 8.000 | 17905 | 4030 | 90.2 |
| 10.00 | 3 | 450 | 0.095 | 3.500 | 10.000 | 14325 | 4080 | 142.9 |
| 12.00 | 3 | 450 | 0.110 | 4.200 | 12.000 | 11935 | 3940 | 198.5 |
| 16.00 | 3 | 450 | 0.120 | 5.600 | 16.000 | 8950 | 3225 | 288.8 |
| 20.00 | 3 | 450 | 0.140 | 7.000 | 20.000 | 7160 | 3010 | 421.1 |

Rame non legato



| | | | | | | | | |
|-------|---|-----|-------|-------|--------|-------|------|-------|
| 6.00 | 3 | 350 | 0.050 | 2.100 | 6.000 | 18570 | 2785 | 35.1 |
| 8.00 | 3 | 350 | 0.060 | 2.800 | 8.000 | 13925 | 2505 | 56.1 |
| 10.00 | 3 | 350 | 0.075 | 3.500 | 10.000 | 11140 | 2505 | 87.7 |
| 12.00 | 3 | 350 | 0.090 | 4.200 | 12.000 | 9285 | 2505 | 126.3 |
| 16.00 | 3 | 350 | 0.095 | 5.600 | 16.000 | 6965 | 1985 | 177.8 |
| 20.00 | 3 | 350 | 0.110 | 7.000 | 20.000 | 5570 | 1840 | 257.4 |

Materiali termoplastici



| | | | | | | | | |
|-------|---|-----|-------|-------|--------|-------|------|-------|
| 6.00 | 3 | 792 | 0.060 | 2.100 | 6.000 | 42015 | 7565 | 95.3 |
| 8.00 | 3 | 800 | 0.075 | 2.800 | 8.000 | 31830 | 7160 | 160.4 |
| 10.00 | 3 | 800 | 0.095 | 3.500 | 10.000 | 25465 | 7255 | 254.0 |
| 12.00 | 3 | 800 | 0.110 | 4.200 | 12.000 | 21220 | 7005 | 352.9 |
| 16.00 | 3 | 800 | 0.120 | 5.600 | 16.000 | 15915 | 5730 | 513.4 |
| 20.00 | 3 | 800 | 0.140 | 7.000 | 20.000 | 12730 | 5350 | 748.7 |

Lega per fonderia Al



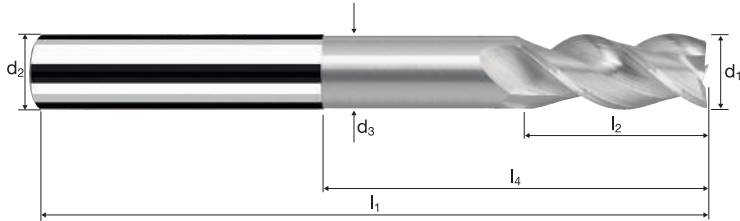
| | | | | | | | | |
|-------|---|-----|-------|-------|--------|-------|------|-------|
| 6.00 | 3 | 360 | 0.060 | 2.100 | 6.000 | 19100 | 3440 | 43.3 |
| 8.00 | 3 | 360 | 0.075 | 2.800 | 8.000 | 14325 | 3225 | 72.2 |
| 10.00 | 3 | 360 | 0.095 | 3.500 | 10.000 | 11460 | 3265 | 114.3 |
| 12.00 | 3 | 360 | 0.110 | 4.200 | 12.000 | 9550 | 3150 | 158.8 |
| 16.00 | 3 | 360 | 0.120 | 5.600 | 16.000 | 7160 | 2580 | 231.0 |
| 20.00 | 3 | 360 | 0.140 | 7.000 | 20.000 | 5730 | 2405 | 336.9 |

Frese cilindriche AX (AX-NV3)

A taglienti lisci, esecuzione lunga con scarico



| | |
|--------------------------|-------------------------------|
| HM MG10 | λ 40° γ 20° |
| 90° | |
| Vario | |
| | |



Sgrossatura

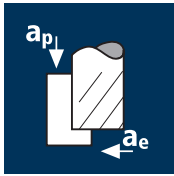
Finitura



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|--------------------|---------------------------------|---------------------------------|--------------------------------|---------------------|-------------------------------|
| Rm < 850 | Al Aluminium > 99% | Al Aluminium Alloy | Al Aluminium Cast | Cu Copper | Plastic Thermoplast |
|--------------------|---------------------------------|---------------------------------|--------------------------------|---------------------|-------------------------------|

| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | z | CELERO | |
|---|----------------------|----------------------|----------------|----------------|----------------|----------------|----------------|---|--------|--------|
| | | | | | | | | | EUR | EUR |
| <p>Esempio: N° Ordine C Rivestimento 15559 Articolo 300 Codice-Ø</p> <p></p> | | | | | | | | | | |
| 300 | 6.00 | 6.00 | 5.50 | 70 | 13.00 | 32.34 | 33.00 | 3 | 65.00 | 78.00 |
| 391 | 8.00 | 8.00 | 7.40 | 80 | 19.00 | 42.29 | 43.00 | 3 | 81.00 | 97.00 |
| 450 | 10.00 | 10.00 | 9.20 | 100 | 22.00 | 58.20 | 59.00 | 3 | 111.00 | 132.00 |
| 501 | 12.00 | 12.00 | 11.00 | 110 | 26.00 | 63.13 | 64.00 | 3 | 137.00 | 163.00 |
| 610 | 16.00 | 16.00 | 15.00 | 123 | 32.00 | 73.13 | 74.00 | 3 | 214.00 | 255.00 |
| 682 | 20.00 | 20.00 | 19.00 | 141 | 38.00 | 89.13 | 90.00 | 3 | 312.00 | 372.00 |
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Applicazione



Materiale

Alluminio malleabile
Costruzione integrale Al



Rame non legato



Materiali termoplastici



Leghe per fonderia Al



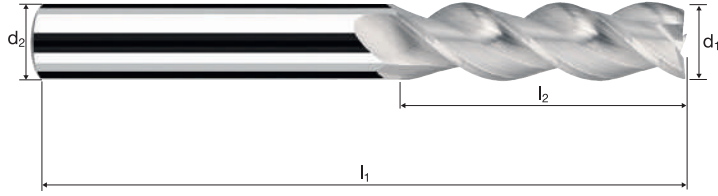
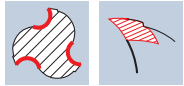
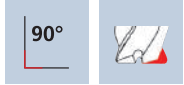
| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 6.00 | 3 | 350 | 0.065 | 18.000 | 0.900 | 18570 | 3620 | 58.7 |
| 8.00 | 3 | 350 | 0.080 | 24.000 | 1.200 | 13925 | 3340 | 96.3 |
| 10.00 | 3 | 350 | 0.100 | 30.000 | 1.500 | 11140 | 3340 | 150.4 |
| 12.00 | 3 | 350 | 0.120 | 36.000 | 1.800 | 9285 | 3340 | 216.6 |
| 16.00 | 3 | 350 | 0.130 | 48.000 | 2.400 | 6965 | 2715 | 312.8 |
| 20.00 | 3 | 350 | 0.150 | 60.000 | 3.000 | 5570 | 2505 | 451.2 |
| | | | | | | | | |
| | | | | | | | | |
| 6.00 | 3 | 220 | 0.050 | 18.000 | 0.900 | 11670 | 1750 | 28.4 |
| 8.00 | 3 | 220 | 0.065 | 24.000 | 1.200 | 8755 | 1705 | 49.2 |
| 10.00 | 3 | 220 | 0.080 | 30.000 | 1.500 | 7005 | 1680 | 75.6 |
| 12.00 | 3 | 220 | 0.095 | 36.000 | 1.800 | 5835 | 1665 | 107.8 |
| 16.00 | 3 | 220 | 0.105 | 48.000 | 2.400 | 4375 | 1380 | 158.8 |
| 20.00 | 3 | 220 | 0.120 | 60.000 | 3.000 | 3500 | 1260 | 226.9 |
| | | | | | | | | |
| | | | | | | | | |
| 6.00 | 3 | 600 | 0.065 | 18.000 | 0.900 | 31830 | 6205 | 100.6 |
| 8.00 | 3 | 600 | 0.080 | 24.000 | 1.200 | 23875 | 5730 | 165.0 |
| 10.00 | 3 | 600 | 0.100 | 30.000 | 1.500 | 19100 | 5730 | 257.8 |
| 12.00 | 3 | 600 | 0.120 | 36.000 | 1.800 | 15915 | 5730 | 371.3 |
| 16.00 | 3 | 600 | 0.130 | 48.000 | 2.400 | 11935 | 4655 | 536.3 |
| 20.00 | 3 | 600 | 0.150 | 60.000 | 3.000 | 9550 | 4295 | 773.5 |
| | | | | | | | | |
| | | | | | | | | |
| 6.00 | 3 | 280 | 0.065 | 18.000 | 0.900 | 14855 | 2895 | 46.9 |
| 8.00 | 3 | 280 | 0.080 | 24.000 | 1.200 | 11140 | 2675 | 77.0 |
| 10.00 | 3 | 280 | 0.100 | 30.000 | 1.500 | 8915 | 2675 | 120.3 |
| 12.00 | 3 | 280 | 0.120 | 36.000 | 1.800 | 7425 | 2675 | 173.3 |
| 16.00 | 3 | 280 | 0.130 | 48.000 | 2.400 | 5570 | 2170 | 250.3 |
| 20.00 | 3 | 280 | 0.150 | 60.000 | 3.000 | 4455 | 2005 | 361.0 |
| | | | | | | | | |
| | | | | | | | | |

Frese cilindriche AX (AX-V3)

A taglienti lisci, esecuzione lunga

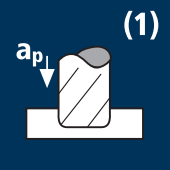

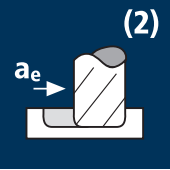

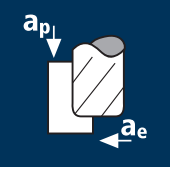

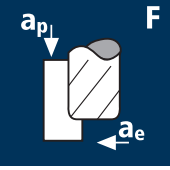





HM λ 40°
MG10 γ 20°



| | | | | | | | | |
|-------------|--|--------------------------|--------------------------|-------------------------|--|--------------|------------------------|--|
| Rm < 850 | | Al Aluminium > 99% | Al Aluminium Alloy | Al Aluminium Cast | | Cu Copper | Plastic Thermoplast | |
|-------------|--|--------------------------|--------------------------|-------------------------|--|--------------|------------------------|--|

| | | | | | | | CELERO | |
|-----------------------|----------------------|----------------------|-------------------|-----------------|---|--------|--------|--------|
| Esempio: N° Ordine | | Rivestimento C | Articolo 15561 | Codice-Ø 300 | | | 15661 | C15661 |
| Ø Code | d ₁ e8 | d ₂ h6 | l ₁ | l ₂ | z | EUR | EUR | |
| 300 | 6.00 | 6.00 | 70 | 26.00 | 3 | 65.00 | 78.00 | |
| 391 | 8.00 | 8.00 | 80 | 36.00 | 3 | 81.00 | 97.00 | |
| 450 | 10.00 | 10.00 | 100 | 45.00 | 3 | 111.00 | 132.00 | |
| 501 | 12.00 | 12.00 | 110 | 53.00 | 3 | 137.00 | 163.00 | |
| 610 | 16.00 | 16.00 | 123 | 63.00 | 3 | 214.00 | 255.00 | |
| 682 | 20.00 | 20.00 | 141 | 75.00 | 3 | 312.00 | 372.00 | |
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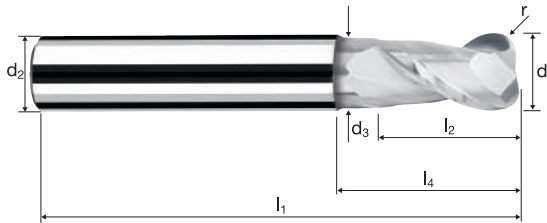
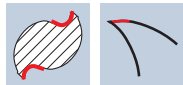
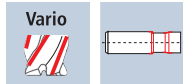
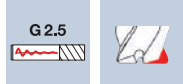
| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=10000 min vf [mm/min] | n=15000 min vf [mm/min] | n=20000 min vf [mm/min] | n=30000 min vf [mm/min] |
|---|---|------------|---|------------------------|------------------------|------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
|  <p>(1)</p> | Alluminio malleabile Costruzione integrale Al  | 10.00 | 2 | 0.175 | 6.000 | 10.000 | 3500 | 5250 | 7000 | 10500 |
| | | 12.00 | 2 | 0.210 | 6.500 | 12.000 | 4200 | 6300 | 8400 | 12600 |
| | | 16.00 | 2 | 0.225 | 7.000 | 16.000 | 4500 | 6750 | 9000 | 13500 |
| | | 20.00 | 2 | 0.240 | 7.000 | 20.000 | 4800 | 7200 | 9600 | 14400 |
| | | 25.00 | 2 | 0.250 | 7.000 | 25.000 | 5000 | 7500 | 10000 | 15000 |
|  <p>(2)</p> | Alluminio malleabile Costruzione integrale Al  | 10.00 | 2 | 0.175 | 6.000 | 8.000 | 3500 | 5250 | 7000 | 10500 |
| | | 12.00 | 2 | 0.210 | 6.500 | 9.600 | 4200 | 6300 | 8400 | 12600 |
| | | 16.00 | 2 | 0.225 | 7.000 | 12.800 | 4500 | 6750 | 9000 | 13500 |
| | | 20.00 | 2 | 0.240 | 7.000 | 16.000 | 4800 | 7200 | 9600 | 14400 |
| | | 25.00 | 2 | 0.250 | 7.000 | 20.000 | 5000 | 7500 | 10000 | 15000 |
|  | Alluminio malleabile Costruzione integrale Al  | 10.00 | 2 | 0.175 | 9.000 | 6.000 | 3500 | 5250 | 7000 | 10500 |
| | | 12.00 | 2 | 0.210 | 9.800 | 7.200 | 4200 | 6300 | 8400 | 12600 |
| | | 16.00 | 2 | 0.225 | 10.500 | 9.600 | 4500 | 6750 | 9000 | 13500 |
| | | 20.00 | 2 | 0.240 | 10.500 | 12.000 | 4800 | 7200 | 9600 | 14400 |
| | | 25.00 | 2 | 0.250 | 10.500 | 15.000 | 5000 | 7500 | 10000 | 15000 |
|  <p>F</p> | Alluminio malleabile Costruzione integrale Al  | 10.00 | 2 | 0.055 | 9.000 | 0.300 | 1100 | 1650 | 2200 | 3300 |
| | | 12.00 | 2 | 0.065 | 9.800 | 0.350 | 1300 | 1950 | 2600 | 3900 |
| | | 16.00 | 2 | 0.070 | 10.500 | 0.500 | 1400 | 2100 | 2800 | 4200 |
| | | 20.00 | 2 | 0.070 | 10.500 | 0.600 | 1400 | 2100 | 2800 | 4200 |
| | | 25.00 | 2 | 0.075 | 10.500 | 0.750 | 1500 | 2250 | 3000 | 4500 |
|  | Alluminio malleabile Costruzione integrale Al  | 10.00 | 2 | 0.385 | 0.500 | 0.500 | 7700 | 11550 | 15400 | 23100 |
| | | 12.00 | 2 | 0.460 | 0.600 | 0.600 | 9200 | 13800 | 18400 | 27600 |
| | | 16.00 | 2 | 0.495 | 0.750 | 0.750 | 9900 | 14850 | 19800 | 29700 |
| | | 20.00 | 2 | 0.530 | 1.000 | 1.000 | 10600 | 15900 | 21200 | 31800 |
| | | 25.00 | 2 | 0.550 | 1.200 | 1.200 | 11000 | 16500 | 22000 | 33000 |

Frese toriche AX (AX-RV2)

A taglienti lisci, esecuzione 2xd con scarico

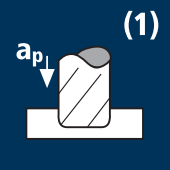

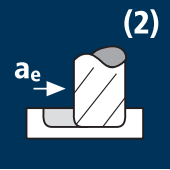

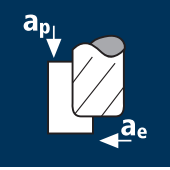

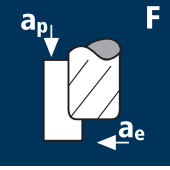





HM λ 40°
MG10 γ 20°



| | | | | | | | | | |
|--|--|--|--------------------------|--------------------------|-------------------------|--|--------------|------------------------|--|
| | | | Al Aluminium > 99% | Al Aluminium Alloy | Al Aluminium Cast | | Cu Copper | Plastic Thermoplast | |
|--|--|--|--------------------------|--------------------------|-------------------------|--|--------------|------------------------|--|

| | | | | | | | | | | | CELERO | |
|--------------------|----------------------|----------------------|----------------|----------------|----------------|----------------|----------------|--------------|---|--|--------|--------|
| Esempio: N° Ordine | | | | | | | | | | | 15572 | C15572 |
| | | | | | | | | | | | EUR | EUR |
| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r 0/+0.03 | z | | EUR | EUR |
| 610 | 16.00 | 16.00 | 15.00 | 82 | 18.00 | 27.73 | 32.00 | 1.500 | 2 | | 207.00 | - |
| 457 | 10.00 | 10.00 | 9.20 | 63 | 11.00 | 16.99 | 20.00 | 2.500 | 2 | | 107.00 | 121.00 |
| 506 | 12.00 | 12.00 | 11.00 | 73 | 13.00 | 20.29 | 24.00 | 2.500 | 2 | | 132.00 | 150.00 |
| 612 | 16.00 | 16.00 | 15.00 | 82 | 18.00 | 27.73 | 32.00 | 2.500 | 2 | | 207.00 | 234.00 |
| 684 | 20.00 | 20.00 | 19.00 | 92 | 22.00 | 35.23 | 40.00 | 2.500 | 2 | | 302.00 | 342.00 |
| 774 | 25.00 | 25.00 | 24.00 | 107 | 27.00 | 44.68 | 50.00 | 2.500 | 2 | | 572.00 | 648.00 |
| 508 | 12.00 | 12.00 | 11.00 | 73 | 13.00 | 20.29 | 24.00 | 4.000 | 2 | | 132.00 | 150.00 |
| 614 | 16.00 | 16.00 | 15.00 | 82 | 18.00 | 27.73 | 32.00 | 4.000 | 2 | | 207.00 | 234.00 |
| 686 | 20.00 | 20.00 | 19.00 | 92 | 22.00 | 35.23 | 40.00 | 4.000 | 2 | | 302.00 | 342.00 |
| 776 | 25.00 | 25.00 | 24.00 | 107 | 27.00 | 44.68 | 50.00 | 4.000 | 2 | | 572.00 | 648.00 |
| | | | | | | | | | | | | |
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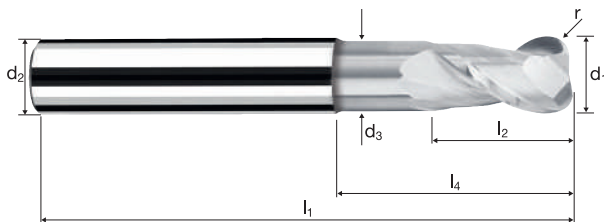
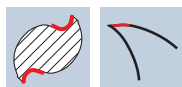
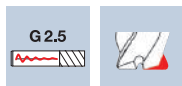
| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=10000 min vf [mm/min] | n=15000 min vf [mm/min] | n=20000 min vf [mm/min] | n=30000 min vf [mm/min] |
|---|---|------------|--------|------------------------|------------------------|------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
|  <p>(1)</p> | Alluminio malleabile Costruzione integrale Al  | 3.00 | 2 | 0.050 | 2.000 | 3.000 | 1000 | 1500 | 2000 | 3000 |
| | | 4.00 | 2 | 0.065 | 3.000 | 4.000 | 1300 | 1950 | 2600 | 3900 |
| | | 6.00 | 2 | 0.100 | 4.000 | 6.000 | 2000 | 3000 | 4000 | 6000 |
| | | 8.00 | 2 | 0.130 | 5.000 | 8.000 | 2600 | 3900 | 5200 | 7800 |
| | | 10.00 | 2 | 0.165 | 5.500 | 10.000 | 3300 | 4950 | 6600 | 9900 |
| | | 12.00 | 2 | 0.195 | 6.000 | 12.000 | 3900 | 5850 | 7800 | 11700 |
| | | 16.00 | 2 | 0.210 | 6.500 | 16.000 | 4200 | 6300 | 8400 | 12600 |
| | | 20.00 | 2 | 0.220 | 7.000 | 20.000 | 4400 | 6600 | 8800 | 13200 |
| 25.00 | 2 | 0.230 | 7.000 | 25.000 | 4600 | 6900 | 9200 | 13800 | | |
|  <p>(2)</p> | Alluminio malleabile Costruzione integrale Al  | 3.00 | 2 | 0.050 | 2.000 | 2.400 | 1000 | 1500 | 2000 | 3000 |
| | | 4.00 | 2 | 0.065 | 3.000 | 3.200 | 1300 | 1950 | 2600 | 3900 |
| | | 6.00 | 2 | 0.100 | 4.000 | 4.800 | 2000 | 3000 | 4000 | 6000 |
| | | 8.00 | 2 | 0.130 | 5.000 | 6.400 | 2600 | 3900 | 5200 | 7800 |
| | | 10.00 | 2 | 0.165 | 5.500 | 8.000 | 3300 | 4950 | 6600 | 9900 |
| | | 12.00 | 2 | 0.195 | 6.000 | 9.600 | 3900 | 5850 | 7800 | 11700 |
| | | 16.00 | 2 | 0.210 | 6.500 | 12.800 | 4200 | 6300 | 8400 | 12600 |
| | | 20.00 | 2 | 0.220 | 7.000 | 16.000 | 4400 | 6600 | 8800 | 13200 |
| 25.00 | 2 | 0.230 | 7.000 | 20.000 | 4600 | 6900 | 9200 | 13800 | | |
|  | Alluminio malleabile Costruzione integrale Al  | 3.00 | 2 | 0.050 | 3.000 | 1.800 | 1000 | 1500 | 2000 | 3000 |
| | | 4.00 | 2 | 0.065 | 4.500 | 2.400 | 1300 | 1950 | 2600 | 3900 |
| | | 6.00 | 2 | 0.100 | 6.000 | 3.600 | 2000 | 3000 | 4000 | 6000 |
| | | 8.00 | 2 | 0.130 | 7.500 | 4.800 | 2600 | 3900 | 5200 | 7800 |
| | | 10.00 | 2 | 0.165 | 8.300 | 6.000 | 3300 | 4950 | 6600 | 9900 |
| | | 12.00 | 2 | 0.195 | 9.000 | 7.200 | 3900 | 5850 | 7800 | 11700 |
| | | 16.00 | 2 | 0.210 | 9.800 | 9.600 | 4200 | 6300 | 8400 | 12600 |
| | | 20.00 | 2 | 0.220 | 10.500 | 12.000 | 4400 | 6600 | 8800 | 13200 |
| 25.00 | 2 | 0.230 | 10.500 | 15.000 | 4600 | 6900 | 9200 | 13800 | | |
|  <p>F</p> | Alluminio malleabile Costruzione integrale Al  | 3.00 | 2 | 0.015 | 3.000 | 0.100 | 300 | 450 | 600 | 900 |
| | | 4.00 | 2 | 0.020 | 4.500 | 0.100 | 400 | 600 | 800 | 1200 |
| | | 6.00 | 2 | 0.030 | 6.000 | 0.200 | 600 | 900 | 1200 | 1800 |
| | | 8.00 | 2 | 0.040 | 7.500 | 0.250 | 800 | 1200 | 1600 | 2400 |
| | | 10.00 | 2 | 0.050 | 8.300 | 0.300 | 1000 | 1500 | 2000 | 3000 |
| | | 12.00 | 2 | 0.060 | 9.000 | 0.350 | 1200 | 1800 | 2400 | 3600 |
| | | 16.00 | 2 | 0.065 | 9.800 | 0.500 | 1300 | 1950 | 2600 | 3900 |
| | | 20.00 | 2 | 0.065 | 10.500 | 0.600 | 1300 | 1950 | 2600 | 3900 |
| 25.00 | 2 | 0.070 | 10.500 | 0.750 | 1400 | 2100 | 2800 | 4200 | | |
|  | Alluminio malleabile Costruzione integrale Al  | 3.00 | 2 | 0.110 | 0.300 | 0.300 | 2200 | 3300 | 4400 | 6600 |
| | | 4.00 | 2 | 0.145 | 0.350 | 0.350 | 2900 | 4350 | 5800 | 8700 |
| | | 6.00 | 2 | 0.220 | 0.400 | 0.400 | 4400 | 6600 | 8800 | 13200 |
| | | 8.00 | 2 | 0.285 | 0.450 | 0.450 | 5700 | 8550 | 11400 | 17100 |
| | | 10.00 | 2 | 0.365 | 0.500 | 0.500 | 7300 | 10950 | 14600 | 21900 |
| | | 12.00 | 2 | 0.430 | 0.600 | 0.600 | 8600 | 12900 | 17200 | 25800 |
| | | 16.00 | 2 | 0.460 | 0.750 | 0.750 | 9200 | 13800 | 18400 | 27600 |
| | | 20.00 | 2 | 0.485 | 1.000 | 1.000 | 9700 | 14550 | 19400 | 29100 |
| 25.00 | 2 | 0.505 | 1.200 | 1.200 | 10100 | 15150 | 20200 | 30300 | | |

Frese toriche AX (AX-RV2)

A taglienti lisci, esecuzione 3xd con scarico



HM λ 40°
MG10 γ 20°



| | | | | | | | | | |
|--|--|--|--------------------------|--------------------------|-------------------------|--|--------------|------------------------|--|
| | | | Al Aluminium > 99% | Al Aluminium Alloy | Al Aluminium Cast | | Cu Copper | Plastic Thermoplast | |
|--|--|--|--------------------------|--------------------------|-------------------------|--|--------------|------------------------|--|

| Esempio: N° Ordine | | | | | | | | | | | | CELERO | |
|---------------------|-------------|-------------|-------|-------|-------|-------|-------|----------------|----------|-----|--------|--------|--------|
| | | | | | | | | | | | | 15573 | C15573 |
| \emptyset Code | d_1 e8 | d_2 h6 | d_3 | l_1 | l_2 | l_3 | l_4 | r 0/+0.03 | α | z | EUR | EUR | |
| 180 | 3.00 | 6.00 | 2.80 | 54 | 4.00 | 9.00 | 15.37 | 0.500 | 5.9° | 2 | 65.00 | 73.00 | |
| 220 | 4.00 | 6.00 | 3.70 | 54 | 5.00 | 12.00 | 16.82 | 0.500 | 3.7° | 2 | 65.00 | 73.00 | |
| 260 | 5.00 | 6.00 | 4.60 | 54 | 6.00 | 15.00 | 18.27 | 0.500 | 1.7° | 2 | 65.00 | 73.00 | |
| 300 | 6.00 | 6.00 | 5.50 | 54 | 7.00 | 16.15 | 18.00 | 0.500 | 0.0° | 2 | 65.00 | 73.00 | |
| 302 | 6.00 | 6.00 | 5.50 | 54 | 7.00 | 16.15 | 18.00 | 1.000 | 0.0° | 2 | 65.00 | 73.00 | |
| 391 | 8.00 | 8.00 | 7.40 | 63 | 9.00 | 21.63 | 24.00 | 1.000 | 0.0° | 2 | 81.00 | 92.00 | |
| 450 | 10.00 | 10.00 | 9.20 | 72 | 11.00 | 26.99 | 30.00 | 1.000 | 0.0° | 2 | 111.00 | 125.00 | |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 13.00 | 32.29 | 36.00 | 1.000 | 0.0° | 2 | 137.00 | 154.00 | |
| 608 | 16.00 | 16.00 | 15.00 | 97 | 18.00 | 43.73 | 48.00 | 1.000 | 0.0° | 2 | 214.00 | 241.00 | |
| 680 | 20.00 | 20.00 | 19.00 | 111 | 22.00 | 55.23 | 60.00 | 1.000 | 0.0° | 2 | 312.00 | 352.00 | |
| 770 | 25.00 | 25.00 | 24.00 | 132 | 27.00 | 69.68 | 75.00 | 1.000 | 0.0° | 2 | 591.00 | 667.00 | |
| 453 | 10.00 | 10.00 | 9.20 | 72 | 11.00 | 26.99 | 30.00 | 1.500 | 0.0° | 2 | 111.00 | - | |
| 503 | 12.00 | 12.00 | 11.00 | 83 | 13.00 | 32.29 | 36.00 | 1.500 | 0.0° | 2 | 137.00 | - | |
| 611 | 16.00 | 16.00 | 15.00 | 97 | 18.00 | 43.73 | 48.00 | 2.000 | 0.0° | 2 | 214.00 | - | |
| 683 | 20.00 | 20.00 | 19.00 | 111 | 22.00 | 55.23 | 60.00 | 2.000 | 0.0° | 2 | 312.00 | - | |

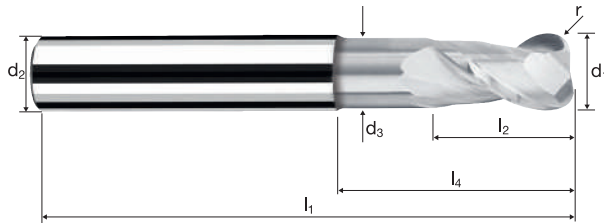
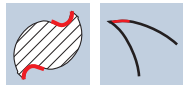
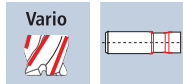
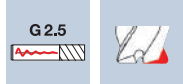
| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=10000 min vf [mm/min] | n=15000 min vf [mm/min] | n=20000 min vf [mm/min] | n=30000 min vf [mm/min] |
|--------------|--|------------|---|------------------------|------------------------|------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| | Alluminio malleabile Costruzione integrale Al | 6.00 | 2 | 0.100 | 4.000 | 6.000 | 2000 | 3000 | 4000 | 6000 |
| | | 8.00 | 2 | 0.130 | 5.000 | 8.000 | 2600 | 3900 | 5200 | 7800 |
| | | 10.00 | 2 | 0.165 | 5.500 | 10.000 | 3300 | 4950 | 6600 | 9900 |
| | | 12.00 | 2 | 0.195 | 6.000 | 12.000 | 3900 | 5850 | 7800 | 11700 |
| | | 16.00 | 2 | 0.210 | 6.500 | 16.000 | 4200 | 6300 | 8400 | 12600 |
| | | 20.00 | 2 | 0.220 | 7.000 | 20.000 | 4400 | 6600 | 8800 | 13200 |
| | | 25.00 | 2 | 0.230 | 7.000 | 25.000 | 4600 | 6900 | 9200 | 13800 |
| | Alluminio malleabile Costruzione integrale Al | 6.00 | 2 | 0.100 | 4.000 | 4.800 | 2000 | 3000 | 4000 | 6000 |
| | | 8.00 | 2 | 0.130 | 5.000 | 6.400 | 2600 | 3900 | 5200 | 7800 |
| | | 10.00 | 2 | 0.165 | 5.500 | 8.000 | 3300 | 4950 | 6600 | 9900 |
| | | 12.00 | 2 | 0.195 | 6.000 | 9.600 | 3900 | 5850 | 7800 | 11700 |
| | | 16.00 | 2 | 0.210 | 6.500 | 12.800 | 4200 | 6300 | 8400 | 12600 |
| | | 20.00 | 2 | 0.220 | 7.000 | 16.000 | 4400 | 6600 | 8800 | 13200 |
| | | 25.00 | 2 | 0.230 | 7.000 | 20.000 | 4600 | 6900 | 9200 | 13800 |
| | Alluminio malleabile Costruzione integrale Al | 6.00 | 2 | 0.100 | 6.000 | 3.600 | 2000 | 3000 | 4000 | 6000 |
| | | 8.00 | 2 | 0.130 | 7.500 | 4.800 | 2600 | 3900 | 5200 | 7800 |
| | | 10.00 | 2 | 0.165 | 8.300 | 6.000 | 3300 | 4950 | 6600 | 9900 |
| | | 12.00 | 2 | 0.195 | 9.000 | 7.200 | 3900 | 5850 | 7800 | 11700 |
| | | 16.00 | 2 | 0.210 | 9.800 | 9.600 | 4200 | 6300 | 8400 | 12600 |
| | | 20.00 | 2 | 0.220 | 10.500 | 12.000 | 4400 | 6600 | 8800 | 13200 |
| | | 25.00 | 2 | 0.230 | 10.500 | 15.000 | 4600 | 6900 | 9200 | 13800 |
| | Alluminio malleabile Costruzione integrale Al | 6.00 | 2 | 0.030 | 6.000 | 0.200 | 600 | 900 | 1200 | 1800 |
| | | 8.00 | 2 | 0.040 | 7.500 | 0.250 | 800 | 1200 | 1600 | 2400 |
| | | 10.00 | 2 | 0.050 | 8.300 | 0.300 | 1000 | 1500 | 2000 | 3000 |
| | | 12.00 | 2 | 0.060 | 9.000 | 0.350 | 1200 | 1800 | 2400 | 3600 |
| | | 16.00 | 2 | 0.065 | 9.800 | 0.500 | 1300 | 1950 | 2600 | 3900 |
| | | 20.00 | 2 | 0.065 | 10.500 | 0.600 | 1300 | 1950 | 2600 | 3900 |
| | | 25.00 | 2 | 0.070 | 10.500 | 0.750 | 1400 | 2100 | 2800 | 4200 |
| | Alluminio malleabile Costruzione integrale Al | 6.00 | 2 | 0.220 | 0.400 | 0.400 | 4400 | 6600 | 8800 | 13200 |
| | | 8.00 | 2 | 0.285 | 0.450 | 0.450 | 5700 | 8550 | 11400 | 17100 |
| | | 10.00 | 2 | 0.365 | 0.500 | 0.500 | 7300 | 10950 | 14600 | 21900 |
| | | 12.00 | 2 | 0.430 | 0.600 | 0.600 | 8600 | 12900 | 17200 | 25800 |
| | | 16.00 | 2 | 0.460 | 0.750 | 0.750 | 9200 | 13800 | 18400 | 27600 |
| | | 20.00 | 2 | 0.485 | 1.000 | 1.000 | 9700 | 14550 | 19400 | 29100 |
| | | 25.00 | 2 | 0.505 | 1.200 | 1.200 | 10100 | 15150 | 20200 | 30300 |

Frese toriche AX (AX-RV2)

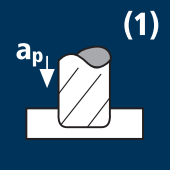

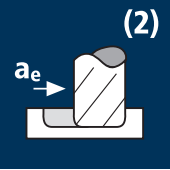

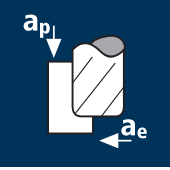

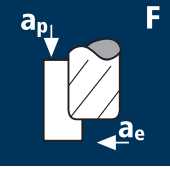



A taglienti lisci, esecuzione 3xd con scarico



HM λ 40°
MG10 γ 20°



| Esempio: N° Ordine | | | | | | | | | | | | CELERO | |
|---------------------|-------------|-------------|-------|-------|-------|-------|-------|----------------|----------|-----|--------|--------|--------|
| | | | | | | | | | | | | 15573 | C15573 |
| \emptyset Code | d_1 e8 | d_2 h6 | d_3 | l_1 | l_2 | l_3 | l_4 | r 0/+0.03 | α | z | EUR | EUR | |
| 307 | 6.00 | 6.00 | 5.50 | 54 | 7.00 | 16.15 | 18.00 | 2.500 | 0.0° | 2 | 65.00 | 73.00 | |
| 397 | 8.00 | 8.00 | 7.40 | 63 | 9.00 | 21.63 | 24.00 | 2.500 | 0.0° | 2 | 81.00 | 92.00 | |
| 457 | 10.00 | 10.00 | 9.20 | 72 | 11.00 | 26.99 | 30.00 | 2.500 | 0.0° | 2 | 111.00 | 125.00 | |
| 506 | 12.00 | 12.00 | 11.00 | 83 | 13.00 | 32.29 | 36.00 | 2.500 | 0.0° | 2 | 137.00 | 154.00 | |
| 612 | 16.00 | 16.00 | 15.00 | 97 | 18.00 | 43.73 | 48.00 | 2.500 | 0.0° | 2 | 214.00 | 241.00 | |
| 684 | 20.00 | 20.00 | 19.00 | 111 | 22.00 | 55.23 | 60.00 | 2.500 | 0.0° | 2 | 312.00 | 352.00 | |
| 774 | 25.00 | 25.00 | 24.00 | 132 | 27.00 | 69.68 | 75.00 | 2.500 | 0.0° | 2 | 591.00 | 667.00 | |
| 459 | 10.00 | 10.00 | 9.20 | 72 | 11.00 | 26.99 | 30.00 | 4.000 | 0.0° | 2 | 111.00 | 125.00 | |
| 508 | 12.00 | 12.00 | 11.00 | 83 | 13.00 | 32.29 | 36.00 | 4.000 | 0.0° | 2 | 137.00 | 154.00 | |
| 614 | 16.00 | 16.00 | 15.00 | 97 | 18.00 | 43.73 | 48.00 | 4.000 | 0.0° | 2 | 214.00 | 241.00 | |
| 686 | 20.00 | 20.00 | 19.00 | 111 | 22.00 | 55.23 | 60.00 | 4.000 | 0.0° | 2 | 312.00 | 352.00 | |
| 776 | 25.00 | 25.00 | 24.00 | 132 | 27.00 | 69.68 | 75.00 | 4.000 | 0.0° | 2 | 591.00 | 667.00 | |

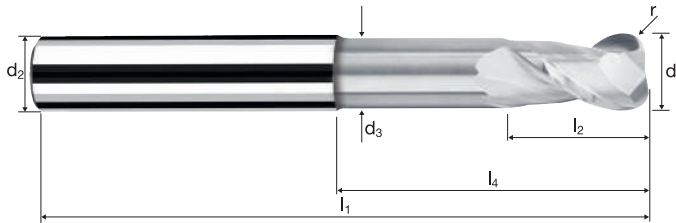
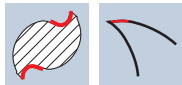
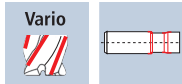
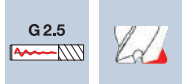
| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=10000 min ⁻¹ vf [mm/min] | n=15000 min ⁻¹ vf [mm/min] | n=20000 min ⁻¹ vf [mm/min] | n=30000 min ⁻¹ vf [mm/min] |
|---|---|------------|---|------------------------|------------------------|------------------------|--|--|--|--|
|  <p>(1)</p> | Alluminio malleabile Costruzione integrale Al  | 6.00 | 2 | 0.090 | 3.500 | 6.000 | 1800 | 2700 | 3600 | 5400 |
| | | 8.00 | 2 | 0.120 | 4.500 | 8.000 | 2400 | 3600 | 4800 | 7200 |
| | | 10.00 | 2 | 0.150 | 5.000 | 10.000 | 3000 | 4500 | 6000 | 9000 |
| | | 12.00 | 2 | 0.180 | 5.500 | 12.000 | 3600 | 5400 | 7200 | 10800 |
| | | 16.00 | 2 | 0.190 | 6.000 | 16.000 | 3800 | 5700 | 7600 | 11400 |
| | | 20.00 | 2 | 0.205 | 6.500 | 20.000 | 4100 | 6150 | 8200 | 12300 |
| | | 25.00 | 2 | 0.215 | 6.500 | 25.000 | 4300 | 6450 | 8600 | 12900 |
|  <p>(2)</p> | Alluminio malleabile Costruzione integrale Al  | 6.00 | 2 | 0.090 | 3.500 | 3.600 | 1800 | 2700 | 3600 | 5400 |
| | | 8.00 | 2 | 0.120 | 4.500 | 4.800 | 2400 | 3600 | 4800 | 7200 |
| | | 10.00 | 2 | 0.150 | 5.000 | 6.000 | 3000 | 4500 | 6000 | 9000 |
| | | 12.00 | 2 | 0.180 | 5.500 | 7.200 | 3600 | 5400 | 7200 | 10800 |
| | | 16.00 | 2 | 0.190 | 6.000 | 9.600 | 3800 | 5700 | 7600 | 11400 |
| | | 20.00 | 2 | 0.205 | 6.500 | 12.000 | 4100 | 6150 | 8200 | 12300 |
| | | 25.00 | 2 | 0.215 | 6.500 | 15.000 | 4300 | 6450 | 8600 | 12900 |
|  | Alluminio malleabile Costruzione integrale Al  | 6.00 | 2 | 0.090 | 5.300 | 3.600 | 1800 | 2700 | 3600 | 5400 |
| | | 8.00 | 2 | 0.120 | 6.800 | 4.800 | 2400 | 3600 | 4800 | 7200 |
| | | 10.00 | 2 | 0.150 | 7.500 | 6.000 | 3000 | 4500 | 6000 | 9000 |
| | | 12.00 | 2 | 0.180 | 8.300 | 7.200 | 3600 | 5400 | 7200 | 10800 |
| | | 16.00 | 2 | 0.190 | 9.000 | 9.600 | 3800 | 5700 | 7600 | 11400 |
| | | 20.00 | 2 | 0.205 | 9.800 | 12.000 | 4100 | 6150 | 8200 | 12300 |
| | | 25.00 | 2 | 0.215 | 9.800 | 15.000 | 4300 | 6450 | 8600 | 12900 |
|  <p>F</p> | Alluminio malleabile Costruzione integrale Al  | 6.00 | 2 | 0.025 | 5.300 | 0.200 | 500 | 750 | 1000 | 1500 |
| | | 8.00 | 2 | 0.035 | 6.800 | 0.250 | 700 | 1050 | 1400 | 2100 |
| | | 10.00 | 2 | 0.045 | 7.500 | 0.300 | 900 | 1350 | 1800 | 2700 |
| | | 12.00 | 2 | 0.055 | 8.300 | 0.350 | 1100 | 1650 | 2200 | 3300 |
| | | 16.00 | 2 | 0.055 | 9.000 | 0.500 | 1100 | 1650 | 2200 | 3300 |
| | | 20.00 | 2 | 0.060 | 9.800 | 0.600 | 1200 | 1800 | 2400 | 3600 |
| | | 25.00 | 2 | 0.065 | 9.800 | 0.750 | 1300 | 1950 | 2600 | 3900 |
|  | Alluminio malleabile Costruzione integrale Al  | 6.00 | 2 | 0.200 | 0.400 | 0.400 | 4000 | 6000 | 8000 | 12000 |
| | | 8.00 | 2 | 0.265 | 0.450 | 0.450 | 5300 | 7950 | 10600 | 15900 |
| | | 10.00 | 2 | 0.330 | 0.500 | 0.500 | 6600 | 9900 | 13200 | 19800 |
| | | 12.00 | 2 | 0.395 | 0.600 | 0.600 | 7900 | 11850 | 15800 | 23700 |
| | | 16.00 | 2 | 0.420 | 0.750 | 0.750 | 8400 | 12600 | 16800 | 25200 |
| | | 20.00 | 2 | 0.450 | 1.000 | 1.000 | 9000 | 13500 | 18000 | 27000 |
| | | 25.00 | 2 | 0.475 | 1.200 | 1.200 | 9500 | 14250 | 19000 | 28500 |

Frese toriche AX (AX-RV2)

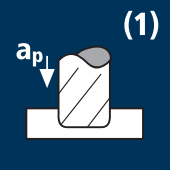

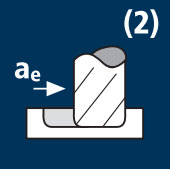

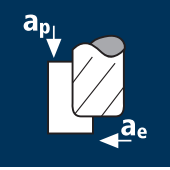

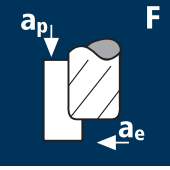



A taglienti lisci, esecuzione 4xd con scarico



HM
MG10 λ 40°
 γ 20°



| | | | | | | | | | | | CELERO | |
|---------------------|-------------|-------------|-------|-------|-------|-------|--------|----------------|-----|--------|--------|--------|
| Esempio: N° Ordine | | | | | | | | | | | 15574 | C15574 |
| | | | | | | | | | | | EUR | EUR |
| \emptyset Code | d_1 e8 | d_2 h6 | d_3 | l_1 | l_2 | l_3 | l_4 | r 0/+0.03 | z | | | |
| 302 | 6.00 | 6.00 | 5.50 | 60 | 7.00 | 22.15 | 24.00 | 1.000 | 2 | 74.00 | 83.00 | |
| 391 | 8.00 | 8.00 | 7.40 | 68 | 9.00 | 29.63 | 32.00 | 1.000 | 2 | 93.00 | 103.00 | |
| 450 | 10.00 | 10.00 | 9.20 | 84 | 11.00 | 36.99 | 40.00 | 1.000 | 2 | 126.00 | 141.00 | |
| 501 | 12.00 | 12.00 | 11.00 | 97 | 13.00 | 44.29 | 48.00 | 1.000 | 2 | 156.00 | 174.00 | |
| 608 | 16.00 | 16.00 | 15.00 | 115 | 18.00 | 59.73 | 64.00 | 1.000 | 2 | 244.00 | 272.00 | |
| 680 | 20.00 | 20.00 | 19.00 | 130 | 22.00 | 75.23 | 80.00 | 1.000 | 2 | 356.00 | 396.00 | |
| 770 | 25.00 | 25.00 | 24.00 | 157 | 27.00 | 94.68 | 100.00 | 1.000 | 2 | 675.00 | 751.00 | |
| 453 | 10.00 | 10.00 | 9.20 | 84 | 11.00 | 36.99 | 40.00 | 1.500 | 2 | 126.00 | - | |
| 503 | 12.00 | 12.00 | 11.00 | 97 | 13.00 | 44.29 | 48.00 | 1.500 | 2 | 156.00 | - | |
| 611 | 16.00 | 16.00 | 15.00 | 115 | 18.00 | 59.73 | 64.00 | 2.000 | 2 | 244.00 | - | |
| 683 | 20.00 | 20.00 | 19.00 | 130 | 22.00 | 75.23 | 80.00 | 2.000 | 2 | 356.00 | - | |
| 307 | 6.00 | 6.00 | 5.50 | 60 | 7.00 | 22.15 | 24.00 | 2.500 | 2 | 74.00 | 83.00 | |
| 397 | 8.00 | 8.00 | 7.40 | 68 | 9.00 | 29.63 | 32.00 | 2.500 | 2 | 93.00 | 103.00 | |
| 457 | 10.00 | 10.00 | 9.20 | 84 | 11.00 | 36.99 | 40.00 | 2.500 | 2 | 126.00 | 141.00 | |
| 506 | 12.00 | 12.00 | 11.00 | 97 | 13.00 | 44.29 | 48.00 | 2.500 | 2 | 156.00 | 174.00 | |
| 612 | 16.00 | 16.00 | 15.00 | 115 | 18.00 | 59.73 | 64.00 | 2.500 | 2 | 244.00 | 272.00 | |
| 684 | 20.00 | 20.00 | 19.00 | 130 | 22.00 | 75.23 | 80.00 | 2.500 | 2 | 356.00 | 396.00 | |
| 774 | 25.00 | 25.00 | 24.00 | 157 | 27.00 | 94.68 | 100.00 | 2.500 | 2 | 675.00 | 751.00 | |

| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=10000 min vf [mm/min] | n=15000 min vf [mm/min] | n=20000 min vf [mm/min] | n=30000 min vf [mm/min] |
|---|---|------------|---|------------------------|------------------------|------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
|  <p>(1)</p> | Alluminio malleabile Costruzione integrale Al  | 10.00 | 2 | 0.150 | 5.000 | 10.000 | 3000 | 4500 | 6000 | 9000 |
| | | 12.00 | 2 | 0.180 | 5.500 | 12.000 | 3600 | 5400 | 7200 | 10800 |
| | | 16.00 | 2 | 0.190 | 6.000 | 16.000 | 3800 | 5700 | 7600 | 11400 |
| | | 20.00 | 2 | 0.205 | 6.500 | 20.000 | 4100 | 6150 | 8200 | 12300 |
| | | 25.00 | 2 | 0.215 | 6.500 | 25.000 | 4300 | 6450 | 8600 | 12900 |
|  <p>(2)</p> | Alluminio malleabile Costruzione integrale Al  | 10.00 | 2 | 0.150 | 5.000 | 6.000 | 3000 | 4500 | 6000 | 9000 |
| | | 12.00 | 2 | 0.180 | 5.500 | 7.200 | 3600 | 5400 | 7200 | 10800 |
| | | 16.00 | 2 | 0.190 | 6.000 | 9.600 | 3800 | 5700 | 7600 | 11400 |
| | | 20.00 | 2 | 0.205 | 6.500 | 12.000 | 4100 | 6150 | 8200 | 12300 |
| | | 25.00 | 2 | 0.215 | 6.500 | 15.000 | 4300 | 6450 | 8600 | 12900 |
|  | Alluminio malleabile Costruzione integrale Al  | 10.00 | 2 | 0.150 | 7.500 | 6.000 | 3000 | 4500 | 6000 | 9000 |
| | | 12.00 | 2 | 0.180 | 8.300 | 7.200 | 3600 | 5400 | 7200 | 10800 |
| | | 16.00 | 2 | 0.190 | 9.000 | 9.600 | 3800 | 5700 | 7600 | 11400 |
| | | 20.00 | 2 | 0.205 | 9.800 | 12.000 | 4100 | 6150 | 8200 | 12300 |
| | | 25.00 | 2 | 0.215 | 9.800 | 15.000 | 4300 | 6450 | 8600 | 12900 |
|  <p>F</p> | Alluminio malleabile Costruzione integrale Al  | 10.00 | 2 | 0.045 | 7.500 | 0.300 | 900 | 1350 | 1800 | 2700 |
| | | 12.00 | 2 | 0.055 | 8.300 | 0.350 | 1100 | 1650 | 2200 | 3300 |
| | | 16.00 | 2 | 0.055 | 9.000 | 0.500 | 1100 | 1650 | 2200 | 3300 |
| | | 20.00 | 2 | 0.060 | 9.800 | 0.600 | 1200 | 1800 | 2400 | 3600 |
| | | 25.00 | 2 | 0.065 | 9.800 | 0.750 | 1300 | 1950 | 2600 | 3900 |
|  | Alluminio malleabile Costruzione integrale Al  | 10.00 | 2 | 0.330 | 0.500 | 0.500 | 6600 | 9900 | 13200 | 19800 |
| | | 12.00 | 2 | 0.395 | 0.600 | 0.600 | 7900 | 11850 | 15800 | 23700 |
| | | 16.00 | 2 | 0.420 | 0.750 | 0.750 | 8400 | 12600 | 16800 | 25200 |
| | | 20.00 | 2 | 0.450 | 1.000 | 1.000 | 9000 | 13500 | 18000 | 27000 |
| | | 25.00 | 2 | 0.475 | 1.200 | 1.200 | 9500 | 14250 | 19000 | 28500 |

Frese toriche AX (AX-RV2)

A taglienti lisci, esecuzione 4xd con scarico

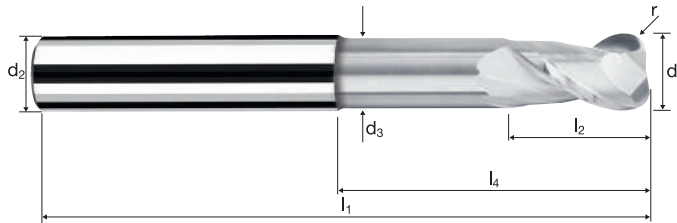


HM
MG10

λ 40°
 γ 20°

G2.5

Vario

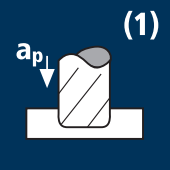

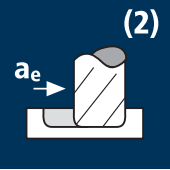

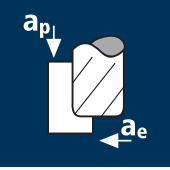

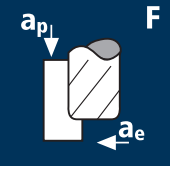





Sgrossatura **Finitura**

ReTool®

Aluminium > 99% **Al** Aluminium Alloy Al Aluminium Cast Cu Copper Plastic Thermoplast

| | | | | | | | | | | | CELERO | |
|--------------------|-------------------|-------------------|----------------|----------------|----------------|----------------|----------------|-----------|---|--|--------|--------|
| Esempio: N° Ordine | | | | | | | | | | | 15574 | C15574 |
| | | | | | | | | | | | EUR | EUR |
| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r 0/+0.03 | z | | EUR | EUR |
| 459 | 10.00 | 10.00 | 9.20 | 84 | 11.00 | 36.99 | 40.00 | 4.000 | 2 | | 126.00 | 141.00 |
| 508 | 12.00 | 12.00 | 11.00 | 97 | 13.00 | 44.29 | 48.00 | 4.000 | 2 | | 156.00 | 174.00 |
| 614 | 16.00 | 16.00 | 15.00 | 115 | 18.00 | 59.73 | 64.00 | 4.000 | 2 | | 244.00 | 272.00 |
| 686 | 20.00 | 20.00 | 19.00 | 130 | 22.00 | 75.23 | 80.00 | 4.000 | 2 | | 356.00 | 396.00 |
| 776 | 25.00 | 25.00 | 24.00 | 157 | 27.00 | 94.68 | 100.00 | 4.000 | 2 | | 675.00 | 751.00 |
| | | | | | | | | | | | | |
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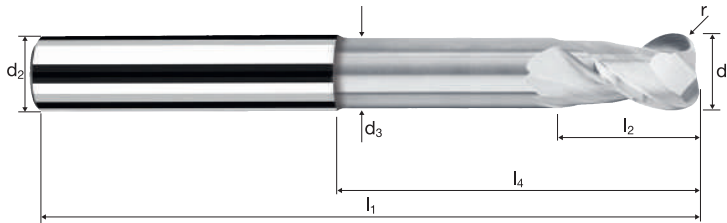
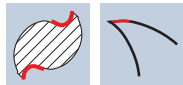
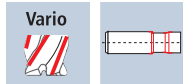
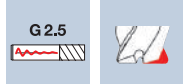
| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=10000 min vf [mm/min] | n=15000 min vf [mm/min] | n=20000 min vf [mm/min] | n=30000 min vf [mm/min] |
|---|---|------------|---|------------------------|------------------------|------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
|  <p>(1)</p> | Alluminio malleabile Costruzione integrale Al  | 6.00 | 2 | 0.065 | 4.000 | 6.000 | 1300 | 1950 | 2600 | 3900 |
| | | 8.00 | 2 | 0.085 | 4.500 | 8.000 | 1700 | 2550 | 3400 | 5100 |
| | | 10.00 | 2 | 0.110 | 5.000 | 10.000 | 2200 | 3300 | 4400 | 6600 |
| | | 12.00 | 2 | 0.120 | 5.000 | 12.000 | 2400 | 3600 | 4800 | 7200 |
| | | 16.00 | 2 | 0.150 | 5.000 | 16.000 | 3000 | 4500 | 6000 | 9000 |
| | | 20.00 | 2 | 0.180 | 5.000 | 20.000 | 3600 | 5400 | 7200 | 10800 |
| | | 25.00 | 2 | 0.200 | 5.000 | 25.000 | 4000 | 6000 | 8000 | 12000 |
|  <p>(2)</p> | Alluminio malleabile Costruzione integrale Al  | 6.00 | 2 | 0.065 | 4.000 | 3.600 | 1300 | 1950 | 2600 | 3900 |
| | | 8.00 | 2 | 0.085 | 4.500 | 4.800 | 1700 | 2550 | 3400 | 5100 |
| | | 10.00 | 2 | 0.110 | 5.000 | 6.000 | 2200 | 3300 | 4400 | 6600 |
| | | 12.00 | 2 | 0.120 | 5.000 | 7.200 | 2400 | 3600 | 4800 | 7200 |
| | | 16.00 | 2 | 0.150 | 5.000 | 9.600 | 3000 | 4500 | 6000 | 9000 |
| | | 20.00 | 2 | 0.180 | 5.000 | 12.000 | 3600 | 5400 | 7200 | 10800 |
| | | 25.00 | 2 | 0.200 | 5.000 | 15.000 | 4000 | 6000 | 8000 | 12000 |
|  | Alluminio malleabile Costruzione integrale Al  | 6.00 | 2 | 0.065 | 6.000 | 3.600 | 1300 | 1950 | 2600 | 3900 |
| | | 8.00 | 2 | 0.085 | 6.800 | 4.800 | 1700 | 2550 | 3400 | 5100 |
| | | 10.00 | 2 | 0.110 | 7.500 | 6.000 | 2200 | 3300 | 4400 | 6600 |
| | | 12.00 | 2 | 0.120 | 7.500 | 7.200 | 2400 | 3600 | 4800 | 7200 |
| | | 16.00 | 2 | 0.150 | 7.500 | 9.600 | 3000 | 4500 | 6000 | 9000 |
| | | 20.00 | 2 | 0.180 | 7.500 | 12.000 | 3600 | 5400 | 7200 | 10800 |
| | | 25.00 | 2 | 0.200 | 7.500 | 15.000 | 4000 | 6000 | 8000 | 12000 |
|  <p>F</p> | Alluminio malleabile Costruzione integrale Al  | 6.00 | 2 | 0.020 | 6.000 | 0.200 | 400 | 600 | 800 | 1200 |
| | | 8.00 | 2 | 0.025 | 6.800 | 0.250 | 500 | 750 | 1000 | 1500 |
| | | 10.00 | 2 | 0.035 | 7.500 | 0.300 | 700 | 1050 | 1400 | 2100 |
| | | 12.00 | 2 | 0.035 | 7.500 | 0.350 | 700 | 1050 | 1400 | 2100 |
| | | 16.00 | 2 | 0.045 | 7.500 | 0.500 | 900 | 1350 | 1800 | 2700 |
| | | 20.00 | 2 | 0.055 | 7.500 | 0.600 | 1100 | 1650 | 2200 | 3300 |
| | | 25.00 | 2 | 0.060 | 7.500 | 0.750 | 1200 | 1800 | 2400 | 3600 |
|  | Alluminio malleabile Costruzione integrale Al  | 6.00 | 2 | 0.145 | 0.350 | 0.350 | 2900 | 4350 | 5800 | 8700 |
| | | 8.00 | 2 | 0.185 | 0.400 | 0.400 | 3700 | 5550 | 7400 | 11100 |
| | | 10.00 | 2 | 0.240 | 0.450 | 0.450 | 4800 | 7200 | 9600 | 14400 |
| | | 12.00 | 2 | 0.265 | 0.500 | 0.500 | 5300 | 7950 | 10600 | 15900 |
| | | 16.00 | 2 | 0.330 | 0.600 | 0.600 | 6600 | 9900 | 13200 | 19800 |
| | | 20.00 | 2 | 0.395 | 0.750 | 0.750 | 7900 | 11850 | 15800 | 23700 |
| | | 25.00 | 2 | 0.440 | 0.800 | 0.800 | 8800 | 13200 | 17600 | 26400 |

Frese toriche AX (AX-RV2)

A taglienti lisci, esecuzione 5xd con scarico

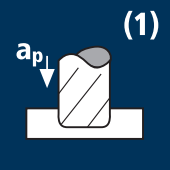

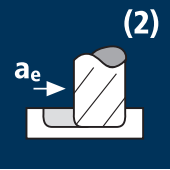

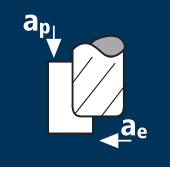

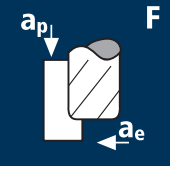





HM λ 40°
MG10 γ 20°



| | | | | | | | | | |
|--|--|--|--------------------------|--------------------------|-------------------------|--|--------------|------------------------|--|
| | | | Al Aluminium > 99% | Al Aluminium Alloy | Al Aluminium Cast | | Cu Copper | Plastic Thermoplast | |
|--|--|--|--------------------------|--------------------------|-------------------------|--|--------------|------------------------|--|

| Esempio: N° Ordine | | | | | | | | | | | CELERO | |
|--------------------|----------------------|----------------------|----------------|----------------|----------------|----------------|----------------|--------------|---|--------|--------|--------|
| | | | | | | | | | | | 15575 | C15575 |
| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r 0/+0.03 | z | EUR | EUR | |
| 302 | 6.00 | 6.00 | 5.50 | 66 | 7.00 | 28.15 | 30.00 | 1.000 | 2 | 80.00 | - | |
| 391 | 8.00 | 8.00 | 7.40 | 76 | 9.00 | 37.63 | 40.00 | 1.000 | 2 | 100.00 | - | |
| 450 | 10.00 | 10.00 | 9.20 | 91 | 11.00 | 46.99 | 50.00 | 1.000 | 2 | 136.00 | 150.00 | |
| 501 | 12.00 | 12.00 | 11.00 | 106 | 13.00 | 56.29 | 60.00 | 1.000 | 2 | 167.00 | 185.00 | |
| 608 | 16.00 | 16.00 | 15.00 | 129 | 18.00 | 75.73 | 80.00 | 1.000 | 2 | 262.00 | 290.00 | |
| 680 | 20.00 | 20.00 | 19.00 | 151 | 22.00 | 95.23 | 100.00 | 1.000 | 2 | 382.00 | 423.00 | |
| 770 | 25.00 | 25.00 | 24.00 | 182 | 27.00 | 119.68 | 125.00 | 1.000 | 2 | 724.00 | 800.00 | |
| 307 | 6.00 | 6.00 | 5.50 | 66 | 7.00 | 28.15 | 30.00 | 2.500 | 2 | 80.00 | 88.00 | |
| 397 | 8.00 | 8.00 | 7.40 | 76 | 9.00 | 37.63 | 40.00 | 2.500 | 2 | 100.00 | 110.00 | |
| 457 | 10.00 | 10.00 | 9.20 | 91 | 11.00 | 46.99 | 50.00 | 2.500 | 2 | 136.00 | 150.00 | |
| 506 | 12.00 | 12.00 | 11.00 | 106 | 13.00 | 56.29 | 60.00 | 2.500 | 2 | 167.00 | 185.00 | |
| 612 | 16.00 | 16.00 | 15.00 | 129 | 18.00 | 75.73 | 80.00 | 2.500 | 2 | 262.00 | 290.00 | |
| 684 | 20.00 | 20.00 | 19.00 | 151 | 22.00 | 95.23 | 100.00 | 2.500 | 2 | 382.00 | 423.00 | |
| 774 | 25.00 | 25.00 | 24.00 | 182 | 27.00 | 119.68 | 125.00 | 2.500 | 2 | 724.00 | 800.00 | |
| 459 | 10.00 | 10.00 | 9.20 | 91 | 11.00 | 46.99 | 50.00 | 4.000 | 2 | 136.00 | 150.00 | |
| 508 | 12.00 | 12.00 | 11.00 | 106 | 13.00 | 56.29 | 60.00 | 4.000 | 2 | 167.00 | 185.00 | |
| 614 | 16.00 | 16.00 | 15.00 | 129 | 18.00 | 75.73 | 80.00 | 4.000 | 2 | 262.00 | 290.00 | |
| 686 | 20.00 | 20.00 | 19.00 | 151 | 22.00 | 95.23 | 100.00 | 4.000 | 2 | 382.00 | 423.00 | |
| 776 | 25.00 | 25.00 | 24.00 | 182 | 27.00 | 119.68 | 125.00 | 4.000 | 2 | 724.00 | 800.00 | |

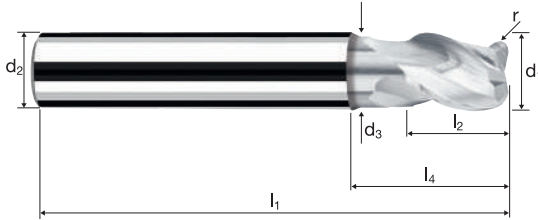
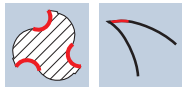
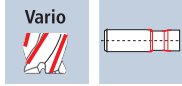
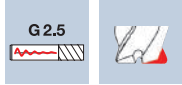
| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=10000 min vf [mm/min] | n=15000 min vf [mm/min] | n=20000 min vf [mm/min] | n=30000 min vf [mm/min] |
|---|---|------------|---|------------------------|------------------------|------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
|  <p>(1)</p> | Alluminio malleabile Costruzione integrale Al  | 10.00 | 3 | 0.115 | 6.000 | 10.000 | 3450 | 5175 | 6900 | 10350 |
| | | 12.00 | 3 | 0.135 | 6.500 | 12.000 | 4050 | 6075 | 8100 | 12150 |
| | | 16.00 | 3 | 0.145 | 7.000 | 16.000 | 4350 | 6525 | 8700 | 13050 |
| | | 20.00 | 3 | 0.155 | 7.000 | 20.000 | 4650 | 6975 | 9300 | 13950 |
| | | 25.00 | 3 | 0.160 | 7.000 | 25.000 | 4800 | 7200 | 9600 | 14400 |
|  <p>(2)</p> | Alluminio malleabile Costruzione integrale Al  | 10.00 | 3 | 0.115 | 6.000 | 8.000 | 3450 | 5175 | 6900 | 10350 |
| | | 12.00 | 3 | 0.135 | 6.500 | 9.600 | 4050 | 6075 | 8100 | 12150 |
| | | 16.00 | 3 | 0.145 | 7.000 | 12.800 | 4350 | 6525 | 8700 | 13050 |
| | | 20.00 | 3 | 0.155 | 7.000 | 16.000 | 4650 | 6975 | 9300 | 13950 |
| | | 25.00 | 3 | 0.160 | 7.000 | 20.000 | 4800 | 7200 | 9600 | 14400 |
|  | Alluminio malleabile Costruzione integrale Al  | 10.00 | 3 | 0.115 | 9.000 | 6.000 | 3450 | 5175 | 6900 | 10350 |
| | | 12.00 | 3 | 0.135 | 9.800 | 7.200 | 4050 | 6075 | 8100 | 12150 |
| | | 16.00 | 3 | 0.145 | 10.500 | 9.600 | 4350 | 6525 | 8700 | 13050 |
| | | 20.00 | 3 | 0.155 | 10.500 | 12.000 | 4650 | 6975 | 9300 | 13950 |
| | | 25.00 | 3 | 0.160 | 10.500 | 15.000 | 4800 | 7200 | 9600 | 14400 |
|  <p>F</p> | Alluminio malleabile Costruzione integrale Al  | 10.00 | 3 | 0.035 | 9.000 | 0.300 | 1050 | 1575 | 2100 | 3150 |
| | | 12.00 | 3 | 0.040 | 9.800 | 0.350 | 1200 | 1800 | 2400 | 3600 |
| | | 16.00 | 3 | 0.045 | 10.500 | 0.500 | 1350 | 2025 | 2700 | 4050 |
| | | 20.00 | 3 | 0.045 | 10.500 | 0.600 | 1350 | 2025 | 2700 | 4050 |
| | | 25.00 | 3 | 0.050 | 10.500 | 0.750 | 1500 | 2250 | 3000 | 4500 |
|  | Alluminio malleabile Costruzione integrale Al  | 10.00 | 3 | 0.255 | 0.500 | 0.500 | 7650 | 11475 | 15300 | 22950 |
| | | 12.00 | 3 | 0.295 | 0.600 | 0.600 | 8850 | 13275 | 17700 | 26550 |
| | | 16.00 | 3 | 0.320 | 0.750 | 0.750 | 9600 | 14400 | 19200 | 28800 |
| | | 20.00 | 3 | 0.340 | 1.000 | 1.000 | 10200 | 15300 | 20400 | 30600 |
| | | 25.00 | 3 | 0.350 | 1.200 | 1.200 | 10500 | 15750 | 21000 | 31500 |

Frese toriche AX (AX-RV3)

A taglienti lisci, esecuzione 2xd con scarico



HM λ 40°
MG10 γ 20°



Sgrossatura

Finitura



ReTool®

| | | | | | | | | |
|--|--|--------------------------|--------------------------|-------------------------|--|--------------|------------------------|--|
| | | Al Aluminium > 99% | Al Aluminium Alloy | Al Aluminium Cast | | Cu Copper | Plastic Thermoplast | |
|--|--|--------------------------|--------------------------|-------------------------|--|--------------|------------------------|--|

| Esempio: N° Ordine | | | | | | | | | | | CELERO | |
|--------------------|----------------------|----------------------|----------------|----------------|----------------|----------------|----------------|--------------|---|--------|--------|--------|
| | | | | | | | | | | | 15582 | C15582 |
| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r 0/+0.03 | z | EUR | EUR | |
| 457 | 10.00 | 10.00 | 9.20 | 63 | 11.00 | 16.99 | 20.00 | 2.500 | 3 | 107.00 | 121.00 | |
| 506 | 12.00 | 12.00 | 11.00 | 73 | 13.00 | 20.29 | 24.00 | 2.500 | 3 | 132.00 | 150.00 | |
| 612 | 16.00 | 16.00 | 15.00 | 82 | 18.00 | 27.73 | 32.00 | 2.500 | 3 | 207.00 | 234.00 | |
| 684 | 20.00 | 20.00 | 19.00 | 92 | 22.00 | 35.23 | 40.00 | 2.500 | 3 | 302.00 | 342.00 | |
| 774 | 25.00 | 25.00 | 24.00 | 107 | 27.00 | 44.68 | 50.00 | 2.500 | 3 | 572.00 | 648.00 | |
| 508 | 12.00 | 12.00 | 11.00 | 73 | 13.00 | 20.29 | 24.00 | 4.000 | 3 | 132.00 | 150.00 | |
| 614 | 16.00 | 16.00 | 15.00 | 82 | 18.00 | 27.73 | 32.00 | 4.000 | 3 | 207.00 | 234.00 | |
| 686 | 20.00 | 20.00 | 19.00 | 92 | 22.00 | 35.23 | 40.00 | 4.000 | 3 | 302.00 | 342.00 | |
| 776 | 25.00 | 25.00 | 24.00 | 107 | 27.00 | 44.68 | 50.00 | 4.000 | 3 | 572.00 | 648.00 | |
| | | | | | | | | | | | | |
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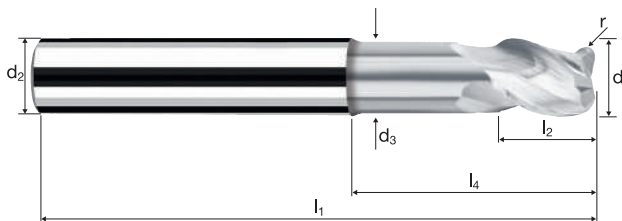
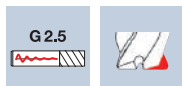
| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=10000 min vf [mm/min] | n=15000 min vf [mm/min] | n=20000 min vf [mm/min] | n=30000 min vf [mm/min] |
|--------------|--|------------|--------|------------------------|------------------------|------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| | Alluminio malleabile Costruzione integrale Al | 3.00 | 3 | 0.030 | 2.000 | 3.000 | 900 | 1350 | 1800 | 2700 |
| | | 4.00 | 3 | 0.040 | 3.000 | 4.000 | 1200 | 1800 | 2400 | 3600 |
| | | 6.00 | 3 | 0.060 | 4.000 | 6.000 | 1800 | 2700 | 3600 | 5400 |
| | | 8.00 | 3 | 0.085 | 5.000 | 8.000 | 2550 | 3825 | 5100 | 7650 |
| | | 10.00 | 3 | 0.105 | 5.500 | 10.000 | 3150 | 4725 | 6300 | 9450 |
| | | 12.00 | 3 | 0.125 | 6.000 | 12.000 | 3750 | 5625 | 7500 | 11250 |
| | | 16.00 | 3 | 0.135 | 6.500 | 16.000 | 4050 | 6075 | 8100 | 12150 |
| | | 20.00 | 3 | 0.140 | 7.000 | 20.000 | 4200 | 6300 | 8400 | 12600 |
| 25.00 | 3 | 0.150 | 7.000 | 25.000 | 4500 | 6750 | 9000 | 13500 | | |
| | Alluminio malleabile Costruzione integrale Al | 3.00 | 3 | 0.030 | 2.000 | 2.400 | 900 | 1350 | 1800 | 2700 |
| | | 4.00 | 3 | 0.040 | 3.000 | 3.200 | 1200 | 1800 | 2400 | 3600 |
| | | 6.00 | 3 | 0.060 | 4.000 | 4.800 | 1800 | 2700 | 3600 | 5400 |
| | | 8.00 | 3 | 0.085 | 5.000 | 6.400 | 2550 | 3825 | 5100 | 7650 |
| | | 10.00 | 3 | 0.105 | 5.500 | 8.000 | 3150 | 4725 | 6300 | 9450 |
| | | 12.00 | 3 | 0.125 | 6.000 | 9.600 | 3750 | 5625 | 7500 | 11250 |
| | | 16.00 | 3 | 0.135 | 6.500 | 12.800 | 4050 | 6075 | 8100 | 12150 |
| | | 20.00 | 3 | 0.140 | 7.000 | 16.000 | 4200 | 6300 | 8400 | 12600 |
| 25.00 | 3 | 0.150 | 7.000 | 20.000 | 4500 | 6750 | 9000 | 13500 | | |
| | Alluminio malleabile Costruzione integrale Al | 3.00 | 3 | 0.030 | 3.000 | 1.800 | 900 | 1350 | 1800 | 2700 |
| | | 4.00 | 3 | 0.040 | 4.500 | 2.400 | 1200 | 1800 | 2400 | 3600 |
| | | 6.00 | 3 | 0.060 | 6.000 | 3.600 | 1800 | 2700 | 3600 | 5400 |
| | | 8.00 | 3 | 0.085 | 7.500 | 4.800 | 2550 | 3825 | 5100 | 7650 |
| | | 10.00 | 3 | 0.105 | 8.300 | 6.000 | 3150 | 4725 | 6300 | 9450 |
| | | 12.00 | 3 | 0.125 | 9.000 | 7.200 | 3750 | 5625 | 7500 | 11250 |
| | | 16.00 | 3 | 0.135 | 9.800 | 9.600 | 4050 | 6075 | 8100 | 12150 |
| | | 20.00 | 3 | 0.140 | 10.500 | 12.000 | 4200 | 6300 | 8400 | 12600 |
| 25.00 | 3 | 0.150 | 10.500 | 15.000 | 4500 | 6750 | 9000 | 13500 | | |
| | Alluminio malleabile Costruzione integrale Al | 3.00 | 3 | 0.010 | 3.000 | 0.100 | 300 | 450 | 600 | 900 |
| | | 4.00 | 3 | 0.010 | 4.500 | 0.100 | 300 | 450 | 600 | 900 |
| | | 6.00 | 3 | 0.020 | 6.000 | 0.200 | 600 | 900 | 1200 | 1800 |
| | | 8.00 | 3 | 0.025 | 7.500 | 0.250 | 750 | 1125 | 1500 | 2250 |
| | | 10.00 | 3 | 0.030 | 8.300 | 0.300 | 900 | 1350 | 1800 | 2700 |
| | | 12.00 | 3 | 0.040 | 9.000 | 0.350 | 1200 | 1800 | 2400 | 3600 |
| | | 16.00 | 3 | 0.040 | 9.800 | 0.500 | 1200 | 1800 | 2400 | 3600 |
| | | 20.00 | 3 | 0.040 | 10.500 | 0.600 | 1200 | 1800 | 2400 | 3600 |
| 25.00 | 3 | 0.045 | 10.500 | 0.750 | 1350 | 2025 | 2700 | 4050 | | |
| | Alluminio malleabile Costruzione integrale Al | 3.00 | 3 | 0.065 | 0.400 | 0.400 | 1950 | 2925 | 3900 | 5850 |
| | | 4.00 | 3 | 0.090 | 0.450 | 0.450 | 2700 | 4050 | 5400 | 8100 |
| | | 6.00 | 3 | 0.130 | 0.400 | 0.400 | 3900 | 5850 | 7800 | 11700 |
| | | 8.00 | 3 | 0.185 | 0.450 | 0.450 | 5550 | 8325 | 11100 | 16650 |
| | | 10.00 | 3 | 0.230 | 0.500 | 0.500 | 6900 | 10350 | 13800 | 20700 |
| | | 12.00 | 3 | 0.275 | 0.600 | 0.600 | 8250 | 12375 | 16500 | 24750 |
| | | 16.00 | 3 | 0.295 | 0.750 | 0.750 | 8850 | 13275 | 17700 | 26550 |
| | | 20.00 | 3 | 0.310 | 1.000 | 1.000 | 9300 | 13950 | 18600 | 27900 |
| 25.00 | 3 | 0.330 | 1.200 | 1.200 | 9900 | 14850 | 19800 | 29700 | | |

Frese toriche AX (AX-RV3)

A taglienti lisci, esecuzione 3xd con scarico



HM λ 40°
MG10 γ 20°

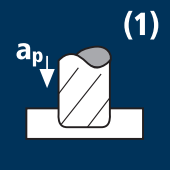

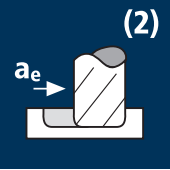

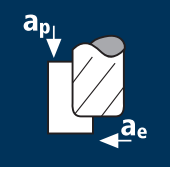

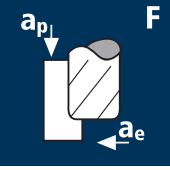





Sgrossatura **Finitura**

ReTool®

| | | | | | | | | | |
|--|--|--|--------------------------|--------------------------|-------------------------|--|--------------|------------------------|--|
| | | | Al Aluminium > 99% | Al Aluminium Alloy | Al Aluminium Cast | | Cu Copper | Plastic Thermoplast | |
|--|--|--|--------------------------|--------------------------|-------------------------|--|--------------|------------------------|--|

| Esempio: N° Ordine | | | | | | | | | | | | CELERO | |
|--------------------|-------------------|-------------------|----------------|----------------|----------------|----------------|----------------|--------------|------|---|--------|--------|--------|
| | | | | | | | | | | | | 15583 | C15583 |
| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r 0/+0.03 | α | z | EUR | EUR | |
| 180 | 3.00 | 6.00 | 2.80 | 54 | 4.00 | 9.00 | 15.37 | 0.500 | 5.9° | 3 | 65.00 | 73.00 | |
| 220 | 4.00 | 6.00 | 3.70 | 54 | 5.00 | 12.00 | 16.82 | 0.500 | 3.7° | 3 | 65.00 | 73.00 | |
| 260 | 5.00 | 6.00 | 4.60 | 54 | 6.00 | 15.00 | 18.27 | 0.500 | 1.7° | 3 | 65.00 | 73.00 | |
| 300 | 6.00 | 6.00 | 5.50 | 54 | 7.00 | 16.15 | 18.00 | 0.500 | 0.0° | 3 | 65.00 | 73.00 | |
| 302 | 6.00 | 6.00 | 5.50 | 54 | 7.00 | 16.15 | 18.00 | 1.000 | 0.0° | 3 | 65.00 | 73.00 | |
| 391 | 8.00 | 8.00 | 7.40 | 63 | 9.00 | 21.63 | 24.00 | 1.000 | 0.0° | 3 | 81.00 | 92.00 | |
| 450 | 10.00 | 10.00 | 9.20 | 72 | 11.00 | 26.99 | 30.00 | 1.000 | 0.0° | 3 | 111.00 | 125.00 | |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 13.00 | 32.29 | 36.00 | 1.000 | 0.0° | 3 | 137.00 | 154.00 | |
| 608 | 16.00 | 16.00 | 15.00 | 97 | 18.00 | 43.73 | 48.00 | 1.000 | 0.0° | 3 | 214.00 | 241.00 | |
| 680 | 20.00 | 20.00 | 19.00 | 111 | 22.00 | 55.23 | 60.00 | 1.000 | 0.0° | 3 | 312.00 | 352.00 | |
| 770 | 25.00 | 25.00 | 24.00 | 132 | 27.00 | 69.68 | 75.00 | 1.000 | 0.0° | 3 | 591.00 | 667.00 | |
| 453 | 10.00 | 10.00 | 9.20 | 72 | 11.00 | 26.99 | 30.00 | 1.500 | 0.0° | 3 | 111.00 | - | |
| 503 | 12.00 | 12.00 | 11.00 | 83 | 13.00 | 32.29 | 36.00 | 1.500 | 0.0° | 3 | 137.00 | - | |
| 611 | 16.00 | 16.00 | 15.00 | 97 | 18.00 | 43.73 | 48.00 | 2.000 | 0.0° | 3 | 214.00 | - | |
| 683 | 20.00 | 20.00 | 19.00 | 111 | 22.00 | 55.23 | 60.00 | 2.000 | 0.0° | 3 | 312.00 | - | |

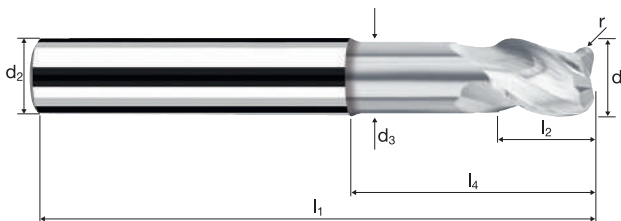
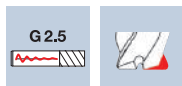
| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=10000 min vf [mm/min] | n=15000 min vf [mm/min] | n=20000 min vf [mm/min] | n=30000 min vf [mm/min] |
|---|---|------------|---|------------------------|------------------------|------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
|  | Alluminio malleabile Costruzione integrale Al  | 6.00 | 3 | 0.060 | 4.000 | 6.000 | 1800 | 2700 | 3600 | 5400 |
| | | 8.00 | 3 | 0.085 | 5.000 | 8.000 | 2550 | 3825 | 5100 | 7650 |
| | | 10.00 | 3 | 0.105 | 5.500 | 10.000 | 3150 | 4725 | 6300 | 9450 |
| | | 12.00 | 3 | 0.125 | 6.000 | 12.000 | 3750 | 5625 | 7500 | 11250 |
| | | 16.00 | 3 | 0.135 | 6.500 | 16.000 | 4050 | 6075 | 8100 | 12150 |
| | | 20.00 | 3 | 0.140 | 7.000 | 20.000 | 4200 | 6300 | 8400 | 12600 |
| | | 25.00 | 3 | 0.150 | 7.000 | 25.000 | 4500 | 6750 | 9000 | 13500 |
|  | Alluminio malleabile Costruzione integrale Al  | 6.00 | 3 | 0.060 | 4.000 | 4.800 | 1800 | 2700 | 3600 | 5400 |
| | | 8.00 | 3 | 0.085 | 5.000 | 6.400 | 2550 | 3825 | 5100 | 7650 |
| | | 10.00 | 3 | 0.105 | 5.500 | 8.000 | 3150 | 4725 | 6300 | 9450 |
| | | 12.00 | 3 | 0.125 | 6.000 | 9.600 | 3750 | 5625 | 7500 | 11250 |
| | | 16.00 | 3 | 0.135 | 6.500 | 12.800 | 4050 | 6075 | 8100 | 12150 |
| | | 20.00 | 3 | 0.140 | 7.000 | 16.000 | 4200 | 6300 | 8400 | 12600 |
| | | 25.00 | 3 | 0.150 | 7.000 | 20.000 | 4500 | 6750 | 9000 | 13500 |
|  | Alluminio malleabile Costruzione integrale Al  | 6.00 | 3 | 0.060 | 6.000 | 3.600 | 1800 | 2700 | 3600 | 5400 |
| | | 8.00 | 3 | 0.085 | 7.500 | 4.800 | 2550 | 3825 | 5100 | 7650 |
| | | 10.00 | 3 | 0.105 | 8.300 | 6.000 | 3150 | 4725 | 6300 | 9450 |
| | | 12.00 | 3 | 0.125 | 9.000 | 7.200 | 3750 | 5625 | 7500 | 11250 |
| | | 16.00 | 3 | 0.135 | 9.800 | 9.600 | 4050 | 6075 | 8100 | 12150 |
| | | 20.00 | 3 | 0.140 | 10.500 | 12.000 | 4200 | 6300 | 8400 | 12600 |
| | | 25.00 | 3 | 0.150 | 10.500 | 15.000 | 4500 | 6750 | 9000 | 13500 |
|  | Alluminio malleabile Costruzione integrale Al  | 6.00 | 3 | 0.020 | 6.000 | 0.200 | 600 | 900 | 1200 | 1800 |
| | | 8.00 | 3 | 0.025 | 7.500 | 0.250 | 750 | 1125 | 1500 | 2250 |
| | | 10.00 | 3 | 0.030 | 8.300 | 0.300 | 900 | 1350 | 1800 | 2700 |
| | | 12.00 | 3 | 0.040 | 9.000 | 0.350 | 1200 | 1800 | 2400 | 3600 |
| | | 16.00 | 3 | 0.040 | 9.800 | 0.500 | 1200 | 1800 | 2400 | 3600 |
| | | 20.00 | 3 | 0.040 | 10.500 | 0.600 | 1200 | 1800 | 2400 | 3600 |
| | | 25.00 | 3 | 0.045 | 10.500 | 0.750 | 1350 | 2025 | 2700 | 4050 |
|  | Alluminio malleabile Costruzione integrale Al  | 6.00 | 3 | 0.130 | 0.400 | 0.400 | 3900 | 5850 | 7800 | 11700 |
| | | 8.00 | 3 | 0.185 | 0.450 | 0.450 | 5550 | 8325 | 11100 | 16650 |
| | | 10.00 | 3 | 0.230 | 0.500 | 0.500 | 6900 | 10350 | 13800 | 20700 |
| | | 12.00 | 3 | 0.275 | 0.600 | 0.600 | 8250 | 12375 | 16500 | 24750 |
| | | 16.00 | 3 | 0.295 | 0.750 | 0.750 | 8850 | 13275 | 17700 | 26550 |
| | | 20.00 | 3 | 0.310 | 1.000 | 1.000 | 9300 | 13950 | 18600 | 27900 |
| | | 25.00 | 3 | 0.330 | 1.200 | 1.200 | 9900 | 14850 | 19800 | 29700 |

Frese toriche AX (AX-RV3)

A taglienti lisci, esecuzione 3xd con scarico



HM λ 40°
MG10 γ 20°



Sgrossatura

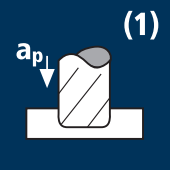

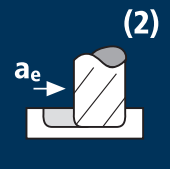

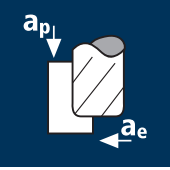

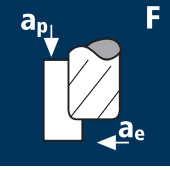



Finitura



ReTool®

| | | | | | | | | | |
|--|--|--|--------------------------|--------------------------|-------------------------|--|--------------|------------------------|--|
| | | | Al Aluminium > 99% | Al Aluminium Alloy | Al Aluminium Cast | | Cu Copper | Plastic Thermoplast | |
|--|--|--|--------------------------|--------------------------|-------------------------|--|--------------|------------------------|--|

| | | | | | | | | | | | CELERO | |
|--------------------|----------------------|----------------------|----------------|----------------|----------------|----------------|----------------|--------------|------|---|--------|--------|
| Esempio: N° Ordine | | | | | | | | | | | 15583 | C15583 |
| | | | | | | | | | | | EUR | EUR |
| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r 0/+0.03 | α | z | EUR | EUR |
| 307 | 6.00 | 6.00 | 5.50 | 54 | 7.00 | 16.15 | 18.00 | 2.500 | 0.0° | 3 | 65.00 | 73.00 |
| 397 | 8.00 | 8.00 | 7.40 | 63 | 9.00 | 21.63 | 24.00 | 2.500 | 0.0° | 3 | 81.00 | 92.00 |
| 457 | 10.00 | 10.00 | 9.20 | 72 | 11.00 | 26.99 | 30.00 | 2.500 | 0.0° | 3 | 111.00 | 125.00 |
| 506 | 12.00 | 12.00 | 11.00 | 83 | 13.00 | 32.29 | 36.00 | 2.500 | 0.0° | 3 | 137.00 | 154.00 |
| 612 | 16.00 | 16.00 | 15.00 | 97 | 18.00 | 43.73 | 48.00 | 2.500 | 0.0° | 3 | 214.00 | 241.00 |
| 684 | 20.00 | 20.00 | 19.00 | 111 | 22.00 | 55.23 | 60.00 | 2.500 | 0.0° | 3 | 312.00 | 352.00 |
| 774 | 25.00 | 25.00 | 24.00 | 132 | 27.00 | 69.68 | 75.00 | 2.500 | 0.0° | 3 | 591.00 | 667.00 |
| 459 | 10.00 | 10.00 | 9.20 | 72 | 11.00 | 26.99 | 30.00 | 4.000 | 0.0° | 3 | 111.00 | 125.00 |
| 508 | 12.00 | 12.00 | 11.00 | 83 | 13.00 | 32.29 | 36.00 | 4.000 | 0.0° | 3 | 137.00 | 154.00 |
| 614 | 16.00 | 16.00 | 15.00 | 97 | 18.00 | 43.73 | 48.00 | 4.000 | 0.0° | 3 | 214.00 | 241.00 |
| 686 | 20.00 | 20.00 | 19.00 | 111 | 22.00 | 55.23 | 60.00 | 4.000 | 0.0° | 3 | 312.00 | 352.00 |
| 776 | 25.00 | 25.00 | 24.00 | 132 | 27.00 | 69.68 | 75.00 | 4.000 | 0.0° | 3 | 591.00 | 667.00 |
| | | | | | | | | | | | | |
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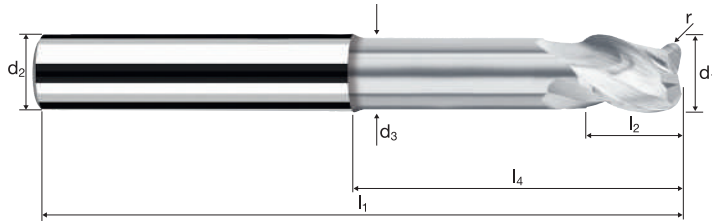
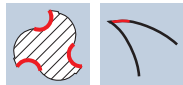
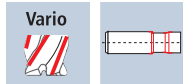
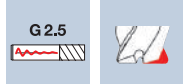
| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=10000 min vf [mm/min] | n=15000 min vf [mm/min] | n=20000 min vf [mm/min] | n=30000 min vf [mm/min] |
|---|---|------------|---|------------------------|------------------------|------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
|  <p>(1)</p> | Alluminio malleabile Costruzione integrale Al  | 6.00 | 3 | 0.060 | 3.500 | 6.000 | 1800 | 2700 | 3600 | 5400 |
| | | 8.00 | 3 | 0.075 | 4.500 | 8.000 | 2250 | 3375 | 4500 | 6750 |
| | | 10.00 | 3 | 0.095 | 5.000 | 10.000 | 2850 | 4275 | 5700 | 8550 |
| | | 12.00 | 3 | 0.115 | 5.500 | 12.000 | 3450 | 5175 | 6900 | 10350 |
| | | 16.00 | 3 | 0.125 | 6.000 | 16.000 | 3750 | 5625 | 7500 | 11250 |
| | | 20.00 | 3 | 0.130 | 6.500 | 20.000 | 3900 | 5850 | 7800 | 11700 |
| | | 25.00 | 3 | 0.140 | 6.500 | 25.000 | 4200 | 6300 | 8400 | 12600 |
|  <p>(2)</p> | Alluminio malleabile Costruzione integrale Al  | 6.00 | 3 | 0.060 | 3.500 | 3.600 | 1800 | 2700 | 3600 | 5400 |
| | | 8.00 | 3 | 0.075 | 4.500 | 4.800 | 2250 | 3375 | 4500 | 6750 |
| | | 10.00 | 3 | 0.095 | 5.000 | 6.000 | 2850 | 4275 | 5700 | 8550 |
| | | 12.00 | 3 | 0.115 | 5.500 | 7.200 | 3450 | 5175 | 6900 | 10350 |
| | | 16.00 | 3 | 0.125 | 6.000 | 9.600 | 3750 | 5625 | 7500 | 11250 |
| | | 20.00 | 3 | 0.130 | 6.500 | 12.000 | 3900 | 5850 | 7800 | 11700 |
| | | 25.00 | 3 | 0.140 | 6.500 | 15.000 | 4200 | 6300 | 8400 | 12600 |
|  | Alluminio malleabile Costruzione integrale Al  | 6.00 | 3 | 0.060 | 5.300 | 3.600 | 1800 | 2700 | 3600 | 5400 |
| | | 8.00 | 3 | 0.075 | 6.800 | 4.800 | 2250 | 3375 | 4500 | 6750 |
| | | 10.00 | 3 | 0.095 | 7.500 | 6.000 | 2850 | 4275 | 5700 | 8550 |
| | | 12.00 | 3 | 0.115 | 8.300 | 7.200 | 3450 | 5175 | 6900 | 10350 |
| | | 16.00 | 3 | 0.125 | 9.000 | 9.600 | 3750 | 5625 | 7500 | 11250 |
| | | 20.00 | 3 | 0.130 | 9.800 | 12.000 | 3900 | 5850 | 7800 | 11700 |
| | | 25.00 | 3 | 0.140 | 9.800 | 15.000 | 4200 | 6300 | 8400 | 12600 |
|  <p>F</p> | Alluminio malleabile Costruzione integrale Al  | 6.00 | 3 | 0.020 | 5.300 | 0.200 | 600 | 900 | 1200 | 1800 |
| | | 8.00 | 3 | 0.025 | 6.800 | 0.250 | 750 | 1125 | 1500 | 2250 |
| | | 10.00 | 3 | 0.030 | 7.500 | 0.300 | 900 | 1350 | 1800 | 2700 |
| | | 12.00 | 3 | 0.035 | 8.300 | 0.350 | 1050 | 1575 | 2100 | 3150 |
| | | 16.00 | 3 | 0.040 | 9.000 | 0.500 | 1200 | 1800 | 2400 | 3600 |
| | | 20.00 | 3 | 0.040 | 9.800 | 0.600 | 1200 | 1800 | 2400 | 3600 |
| | | 25.00 | 3 | 0.040 | 9.800 | 0.750 | 1200 | 1800 | 2400 | 3600 |
|  | Alluminio malleabile Costruzione integrale Al  | 6.00 | 3 | 0.130 | 0.350 | 0.350 | 3900 | 5850 | 7800 | 11700 |
| | | 8.00 | 3 | 0.165 | 0.400 | 0.400 | 4950 | 7425 | 9900 | 14850 |
| | | 10.00 | 3 | 0.210 | 0.450 | 0.450 | 6300 | 9450 | 12600 | 18900 |
| | | 12.00 | 3 | 0.255 | 0.500 | 0.500 | 7650 | 11475 | 15300 | 22950 |
| | | 16.00 | 3 | 0.275 | 0.600 | 0.600 | 8250 | 12375 | 16500 | 24750 |
| | | 20.00 | 3 | 0.285 | 0.750 | 0.750 | 8550 | 12825 | 17100 | 25650 |
| | | 25.00 | 3 | 0.310 | 0.800 | 0.800 | 9300 | 13950 | 18600 | 27900 |

Frese toriche AX (AX-RV3)

A taglienti lisci, esecuzione 4xd con scarico



HM λ 40°
MG10 γ 20°



| Esempio: N° Ordine | | | | | | | | | | | CELERO | |
|---------------------|-------------|-------------|-------|-------|-------|-------|--------|----------------|-----|--------|--------|--------|
| | | | | | | | | | | | 15584 | C15584 |
| \emptyset Code | d_1 e8 | d_2 h6 | d_3 | l_1 | l_2 | l_3 | l_4 | r 0/+0.03 | z | EUR | EUR | |
| 302 | 6.00 | 6.00 | 5.50 | 60 | 7.00 | 22.15 | 24.00 | 1.000 | 3 | 74.00 | 83.00 | |
| 391 | 8.00 | 8.00 | 7.40 | 68 | 9.00 | 29.63 | 32.00 | 1.000 | 3 | 93.00 | 103.00 | |
| 450 | 10.00 | 10.00 | 9.20 | 84 | 11.00 | 36.99 | 40.00 | 1.000 | 3 | 126.00 | 141.00 | |
| 501 | 12.00 | 12.00 | 11.00 | 97 | 13.00 | 44.29 | 48.00 | 1.000 | 3 | 156.00 | 174.00 | |
| 608 | 16.00 | 16.00 | 15.00 | 115 | 18.00 | 59.73 | 64.00 | 1.000 | 3 | 244.00 | 272.00 | |
| 680 | 20.00 | 20.00 | 19.00 | 130 | 22.00 | 75.23 | 80.00 | 1.000 | 3 | 356.00 | 396.00 | |
| 770 | 25.00 | 25.00 | 24.00 | 157 | 27.00 | 94.68 | 100.00 | 1.000 | 3 | 675.00 | 751.00 | |
| 307 | 6.00 | 6.00 | 5.50 | 60 | 7.00 | 22.15 | 24.00 | 2.500 | 3 | 74.00 | 83.00 | |
| 397 | 8.00 | 8.00 | 7.40 | 68 | 9.00 | 29.63 | 32.00 | 2.500 | 3 | 93.00 | 103.00 | |
| 457 | 10.00 | 10.00 | 9.20 | 84 | 11.00 | 36.99 | 40.00 | 2.500 | 3 | 126.00 | 141.00 | |
| 506 | 12.00 | 12.00 | 11.00 | 97 | 13.00 | 44.29 | 48.00 | 2.500 | 3 | 156.00 | 174.00 | |
| 612 | 16.00 | 16.00 | 15.00 | 115 | 18.00 | 59.73 | 64.00 | 2.500 | 3 | 244.00 | 272.00 | |
| 684 | 20.00 | 20.00 | 19.00 | 130 | 22.00 | 75.23 | 80.00 | 2.500 | 3 | 356.00 | 396.00 | |
| 774 | 25.00 | 25.00 | 24.00 | 157 | 27.00 | 94.68 | 100.00 | 2.500 | 3 | 675.00 | 751.00 | |
| 459 | 10.00 | 10.00 | 9.20 | 84 | 11.00 | 36.99 | 40.00 | 4.000 | 3 | 126.00 | 141.00 | |
| 508 | 12.00 | 12.00 | 11.00 | 97 | 13.00 | 44.29 | 48.00 | 4.000 | 3 | 156.00 | 174.00 | |
| 614 | 16.00 | 16.00 | 15.00 | 115 | 18.00 | 59.73 | 64.00 | 4.000 | 3 | 244.00 | 272.00 | |
| 686 | 20.00 | 20.00 | 19.00 | 130 | 22.00 | 75.23 | 80.00 | 4.000 | 3 | 356.00 | 396.00 | |
| 776 | 25.00 | 25.00 | 24.00 | 157 | 27.00 | 94.68 | 100.00 | 4.000 | 3 | 675.00 | 751.00 | |

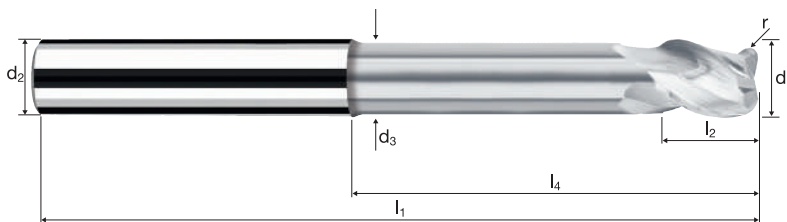
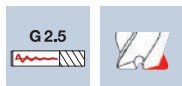
| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=10000 min vf [mm/min] | n=15000 min vf [mm/min] | n=20000 min vf [mm/min] | n=30000 min vf [mm/min] |
|---|--|------------|---|------------------------|------------------------|------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| (1) | Alluminio malleabile Costruzione integrale Al | 6.00 | 3 | 0.040 | 4.000 | 6.000 | 1200 | 1800 | 2400 | 3600 |
| | | 8.00 | 3 | 0.055 | 4.500 | 8.000 | 1650 | 2475 | 3300 | 4950 |
| | | 10.00 | 3 | 0.070 | 5.000 | 10.000 | 2100 | 3150 | 4200 | 6300 |
| | | 12.00 | 3 | 0.075 | 5.000 | 12.000 | 2250 | 3375 | 4500 | 6750 |
| | | 16.00 | 3 | 0.095 | 5.000 | 16.000 | 2850 | 4275 | 5700 | 8550 |
| | | 20.00 | 3 | 0.115 | 5.000 | 20.000 | 3450 | 5175 | 6900 | 10350 |
| | | 25.00 | 3 | 0.130 | 5.000 | 25.000 | 3900 | 5850 | 7800 | 11700 |
| (2) | Alluminio malleabile Costruzione integrale Al | 6.00 | 3 | 0.040 | 4.000 | 3.600 | 1200 | 1800 | 2400 | 3600 |
| | | 8.00 | 3 | 0.055 | 4.500 | 4.800 | 1650 | 2475 | 3300 | 4950 |
| | | 10.00 | 3 | 0.070 | 5.000 | 6.000 | 2100 | 3150 | 4200 | 6300 |
| | | 12.00 | 3 | 0.075 | 5.000 | 7.200 | 2250 | 3375 | 4500 | 6750 |
| | | 16.00 | 3 | 0.095 | 5.000 | 9.600 | 2850 | 4275 | 5700 | 8550 |
| | | 20.00 | 3 | 0.115 | 5.000 | 12.000 | 3450 | 5175 | 6900 | 10350 |
| | | 25.00 | 3 | 0.130 | 5.000 | 15.000 | 3900 | 5850 | 7800 | 11700 |
| a_{p1} a_e | Alluminio malleabile Costruzione integrale Al | 6.00 | 3 | 0.040 | 6.000 | 3.600 | 1200 | 1800 | 2400 | 3600 |
| | | 8.00 | 3 | 0.055 | 6.800 | 4.800 | 1650 | 2475 | 3300 | 4950 |
| | | 10.00 | 3 | 0.070 | 7.500 | 6.000 | 2100 | 3150 | 4200 | 6300 |
| | | 12.00 | 3 | 0.075 | 7.500 | 7.200 | 2250 | 3375 | 4500 | 6750 |
| | | 16.00 | 3 | 0.095 | 7.500 | 9.600 | 2850 | 4275 | 5700 | 8550 |
| | | 20.00 | 3 | 0.115 | 7.500 | 12.000 | 3450 | 5175 | 6900 | 10350 |
| | | 25.00 | 3 | 0.130 | 7.500 | 15.000 | 3900 | 5850 | 7800 | 11700 |
| F a_{p1} a_e | Alluminio malleabile Costruzione integrale Al | 6.00 | 3 | 0.010 | 6.000 | 0.200 | 300 | 450 | 600 | 900 |
| | | 8.00 | 3 | 0.015 | 6.800 | 0.250 | 450 | 675 | 900 | 1350 |
| | | 10.00 | 3 | 0.020 | 7.500 | 0.300 | 600 | 900 | 1200 | 1800 |
| | | 12.00 | 3 | 0.025 | 7.500 | 0.350 | 750 | 1125 | 1500 | 2250 |
| | | 16.00 | 3 | 0.030 | 7.500 | 0.500 | 900 | 1350 | 1800 | 2700 |
| | | 20.00 | 3 | 0.035 | 7.500 | 0.600 | 1050 | 1575 | 2100 | 3150 |
| | | 25.00 | 3 | 0.040 | 7.500 | 0.750 | 1200 | 1800 | 2400 | 3600 |
| a_{p1} a_e | Alluminio malleabile Costruzione integrale Al | 6.00 | 3 | 0.090 | 0.450 | 0.450 | 2700 | 4050 | 5400 | 8100 |
| | | 8.00 | 3 | 0.120 | 0.500 | 0.500 | 3600 | 5400 | 7200 | 10800 |
| | | 10.00 | 3 | 0.155 | 0.450 | 0.450 | 4650 | 6975 | 9300 | 13950 |
| | | 12.00 | 3 | 0.165 | 0.500 | 0.500 | 4950 | 7425 | 9900 | 14850 |
| | | 16.00 | 3 | 0.210 | 0.600 | 0.600 | 6300 | 9450 | 12600 | 18900 |
| | | 20.00 | 3 | 0.255 | 0.750 | 0.750 | 7650 | 11475 | 15300 | 22950 |
| | | 25.00 | 3 | 0.285 | 0.800 | 0.800 | 8550 | 12825 | 17100 | 25650 |

Frese toriche AX (AX-RV3)

A taglienti lisci, esecuzione 5xd con scarico



HM λ 40°
MG10 γ 20°



Sgrossatura

Finitura

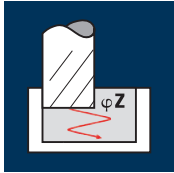
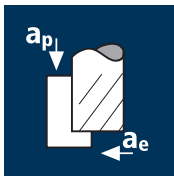


ReTool®

| | | | | | | | | | |
|--|--|--|--------------------------|--------------------------|-------------------------|--|--------------|------------------------|--|
| | | | Al Aluminium > 99% | Al Aluminium Alloy | Al Aluminium Cast | | Cu Copper | Plastic Thermoplast | |
|--|--|--|--------------------------|--------------------------|-------------------------|--|--------------|------------------------|--|

| | | | | | | | | | | CELERO | |
|--------------------|----------------------|----------------------|----------------|----------------|----------------|----------------|----------------|--------------|---|--------|--------|
| Esempio: N° Ordine | | | | | | | | | | 15585 | C15585 |
| | | | | | | | | | | EUR | EUR |
| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r 0/+0.03 | z | | |
| 450 | 10.00 | 10.00 | 9.20 | 91 | 11.00 | 46.99 | 50.00 | 1.000 | 3 | 136.00 | 150.00 |
| 501 | 12.00 | 12.00 | 11.00 | 106 | 13.00 | 56.29 | 60.00 | 1.000 | 3 | 167.00 | 185.00 |
| 608 | 16.00 | 16.00 | 15.00 | 129 | 18.00 | 75.73 | 80.00 | 1.000 | 3 | 262.00 | 290.00 |
| 680 | 20.00 | 20.00 | 19.00 | 151 | 22.00 | 95.23 | 100.00 | 1.000 | 3 | 382.00 | 423.00 |
| 770 | 25.00 | 25.00 | 24.00 | 182 | 27.00 | 119.68 | 125.00 | 1.000 | 3 | 724.00 | 800.00 |
| 307 | 6.00 | 6.00 | 5.50 | 66 | 7.00 | 28.15 | 30.00 | 2.500 | 3 | 80.00 | 88.00 |
| 397 | 8.00 | 8.00 | 7.40 | 76 | 9.00 | 37.63 | 40.00 | 2.500 | 3 | 100.00 | 110.00 |
| 457 | 10.00 | 10.00 | 9.20 | 91 | 11.00 | 46.99 | 50.00 | 2.500 | 3 | 136.00 | 150.00 |
| 506 | 12.00 | 12.00 | 11.00 | 106 | 13.00 | 56.29 | 60.00 | 2.500 | 3 | 167.00 | 185.00 |
| 612 | 16.00 | 16.00 | 15.00 | 129 | 18.00 | 75.73 | 80.00 | 2.500 | 3 | 262.00 | 290.00 |
| 684 | 20.00 | 20.00 | 19.00 | 151 | 22.00 | 95.23 | 100.00 | 2.500 | 3 | 382.00 | 423.00 |
| 774 | 25.00 | 25.00 | 24.00 | 182 | 27.00 | 119.68 | 125.00 | 2.500 | 3 | 724.00 | 800.00 |
| 459 | 10.00 | 10.00 | 9.20 | 91 | 11.00 | 46.99 | 50.00 | 4.000 | 3 | 136.00 | 150.00 |
| 508 | 12.00 | 12.00 | 11.00 | 106 | 13.00 | 56.29 | 60.00 | 4.000 | 3 | 167.00 | 185.00 |
| 614 | 16.00 | 16.00 | 15.00 | 129 | 18.00 | 75.73 | 80.00 | 4.000 | 3 | 262.00 | 290.00 |
| 686 | 20.00 | 20.00 | 19.00 | 151 | 22.00 | 95.23 | 100.00 | 4.000 | 3 | 382.00 | 423.00 |
| 776 | 25.00 | 25.00 | 24.00 | 182 | 27.00 | 119.68 | 125.00 | 4.000 | 3 | 724.00 | 800.00 |

Applicazione



Materiale

Alluminio malleabile
Costruzione integrale Al



Lega per fonderia Al



Rame non legato

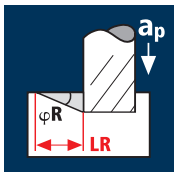


| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 6.00 | 3 | 500 | 0.080 | 9.000 | 4.800 | 26525 | 6365 | 275.0 | 20° |
| 8.00 | 3 | 500 | 0.100 | 12.000 | 6.400 | 19895 | 5970 | 458.4 | 20° |
| 10.00 | 3 | 500 | 0.120 | 15.000 | 8.000 | 15915 | 5730 | 687.5 | 20° |
| 12.00 | 3 | 500 | 0.140 | 18.000 | 9.600 | 13265 | 5570 | 962.6 | 20° |
| 16.00 | 3 | 500 | 0.160 | 24.000 | 12.800 | 9945 | 4775 | 1466.8 | 20° |
| 20.00 | 3 | 500 | 0.180 | 30.000 | 16.000 | 7960 | 4295 | 2062.6 | 20° |
| 25.00 | 3 | 500 | 0.200 | 37.500 | 20.000 | 6365 | 3820 | 2864.8 | 20° |

| | | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|--------|-----|
| 6.00 | 3 | 450 | 0.080 | 9.000 | 4.800 | 23875 | 5730 | 247.5 | 20° |
| 8.00 | 3 | 450 | 0.100 | 12.000 | 6.400 | 17905 | 5370 | 412.5 | 20° |
| 10.00 | 3 | 450 | 0.120 | 15.000 | 8.000 | 14325 | 5155 | 618.8 | 20° |
| 12.00 | 3 | 450 | 0.140 | 18.000 | 9.600 | 11935 | 5015 | 866.3 | 20° |
| 16.00 | 3 | 450 | 0.160 | 24.000 | 12.800 | 8950 | 4295 | 1320.1 | 20° |
| 20.00 | 3 | 450 | 0.180 | 30.000 | 16.000 | 7160 | 3865 | 1856.4 | 20° |
| 25.00 | 3 | 450 | 0.200 | 37.500 | 20.000 | 5730 | 3440 | 2578.3 | 20° |

| | | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|--------|-----|
| 6.00 | 3 | 400 | 0.072 | 9.000 | 4.800 | 21220 | 4585 | 198.0 | 12° |
| 8.00 | 3 | 400 | 0.090 | 12.000 | 6.400 | 15915 | 4295 | 330.0 | 12° |
| 10.00 | 3 | 400 | 0.108 | 15.000 | 8.000 | 12730 | 4125 | 495.0 | 12° |
| 12.00 | 3 | 400 | 0.126 | 18.000 | 9.600 | 10610 | 4010 | 693.0 | 12° |
| 16.00 | 3 | 400 | 0.144 | 24.000 | 12.800 | 7960 | 3440 | 1056.1 | 12° |
| 20.00 | 3 | 400 | 0.162 | 30.000 | 16.000 | 6365 | 3095 | 1485.1 | 12° |
| 25.00 | 3 | 400 | 0.180 | 37.500 | 20.000 | 5095 | 2750 | 2062.6 | 12° |

Applicazione



Materiale

Alluminio malleabile
Costruzione integrale Al



Lega per fonderia Al



Rame non legato



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] | LR [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|---------|
| 6.00 | 3 | 450 | 0.072 | 9.000 | 6.000 | 23875 | 5155 | 278.5 | 25° | 19.3 |
| 8.00 | 3 | 450 | 0.090 | 12.000 | 8.000 | 17905 | 4835 | 464.1 | 25° | 25.7 |
| 10.00 | 3 | 450 | 0.108 | 15.000 | 10.000 | 14325 | 4640 | 696.1 | 25° | 32.2 |
| 12.00 | 3 | 450 | 0.126 | 18.000 | 12.000 | 11935 | 4510 | 974.6 | 25° | 38.6 |
| 16.00 | 3 | 450 | 0.144 | 24.000 | 16.000 | 8950 | 3865 | 1485.1 | 25° | 51.5 |
| 20.00 | 3 | 450 | 0.162 | 30.000 | 20.000 | 7160 | 3480 | 2088.4 | 25° | 64.3 |
| 25.00 | 3 | 450 | 0.180 | 37.500 | 25.000 | 5730 | 3095 | 2900.6 | 25° | 80.4 |

| | | | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|--------|-----|------|
| 6.00 | 3 | 405 | 0.072 | 9.000 | 6.000 | 21485 | 4640 | 250.6 | 25° | 19.3 |
| 8.00 | 3 | 405 | 0.090 | 12.000 | 8.000 | 16115 | 4350 | 417.7 | 25° | 25.7 |
| 10.00 | 3 | 405 | 0.108 | 15.000 | 10.000 | 12890 | 4175 | 626.5 | 25° | 32.2 |
| 12.00 | 3 | 405 | 0.126 | 18.000 | 12.000 | 10745 | 4060 | 877.1 | 25° | 38.6 |
| 16.00 | 3 | 405 | 0.144 | 24.000 | 16.000 | 8055 | 3480 | 1336.6 | 25° | 51.5 |
| 20.00 | 3 | 405 | 0.162 | 30.000 | 20.000 | 6445 | 3135 | 1879.6 | 25° | 64.3 |
| 25.00 | 3 | 405 | 0.180 | 37.500 | 25.000 | 5155 | 2785 | 2610.5 | 25° | 80.4 |

| | | | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|--------|-----|-------|
| 6.00 | 3 | 320 | 0.058 | 9.000 | 6.000 | 16975 | 2935 | 158.4 | 15° | 33.6 |
| 8.00 | 3 | 320 | 0.072 | 12.000 | 8.000 | 12730 | 2750 | 264.0 | 15° | 44.8 |
| 10.00 | 3 | 320 | 0.086 | 15.000 | 10.000 | 10185 | 2640 | 396.0 | 15° | 56.0 |
| 12.00 | 3 | 320 | 0.101 | 18.000 | 12.000 | 8490 | 2565 | 554.4 | 15° | 67.2 |
| 16.00 | 3 | 320 | 0.115 | 24.000 | 16.000 | 6365 | 2200 | 844.9 | 15° | 89.6 |
| 20.00 | 3 | 320 | 0.130 | 30.000 | 20.000 | 5095 | 1980 | 1188.1 | 15° | 112.0 |
| 25.00 | 3 | 320 | 0.144 | 37.500 | 25.000 | 4075 | 1760 | 1650.1 | 15° | 140.0 |



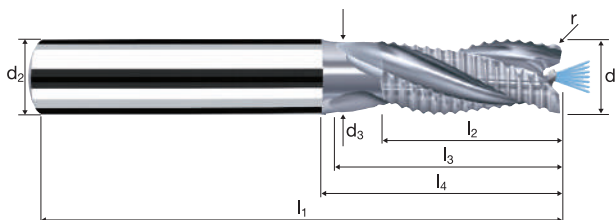
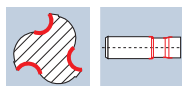
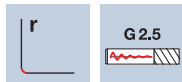
Utilizzate
ToolExpert AX-FPS
per determinare i dati
di taglio più potenti
per il vostro ambiente
di lavorazione

Frese cilindriche AX-FPS



Profilata, esecuzione normale con scarico cort
 Geometria frontale per fresature in penetrazione ad alto rendimento
 con canale di raffreddamento centrale

HM
 MG10 λ 30°
 γ 20°



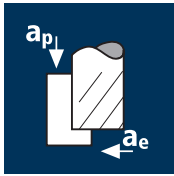
| | | | | | | | | | |
|--|--|--|--------------------------|--------------------------|-------------------------|--|--------------|------------------------|--|
| | | | Al Aluminium > 99% | Al Aluminium Alloy | Al Aluminium Cast | | Cu Copper | Plastic Thermoplast | |
|--|--|--|--------------------------|--------------------------|-------------------------|--|--------------|------------------------|--|

| Ø Code | d ₁ e8 | d ₂ h5 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r | z | Esempio: N° Ordine | | |
|-----------|----------------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------|---|-----------------------|----------|----------|
| | | | | | | | | | | Rivestimento | Articolo | Codice-Ø |
| 300 | 6.00 | 6.00 | 5.50 | 57 | 13.00 | 18.15 | 20.00 | 0.100 | 3 | 15600 | 15500 | 108.00 |
| 391 | 8.00 | 8.00 | 7.40 | 63 | 18.00 | 23.63 | 26.00 | 0.150 | 3 | 15600 | 15500 | 135.00 |
| 450 | 10.00 | 10.00 | 9.20 | 72 | 22.00 | 27.99 | 31.00 | 0.200 | 3 | 15600 | 15500 | 183.00 |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 26.00 | 33.29 | 37.00 | 0.200 | 3 | 15600 | 15500 | 227.00 |
| 610 | 16.00 | 16.00 | 15.00 | 95 | 32.00 | 41.73 | 46.00 | 0.200 | 3 | 15600 | 15500 | 354.00 |
| 682 | 20.00 | 20.00 | 19.00 | 104 | 40.00 | 48.23 | 53.00 | 0.200 | 3 | 15600 | 15500 | 517.00 |
| 770** | 25.00 | 25.00 | 24.00 | 121 | 44.00 | 58.68 | 64.00 | 0.250 | 3 | 15600 | 15500 | 979.00 |
| 772* | 25.00 | 25.00 | 24.00 | 121 | 50.00 | 64.68 | 70.00 | 0.250 | 3 | 15600 | 15500 | 979.00 |

* Gambo cilindrico HA, lunghezza gambo = 50 mm

** Gambo con attacco weldon a norma DIN 6535 HB

Applicazione



Materiale

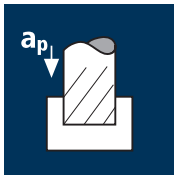
Alluminio malleabile
Costruzione integrale Al



Rame non legato



Materiali termoplastici



Alluminio malleabile
Costruzione integrale Al



Rame non legato



Materiali termoplastici



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 6.00 | 3 | 600 | 0.065 | 9.000 | 3.600 | 31830 | 6205 | 201.1 |
| 8.00 | 3 | 600 | 0.090 | 12.000 | 4.800 | 23875 | 6445 | 371.3 |
| 10.00 | 3 | 600 | 0.110 | 15.000 | 6.000 | 19100 | 6305 | 567.2 |
| 12.00 | 3 | 600 | 0.135 | 18.000 | 7.200 | 15915 | 6445 | 835.4 |
| 16.00 | 3 | 600 | 0.180 | 24.000 | 9.600 | 11935 | 6445 | 1485.1 |
| 20.00 | 3 | 600 | 0.220 | 30.000 | 12.000 | 9550 | 6305 | 2268.9 |

| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|--------|
| 6.00 | 3 | 400 | 0.065 | 9.000 | 3.600 | 21220 | 4140 | 134.1 |
| 8.00 | 3 | 400 | 0.090 | 12.000 | 4.800 | 15915 | 4295 | 247.5 |
| 10.00 | 3 | 400 | 0.110 | 15.000 | 6.000 | 12730 | 4200 | 378.2 |
| 12.00 | 3 | 400 | 0.135 | 18.000 | 7.200 | 10610 | 4295 | 556.9 |
| 16.00 | 3 | 400 | 0.180 | 24.000 | 9.600 | 7960 | 4295 | 990.1 |
| 20.00 | 3 | 400 | 0.220 | 30.000 | 12.000 | 6365 | 4200 | 1512.6 |

| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|--------|
| 6.00 | 3 | 650 | 0.065 | 9.000 | 3.600 | 34485 | 6725 | 217.9 |
| 8.00 | 3 | 650 | 0.090 | 12.000 | 4.800 | 25865 | 6985 | 402.2 |
| 10.00 | 3 | 650 | 0.110 | 15.000 | 6.000 | 20690 | 6830 | 614.5 |
| 12.00 | 3 | 650 | 0.135 | 18.000 | 7.200 | 17240 | 6985 | 905.0 |
| 16.00 | 3 | 650 | 0.180 | 24.000 | 9.600 | 12930 | 6985 | 1608.9 |
| 20.00 | 3 | 650 | 0.220 | 30.000 | 12.000 | 10345 | 6830 | 2458.0 |

| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|--------|
| 6.00 | 3 | 500 | 0.060 | 9.000 | 6.000 | 26525 | 4775 | 257.8 |
| 8.00 | 3 | 500 | 0.080 | 12.000 | 8.000 | 19895 | 4775 | 458.4 |
| 10.00 | 3 | 500 | 0.100 | 15.000 | 10.000 | 15915 | 4775 | 716.2 |
| 12.00 | 3 | 500 | 0.120 | 18.000 | 12.000 | 13265 | 4775 | 1031.3 |
| 16.00 | 3 | 500 | 0.160 | 24.000 | 16.000 | 9945 | 4775 | 1833.5 |
| 20.00 | 3 | 500 | 0.200 | 30.000 | 20.000 | 7960 | 4775 | 2864.8 |

| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|--------|
| 6.00 | 3 | 270 | 0.060 | 9.000 | 6.000 | 14325 | 2580 | 139.2 |
| 8.00 | 3 | 270 | 0.080 | 12.000 | 8.000 | 10745 | 2580 | 247.5 |
| 10.00 | 3 | 270 | 0.100 | 15.000 | 10.000 | 8595 | 2580 | 386.7 |
| 12.00 | 3 | 270 | 0.120 | 18.000 | 12.000 | 7160 | 2580 | 556.9 |
| 16.00 | 3 | 270 | 0.160 | 24.000 | 16.000 | 5370 | 2580 | 990.1 |
| 20.00 | 3 | 270 | 0.200 | 30.000 | 20.000 | 4295 | 2580 | 1547.0 |

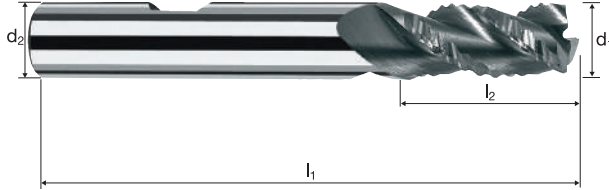
| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|--------|
| 6.00 | 3 | 650 | 0.060 | 9.000 | 6.000 | 34485 | 6205 | 335.2 |
| 8.00 | 3 | 650 | 0.080 | 12.000 | 8.000 | 25865 | 6205 | 595.9 |
| 10.00 | 3 | 650 | 0.100 | 15.000 | 10.000 | 20690 | 6205 | 931.1 |
| 12.00 | 3 | 650 | 0.120 | 18.000 | 12.000 | 17240 | 6205 | 1340.7 |
| 16.00 | 3 | 650 | 0.160 | 24.000 | 16.000 | 12930 | 6205 | 2383.5 |
| 20.00 | 3 | 650 | 0.200 | 30.000 | 20.000 | 10345 | 6205 | 3724.2 |

Frese cilindriche AX (AX-FP)

Profilata, esecuzione normale





| | |
|-------------|---------------|
| HM | λ 40° |
| MG10 | γ 18° |



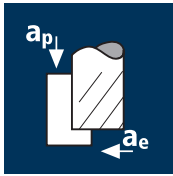
Sgrossatura Finitura



| | | | | | | | | | |
|--------------------|--|--|---------------------------------|---------------------------------|--------------------------------|--|---------------------|-------------------------------|--|
| Rm < 850 | | | Al Aluminium > 99% | Al Aluminium Alloy | Al Aluminium Cast | | Cu Copper | Plastic Thermoplast | |
|--------------------|--|--|---------------------------------|---------------------------------|--------------------------------|--|---------------------|-------------------------------|--|

| Esempio: N° Ordine | | | | | | | |   | CELERO | |
|-----------------------|----------------------|----------------------|-------------------|------------------|-----------------|----------------|----------------|--|--------|--------|
| Ø Code | d ₁ e8 | d ₂ h6 | Rivestimento C | Articolo 5397 | Codice-Ø 300 | l ₁ | l ₂ | | 45° | z |
| 300 | 6.00 | 6.00 | | | | 57 | 13.00 | 0.40 | 3 | 107.00 |
| 391 | 8.00 | 8.00 | | | | 63 | 19.00 | 0.40 | 3 | 131.00 |
| 450 | 10.00 | 10.00 | | | | 72 | 22.00 | 0.40 | 3 | 149.00 |
| 501 | 12.00 | 12.00 | | | | 83 | 26.00 | 0.40 | 3 | 192.00 |
| 610 | 16.00 | 16.00 | | | | 92 | 32.00 | 0.50 | 3 | 335.00 |
| 682 | 20.00 | 20.00 | | | | 104 | 38.00 | 0.50 | 3 | 485.00 |
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Applicazione



Materiale

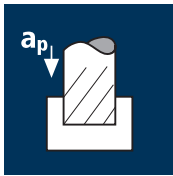
Alluminio malleabile
Costruzione integrale Al



Rame non legato



Materiali termoplastici



Alluminio malleabile
Costruzione integrale Al



Rame non legato



Materiali termoplastici



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 6.00 | 3 | 207 | 0.055 | 9.000 | 2.400 | 10980 | 1810 | 39.1 |
| 8.00 | 3 | 207 | 0.070 | 12.000 | 3.200 | 8235 | 1730 | 66.4 |
| 10.00 | 3 | 207 | 0.090 | 15.000 | 4.000 | 6590 | 1780 | 106.7 |
| 12.00 | 3 | 207 | 0.125 | 18.000 | 4.800 | 5490 | 2060 | 177.9 |
| 16.00 | 3 | 207 | 0.170 | 24.000 | 6.400 | 4120 | 2100 | 322.6 |
| 20.00 | 3 | 207 | 0.210 | 30.000 | 8.000 | 3295 | 2075 | 498.1 |
| 25.00 | 3 | 207 | 0.265 | 37.500 | 10.000 | 2635 | 2095 | 785.7 |

| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|-------|
| 6.00 | 3 | 88 | 0.055 | 9.000 | 2.400 | 4670 | 770 | 16.6 |
| 8.00 | 3 | 88 | 0.070 | 12.000 | 3.200 | 3500 | 735 | 28.2 |
| 10.00 | 3 | 88 | 0.090 | 15.000 | 4.000 | 2800 | 755 | 45.4 |
| 12.00 | 3 | 88 | 0.125 | 18.000 | 4.800 | 2335 | 875 | 75.6 |
| 16.00 | 3 | 88 | 0.170 | 24.000 | 6.400 | 1750 | 895 | 137.1 |
| 20.00 | 3 | 88 | 0.210 | 30.000 | 8.000 | 1400 | 880 | 211.8 |
| 25.00 | 3 | 88 | 0.265 | 37.500 | 10.000 | 1120 | 890 | 334.0 |

| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|-------|
| 6.00 | 3 | 224 | 0.055 | 9.000 | 2.400 | 11885 | 1960 | 42.4 |
| 8.00 | 3 | 224 | 0.070 | 12.000 | 3.200 | 8915 | 1870 | 71.9 |
| 10.00 | 3 | 224 | 0.090 | 15.000 | 4.000 | 7130 | 1925 | 115.5 |
| 12.00 | 3 | 224 | 0.125 | 18.000 | 4.800 | 5940 | 2230 | 192.5 |
| 16.00 | 3 | 224 | 0.170 | 24.000 | 6.400 | 4455 | 2275 | 349.1 |
| 20.00 | 3 | 224 | 0.210 | 30.000 | 8.000 | 3565 | 2245 | 539.0 |
| 25.00 | 3 | 224 | 0.265 | 37.500 | 10.000 | 2850 | 2265 | 850.3 |

| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|-------|
| 6.00 | 3 | 189 | 0.045 | 6.000 | 6.000 | 10025 | 1355 | 48.7 |
| 8.00 | 3 | 189 | 0.055 | 8.000 | 8.000 | 7520 | 1240 | 79.4 |
| 10.00 | 3 | 189 | 0.070 | 10.000 | 10.000 | 6015 | 1265 | 126.3 |
| 12.00 | 3 | 189 | 0.100 | 12.000 | 12.000 | 5015 | 1505 | 216.6 |
| 16.00 | 3 | 189 | 0.135 | 16.000 | 16.000 | 3760 | 1525 | 389.8 |
| 20.00 | 3 | 189 | 0.170 | 20.000 | 20.000 | 3010 | 1535 | 613.6 |
| 25.00 | 3 | 189 | 0.210 | 25.000 | 25.000 | 2405 | 1515 | 947.5 |

| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|-------|
| 6.00 | 3 | 82 | 0.045 | 6.000 | 6.000 | 4350 | 585 | 21.1 |
| 8.00 | 3 | 82 | 0.055 | 8.000 | 8.000 | 3265 | 540 | 34.5 |
| 10.00 | 3 | 82 | 0.070 | 10.000 | 10.000 | 2610 | 550 | 54.8 |
| 12.00 | 3 | 82 | 0.100 | 12.000 | 12.000 | 2175 | 655 | 94.0 |
| 16.00 | 3 | 82 | 0.135 | 16.000 | 16.000 | 1630 | 660 | 169.1 |
| 20.00 | 3 | 82 | 0.170 | 20.000 | 20.000 | 1305 | 665 | 266.2 |
| 25.00 | 3 | 82 | 0.210 | 25.000 | 25.000 | 1045 | 660 | 411.1 |

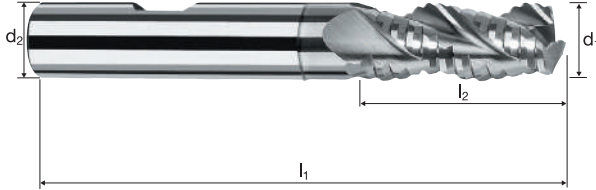
| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|--------|
| 6.00 | 3 | 224 | 0.045 | 6.000 | 6.000 | 11885 | 1605 | 57.8 |
| 8.00 | 3 | 224 | 0.055 | 8.000 | 8.000 | 8915 | 1470 | 94.1 |
| 10.00 | 3 | 224 | 0.070 | 10.000 | 10.000 | 7130 | 1495 | 149.7 |
| 12.00 | 3 | 224 | 0.100 | 12.000 | 12.000 | 5940 | 1785 | 256.7 |
| 16.00 | 3 | 224 | 0.135 | 16.000 | 16.000 | 4455 | 1805 | 462.0 |
| 20.00 | 3 | 224 | 0.170 | 20.000 | 20.000 | 3565 | 1820 | 727.3 |
| 25.00 | 3 | 224 | 0.210 | 25.000 | 25.000 | 2850 | 1795 | 1123.0 |

Frese cilindriche

Profilata, esecuzione normale

HSS

HSS-E λ 40°
Co8 γ 18°



Sgrossatura

Finitura



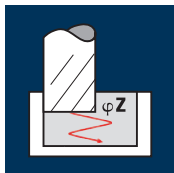
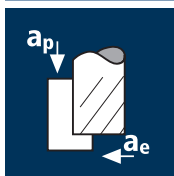
ReTool®

| | | | | | | | | |
|-------------|--|--------------------------|--------------------------|--|--|--------------|------------------------|--|
| Rm < 850 | | Al Aluminium > 99% | Al Aluminium Alloy | | | Cu Copper | Plastic Thermoplast | |
|-------------|--|--------------------------|--------------------------|--|--|--------------|------------------------|--|

III

| Esempio: N° Ordine | | | | | | | | | | CELERO |
|--------------------|----------------------|----------------------|----------------|----------------|----------------|------|------|---|--|--------|
| | | | | | | | | | | C0391 |
| Ø Code | d ₁ k8 | d ₂ h6 | l ₁ | l ₂ | l ₄ | 45° | α | z | | EUR |
| 300 | 6.00 | 6.00 | 57 | 13.00 | - | 0.40 | 0.0° | 3 | | 47.80 |
| 402 | 8.00 | 10.00 | 69 | 19.00 | 28.50 | 0.40 | 2.5° | 3 | | 49.20 |
| 450 | 10.00 | 10.00 | 72 | 22.00 | - | 0.40 | 0.0° | 3 | | 53.00 |
| 501 | 12.00 | 12.00 | 83 | 26.00 | - | 0.40 | 0.0° | 3 | | 59.50 |
| 610 | 16.00 | 16.00 | 92 | 32.00 | - | 0.50 | 0.0° | 3 | | 81.00 |
| 682 | 20.00 | 20.00 | 104 | 38.00 | - | 0.50 | 0.0° | 3 | | 113.00 |
| 772 | 25.00 | 25.00 | 121 | 45.00 | - | 0.70 | 0.0° | 3 | | 167.00 |
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Applicazione



Materiale

Alluminio malleabile
Costruzione integrale Al



Legia per fonderia Al



Rame non legato

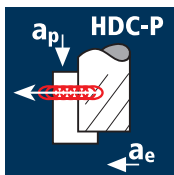


| d1 [mm] | z | v _r [m/min] | f _f [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 6.00 | 3 | 450 | 0.064 | 9.000 | 3.600 | 23875 | 4585 | 148.5 | 15° |
| 8.00 | 3 | 450 | 0.080 | 12.000 | 4.800 | 17905 | 4295 | 247.5 | 15° |
| 10.00 | 3 | 450 | 0.096 | 15.000 | 6.000 | 14325 | 4125 | 371.3 | 15° |
| 12.00 | 3 | 450 | 0.112 | 18.000 | 7.200 | 11935 | 4010 | 519.8 | 15° |
| 16.00 | 3 | 450 | 0.128 | 24.000 | 9.600 | 8950 | 3440 | 792.1 | 15° |
| 20.00 | 3 | 450 | 0.144 | 30.000 | 12.000 | 7160 | 3095 | 1113.8 | 15° |

| | | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|--------|-----|
| 6.00 | 3 | 405 | 0.064 | 9.000 | 3.600 | 21485 | 4125 | 133.7 | 15° |
| 8.00 | 3 | 405 | 0.080 | 12.000 | 4.800 | 16115 | 3865 | 222.8 | 15° |
| 10.00 | 3 | 405 | 0.096 | 15.000 | 6.000 | 12890 | 3715 | 334.1 | 15° |
| 12.00 | 3 | 405 | 0.112 | 18.000 | 7.200 | 10745 | 3610 | 467.8 | 15° |
| 16.00 | 3 | 405 | 0.128 | 24.000 | 9.600 | 8055 | 3095 | 712.9 | 15° |
| 20.00 | 3 | 405 | 0.144 | 30.000 | 12.000 | 6445 | 2785 | 1002.4 | 15° |

| | | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|-------|----|
| 6.00 | 3 | 360 | 0.058 | 9.000 | 3.600 | 19100 | 3300 | 106.9 | 9° |
| 8.00 | 3 | 360 | 0.072 | 12.000 | 4.800 | 14325 | 3095 | 178.2 | 9° |
| 10.00 | 3 | 360 | 0.086 | 15.000 | 6.000 | 11460 | 2970 | 267.3 | 9° |
| 12.00 | 3 | 360 | 0.101 | 18.000 | 7.200 | 9550 | 2890 | 374.2 | 9° |
| 16.00 | 3 | 360 | 0.115 | 24.000 | 9.600 | 7160 | 2475 | 570.3 | 9° |
| 20.00 | 3 | 360 | 0.130 | 30.000 | 12.000 | 5730 | 2230 | 802.0 | 9° |

Applicazione



Materiale

Alluminio malleabile
Costruzione integrale Al



Legia per fonderia Al



Rame non legato



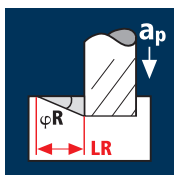
| d1 [mm] | z | v _r [m/min] | f _f [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 6.00 | 3 | 300 | 0.104 | 19.000 | 1.800 | 15915 | 4965 | 169.8 |
| 8.00 | 3 | 350 | 0.134 | 28.000 | 2.400 | 13925 | 5600 | 376.2 |
| 10.00 | 3 | 400 | 0.181 | 34.000 | 3.000 | 12730 | 6915 | 705.2 |
| 12.00 | 3 | 400 | 0.259 | 40.000 | 3.600 | 10610 | 8245 | 1187.2 |
| 16.00 | 3 | 500 | 0.300 | 48.000 | 4.800 | 9945 | 8950 | 2062.6 |
| 20.00 | 3 | 500 | 0.340 | 56.000 | 6.000 | 7960 | 8115 | 2727.3 |

| | | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|------|--------|
| 6.00 | 3 | 270 | 0.104 | 19.000 | 1.800 | 14325 | 4470 | 152.8 |
| 8.00 | 3 | 315 | 0.134 | 28.000 | 2.400 | 12535 | 5040 | 338.6 |
| 10.00 | 3 | 360 | 0.181 | 34.000 | 3.000 | 11460 | 6220 | 634.7 |
| 12.00 | 3 | 360 | 0.259 | 40.000 | 3.600 | 9550 | 7420 | 1068.5 |
| 16.00 | 3 | 450 | 0.300 | 48.000 | 4.800 | 8950 | 8055 | 1856.4 |
| 20.00 | 3 | 450 | 0.340 | 56.000 | 6.000 | 7160 | 7305 | 2454.6 |

| | | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|------|--------|
| 6.00 | 3 | 240 | 0.083 | 19.000 | 1.800 | 12730 | 3180 | 108.7 |
| 8.00 | 3 | 280 | 0.107 | 28.000 | 2.400 | 11140 | 3585 | 240.8 |
| 10.00 | 3 | 320 | 0.145 | 34.000 | 3.000 | 10185 | 4425 | 451.3 |
| 12.00 | 3 | 320 | 0.207 | 40.000 | 3.600 | 8490 | 5275 | 759.8 |
| 16.00 | 3 | 400 | 0.240 | 48.000 | 4.800 | 7960 | 5730 | 1320.1 |
| 20.00 | 3 | 400 | 0.272 | 56.000 | 6.000 | 6365 | 5195 | 1745.5 |



Utilizzate
ToolExpert AX-FPS
per determinare i dati
di taglio più potenti
per il vostro ambiente
di lavorazione

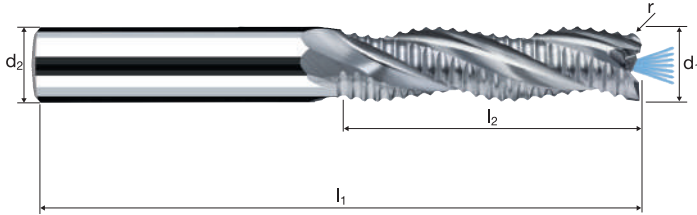
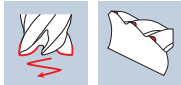
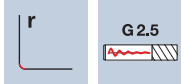


Frese cilindriche AX-FPS



Profilata, esecuzione medio-lunga
Geometria frontale per fresature in penetrazione ad alto rendimento
con canale di raffreddamento centrale

HM λ 30°
MG10 γ 20°



Sgrossatura Finitura

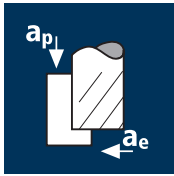


ReTool®

| | | | | | | | | |
|--|--|--------------------------|--------------------------|-------------------------|--|--------------|------------------------|--|
| | | Al Aluminium > 99% | Al Aluminium Alloy | Al Aluminium Cast | | Cu Copper | Plastic Thermoplast | |
|--|--|--------------------------|--------------------------|-------------------------|--|--------------|------------------------|--|

| Ø Code | d ₁ e8 | d ₂ h5 | l ₁ | l ₂ | r | z | Esempio: N° Ordine | |
|-----------|----------------------|----------------------|----------------|----------------|-------|---|-----------------------|----------|
| | | | | | | | Rivestimento | Articolo |
| | | | | | | | 15506 | 300 |
| | | | | | | | 15606 | |
| | | | | | | | 15506 | |
| EUR | | | | | | | | |
| 300 | 6.00 | 6.00 | 63 | 19.00 | 0.100 | 3 | 120.00 | |
| 391 | 8.00 | 8.00 | 72 | 28.00 | 0.150 | 3 | 150.00 | |
| 450 | 10.00 | 10.00 | 84 | 34.00 | 0.200 | 3 | 204.00 | |
| 501 | 12.00 | 12.00 | 97 | 40.00 | 0.200 | 3 | 252.00 | |
| 610 | 16.00 | 16.00 | 108 | 48.00 | 0.200 | 3 | 394.00 | |
| 682 | 20.00 | 20.00 | 122 | 56.00 | 0.200 | 3 | 576.00 | |
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Applicazione



Materiale

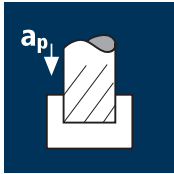
Alluminio malleabile
Costruzione integrale Al



Rame non legato



Materiali termoplastici



Alluminio malleabile
Costruzione integrale Al



Rame non legato



Materiali termoplastici



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 6.00 | 3 | 600 | 0.065 | 12.000 | 1.800 | 31830 | 6205 | 134.1 |
| 8.00 | 3 | 600 | 0.090 | 16.000 | 2.400 | 23875 | 6445 | 247.5 |
| 10.00 | 3 | 600 | 0.110 | 20.000 | 3.000 | 19100 | 6305 | 378.2 |
| 12.00 | 3 | 600 | 0.135 | 24.000 | 3.600 | 15915 | 6445 | 556.9 |
| 16.00 | 3 | 600 | 0.180 | 32.000 | 4.800 | 11935 | 6445 | 990.1 |
| 20.00 | 3 | 600 | 0.220 | 40.000 | 6.000 | 9550 | 6305 | 1512.6 |

| | | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|------|--------|
| 6.00 | 3 | 400 | 0.065 | 12.000 | 1.800 | 21220 | 4140 | 89.4 |
| 8.00 | 3 | 400 | 0.090 | 16.000 | 2.400 | 15915 | 4295 | 165.0 |
| 10.00 | 3 | 400 | 0.110 | 20.000 | 3.000 | 12730 | 4200 | 252.1 |
| 12.00 | 3 | 400 | 0.135 | 24.000 | 3.600 | 10610 | 4295 | 371.3 |
| 16.00 | 3 | 400 | 0.180 | 32.000 | 4.800 | 7960 | 4295 | 660.0 |
| 20.00 | 3 | 400 | 0.220 | 40.000 | 6.000 | 6365 | 4200 | 1008.4 |

| | | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|------|--------|
| 6.00 | 3 | 650 | 0.065 | 12.000 | 1.800 | 34485 | 6725 | 145.2 |
| 8.00 | 3 | 650 | 0.090 | 16.000 | 2.400 | 25865 | 6985 | 268.1 |
| 10.00 | 3 | 650 | 0.110 | 20.000 | 3.000 | 20690 | 6830 | 409.7 |
| 12.00 | 3 | 650 | 0.135 | 24.000 | 3.600 | 17240 | 6985 | 603.3 |
| 16.00 | 3 | 650 | 0.180 | 32.000 | 4.800 | 12930 | 6985 | 1072.6 |
| 20.00 | 3 | 650 | 0.220 | 40.000 | 6.000 | 10345 | 6830 | 1638.7 |

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|-------|---|-----|-------|--------|--------|-------|------|--------|
| 6.00 | 3 | 500 | 0.060 | 4.200 | 6.000 | 26525 | 4775 | 120.3 |
| 8.00 | 3 | 500 | 0.080 | 5.600 | 8.000 | 19895 | 4775 | 213.9 |
| 10.00 | 3 | 500 | 0.100 | 7.000 | 10.000 | 15915 | 4775 | 334.2 |
| 12.00 | 3 | 500 | 0.120 | 8.400 | 12.000 | 13265 | 4775 | 481.3 |
| 16.00 | 3 | 500 | 0.160 | 11.200 | 16.000 | 9945 | 4775 | 855.6 |
| 20.00 | 3 | 500 | 0.200 | 14.000 | 20.000 | 7960 | 4775 | 1336.9 |

| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|-------|
| 6.00 | 3 | 270 | 0.060 | 4.200 | 6.000 | 14325 | 2580 | 65.0 |
| 8.00 | 3 | 270 | 0.080 | 5.600 | 8.000 | 10745 | 2580 | 115.5 |
| 10.00 | 3 | 270 | 0.100 | 7.000 | 10.000 | 8595 | 2580 | 180.5 |
| 12.00 | 3 | 270 | 0.120 | 8.400 | 12.000 | 7160 | 2580 | 259.9 |
| 16.00 | 3 | 270 | 0.160 | 11.200 | 16.000 | 5370 | 2580 | 462.0 |
| 20.00 | 3 | 270 | 0.200 | 14.000 | 20.000 | 4295 | 2580 | 721.9 |

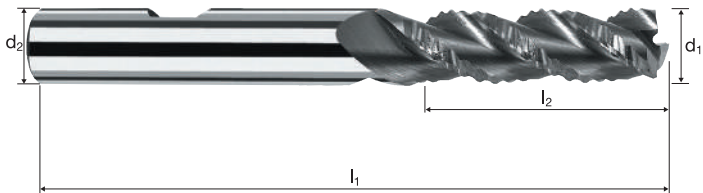
| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|--------|
| 6.00 | 3 | 650 | 0.060 | 4.200 | 6.000 | 34485 | 6205 | 156.4 |
| 8.00 | 3 | 650 | 0.080 | 5.600 | 8.000 | 25865 | 6205 | 278.1 |
| 10.00 | 3 | 650 | 0.100 | 7.000 | 10.000 | 20690 | 6205 | 434.5 |
| 12.00 | 3 | 650 | 0.120 | 8.400 | 12.000 | 17240 | 6205 | 625.7 |
| 16.00 | 3 | 650 | 0.160 | 11.200 | 16.000 | 12930 | 6205 | 1112.3 |
| 20.00 | 3 | 650 | 0.200 | 14.000 | 20.000 | 10345 | 6205 | 1738.0 |

Frese cilindriche AX (AX-FP)

Profilata, esecuzione medio-lunga



HM λ 40°
MG10 γ 18°



Sgrossatura Finitura

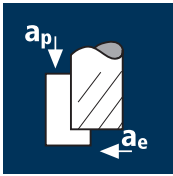


ReTool®

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|-------------|--|--------------------------|--------------------------|-------------------------|--|--------------|------------------------|--|
| Rm < 850 | | Al Aluminium > 99% | Al Aluminium Alloy | Al Aluminium Cast | | Cu Copper | Plastic Thermoplast | |
|-------------|--|--------------------------|--------------------------|-------------------------|--|--------------|------------------------|--|

| Esempio: N° Ordine | | | | | | | | | CELERO |
|--------------------|----------------------|----------------------|----------------|----------------|------|---|--|--|--------|
| Rivestimento | | Articolo | | Codice-Ø | | | | | |
| C | | 15397 | | 300 | | | | | |
| Ø Code | d ₁ e8 | d ₂ h6 | l ₁ | l ₂ | 45° | z | | | EUR |
| 300 | 6.00 | 6.00 | 63 | 19.00 | 0.40 | 3 | | | 119.00 |
| 391 | 8.00 | 8.00 | 72 | 28.00 | 0.40 | 3 | | | 146.00 |
| 450 | 10.00 | 10.00 | 84 | 34.00 | 0.40 | 3 | | | 166.00 |
| 501 | 12.00 | 12.00 | 97 | 40.00 | 0.40 | 3 | | | 214.00 |
| 610 | 16.00 | 16.00 | 108 | 48.00 | 0.50 | 3 | | | 374.00 |
| 682 | 20.00 | 20.00 | 122 | 56.00 | 0.50 | 3 | | | 540.00 |
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Applicazione



Materiale

Alluminio malleabile
Costruzione integrale Al



| d1 [mm] | z | v _c [m/min] | f _c [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 10.00 | 3 | 173 | 0.060 | 30.000 | 2.000 | 5505 | 990 | 59.5 |
| 12.00 | 3 | 173 | 0.090 | 36.000 | 2.400 | 4590 | 1240 | 107.1 |
| 16.00 | 3 | 173 | 0.120 | 48.000 | 3.200 | 3440 | 1240 | 190.3 |
| 20.00 | 3 | 173 | 0.145 | 60.000 | 4.000 | 2755 | 1200 | 287.5 |
| 25.00 | 3 | 173 | 0.185 | 75.000 | 5.000 | 2205 | 1225 | 458.4 |
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Rame non legato

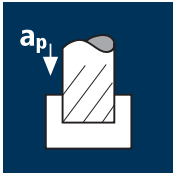


| | | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|-------|
| 10.00 | 3 | 73 | 0.060 | 30.000 | 2.000 | 2325 | 420 | 25.1 |
| 12.00 | 3 | 73 | 0.090 | 36.000 | 2.400 | 1935 | 525 | 45.2 |
| 16.00 | 3 | 73 | 0.120 | 48.000 | 3.200 | 1450 | 525 | 80.3 |
| 20.00 | 3 | 73 | 0.145 | 60.000 | 4.000 | 1160 | 505 | 121.3 |
| 25.00 | 3 | 73 | 0.185 | 75.000 | 5.000 | 930 | 515 | 193.4 |
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Materiali termoplastici



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|-------|---|-----|-------|--------|-------|------|------|-------|
| 10.00 | 3 | 183 | 0.060 | 30.000 | 2.000 | 5825 | 1050 | 62.9 |
| 12.00 | 3 | 183 | 0.090 | 36.000 | 2.400 | 4855 | 1310 | 113.2 |
| 16.00 | 3 | 183 | 0.120 | 48.000 | 3.200 | 3640 | 1310 | 201.3 |
| 20.00 | 3 | 183 | 0.145 | 60.000 | 4.000 | 2915 | 1265 | 304.1 |
| 25.00 | 3 | 183 | 0.185 | 75.000 | 5.000 | 2330 | 1295 | 484.9 |
| | | | | | | | | |
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Alluminio malleabile
Costruzione integrale Al



| | | | | | | | | |
|-------|---|-----|-------|--------|--------|------|-----|-------|
| 10.00 | 3 | 157 | 0.050 | 5.000 | 10.000 | 4995 | 750 | 37.5 |
| 12.00 | 3 | 157 | 0.070 | 6.000 | 12.000 | 4165 | 875 | 63.0 |
| 16.00 | 3 | 157 | 0.095 | 8.000 | 16.000 | 3125 | 890 | 113.9 |
| 20.00 | 3 | 157 | 0.120 | 10.000 | 20.000 | 2500 | 900 | 179.9 |
| 25.00 | 3 | 157 | 0.145 | 12.500 | 25.000 | 2000 | 870 | 271.7 |
| | | | | | | | | |
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Rame non legato



| | | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|-------|
| 10.00 | 3 | 68 | 0.050 | 5.000 | 10.000 | 2165 | 325 | 16.2 |
| 12.00 | 3 | 68 | 0.070 | 6.000 | 12.000 | 1805 | 380 | 27.3 |
| 16.00 | 3 | 68 | 0.095 | 8.000 | 16.000 | 1355 | 385 | 49.4 |
| 20.00 | 3 | 68 | 0.120 | 10.000 | 20.000 | 1080 | 390 | 77.9 |
| 25.00 | 3 | 68 | 0.145 | 12.500 | 25.000 | 865 | 375 | 117.7 |
| | | | | | | | | |
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Materiali termoplastici



| | | | | | | | | |
|-------|---|-----|-------|--------|--------|------|-----|-------|
| 10.00 | 3 | 168 | 0.050 | 5.000 | 10.000 | 5350 | 800 | 40.1 |
| 12.00 | 3 | 168 | 0.070 | 6.000 | 12.000 | 4455 | 935 | 67.4 |
| 16.00 | 3 | 168 | 0.095 | 8.000 | 16.000 | 3340 | 955 | 121.9 |
| 20.00 | 3 | 168 | 0.120 | 10.000 | 20.000 | 2675 | 965 | 192.5 |
| 25.00 | 3 | 168 | 0.145 | 12.500 | 25.000 | 2140 | 930 | 290.8 |
| | | | | | | | | |
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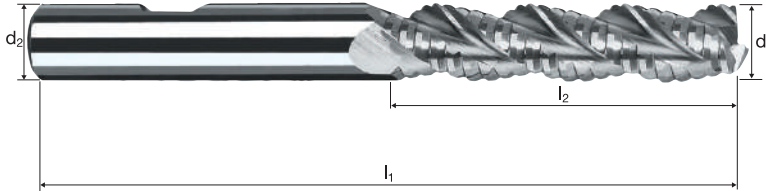
Frese cilindriche

Profilata, esecuzione medio-lunga



HSS-E
Co8

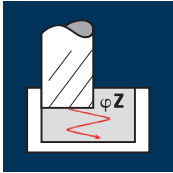
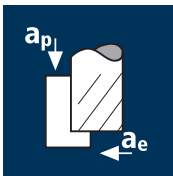
λ 40°
 γ 18°



| | | | | | | | |
|----------|--|--------------------|--------------------|--|--|-----------|---------------------|
| Rm < 850 | | Al Aluminium > 99% | Al Aluminium Alloy | | | Cu Copper | Plastic Thermoplast |
|----------|--|--------------------|--------------------|--|--|-----------|---------------------|

| Esempio: N° Ordine | | | | | | | Rivestimento | | Articolo | | Codice-Ø | | CELERO | |
|--------------------|-------------------|-------------------|----------------|----------------|------|---|--------------|--|----------|--|----------|--|--------|--|
| | | | | | | | C | | 0393 | | 450 | | C0393 | |
| Ø Code | d ₁ k8 | d ₂ h6 | l ₁ | l ₂ | 45° | z | | | | | EUR | | | |
| 450 | 10.00 | 10.00 | 95 | 45.00 | 0.40 | 3 | | | | | 72.00 | | | |
| 501 | 12.00 | 12.00 | 110 | 53.00 | 0.40 | 3 | | | | | 80.00 | | | |
| 610 | 16.00 | 16.00 | 123 | 63.00 | 0.50 | 3 | | | | | 109.00 | | | |
| 682 | 20.00 | 20.00 | 141 | 75.00 | 0.50 | 3 | | | | | 153.00 | | | |
| 772 | 25.00 | 25.00 | 166 | 90.00 | 0.70 | 3 | | | | | 225.00 | | | |
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Applicazione



Materiale

Alluminio malleabile
Costruzione integrale Al



Legia per fonderia Al



Rame non legato

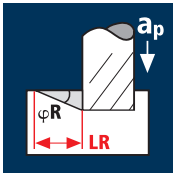
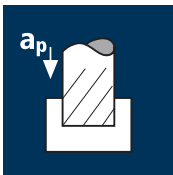


| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 6.00 | 3 | 450 | 0.064 | 9.000 | 3.600 | 23875 | 4585 | 148.5 | 15° |
| 8.00 | 3 | 450 | 0.080 | 12.000 | 4.800 | 17905 | 4295 | 247.5 | 15° |
| 10.00 | 3 | 450 | 0.096 | 15.000 | 6.000 | 14325 | 4125 | 371.3 | 15° |
| 12.00 | 3 | 450 | 0.112 | 18.000 | 7.200 | 11935 | 4010 | 519.8 | 15° |
| 16.00 | 3 | 450 | 0.128 | 24.000 | 9.600 | 8950 | 3440 | 792.1 | 15° |
| 20.00 | 3 | 450 | 0.144 | 30.000 | 12.000 | 7160 | 3095 | 1113.8 | 15° |
| 25.00 | 3 | 450 | 0.160 | 37.500 | 15.000 | 5730 | 2750 | 1547.0 | 15° |

| | | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|--------|-----|
| 6.00 | 3 | 405 | 0.064 | 9.000 | 3.600 | 21485 | 4125 | 133.7 | 15° |
| 8.00 | 3 | 405 | 0.080 | 12.000 | 4.800 | 16115 | 3865 | 222.8 | 15° |
| 10.00 | 3 | 405 | 0.096 | 15.000 | 6.000 | 12890 | 3715 | 334.1 | 15° |
| 12.00 | 3 | 405 | 0.112 | 18.000 | 7.200 | 10745 | 3610 | 467.8 | 15° |
| 16.00 | 3 | 405 | 0.128 | 24.000 | 9.600 | 8055 | 3095 | 712.9 | 15° |
| 20.00 | 3 | 405 | 0.144 | 30.000 | 12.000 | 6445 | 2785 | 1002.4 | 15° |
| 25.00 | 3 | 405 | 0.160 | 37.500 | 15.000 | 5155 | 2475 | 1392.3 | 15° |

| | | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|--------|----|
| 6.00 | 3 | 360 | 0.058 | 9.000 | 3.600 | 19100 | 3300 | 106.9 | 9° |
| 8.00 | 3 | 360 | 0.072 | 12.000 | 4.800 | 14325 | 3095 | 178.2 | 9° |
| 10.00 | 3 | 360 | 0.086 | 15.000 | 6.000 | 11460 | 2970 | 267.3 | 9° |
| 12.00 | 3 | 360 | 0.101 | 18.000 | 7.200 | 9550 | 2890 | 374.2 | 9° |
| 16.00 | 3 | 360 | 0.115 | 24.000 | 9.600 | 7160 | 2475 | 570.3 | 9° |
| 20.00 | 3 | 360 | 0.130 | 30.000 | 12.000 | 5730 | 2230 | 802.0 | 9° |
| 25.00 | 3 | 360 | 0.144 | 37.500 | 15.000 | 4585 | 1980 | 1113.8 | 9° |

Applicazione



Materiale

Alluminio malleabile
Costruzione integrale Al



Legia per fonderia Al



Rame non legato



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] | LR [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|---------|
| 6.00 | 3 | 315 | 0.051 | 9.000 | 6.000 | 16710 | 2565 | 138.6 | 15° | 33.6 |
| 8.00 | 3 | 315 | 0.064 | 12.000 | 8.000 | 12535 | 2405 | 231.0 | 15° | 44.8 |
| 10.00 | 3 | 315 | 0.077 | 15.000 | 10.000 | 10025 | 2310 | 346.5 | 15° | 56.0 |
| 12.00 | 3 | 315 | 0.090 | 18.000 | 12.000 | 8355 | 2245 | 485.1 | 15° | 67.2 |
| 16.00 | 3 | 315 | 0.102 | 24.000 | 16.000 | 6265 | 1925 | 739.3 | 15° | 89.6 |
| 20.00 | 3 | 315 | 0.115 | 30.000 | 20.000 | 5015 | 1735 | 1039.6 | 15° | 112.0 |
| 25.00 | 3 | 315 | 0.128 | 37.500 | 25.000 | 4010 | 1540 | 1443.9 | 15° | 140.0 |

| | | | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|--------|-----|-------|
| 6.00 | 3 | 285 | 0.051 | 9.000 | 6.000 | 15120 | 2320 | 125.4 | 15° | 33.6 |
| 8.00 | 3 | 285 | 0.064 | 12.000 | 8.000 | 11340 | 2175 | 209.0 | 15° | 44.8 |
| 10.00 | 3 | 285 | 0.077 | 15.000 | 10.000 | 9070 | 2090 | 313.5 | 15° | 56.0 |
| 12.00 | 3 | 285 | 0.090 | 18.000 | 12.000 | 7560 | 2030 | 438.9 | 15° | 67.2 |
| 16.00 | 3 | 285 | 0.102 | 24.000 | 16.000 | 5670 | 1740 | 668.8 | 15° | 89.6 |
| 20.00 | 3 | 285 | 0.115 | 30.000 | 20.000 | 4535 | 1570 | 940.6 | 15° | 112.0 |
| 25.00 | 3 | 285 | 0.128 | 37.500 | 25.000 | 3630 | 1395 | 1306.3 | 15° | 140.0 |

| | | | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|-------|----|-------|
| 6.00 | 3 | 216 | 0.040 | 9.000 | 6.000 | 11460 | 1385 | 74.8 | 9° | 56.8 |
| 8.00 | 3 | 216 | 0.050 | 12.000 | 8.000 | 8595 | 1300 | 124.7 | 9° | 75.8 |
| 10.00 | 3 | 216 | 0.060 | 15.000 | 10.000 | 6875 | 1245 | 187.1 | 9° | 94.7 |
| 12.00 | 3 | 216 | 0.071 | 18.000 | 12.000 | 5730 | 1215 | 262.0 | 9° | 113.6 |
| 16.00 | 3 | 216 | 0.081 | 24.000 | 16.000 | 4295 | 1040 | 399.2 | 9° | 151.5 |
| 20.00 | 3 | 216 | 0.091 | 30.000 | 20.000 | 3440 | 935 | 561.4 | 9° | 189.4 |
| 25.00 | 3 | 216 | 0.101 | 37.500 | 25.000 | 2750 | 830 | 779.7 | 9° | 236.8 |



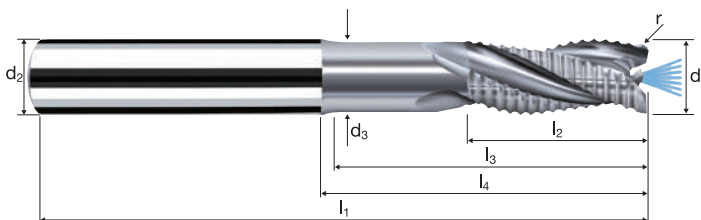
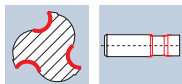
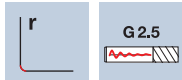
Utilizzate
ToolExpert AX-FPS
per determinare i dati
di taglio più potenti
per il vostro ambiente
di lavorazione

Frese cilindriche AX-FPS



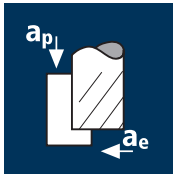
Profilata, esecuzione medio-lunga con scarico
Geometria frontale per fresature in penetrazione ad alto rendimento
con canale di raffreddamento centrale

HM
MG10 λ 30°
 γ 20°



| Esempio: N° Ordine | Rivestimento | | Articolo | | Codice-Ø | | | | | | |
|---|----------------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------|---|---------|--|
| | 15505 | | 300 | | 300 | | | | | | |
| Ø Code | d ₁ e8 | d ₂ h5 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r | z | EUR | |
| 300 | 6.00 | 6.00 | 5.50 | 63 | 13.00 | 24.15 | 26.00 | 0.100 | 3 | 117.00 | |
| 391 | 8.00 | 8.00 | 7.40 | 72 | 18.00 | 32.63 | 35.00 | 0.150 | 3 | 146.00 | |
| 450 | 10.00 | 10.00 | 9.20 | 84 | 22.00 | 39.99 | 43.00 | 0.200 | 3 | 199.00 | |
| 501 | 12.00 | 12.00 | 11.00 | 97 | 26.00 | 47.29 | 51.00 | 0.200 | 3 | 246.00 | |
| 610 | 16.00 | 16.00 | 15.00 | 108 | 32.00 | 54.73 | 59.00 | 0.200 | 3 | 385.00 | |
| 682 | 20.00 | 20.00 | 19.00 | 122 | 40.00 | 66.23 | 71.00 | 0.200 | 3 | 561.00 | |
| 770** | 25.00 | 25.00 | 24.00 | 144 | 50.00 | 81.68 | 87.00 | 0.250 | 3 | 1063.00 | |
| 772* | 25.00 | 25.00 | 24.00 | 144 | 50.00 | 86.68 | 92.00 | 0.250 | 3 | 1063.00 | |
| * Gambo cilindrico HA, lunghezza gambo = 50 mm | | | | | | | | | | | |
| ** Gambo con attacco weldon a norma DIN 6535 HB | | | | | | | | | | | |

Applicazione



Materiale

Alluminio malleabile
Costruzione integrale Al



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 6.00 | 3 | 600 | 0.065 | 9.000 | 2.400 | 31830 | 6205 | 134.1 |
| 8.00 | 3 | 600 | 0.090 | 12.000 | 3.200 | 23875 | 6445 | 247.5 |
| 10.00 | 3 | 600 | 0.110 | 15.000 | 4.000 | 19100 | 6305 | 378.2 |
| 12.00 | 3 | 600 | 0.135 | 18.000 | 4.800 | 15915 | 6445 | 556.9 |
| 16.00 | 3 | 600 | 0.180 | 24.000 | 6.400 | 11935 | 6445 | 990.1 |
| 20.00 | 3 | 600 | 0.220 | 30.000 | 8.000 | 9550 | 6305 | 1512.6 |
| 25.00 | 3 | 600 | 0.280 | 37.500 | 10.000 | 7640 | 6415 | 2406.4 |

Rame non legato



| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|--------|
| 6.00 | 3 | 400 | 0.065 | 9.000 | 2.400 | 21220 | 4140 | 89.4 |
| 8.00 | 3 | 400 | 0.090 | 12.000 | 3.200 | 15915 | 4295 | 165.0 |
| 10.00 | 3 | 400 | 0.110 | 15.000 | 4.000 | 12730 | 4200 | 252.1 |
| 12.00 | 3 | 400 | 0.135 | 18.000 | 4.800 | 10610 | 4295 | 371.3 |
| 16.00 | 3 | 400 | 0.180 | 24.000 | 6.400 | 7960 | 4295 | 660.0 |
| 20.00 | 3 | 400 | 0.220 | 30.000 | 8.000 | 6365 | 4200 | 1008.4 |
| 25.00 | 3 | 400 | 0.280 | 37.500 | 10.000 | 5095 | 4280 | 1604.3 |

Materiali termoplastici



| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|--------|
| 6.00 | 3 | 792 | 0.065 | 9.000 | 2.400 | 42015 | 8195 | 177.0 |
| 8.00 | 3 | 800 | 0.090 | 12.000 | 3.200 | 31830 | 8595 | 330.0 |
| 10.00 | 3 | 800 | 0.110 | 15.000 | 4.000 | 25465 | 8405 | 504.2 |
| 12.00 | 3 | 800 | 0.135 | 18.000 | 4.800 | 21220 | 8595 | 742.6 |
| 16.00 | 3 | 800 | 0.180 | 24.000 | 6.400 | 15915 | 8595 | 1320.1 |
| 20.00 | 3 | 800 | 0.220 | 30.000 | 8.000 | 12730 | 8405 | 2016.8 |
| 25.00 | 3 | 800 | 0.280 | 37.500 | 10.000 | 10185 | 8555 | 3208.6 |



Alluminio malleabile
Costruzione integrale Al



| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|--------|
| 6.00 | 3 | 500 | 0.060 | 4.800 | 6.000 | 26525 | 4775 | 137.5 |
| 8.00 | 3 | 500 | 0.080 | 6.400 | 8.000 | 19895 | 4775 | 244.5 |
| 10.00 | 3 | 500 | 0.100 | 8.000 | 10.000 | 15915 | 4775 | 382.0 |
| 12.00 | 3 | 500 | 0.120 | 9.600 | 12.000 | 13265 | 4775 | 550.0 |
| 16.00 | 3 | 500 | 0.160 | 12.800 | 16.000 | 9945 | 4775 | 977.8 |
| 20.00 | 3 | 500 | 0.200 | 16.000 | 20.000 | 7960 | 4775 | 1527.9 |
| 25.00 | 3 | 500 | 0.250 | 20.000 | 25.000 | 6365 | 4775 | 2387.3 |

Rame non legato



| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|--------|
| 6.00 | 3 | 270 | 0.060 | 4.800 | 6.000 | 14325 | 2580 | 74.3 |
| 8.00 | 3 | 270 | 0.080 | 6.400 | 8.000 | 10745 | 2580 | 132.0 |
| 10.00 | 3 | 270 | 0.100 | 8.000 | 10.000 | 8595 | 2580 | 206.3 |
| 12.00 | 3 | 270 | 0.120 | 9.600 | 12.000 | 7160 | 2580 | 297.0 |
| 16.00 | 3 | 270 | 0.160 | 12.800 | 16.000 | 5370 | 2580 | 528.0 |
| 20.00 | 3 | 270 | 0.200 | 16.000 | 20.000 | 4295 | 2580 | 825.1 |
| 25.00 | 3 | 270 | 0.250 | 20.000 | 25.000 | 3440 | 2580 | 1289.2 |

Materiali termoplastici



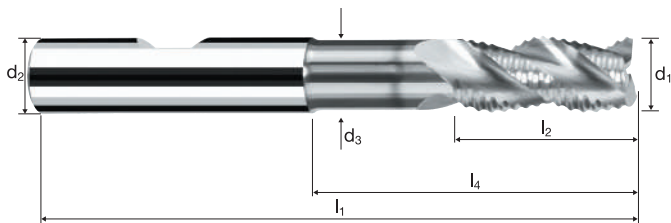
| | | | | | | | | |
|-------|---|-----|-------|--------|--------|-------|------|--------|
| 6.00 | 3 | 792 | 0.060 | 4.800 | 6.000 | 42015 | 7565 | 217.8 |
| 8.00 | 3 | 800 | 0.080 | 6.400 | 8.000 | 31830 | 7640 | 391.1 |
| 10.00 | 3 | 800 | 0.100 | 8.000 | 10.000 | 25465 | 7640 | 611.2 |
| 12.00 | 3 | 800 | 0.120 | 9.600 | 12.000 | 21220 | 7640 | 880.1 |
| 16.00 | 3 | 800 | 0.160 | 12.800 | 16.000 | 15915 | 7640 | 1564.6 |
| 20.00 | 3 | 800 | 0.200 | 16.000 | 20.000 | 12730 | 7640 | 2444.6 |
| 25.00 | 3 | 800 | 0.250 | 20.000 | 25.000 | 10185 | 7640 | 3819.7 |

Frese cilindriche AX (AX-FP)

Profilata, esecuzione medio-lunga con scarico



HM
MG10 λ 40°
 γ 18°

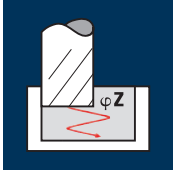


ReTool®

| | | | | | |
|-------------|--------------------------|--------------------------|-------------------------|--------------|------------------------|
| Rm < 850 | Al Aluminium > 99% | Al Aluminium Alloy | Al Aluminium Cast | Cu Copper | Plastic Thermoplast |
|-------------|--------------------------|--------------------------|-------------------------|--------------|------------------------|

| Ø Code | d ₁ e8 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | 45° | z | ESEMPIO | | | |
|--|----------------------|----------------------|----------------|----------------|----------------|----------------|----------------|------|---|--------------|----------|----------|--------|
| | | | | | | | | | | Rivestimento | Articolo | Codice-ø | CELERO |
| Esempio: N° Ordine C 15398 300 | | | | | | | | | | | CELERO | | |
| 300 | 6.00 | 6.00 | 5.50 | 63 | 13.00 | 25.34 | 26.00 | 0.40 | 3 | C | 15398 | C15398 | 120.00 |
| 391 | 8.00 | 8.00 | 7.40 | 72 | 19.00 | 34.29 | 35.00 | 0.40 | 3 | | | C15298 | 148.00 |
| 450 | 10.00 | 10.00 | 9.20 | 84 | 22.00 | 42.20 | 43.00 | 0.40 | 3 | | | | 168.00 |
| 501 | 12.00 | 12.00 | 11.00 | 97 | 26.00 | 50.13 | 51.00 | 0.40 | 3 | | | | 216.00 |
| 610 | 16.00 | 16.00 | 15.00 | 108 | 32.00 | 58.13 | 59.00 | 0.50 | 3 | | | | 377.00 |
| 682 | 20.00 | 20.00 | 19.00 | 122 | 38.00 | 70.13 | 71.00 | 0.50 | 3 | | | | 545.00 |
| 772 | 25.00 | 25.00 | 24.00 | 144 | 45.00 | 86.13 | 87.00 | 0.70 | 3 | | | | 803.00 |
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Applicazione



Materiale

Alluminio malleabile
Costruzione integrale Al



| d1 [mm] | z | v _r [m/min] | f _f [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------|
| 6.00 | 3 | 300 | 0.065 | 32.000 | 5.400 | 15915 | 3105 | 5° |
| 8.00 | 3 | 300 | 0.080 | 42.000 | 7.200 | 11935 | 2865 | 5° |
| 10.00 | 3 | 350 | 0.095 | 53.000 | 9.000 | 11140 | 3175 | 5° |
| 12.00 | 3 | 350 | 0.110 | 63.000 | 10.800 | 9285 | 3065 | 5° |
| 16.00 | 3 | 400 | 0.130 | 84.000 | 14.400 | 7960 | 3105 | 5° |
| 20.00 | 3 | 400 | 0.145 | 105.000 | 18.000 | 6365 | 2770 | 5° |

Legia per fonderia Al



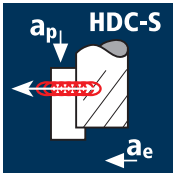
| d1 [mm] | z | v _r [m/min] | f _f [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------|
| 6.00 | 3 | 270 | 0.065 | 32.000 | 5.400 | 14325 | 2795 | 5° |
| 8.00 | 3 | 270 | 0.080 | 42.000 | 7.200 | 10745 | 2580 | 5° |
| 10.00 | 3 | 315 | 0.095 | 53.000 | 9.000 | 10025 | 2860 | 5° |
| 12.00 | 3 | 315 | 0.110 | 63.000 | 10.800 | 8355 | 2755 | 5° |
| 16.00 | 3 | 360 | 0.130 | 84.000 | 14.400 | 7160 | 2795 | 5° |
| 20.00 | 3 | 360 | 0.145 | 105.000 | 18.000 | 5730 | 2490 | 5° |

Rame non legato



| d1 [mm] | z | v _r [m/min] | f _f [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------|
| 6.00 | 3 | 240 | 0.052 | 32.000 | 5.400 | 12730 | 1985 | 4° |
| 8.00 | 3 | 240 | 0.064 | 42.000 | 7.200 | 9550 | 1835 | 4° |
| 10.00 | 3 | 280 | 0.076 | 53.000 | 9.000 | 8915 | 2030 | 4° |
| 12.00 | 3 | 280 | 0.088 | 63.000 | 10.800 | 7425 | 1960 | 4° |
| 16.00 | 3 | 320 | 0.104 | 84.000 | 14.400 | 6365 | 1985 | 4° |
| 20.00 | 3 | 320 | 0.116 | 105.000 | 18.000 | 5095 | 1770 | 4° |

Applicazione



Materiale

Alluminio malleabile
Costruzione integrale Al



| d1 [mm] | z | v _r [m/min] | f _f [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 6.00 | 3 | 300 | 0.106 | 32.000 | 0.600 | 15915 | 5060 | 97.2 |
| 8.00 | 3 | 350 | 0.153 | 42.000 | 0.800 | 13925 | 6390 | 214.8 |
| 10.00 | 3 | 400 | 0.174 | 53.000 | 1.000 | 12730 | 6645 | 352.3 |
| 12.00 | 3 | 400 | 0.211 | 63.000 | 1.200 | 10610 | 6715 | 507.8 |
| 16.00 | 3 | 500 | 0.214 | 84.000 | 1.600 | 9945 | 6385 | 858.3 |
| 20.00 | 3 | 500 | 0.241 | 105.000 | 2.000 | 7960 | 5755 | 1208.2 |

Legia per fonderia Al



| d1 [mm] | z | v _r [m/min] | f _f [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 6.00 | 3 | 270 | 0.106 | 32.000 | 0.600 | 14325 | 4555 | 87.5 |
| 8.00 | 3 | 315 | 0.153 | 42.000 | 0.800 | 12535 | 5755 | 193.3 |
| 10.00 | 3 | 360 | 0.174 | 53.000 | 1.000 | 11460 | 5980 | 317.0 |
| 12.00 | 3 | 360 | 0.211 | 63.000 | 1.200 | 9550 | 6045 | 457.0 |
| 16.00 | 3 | 450 | 0.214 | 84.000 | 1.600 | 8950 | 5745 | 772.5 |
| 20.00 | 3 | 450 | 0.241 | 105.000 | 2.000 | 7160 | 5180 | 1087.4 |

Rame non legato



| d1 [mm] | z | v _r [m/min] | f _f [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|
| 6.00 | 3 | 240 | 0.085 | 32.000 | 0.600 | 12730 | 3240 | 62.2 |
| 8.00 | 3 | 280 | 0.122 | 42.000 | 0.800 | 11140 | 4090 | 137.5 |
| 10.00 | 3 | 320 | 0.139 | 53.000 | 1.000 | 10185 | 4255 | 225.4 |
| 12.00 | 3 | 320 | 0.169 | 63.000 | 1.200 | 8490 | 4300 | 325.0 |
| 16.00 | 3 | 400 | 0.171 | 84.000 | 1.600 | 7960 | 4085 | 549.3 |
| 20.00 | 3 | 400 | 0.193 | 105.000 | 2.000 | 6365 | 3680 | 773.3 |



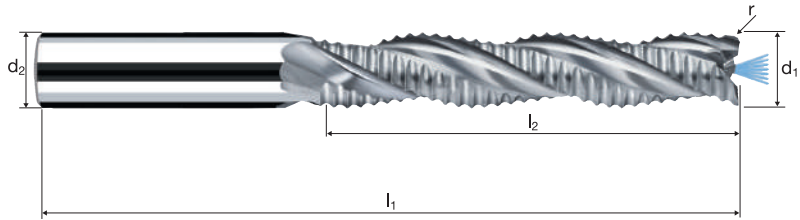
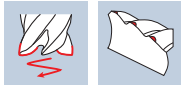
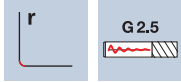
Utilizzate
ToolExpert AX-FPS
per determinare i dati
di taglio più potenti
per il vostro ambiente
di lavorazione

Frese cilindriche AX-FPS



Profilata, esecuzione extralunga 5.2xd
Geometria frontale per fresature in penetrazione ad alto rendimento
con canale di raffreddamento centrale

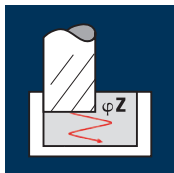
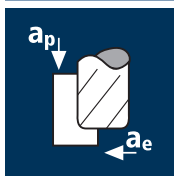
HM λ 30°
MG10 γ 20°



| | | | | | | | | |
|--|--|--------------------------|--------------------------|-------------------------|--|--------------|------------------------|--|
| | | Al Aluminium > 99% | Al Aluminium Alloy | Al Aluminium Cast | | Cu Copper | Plastic Thermoplast | |
|--|--|--------------------------|--------------------------|-------------------------|--|--------------|------------------------|--|

| Ø Code | d ₁ e8 | d ₂ h5 | l ₁ | l ₂ | r | z | Esempio: N° Ordine | |
|-----------|----------------------|----------------------|----------------|----------------|-------|---|-----------------------|----------|
| | | | | | | | Rivestimento | Articolo |
| | | | | | | | 15607 | |
| | | | | | | | 15507 | |
| | | | | | | | 300 | |
| | | | | | | | EUR | |
| 300 | 6.00 | 6.00 | 73 | 32.00 | 0.100 | 3 | 134.00 | |
| 391 | 8.00 | 8.00 | 84 | 42.00 | 0.150 | 3 | 168.00 | |
| 450 | 10.00 | 10.00 | 100 | 53.00 | 0.200 | 3 | 228.00 | |
| 501 | 12.00 | 12.00 | 117 | 63.00 | 0.200 | 3 | 282.00 | |
| 610 | 16.00 | 16.00 | 144 | 84.00 | 0.200 | 3 | 441.00 | |
| 682 | 20.00 | 20.00 | 169 | 105.00 | 0.200 | 3 | 644.00 | |
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Applicazione



Materiale

Alluminio malleabile
Costruzione integrale Al



Legia per fonderia Al



Rame non legato

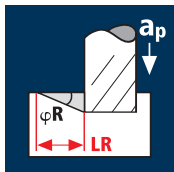
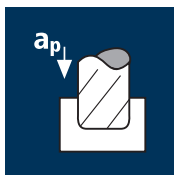


| d1 [mm] | z | v _c [m/min] | f _z [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 12.00 | 3 | 500 | 0.140 | 18.000 | 9.600 | 13265 | 5570 | 962.6 | 12° |
| 16.00 | 3 | 500 | 0.160 | 24.000 | 12.800 | 9945 | 4775 | 1466.8 | 12° |
| 20.00 | 3 | 500 | 0.180 | 30.000 | 16.000 | 7960 | 4295 | 2062.6 | 12° |
| 25.00 | 3 | 500 | 0.200 | 37.500 | 20.000 | 6365 | 3820 | 2864.8 | 12° |
| | | | | | | | | | |
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|-------|---|-----|-------|--------|--------|-------|------|--------|-----|
| 12.00 | 3 | 450 | 0.140 | 18.000 | 9.600 | 11935 | 5015 | 866.3 | 12° |
| 16.00 | 3 | 450 | 0.160 | 24.000 | 12.800 | 8950 | 4295 | 1320.1 | 12° |
| 20.00 | 3 | 450 | 0.180 | 30.000 | 16.000 | 7160 | 3865 | 1856.4 | 12° |
| 25.00 | 3 | 450 | 0.200 | 37.500 | 20.000 | 5730 | 3440 | 2578.3 | 12° |
| | | | | | | | | | |
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|-------|---|-----|-------|--------|--------|-------|------|--------|----|
| 12.00 | 3 | 400 | 0.126 | 18.000 | 9.600 | 10610 | 4010 | 693.0 | 7° |
| 16.00 | 3 | 400 | 0.144 | 24.000 | 12.800 | 7960 | 3440 | 1056.1 | 7° |
| 20.00 | 3 | 400 | 0.162 | 30.000 | 16.000 | 6365 | 3095 | 1485.1 | 7° |
| 25.00 | 3 | 400 | 0.180 | 37.500 | 20.000 | 5095 | 2750 | 2062.6 | 7° |
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Applicazione



Materiale

Alluminio malleabile
Costruzione integrale Al



Legia per fonderia Al



Rame non legato



| d1 [mm] | z | v _c [m/min] | f _z [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] | LR [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|---------|
| 12.00 | 3 | 450 | 0.126 | 18.000 | 12.000 | 11935 | 4510 | 974.6 | 15° | 67.2 |
| 16.00 | 3 | 450 | 0.144 | 24.000 | 16.000 | 8950 | 3865 | 1485.1 | 15° | 89.6 |
| 20.00 | 3 | 450 | 0.162 | 30.000 | 20.000 | 7160 | 3480 | 2088.4 | 15° | 112.0 |
| 25.00 | 3 | 450 | 0.180 | 37.500 | 25.000 | 5730 | 3095 | 2900.6 | 15° | 140.0 |
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|-------|---|-----|-------|--------|--------|-------|------|--------|-----|-------|
| 12.00 | 3 | 405 | 0.126 | 18.000 | 12.000 | 10745 | 4060 | 877.1 | 15° | 67.2 |
| 16.00 | 3 | 405 | 0.144 | 24.000 | 16.000 | 8055 | 3480 | 1336.6 | 15° | 89.6 |
| 20.00 | 3 | 405 | 0.162 | 30.000 | 20.000 | 6445 | 3135 | 1879.6 | 15° | 112.0 |
| 25.00 | 3 | 405 | 0.180 | 37.500 | 25.000 | 5155 | 2785 | 2610.5 | 15° | 140.0 |
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|-------|---|-----|-------|--------|--------|------|------|--------|----|-------|
| 12.00 | 3 | 320 | 0.101 | 18.000 | 12.000 | 8490 | 2565 | 554.4 | 9° | 113.6 |
| 16.00 | 3 | 320 | 0.115 | 24.000 | 16.000 | 6365 | 2200 | 844.9 | 9° | 151.5 |
| 20.00 | 3 | 320 | 0.130 | 30.000 | 20.000 | 5095 | 1980 | 1188.1 | 9° | 189.4 |
| 25.00 | 3 | 320 | 0.144 | 37.500 | 25.000 | 4075 | 1760 | 1650.1 | 9° | 236.8 |
| | | | | | | | | | | |
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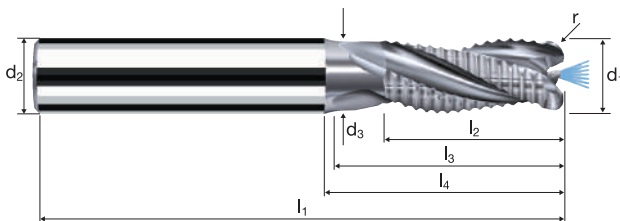
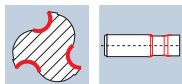
Utilizzate
ToolExpert AX-FPS
per determinare i dati
di taglio più potenti
per il vostro ambiente
di lavorazione

Frese toriche AX-FPS (AX-RFPS)



Profilata, esecuzione normale con scarico corto
Geometria frontale per fresature in penetrazione ad alto rendimento
con canale di raffreddamento centrale

HM
MG10 λ 30°
 γ 20°



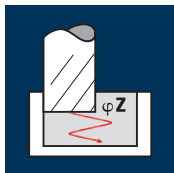
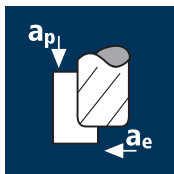
Sgrossatura Finitura

ReTool®

| | | | | | | | | | |
|--|--|--|--------------------------|--------------------------|-------------------------|--|--------------|------------------------|--|
| | | | Al Aluminium > 99% | Al Aluminium Alloy | Al Aluminium Cast | | Cu Copper | Plastic Thermoplast | |
|--|--|--|--------------------------|--------------------------|-------------------------|--|--------------|------------------------|--|

| Ø Code | d ₁ e8 | d ₂ h5 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r 0/+0.03 | z | Esempio: N° Ordine | |
|--|----------------------|----------------------|----------------|----------------|----------------|----------------|----------------|--------------|---|-----------------------|-----|
| | | | | | | | | | | 15502 | 498 |
| 498 | 12.00 | 12.00 | 11.00 | 83 | 26.00 | 33.29 | 37.00 | 0.500 | 3 | 235.00 | █ |
| 606 | 16.00 | 16.00 | 15.00 | 95 | 32.00 | 41.73 | 46.00 | 0.500 | 3 | 368.00 | █ |
| 501 | 12.00 | 12.00 | 11.00 | 83 | 26.00 | 33.29 | 37.00 | 1.000 | 3 | 235.00 | █ |
| 608 | 16.00 | 16.00 | 15.00 | 95 | 32.00 | 41.73 | 46.00 | 1.000 | 3 | 368.00 | █ |
| 680 | 20.00 | 20.00 | 19.00 | 104 | 40.00 | 48.23 | 53.00 | 1.000 | 3 | 537.00 | █ |
| 770* | 25.00 | 25.00 | 24.00 | 121 | 50.00 | 64.68 | 70.00 | 1.000 | 3 | 1018.00 | █ |
| 505 | 12.00 | 12.00 | 11.00 | 83 | 26.00 | 33.29 | 37.00 | 2.000 | 3 | 235.00 | █ |
| 611 | 16.00 | 16.00 | 15.00 | 95 | 32.00 | 41.73 | 46.00 | 2.000 | 3 | 368.00 | █ |
| 683 | 20.00 | 20.00 | 19.00 | 104 | 40.00 | 48.23 | 53.00 | 2.000 | 3 | 537.00 | █ |
| 772* | 25.00 | 25.00 | 24.00 | 121 | 50.00 | 64.68 | 70.00 | 2.000 | 3 | 1018.00 | █ |
| 506 | 12.00 | 12.00 | 11.00 | 83 | 26.00 | 33.29 | 37.00 | 2.500 | 3 | 235.00 | █ |
| 612 | 16.00 | 16.00 | 15.00 | 95 | 32.00 | 41.73 | 46.00 | 2.500 | 3 | 368.00 | █ |
| 684 | 20.00 | 20.00 | 19.00 | 104 | 40.00 | 48.23 | 53.00 | 2.500 | 3 | 537.00 | █ |
| 774* | 25.00 | 25.00 | 24.00 | 121 | 50.00 | 64.68 | 70.00 | 2.500 | 3 | 1018.00 | █ |
| * Gambo cilindrico HA, lunghezza gambo = 50 mm | | | | | | | | | | | |
| █ Disponibilità e date di consegna su richiesta. | | | | | | | | | | | |

Applicazione



Materiale

Alluminio malleabile
Costruzione integrale Al



Leghe per fonderia Al



Rame non legato

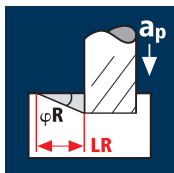
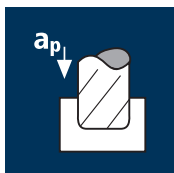


| d1 [mm] | z | v _c [m/min] | f _z [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φZ [°] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|
| 16.00 | 3 | 500 | 0.160 | 24.000 | 12.800 | 9945 | 4775 | 1466.8 | 12° |
| 20.00 | 3 | 500 | 0.180 | 30.000 | 16.000 | 7960 | 4295 | 2062.6 | 12° |
| 25.00 | 3 | 500 | 0.200 | 37.500 | 20.000 | 6365 | 3820 | 2864.8 | 12° |
| | | | | | | | | | |
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|-------|---|-----|-------|--------|--------|------|------|--------|-----|
| 16.00 | 3 | 450 | 0.160 | 24.000 | 12.800 | 8950 | 4295 | 1320.1 | 12° |
| 20.00 | 3 | 450 | 0.180 | 30.000 | 16.000 | 7160 | 3865 | 1856.4 | 12° |
| 25.00 | 3 | 450 | 0.200 | 37.500 | 20.000 | 5730 | 3440 | 2578.3 | 12° |
| | | | | | | | | | |
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|-------|---|-----|-------|--------|--------|------|------|--------|----|
| 16.00 | 3 | 400 | 0.144 | 24.000 | 12.800 | 7960 | 3440 | 1056.1 | 7° |
| 20.00 | 3 | 400 | 0.162 | 30.000 | 16.000 | 6365 | 3095 | 1485.1 | 7° |
| 25.00 | 3 | 400 | 0.180 | 37.500 | 20.000 | 5095 | 2750 | 2062.6 | 7° |
| | | | | | | | | | |
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Applicazione



Materiale

Alluminio malleabile
Costruzione integrale Al



Leghe per fonderia Al



Rame non legato



| d1 [mm] | z | v _c [m/min] | f _z [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] | φR [°] | LR [mm] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|--------------------------|--------|---------|
| 16.00 | 3 | 450 | 0.144 | 24.000 | 16.000 | 8950 | 3865 | 1485.1 | 15° | 89.6 |
| 20.00 | 3 | 450 | 0.162 | 30.000 | 20.000 | 7160 | 3480 | 2088.4 | 15° | 112.0 |
| 25.00 | 3 | 450 | 0.180 | 37.500 | 25.000 | 5730 | 3095 | 2900.6 | 15° | 140.0 |
| | | | | | | | | | | |
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|-------|---|-----|-------|--------|--------|------|------|--------|-----|-------|
| 16.00 | 3 | 405 | 0.144 | 24.000 | 16.000 | 8055 | 3480 | 1336.6 | 15° | 89.6 |
| 20.00 | 3 | 405 | 0.162 | 30.000 | 20.000 | 6445 | 3135 | 1879.6 | 15° | 112.0 |
| 25.00 | 3 | 405 | 0.180 | 37.500 | 25.000 | 5155 | 2785 | 2610.5 | 15° | 140.0 |
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|-------|---|-----|-------|--------|--------|------|------|--------|----|-------|
| 16.00 | 3 | 320 | 0.115 | 24.000 | 16.000 | 6365 | 2200 | 844.9 | 9° | 151.5 |
| 20.00 | 3 | 320 | 0.130 | 30.000 | 20.000 | 5095 | 1980 | 1188.1 | 9° | 189.4 |
| 25.00 | 3 | 320 | 0.144 | 37.500 | 25.000 | 4075 | 1760 | 1650.1 | 9° | 236.8 |
| | | | | | | | | | | |
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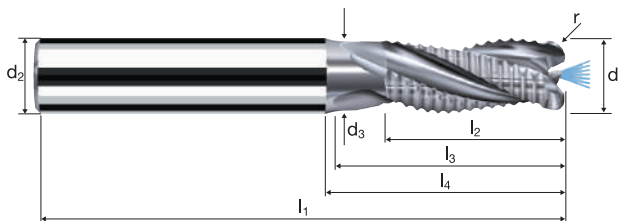
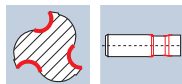
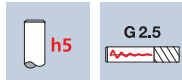
Utilizzate
ToolExpert AX-FPS
per determinare i dati
di taglio più potenti
per il vostro ambiente
di lavorazione

Frese toriche AX-FPS (AX-RFPS)



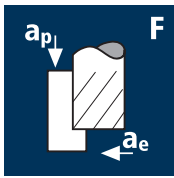
Profilata, esecuzione normale con scarico corto
Geometria frontale per fresature in penetrazione ad alto rendimento
con canale di raffreddamento centrale

HM λ 30°
MG10 γ 20°



| Esempio: N° Ordine | | | | | | | | | | | Rivestimento | | Articolo | | Codice-Ø | | | |
|--|-------------------|-------------------|----------------|----------------|----------------|----------------|----------------|-----------|---|---------|--------------|--|----------|--|----------|--|--|--|
| | | | | | | | | | | | 15502 | | 613 | | 613 | | | |
| Ø Code | d ₁ e8 | d ₂ h5 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r 0/+0.03 | z | EUR | | | | | | | | |
| 613 | 16.00 | 16.00 | 15.00 | 95 | 32.00 | 41.73 | 46.00 | 3.000 | 3 | 368.00 | I | | | | | | | |
| 685 | 20.00 | 20.00 | 19.00 | 104 | 40.00 | 48.23 | 53.00 | 3.000 | 3 | 537.00 | I | | | | | | | |
| 775* | 25.00 | 25.00 | 24.00 | 121 | 50.00 | 64.68 | 70.00 | 3.000 | 3 | 1018.00 | I | | | | | | | |
| 686 | 20.00 | 20.00 | 19.00 | 104 | 40.00 | 48.23 | 53.00 | 4.000 | 3 | 537.00 | I | | | | | | | |
| 776* | 25.00 | 25.00 | 24.00 | 121 | 50.00 | 64.68 | 70.00 | 4.000 | 3 | 1018.00 | I | | | | | | | |
| 777* | 25.00 | 25.00 | 24.00 | 121 | 50.00 | 64.68 | 70.00 | 5.000 | 3 | 1018.00 | I | | | | | | | |
| * Gambo cilindrico HA, lunghezza gambo = 50 mm | | | | | | | | | | | | | | | | | | |
| I Disponibilità e date di consegna su richiesta. | | | | | | | | | | | | | | | | | | |

Applicazione



Materiale

Alluminio malleabile
Costruzione integrale Al



Rame non legato



Materiali termoplastici



Lega per fonderia Al



| d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=10000 min vf [mm/min] | n=15000 min vf [mm/min] | n=20000 min vf [mm/min] | n=30000 min vf [mm/min] |
|------------|---|------------------------|------------------------|------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| 6.00 | 6 | 0.020 | 12.000 | 0.100 | 1200 | 1800 | 2400 | 3600 |
| 8.00 | 6 | 0.020 | 16.000 | 0.100 | 1200 | 1800 | 2400 | 3600 |
| 10.00 | 6 | 0.025 | 20.000 | 0.150 | 1500 | 2250 | 3000 | 4500 |
| 12.00 | 6 | 0.025 | 24.000 | 0.200 | 1500 | 2250 | 3000 | 4500 |
| 16.00 | 6 | 0.030 | 32.000 | 0.250 | 1800 | 2700 | 3600 | 5400 |
| 20.00 | 6 | 0.030 | 40.000 | 0.300 | 1800 | 2700 | 3600 | 5400 |
| | | | | | | | | |
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| | | | | | | | | |
| 6.00 | 6 | 0.020 | 12.000 | 0.100 | 1200 | 1800 | 2400 | 3600 |
| 8.00 | 6 | 0.020 | 16.000 | 0.100 | 1200 | 1800 | 2400 | 3600 |
| 10.00 | 6 | 0.025 | 20.000 | 0.150 | 1500 | 2250 | 3000 | 4500 |
| 12.00 | 6 | 0.025 | 24.000 | 0.200 | 1500 | 2250 | 3000 | 4500 |
| 16.00 | 6 | 0.030 | 32.000 | 0.250 | 1800 | 2700 | 3600 | 5400 |
| 20.00 | 6 | 0.030 | 40.000 | 0.300 | 1800 | 2700 | 3600 | 5400 |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| 6.00 | 6 | 0.020 | 12.000 | 0.100 | 1200 | 1800 | 2400 | 3600 |
| 8.00 | 6 | 0.020 | 16.000 | 0.100 | 1200 | 1800 | 2400 | 3600 |
| 10.00 | 6 | 0.025 | 20.000 | 0.150 | 1500 | 2250 | 3000 | 4500 |
| 12.00 | 6 | 0.025 | 24.000 | 0.200 | 1500 | 2250 | 3000 | 4500 |
| 16.00 | 6 | 0.030 | 32.000 | 0.250 | 1800 | 2700 | 3600 | 5400 |
| 20.00 | 6 | 0.030 | 40.000 | 0.300 | 1800 | 2700 | 3600 | 5400 |
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Frese cilindriche MulticutXA

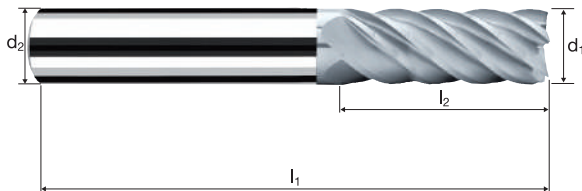
Finitura, esecuzione normale



HM λ 40°
MG10 γ 20°

r
G 2.5

Vario



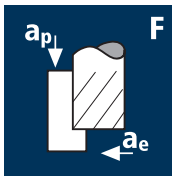
Sgrossatura **Finitura**

ReTool®

Al Aluminium > 99% **Al** Aluminium Alloy Al Aluminium Cast Cu Copper Plastic Thermoplast

| | | | | | | | | CELERO | |
|-----------------------|----------------------|----------------------|----------|----------------|----------------|-------|---|--------|--------|
| Esempio: N° Ordine | | Rivestimento | Articolo | Codice-ø | | | | 15589 | C15589 |
| Ø Code | d ₁ e8 | d ₂ h6 | | l ₁ | l ₂ | r | z | EUR | EUR |
| 300 | 6.00 | 6.00 | C | 57 | 13.00 | 0.150 | 6 | 65.00 | 77.00 |
| 391 | 8.00 | 8.00 | 15589 | 63 | 19.00 | 0.150 | 6 | 81.00 | 97.00 |
| 450 | 10.00 | 10.00 | 300 | 72 | 22.00 | 0.200 | 6 | 110.00 | 131.00 |
| 501 | 12.00 | 12.00 | | 83 | 26.00 | 0.200 | 6 | 136.00 | 162.00 |
| 610 | 16.00 | 16.00 | | 92 | 32.00 | 0.200 | 6 | 212.00 | 254.00 |
| 682 | 20.00 | 20.00 | | 104 | 40.00 | 0.200 | 6 | 310.00 | 370.00 |
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Applicazione



Materiale

Alluminio malleabile
Costruzione integrale Al



Rame non legato



Materiali termoplastici



Lega per fonderia Al



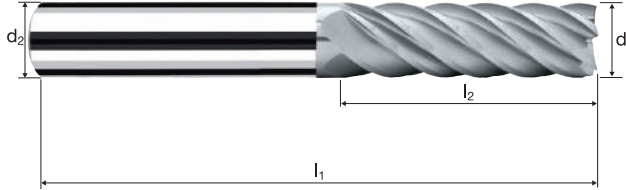
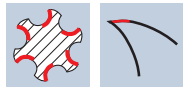
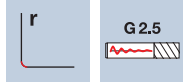
| d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=10000 min vf [mm/min] | n=15000 min vf [mm/min] | n=20000 min vf [mm/min] | n=30000 min vf [mm/min] |
|------------|---|------------------------|------------------------|------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| 6.00 | 6 | 0.020 | 18.000 | 0.100 | 1200 | 1800 | 2400 | 3600 |
| 8.00 | 6 | 0.020 | 24.000 | 0.100 | 1200 | 1800 | 2400 | 3600 |
| 10.00 | 6 | 0.025 | 30.000 | 0.150 | 1500 | 2250 | 3000 | 4500 |
| 12.00 | 6 | 0.025 | 36.000 | 0.200 | 1500 | 2250 | 3000 | 4500 |
| 16.00 | 6 | 0.030 | 48.000 | 0.250 | 1800 | 2700 | 3600 | 5400 |
| 20.00 | 6 | 0.030 | 60.000 | 0.300 | 1800 | 2700 | 3600 | 5400 |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| 6.00 | 6 | 0.020 | 18.000 | 0.100 | 1200 | 1800 | 2400 | 3600 |
| 8.00 | 6 | 0.020 | 24.000 | 0.100 | 1200 | 1800 | 2400 | 3600 |
| 10.00 | 6 | 0.025 | 30.000 | 0.150 | 1500 | 2250 | 3000 | 4500 |
| 12.00 | 6 | 0.025 | 36.000 | 0.200 | 1500 | 2250 | 3000 | 4500 |
| 16.00 | 6 | 0.030 | 48.000 | 0.250 | 1800 | 2700 | 3600 | 5400 |
| 20.00 | 6 | 0.030 | 60.000 | 0.300 | 1800 | 2700 | 3600 | 5400 |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| 6.00 | 6 | 0.020 | 18.000 | 0.100 | 1200 | 1800 | 2400 | 3600 |
| 8.00 | 6 | 0.020 | 24.000 | 0.100 | 1200 | 1800 | 2400 | 3600 |
| 10.00 | 6 | 0.025 | 30.000 | 0.150 | 1500 | 2250 | 3000 | 4500 |
| 12.00 | 6 | 0.025 | 36.000 | 0.200 | 1500 | 2250 | 3000 | 4500 |
| 16.00 | 6 | 0.030 | 48.000 | 0.250 | 1800 | 2700 | 3600 | 5400 |
| 20.00 | 6 | 0.030 | 60.000 | 0.300 | 1800 | 2700 | 3600 | 5400 |
| | | | | | | | | |
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Frese cilindriche MulticutXA

Finitura, esecuzione medio-lunga





HM λ 40°
MG10 γ 20°



| | | | | | | | | | |
|--|--|--|--------------------------|--------------------------|-------------------------|--|--------------|------------------------|--|
| | | | Al Aluminium > 99% | Al Aluminium Alloy | Al Aluminium Cast | | Cu Copper | Plastic Thermoplast | |
|--|--|--|--------------------------|--------------------------|-------------------------|--|--------------|------------------------|--|

| Esempio: N° Ordine | | | | | | | | CELERO | |
|-----------------------|----------------------|----------------------|----------|----------------|----------------|-------|---|--------|--------|
| | | Rivestimento | Articolo | Codice-Ø | | | | 15590 | C15590 |
| Ø Code | d ₁ e8 | d ₂ h6 | | l ₁ | l ₂ | r | z | EUR | EUR |
| 300 | 6.00 | 6.00 | C | 63 | 18.00 | 0.150 | 6 | 74.00 | 86.00 |
| 391 | 8.00 | 8.00 | 15590 | 72 | 24.00 | 0.150 | 6 | 92.00 | 108.00 |
| 450 | 10.00 | 10.00 | 300 | 84 | 30.00 | 0.200 | 6 | 126.00 | 147.00 |
| 501 | 12.00 | 12.00 | | 97 | 36.00 | 0.200 | 6 | 155.00 | 182.00 |
| 610 | 16.00 | 16.00 | | 108 | 48.00 | 0.200 | 6 | 243.00 | 284.00 |
| 682 | 20.00 | 20.00 | | 122 | 60.00 | 0.200 | 6 | 354.00 | 415.00 |
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| Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|--|---|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|
|  | Alluminio malleabile Costruzione integrale Al  | 6.00 | 3 | 300 | 0.025 | 32.000 | 0.080 | 15915 | 1195 |
| | | 8.00 | 3 | 300 | 0.030 | 42.000 | 0.100 | 11935 | 1075 |
| | | 10.00 | 3 | 350 | 0.030 | 53.000 | 0.120 | 11140 | 1005 |
| | | 12.00 | 3 | 350 | 0.030 | 63.000 | 0.120 | 9285 | 835 |
| | | 16.00 | 3 | 400 | 0.035 | 84.000 | 0.150 | 7960 | 835 |
| | | 20.00 | 3 | 400 | 0.035 | 105.000 | 0.150 | 6365 | 670 |
| | | | | | | | | | |
|  | Lega per fonderia Al  | 6.00 | 3 | 270 | 0.025 | 32.000 | 0.080 | 14325 | 1075 |
| | | 8.00 | 3 | 270 | 0.030 | 42.000 | 0.100 | 10745 | 965 |
| | | 10.00 | 3 | 315 | 0.030 | 53.000 | 0.120 | 10025 | 900 |
| | | 12.00 | 3 | 315 | 0.030 | 63.000 | 0.120 | 8355 | 750 |
| | | 16.00 | 3 | 360 | 0.035 | 84.000 | 0.150 | 7160 | 750 |
| | | 20.00 | 3 | 360 | 0.035 | 105.000 | 0.150 | 5730 | 600 |
| | | | | | | | | | |
|  | Alluminio malleabile Costruzione integrale Al  | 6.00 | 3 | 200 | 0.020 | 32.000 | 0.030 | 10610 | 635 |
| | | 8.00 | 3 | 200 | 0.025 | 42.000 | 0.050 | 7960 | 595 |
| | | 10.00 | 3 | 250 | 0.025 | 53.000 | 0.050 | 7960 | 595 |
| | | 12.00 | 3 | 250 | 0.025 | 63.000 | 0.050 | 6630 | 495 |
| | | 16.00 | 3 | 300 | 0.030 | 84.000 | 0.050 | 5970 | 535 |
| | | 20.00 | 3 | 300 | 0.030 | 105.000 | 0.050 | 4775 | 430 |
| | | | | | | | | | |
|  | Lega per fonderia Al  | 6.00 | 3 | 180 | 0.020 | 32.000 | 0.030 | 9550 | 575 |
| | | 8.00 | 3 | 180 | 0.025 | 42.000 | 0.050 | 7160 | 535 |
| | | 10.00 | 3 | 225 | 0.025 | 53.000 | 0.050 | 7160 | 535 |
| | | 12.00 | 3 | 225 | 0.025 | 63.000 | 0.050 | 5970 | 450 |
| | | 16.00 | 3 | 270 | 0.030 | 84.000 | 0.050 | 5370 | 485 |
| | | 20.00 | 3 | 270 | 0.030 | 105.000 | 0.050 | 4295 | 385 |
| | | | | | | | | | |
|  | Alluminio malleabile Costruzione integrale Al  | 6.00 | 3 | 200 | 0.025 | 32.000 | 0.060 | 10610 | 795 |
| | | 8.00 | 3 | 200 | 0.030 | 42.000 | 0.060 | 7960 | 715 |
| | | 10.00 | 3 | 250 | 0.030 | 53.000 | 0.080 | 7960 | 715 |
| | | 12.00 | 3 | 250 | 0.030 | 63.000 | 0.080 | 6630 | 595 |
| | | 16.00 | 3 | 300 | 0.035 | 84.000 | 0.100 | 5970 | 625 |
| | | 20.00 | 3 | 300 | 0.035 | 105.000 | 0.100 | 4775 | 500 |
| | | | | | | | | | |
| | Rame non legato | 6.00 | 3 | 120 | 0.025 | 32.000 | 0.060 | 6365 | 475 |
| | | 8.00 | 3 | 120 | 0.030 | 42.000 | 0.060 | 4775 | 430 |
| | | 10.00 | 3 | 150 | 0.030 | 53.000 | 0.080 | 4775 | 430 |
| | | 12.00 | 3 | 150 | 0.030 | 63.000 | 0.080 | 3980 | 360 |
| | | 16.00 | 3 | 180 | 0.035 | 84.000 | 0.100 | 3580 | 375 |
| | | 20.00 | 3 | 180 | 0.035 | 105.000 | 0.100 | 2865 | 300 |
| | | | | | | | | | |
| | Alluminio malleabile Costruzione integrale Al | 6.00 | 3 | 150 | 0.020 | 32.000 | 0.030 | 7960 | 475 |
| | | 8.00 | 3 | 150 | 0.025 | 42.000 | 0.030 | 5970 | 450 |
| | | 10.00 | 3 | 200 | 0.025 | 53.000 | 0.040 | 6365 | 475 |
| | | 12.00 | 3 | 200 | 0.025 | 63.000 | 0.040 | 5305 | 400 |
| | | 16.00 | 3 | 250 | 0.030 | 84.000 | 0.050 | 4975 | 450 |
| | | 20.00 | 3 | 250 | 0.030 | 105.000 | 0.050 | 3980 | 360 |
| | | | | | | | | | |
| | Rame non legato | 6.00 | 3 | 90 | 0.020 | 32.000 | 0.030 | 4775 | 285 |
| | | 8.00 | 3 | 90 | 0.025 | 42.000 | 0.030 | 3580 | 270 |
| | | 10.00 | 3 | 120 | 0.025 | 53.000 | 0.040 | 3820 | 285 |
| | | 12.00 | 3 | 120 | 0.025 | 63.000 | 0.040 | 3185 | 240 |
| | | 16.00 | 3 | 150 | 0.030 | 84.000 | 0.050 | 2985 | 270 |
| | | 20.00 | 3 | 150 | 0.030 | 105.000 | 0.050 | 2385 | 215 |
| | | | | | | | | | |

Frese cilindriche AX

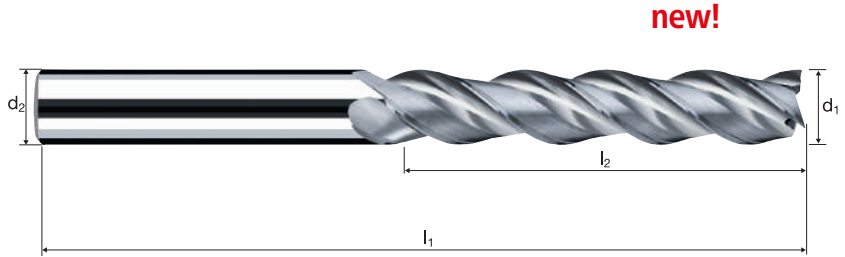
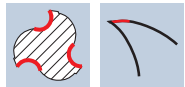
Finitura, esecuzione extralunga 5.2xd



HM
MG10 λ 40°
 γ 20°

r G2.5




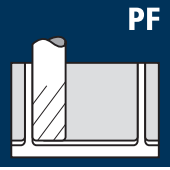

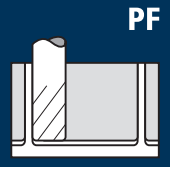
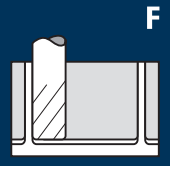

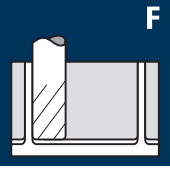
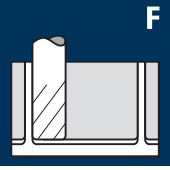

Vario



Sgrossatura Finitura

Al Aluminium > 99% Al Aluminium Alloy Al Aluminium Cast Cu Copper Plastic Thermoplast

| Esempio: N° Ordine | | Rivestimento | Articolo | Codice-ø | | | | | |
|-----------------------|----------------------|----------------------|----------------|----------------|-------|---|--------|--|--|
| | | | 15510 | 300 | | | | | |
| Ø Code | d ₁ e8 | d ₂ h6 | l ₁ | l ₂ | r | z | EUR | | |
| 300 | 6.00 | 6.00 | 73 | 32.00 | 0.150 | 3 | 134.00 | | |
| 391 | 8.00 | 8.00 | 84 | 42.00 | 0.150 | 3 | 168.00 | | |
| 450 | 10.00 | 10.00 | 100 | 53.00 | 0.200 | 3 | 228.00 | | |
| 501 | 12.00 | 12.00 | 117 | 63.00 | 0.200 | 3 | 282.00 | | |
| 610 | 16.00 | 16.00 | 144 | 84.00 | 0.200 | 3 | 441.00 | | |
| 682 | 20.00 | 20.00 | 169 | 105.00 | 0.200 | 3 | 643.00 | | |
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| Applicazione | Materiale | d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|--|--|---|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|
|  <p>PF</p> | Alluminio malleabile Costruzione integrale Al | 6.00 | 3 | 300 | 0.025 | 32.000 | 0.080 | 15915 | 1195 |
| | | 8.00 | 3 | 300 | 0.030 | 42.000 | 0.100 | 11935 | 1075 |
| | | 10.00 | 3 | 350 | 0.030 | 53.000 | 0.120 | 11140 | 1005 |
| | | 12.00 | 3 | 350 | 0.030 | 63.000 | 0.120 | 9285 | 835 |
| | | 16.00 | 3 | 400 | 0.035 | 84.000 | 0.150 | 7960 | 835 |
| | | 20.00 | 3 | 400 | 0.035 | 105.000 | 0.150 | 6365 | 670 |
| | |  | | | | | | | |
|  <p>F</p> | Lega per fonderia Al | 6.00 | 3 | 270 | 0.025 | 32.000 | 0.080 | 14325 | 1075 |
| | | 8.00 | 3 | 270 | 0.030 | 42.000 | 0.100 | 10745 | 965 |
| | | 10.00 | 3 | 315 | 0.030 | 53.000 | 0.120 | 10025 | 900 |
| | | 12.00 | 3 | 315 | 0.030 | 63.000 | 0.120 | 8355 | 750 |
| | | 16.00 | 3 | 360 | 0.035 | 84.000 | 0.150 | 7160 | 750 |
| | | 20.00 | 3 | 360 | 0.035 | 105.000 | 0.150 | 5730 | 600 |
| | |  | | | | | | | |
|  <p>F</p> | Alluminio malleabile Costruzione integrale Al | 6.00 | 3 | 200 | 0.020 | 32.000 | 0.030 | 10610 | 635 |
| | | 8.00 | 3 | 200 | 0.025 | 42.000 | 0.050 | 7960 | 595 |
| | | 10.00 | 3 | 250 | 0.025 | 53.000 | 0.050 | 7960 | 595 |
| | | 12.00 | 3 | 250 | 0.025 | 63.000 | 0.050 | 6630 | 495 |
| | | 16.00 | 3 | 300 | 0.030 | 84.000 | 0.050 | 5970 | 535 |
| | | 20.00 | 3 | 300 | 0.030 | 105.000 | 0.050 | 4775 | 430 |
| | |  | | | | | | | |
|  <p>PF</p> | Lega per fonderia Al | 6.00 | 3 | 180 | 0.020 | 32.000 | 0.030 | 9550 | 575 |
| | | 8.00 | 3 | 180 | 0.025 | 42.000 | 0.050 | 7160 | 535 |
| | | 10.00 | 3 | 225 | 0.025 | 53.000 | 0.050 | 7160 | 535 |
| | | 12.00 | 3 | 225 | 0.025 | 63.000 | 0.050 | 5970 | 450 |
| | | 16.00 | 3 | 270 | 0.030 | 84.000 | 0.050 | 5370 | 485 |
| | | 20.00 | 3 | 270 | 0.030 | 105.000 | 0.050 | 4295 | 385 |
| | |  | | | | | | | |
|  <p>PF</p> | Alluminio malleabile Costruzione integrale Al | 6.00 | 3 | 200 | 0.025 | 32.000 | 0.060 | 10610 | 795 |
| | | 8.00 | 3 | 200 | 0.030 | 42.000 | 0.060 | 7960 | 715 |
| | | 10.00 | 3 | 250 | 0.030 | 53.000 | 0.080 | 7960 | 715 |
| | | 12.00 | 3 | 250 | 0.030 | 63.000 | 0.080 | 6630 | 595 |
| | | 16.00 | 3 | 300 | 0.035 | 84.000 | 0.100 | 5970 | 625 |
| | | 20.00 | 3 | 300 | 0.035 | 105.000 | 0.100 | 4775 | 500 |
| | |  | | | | | | | |
|  <p>F</p> | Rame non legato | 6.00 | 3 | 120 | 0.025 | 32.000 | 0.060 | 6365 | 475 |
| | | 8.00 | 3 | 120 | 0.030 | 42.000 | 0.060 | 4775 | 430 |
| | | 10.00 | 3 | 150 | 0.030 | 53.000 | 0.080 | 4775 | 430 |
| | | 12.00 | 3 | 150 | 0.030 | 63.000 | 0.080 | 3980 | 360 |
| | | 16.00 | 3 | 180 | 0.035 | 84.000 | 0.100 | 3580 | 375 |
| | | 20.00 | 3 | 180 | 0.035 | 105.000 | 0.100 | 2865 | 300 |
| | |  | | | | | | | |
|  <p>F</p> | Alluminio malleabile Costruzione integrale Al | 6.00 | 3 | 150 | 0.020 | 32.000 | 0.030 | 7960 | 475 |
| | | 8.00 | 3 | 150 | 0.025 | 42.000 | 0.030 | 5970 | 450 |
| | | 10.00 | 3 | 200 | 0.025 | 53.000 | 0.040 | 6365 | 475 |
| | | 12.00 | 3 | 200 | 0.025 | 63.000 | 0.040 | 5305 | 400 |
| | | 16.00 | 3 | 250 | 0.030 | 84.000 | 0.050 | 4975 | 450 |
| | | 20.00 | 3 | 250 | 0.030 | 105.000 | 0.050 | 3980 | 360 |
| | |  | | | | | | | |
|  <p>F</p> | Rame non legato | 6.00 | 3 | 90 | 0.020 | 32.000 | 0.030 | 4775 | 285 |
| | | 8.00 | 3 | 90 | 0.025 | 42.000 | 0.030 | 3580 | 270 |
| | | 10.00 | 3 | 120 | 0.025 | 53.000 | 0.040 | 3820 | 285 |
| | | 12.00 | 3 | 120 | 0.025 | 63.000 | 0.040 | 3185 | 240 |
| | | 16.00 | 3 | 150 | 0.030 | 84.000 | 0.050 | 2985 | 270 |
| | | 20.00 | 3 | 150 | 0.030 | 105.000 | 0.050 | 2385 | 215 |
| | |  | | | | | | | |

Frese toriche AX

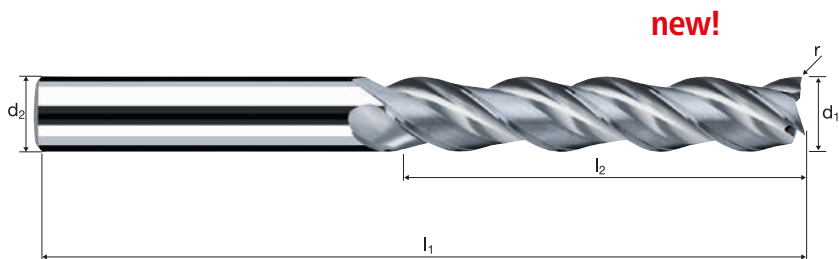
Finitura, esecuzione extralunga 5.2xd



HM λ 40°
MG10 γ 20°

G 2.5

Vario



new!

Sgrossatura **Finitura**








Al Aluminium > 99% | Al Aluminium Alloy | Al Aluminium Cast | Cu Copper | Plastic Thermoplast








| Esempio: N° Ordine | | Rivestimento | Articolo | Codice-Ø | | | | | |
|--|----------------------|----------------------|----------------|----------------|-------|---|--------|--------------|--|
| | | | 15512 | 302 | | | | 15512 | |
| Ø Code | d ₁ e8 | d ₂ h6 | l ₁ | l ₂ | r | z | EUR | | |
| 302 | 6.00 | 6.00 | 73 | 32.00 | 1.000 | 3 | 138.00 | ■ | |
| 391 | 8.00 | 8.00 | 84 | 42.00 | 1.000 | 3 | 173.00 | ■ | |
| 450 | 10.00 | 10.00 | 100 | 53.00 | 1.000 | 3 | 235.00 | ■ | |
| 501 | 12.00 | 12.00 | 117 | 63.00 | 1.000 | 3 | 290.00 | ■ | |
| 608 | 16.00 | 16.00 | 144 | 84.00 | 1.000 | 3 | 454.00 | ■ | |
| 457 | 10.00 | 10.00 | 100 | 53.00 | 2.500 | 3 | 235.00 | ■ | |
| 506 | 12.00 | 12.00 | 117 | 63.00 | 2.500 | 3 | 290.00 | ■ | |
| 612 | 16.00 | 16.00 | 144 | 84.00 | 2.500 | 3 | 454.00 | ■ | |
| 684 | 20.00 | 20.00 | 169 | 105.00 | 2.500 | 3 | 663.00 | ■ | |
| ■ Disponibilità e date di consegna su richiesta. | | | | | | | | | |



Frese per grafite

Micro con estremità emisferica




| Gambo ø 6mm, tolleranza r ±0.005 | | | | | | | | | | |
|----------------------------------|--|-----------------------|--------------|----------|------|--------------|---|----------|--|-----|
| N° 6062 |  | MicroX (MicrospherXG) | X-Generation | X | 3xd | d, 1.5 – 6.0 | C | Graphite | | 665 |
| | | | | | R | F | | | | |
| N° 6064 |  | MicroX (MicrospherXG) | X-Generation | X | 5xd | d, 0.1 – 6.0 | C | Graphite | | 667 |
| | | | | | R | F | | | | |
| N° 6066 |  | MicroX (MicrospherXG) | X-Generation | X | 8xd | d, 0.1 – 6.0 | C | Graphite | | 669 |
| | | | | | R | F | | | | |
| N° 6068 |  | MicroX (MicrospherXG) | X-Generation | X | 10xd | d, 0.2 – 6.0 | C | Graphite | | 671 |
| | | | | | R | F | | | | |
| N° 6070 |  | MicroX (MicrospherXG) | X-Generation | X | 12xd | d, 0.2 – 4.0 | C | Graphite | | 673 |
| | | | | | R | F | | | | |
| N° 6072 |  | MicroX (MicrospherXG) | X-Generation | X | 15xd | d, 0.3 – 4.0 | C | Graphite | | 675 |
| | | | | | R | F | | | | |
| N° 6074 |  | MicroX (MicrospherXG) | X-Generation | X | 20xd | d, 0.3 – 4.0 | C | Graphite | | 677 |
| | | | | | R | F | | | | |

| Gambo ø 3mm, tolleranza r ±0.01 | | | | | | | | | | |
|---------------------------------|--|----------|--------|----------|------|--------------|---|----------|--|-----|
| N° 5782 |  | Microcut | Base-X | B | 3xd | d, 0.2 – 3.0 | C | Graphite | | 679 |
| | | | | | R | F | | | | |
| N° 5784 |  | Microcut | Base-X | B | 5xd | d, 0.5 – 3.0 | C | Graphite | | 681 |
| | | | | | R | F | | | | |
| N° 5786 |  | Microcut | Base-X | B | 8xd | d, 0.5 – 3.0 | C | Graphite | | 683 |
| | | | | | R | F | | | | |
| N° 5787 |  | Microcut | Base-X | B | 10xd | d, 0.5 – 3.0 | C | Graphite | | 685 |
| | | | | | R | F | | | | |
| N° 5791 |  | Microcut | Base-X | B | 12xd | d, 1.0 – 3.0 | C | Graphite | | 687 |
| | | | | | R | F | | | | |
| N° 5793 |  | Microcut | Base-X | B | 15xd | d, 1.0 – 3.0 | C | Graphite | | 689 |
| | | | | | R | F | | | | |
| N° 15795 |  | Microcut | Base-X | B | 20xd | d, 1.0 – 3.0 | C | Graphite | | 691 |
| | | | | | R | F | | | | |

Frese per grafite





Micro torico

| Gambo ø 6mm, tolleranza r ±0.005 | | | | | | | | | |
|----------------------------------|--|-----------------------------|--------------------------|-------------|--------------------------|----------------------|--|--|-----|
| N° 6032 |  | MicroX (MicrotoroXG) | X-Generation X | 3xd | r 0,2, 0,5 | C Graphite | | | 693 |
| | | | | R | | | | | |
| N° 6034 |  | MicroX (MicrotoroXG) | X-Generation X | 5xd | r 0,05, 0,1, 0,2, 0,5 | C Graphite | | | 695 |
| | | | | R | | | | | |
| N° 6036 |  | MicroX (MicrotoroXG) | X-Generation X | 8xd | r 0,05, 0,1, 0,2, 0,5 | C Graphite | | | 699 |
| | | | | R | | | | | |
| N° 6038 |  | MicroX (MicrotoroXG) | X-Generation X | 10xd | r 0,05, 0,1, 0,2, 0,5 | C Graphite | | | 703 |
| | | | | R | | | | | |
| N° 6040 |  | MicroX (MicrotoroXG) | X-Generation X | 12xd | r 0,05, 0,1, 0,2, 0,5 | C Graphite | | | 707 |
| | | | | R | | | | | |
| N° 6042 |  | MicroX (MicrotoroXG) | X-Generation X | 15xd | r 0,05, 0,1, 0,2, 0,5 | C Graphite | | | 709 |
| | | | | R | | | | | |
| N° 6044 |  | MicroX (MicrotoroXG) | X-Generation X | 20xd | r 0,05, 0,1, 0,2, 0,5 | C Graphite | | | 711 |
| | | | | R | | | | | |

| Gambo ø 3mm, tolleranza r 0/+0.03 | | | | | | | | | |
|-----------------------------------|--|-----------------|--------------------|------------|-------|----------------------|--|--|-----|
| N° 5752 |  | Microcut | Base-X B | 3xd | r 0,2 | C Graphite | | | 713 |
| | | | | R | | | | | |
| N° 5754 |  | Microcut | Base-X B | 5xd | r 0,2 | C Graphite | | | 715 |
| | | | | R | | | | | |
| N° 5756 |  | Microcut | Base-X B | 8xd | r 0,2 | C Graphite | | | 717 |
| | | | | R | | | | | |



Frese per grafite

Micro, cilindrico

| Gambo ø 3mm | | | | | | | | |
|-------------|--|----------|--------------------|-------------------|--------------|----------------------|--|-----|
| N° 5712 |  | Microcut | Base-X B | 3xd | d, 0.2 – 3.0 | C Graphite | | 719 |
| | | | | R F | 45° | | | |
| N° 5714 |  | Microcut | Base-X B | 5xd | d, 0.5 – 3.0 | C Graphite | | 721 |
| | | | | R F | 45° | | | |
| N° 5716 |  | Microcut | Base-X B | 8xd | d, 0.5 – 3.0 | C Graphite | | 723 |
| | | | | R F | 45° | | | |
| N° 5717 |  | Microcut | Base-X B | 10xd | d, 0.5 – 3.0 | C Graphite | | 725 |
| | | | | R F | 45° | | | |

Frese per grafite

Estremità emisferica

| Tolleranza r ±0.005 | | | | | | | | | |
|---------------------|--|---------------------------|--------------------------|------------|-----------------------|----------------------|--|--|-----|
| N° 7484 |  | SpheroX (SpheroXG) | X-Generation X | 6xd | d ₁ 6 – 12 | C Graphite | | | 727 |
| | | | | R | F | | | | |
| N° 7488 |  | SpheroX (SpheroXG) | X-Generation X | 9xd | d ₁ 6 – 12 | C Graphite | | | 729 |
| | | | | R | F | | | | |

Frese per grafite Torico

Tolleranza r ± 0.005

N° 7284

ToroX (ToroXG)



X-Generation

X

6xd

r 0.5, 1.0

R

F

C

Graphite

731

N° 7288

ToroX (ToroXG)



X-Generation

X

9xd

r 0.5, 1.0

R

F

C

Graphite

733

Tolleranza r 0/+0.03

N° 5640



Base-X

B

r 0.15, 0.2,
0.3, 0.5

R

F

C

Graphite

735

N° 5645



Base-X

B

r 0.15, 0.2,
0.3, 0.5

R

F

C

Graphite

737

N° 5650



Base-X

B

r 0.5

R

F

C

Graphite

739

IV

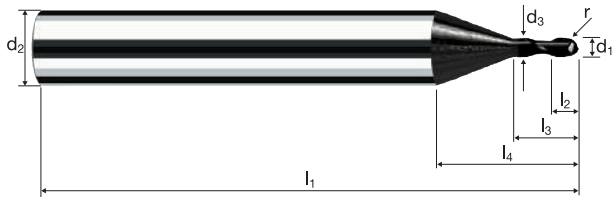
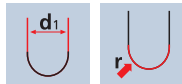
| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=15000 min vf [mm/min] | n=25000 min vf [mm/min] | n=30000 min vf [mm/min] | n=45000 min vf [mm/min] |
|--------------|---------------------------------|------------|---|------------------------|------------------------|------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| | Grafite B B | 1.50 | 2 | 0.018 | 0.750 | 0.900 | 540 | 900 | 1080 | 1620 |
| | | 2.00 | 2 | 0.024 | 1.000 | 1.200 | 720 | 1200 | 1440 | 2160 |
| | | 3.00 | 2 | 0.035 | 1.500 | 1.800 | 1050 | 1750 | 2100 | 3150 |
| | | 4.00 | 2 | 0.047 | 2.000 | 2.400 | 1410 | 2350 | 2820 | 4230 |
| | | 5.00 | 2 | 0.059 | 2.500 | 3.000 | 1770 | 2950 | 3540 | 5310 |
| | | 6.00 | 2 | 0.071 | 3.000 | 3.600 | 2130 | 3550 | 4260 | 6390 |
| | Grafite B B | 1.50 | 2 | 0.014 | 0.750 | 1.500 | 420 | 700 | 840 | 1260 |
| | | 2.00 | 2 | 0.018 | 1.000 | 2.000 | 540 | 900 | 1080 | 1620 |
| | | 3.00 | 2 | 0.027 | 1.500 | 3.000 | 810 | 1350 | 1620 | 2430 |
| | | 4.00 | 2 | 0.036 | 2.000 | 4.000 | 1080 | 1800 | 2160 | 3240 |
| | | 5.00 | 2 | 0.045 | 2.500 | 5.000 | 1350 | 2250 | 2700 | 4050 |
| | | 6.00 | 2 | 0.055 | 3.000 | 6.000 | 1650 | 2750 | 3300 | 4950 |
| | Grafite B B | 1.50 | 2 | 0.020 | 0.230 | 0.300 | 600 | 1000 | 1200 | 1800 |
| | | 2.00 | 2 | 0.027 | 0.300 | 0.400 | 810 | 1350 | 1620 | 2430 |
| | | 3.00 | 2 | 0.040 | 0.450 | 0.600 | 1200 | 2000 | 2400 | 3600 |
| | | 4.00 | 2 | 0.053 | 0.600 | 0.800 | 1590 | 2650 | 3180 | 4770 |
| | | 5.00 | 2 | 0.067 | 0.750 | 1.000 | 2010 | 3350 | 4020 | 6030 |
| | | 6.00 | 2 | 0.080 | 0.900 | 1.200 | 2400 | 4000 | 4800 | 7200 |
| | Grafite B B | 1.50 | 2 | 0.020 | 0.300 | 0.300 | 600 | 1000 | 1200 | 1800 |
| | | 2.00 | 2 | 0.027 | 0.400 | 0.400 | 810 | 1350 | 1620 | 2430 |
| | | 3.00 | 2 | 0.040 | 0.600 | 0.600 | 1200 | 2000 | 2400 | 3600 |
| | | 4.00 | 2 | 0.053 | 0.800 | 0.800 | 1590 | 2650 | 3180 | 4770 |
| | | 5.00 | 2 | 0.067 | 1.000 | 1.000 | 2010 | 3350 | 4020 | 6030 |
| | | 6.00 | 2 | 0.080 | 1.200 | 1.200 | 2400 | 4000 | 4800 | 7200 |

Frese con estremità emisferica MicroX (MicrospheroXG)

Gambo ø 6mm, scarico cilindrico, 3xd



HM λ 30°
XA γ 15°



| | | | | | | | | | | | |
|--|--|--|--|----------------------|--|--|--|--|--|--|--|
| | | | | C Graphite | | | | | | | CF / GF Fiber Reinforced Plastics |
|--|--|--|--|----------------------|--|--|--|--|--|--|--|



| | | | | | | | | | | | | DIAPLUS |
|--------------------|----------------|----------------------------------|----------------|----------------|----------------|----------------|----------------|-------------|---|---|--|---------|
| Esempio: N° Ordine | | | | | | | | | | | | B6062 |
| | | | | | | | | | | | | EUR |
| | d ₁ | d ₂ h ₄ | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.005 | α | z | | |
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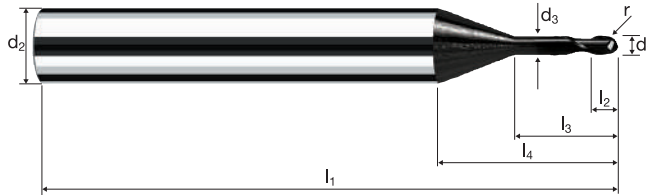
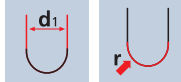
| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=15000 min vf [mm/min] | n=25000 min vf [mm/min] | n=30000 min vf [mm/min] | n=45000 min vf [mm/min] |
|--------------|---------------------------------|------------|---|------------------------|------------------------|------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| | Grafite B B | 0.20 | 2 | 0.002 | 0.100 | 0.100 | 60 | 100 | 120 | 180 |
| | | 0.50 | 2 | 0.006 | 0.250 | 0.300 | 180 | 300 | 360 | 540 |
| | | 0.80 | 2 | 0.009 | 0.350 | 0.500 | 270 | 450 | 540 | 810 |
| | | 1.00 | 2 | 0.012 | 0.450 | 0.600 | 360 | 600 | 720 | 1080 |
| | | 2.00 | 2 | 0.024 | 0.900 | 1.200 | 720 | 1200 | 1440 | 2160 |
| | | 3.00 | 2 | 0.035 | 1.350 | 1.800 | 1050 | 1750 | 2100 | 3150 |
| | | 4.00 | 2 | 0.047 | 1.800 | 2.400 | 1410 | 2350 | 2820 | 4230 |
| | | 5.00 | 2 | 0.059 | 2.250 | 3.000 | 1770 | 2950 | 3540 | 5310 |
| | | 6.00 | 2 | 0.071 | 2.700 | 3.600 | 2130 | 3550 | 4260 | 6390 |
| | Grafite B B | 0.20 | 2 | 0.002 | 0.100 | 0.200 | 60 | 100 | 120 | 180 |
| | | 0.50 | 2 | 0.005 | 0.250 | 0.500 | 150 | 250 | 300 | 450 |
| | | 0.80 | 2 | 0.007 | 0.350 | 0.800 | 210 | 350 | 420 | 630 |
| | | 1.00 | 2 | 0.009 | 0.450 | 1.000 | 270 | 450 | 540 | 810 |
| | | 2.00 | 2 | 0.018 | 0.900 | 2.000 | 540 | 900 | 1080 | 1620 |
| | | 3.00 | 2 | 0.027 | 1.350 | 3.000 | 810 | 1350 | 1620 | 2430 |
| | | 4.00 | 2 | 0.036 | 1.800 | 4.000 | 1080 | 1800 | 2160 | 3240 |
| | | 5.00 | 2 | 0.045 | 2.250 | 5.000 | 1350 | 2250 | 2700 | 4050 |
| | | 6.00 | 2 | 0.055 | 2.700 | 6.000 | 1650 | 2750 | 3300 | 4950 |
| | Grafite B B | 0.20 | 2 | 0.003 | 0.030 | 0.040 | 90 | 150 | 180 | 270 |
| | | 0.50 | 2 | 0.007 | 0.070 | 0.100 | 210 | 350 | 420 | 630 |
| | | 0.80 | 2 | 0.011 | 0.110 | 0.160 | 330 | 550 | 660 | 990 |
| | | 1.00 | 2 | 0.013 | 0.140 | 0.200 | 390 | 650 | 780 | 1170 |
| | | 2.00 | 2 | 0.027 | 0.280 | 0.400 | 810 | 1350 | 1620 | 2430 |
| | | 3.00 | 2 | 0.040 | 0.420 | 0.600 | 1200 | 2000 | 2400 | 3600 |
| | | 4.00 | 2 | 0.053 | 0.560 | 0.800 | 1590 | 2650 | 3180 | 4770 |
| | | 5.00 | 2 | 0.067 | 0.700 | 1.000 | 2010 | 3350 | 4020 | 6030 |
| | | 6.00 | 2 | 0.080 | 0.840 | 1.200 | 2400 | 4000 | 4800 | 7200 |
| | Grafite B B | 0.20 | 2 | 0.003 | 0.040 | 0.040 | 90 | 150 | 180 | 270 |
| | | 0.50 | 2 | 0.007 | 0.090 | 0.090 | 210 | 350 | 420 | 630 |
| | | 0.80 | 2 | 0.011 | 0.140 | 0.140 | 330 | 550 | 660 | 990 |
| | | 1.00 | 2 | 0.013 | 0.180 | 0.180 | 390 | 650 | 780 | 1170 |
| | | 2.00 | 2 | 0.027 | 0.360 | 0.360 | 810 | 1350 | 1620 | 2430 |
| | | 3.00 | 2 | 0.040 | 0.540 | 0.540 | 1200 | 2000 | 2400 | 3600 |
| | | 4.00 | 2 | 0.053 | 0.720 | 0.720 | 1590 | 2650 | 3180 | 4770 |
| | | 5.00 | 2 | 0.067 | 0.900 | 0.900 | 2010 | 3350 | 4020 | 6030 |
| | | 6.00 | 2 | 0.080 | 1.080 | 1.080 | 2400 | 4000 | 4800 | 7200 |

Frese con estremità emisferica MicroX (MicrospheroXG)

Gambo ø 6mm, scarico cilindrico, 5xd



| | |
|----|---------------|
| HM | λ 30° |
| XA | γ 15° |



| | | | | | | | | | | | |
|--|--|--|--|---------------|--|--|--|--|--|--|---------------------------------------|
| | | | | C Graphite | | | | | | | CF/GF Fiber Reinforced Plastics |
|--|--|--|--|---------------|--|--|--|--|--|--|---------------------------------------|

IV

| Esempio: N° Ordine | | | | | | | | | | | DIAPLUS |
|--------------------------------|----------------|----------------------------------|----------------|----------------|----------------|----------------|----------------|-------------|-------|---|---------|
| Rivestimento Articolo Codice-ø | | | | | | | | | | | |
| B 6064 010 | | | | | | | | | | | B6064 |
| Ø Code | d ₁ | d ₂ h ₄ | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.005 | α | z | EUR |
| 010 | 0.10 | 6.00 | 0.09 | 57 | 0.10 | 0.50 | 17.70 | 0.050 | 14.5° | 2 | 134.00 |
| 015 | 0.15 | 6.00 | 0.13 | 57 | 0.15 | 0.75 | 17.83 | 0.075 | 14.2° | 2 | 134.00 |
| 020 | 0.20 | 6.00 | 0.18 | 57 | 0.20 | 1.00 | 17.94 | 0.100 | 13.9° | 2 | 108.00 |
| 030 | 0.30 | 6.00 | 0.25 | 57 | 0.30 | 1.50 | 18.24 | 0.150 | 13.8° | 2 | 98.00 |
| 040 | 0.40 | 6.00 | 0.35 | 57 | 0.40 | 2.00 | 18.46 | 0.200 | 12.8° | 2 | 98.00 |
| 050 | 0.50 | 6.00 | 0.45 | 57 | 0.50 | 2.50 | 13.51 | 0.250 | 12.3° | 2 | 98.00 |
| 060 | 0.60 | 6.00 | 0.55 | 57 | 0.60 | 3.00 | 13.83 | 0.300 | 11.9° | 2 | 98.00 |
| 080 | 0.80 | 6.00 | 0.75 | 57 | 0.80 | 4.00 | 14.45 | 0.400 | 11.0° | 2 | 98.00 |
| 100 | 1.00 | 6.00 | 0.95 | 57 | 1.00 | 5.00 | 15.08 | 0.500 | 10.2° | 2 | 98.00 |
| 120 | 1.50 | 6.00 | 1.40 | 57 | 1.50 | 7.50 | 16.74 | 0.750 | 8.4° | 2 | 98.00 |
| 140 | 2.00 | 6.00 | 1.90 | 57 | 2.00 | 10.00 | 18.31 | 1.000 | 6.9° | 2 | 98.00 |
| 180 | 3.00 | 6.00 | 2.80 | 57 | 3.00 | 15.00 | 21.63 | 1.500 | 4.4° | 2 | 98.00 |
| 182 | 3.00 | 6.00 | 2.80 | 61 | 3.00 | 18.00 | 24.63 | 1.500 | 3.9° | 2 | 98.00 |
| 220 | 4.00 | 6.00 | 3.70 | 61 | 4.00 | 20.00 | 24.95 | 2.000 | 2.6° | 2 | 104.00 |
| 222 | 4.00 | 6.00 | 3.70 | 66 | 4.00 | 25.00 | 29.95 | 2.000 | 2.2° | 2 | 113.00 |
| 260 | 5.00 | 6.00 | 4.60 | 66 | 5.00 | 25.00 | 28.27 | 2.500 | 1.2° | 2 | 120.00 |
| 300 | 6.00 | 6.00 | 5.50 | 69 | 6.00 | 29.34 | 30.00 | 3.000 | 0.0° | 2 | 126.00 |
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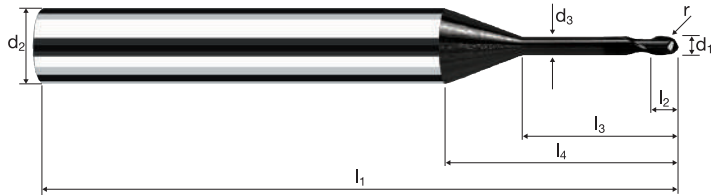
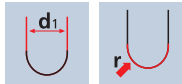
| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=15000 min vf [mm/min] | n=25000 min vf [mm/min] | n=30000 min vf [mm/min] | n=45000 min vf [mm/min] |
|--------------|---------------------------------|------------|-------|------------------------|------------------------|------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| | Grafite B B | 0.20 | 2 | 0.002 | 0.100 | 0.100 | 60 | 100 | 120 | 180 |
| | | 0.50 | 2 | 0.006 | 0.200 | 0.300 | 180 | 300 | 360 | 540 |
| | | 0.80 | 2 | 0.009 | 0.300 | 0.500 | 270 | 450 | 540 | 810 |
| | | 1.00 | 2 | 0.012 | 0.400 | 0.600 | 360 | 600 | 720 | 1080 |
| | | 2.00 | 2 | 0.024 | 0.800 | 1.200 | 720 | 1200 | 1440 | 2160 |
| | | 3.00 | 2 | 0.035 | 1.200 | 1.800 | 1050 | 1750 | 2100 | 3150 |
| | | 4.00 | 2 | 0.047 | 1.600 | 2.400 | 1410 | 2350 | 2820 | 4230 |
| | | 5.00 | 2 | 0.059 | 2.000 | 3.000 | 1770 | 2950 | 3540 | 5310 |
| 6.00 | 2 | 0.071 | 2.400 | 3.600 | 2130 | 3550 | 4260 | 6390 | | |
| | Grafite B B | 0.20 | 2 | 0.002 | 0.100 | 0.200 | 60 | 100 | 120 | 180 |
| | | 0.50 | 2 | 0.005 | 0.200 | 0.500 | 150 | 250 | 300 | 450 |
| | | 0.80 | 2 | 0.007 | 0.300 | 0.800 | 210 | 350 | 420 | 630 |
| | | 1.00 | 2 | 0.009 | 0.400 | 1.000 | 270 | 450 | 540 | 810 |
| | | 2.00 | 2 | 0.018 | 0.800 | 2.000 | 540 | 900 | 1080 | 1620 |
| | | 3.00 | 2 | 0.027 | 1.200 | 3.000 | 810 | 1350 | 1620 | 2430 |
| | | 4.00 | 2 | 0.036 | 1.600 | 4.000 | 1080 | 1800 | 2160 | 3240 |
| | | 5.00 | 2 | 0.045 | 2.000 | 5.000 | 1350 | 2250 | 2700 | 4050 |
| 6.00 | 2 | 0.055 | 2.400 | 6.000 | 1650 | 2750 | 3300 | 4950 | | |
| | Grafite B B | 0.20 | 2 | 0.003 | 0.020 | 0.040 | 90 | 150 | 180 | 270 |
| | | 0.50 | 2 | 0.007 | 0.060 | 0.090 | 210 | 350 | 420 | 630 |
| | | 0.80 | 2 | 0.011 | 0.100 | 0.140 | 330 | 550 | 660 | 990 |
| | | 1.00 | 2 | 0.013 | 0.120 | 0.180 | 390 | 650 | 780 | 1170 |
| | | 2.00 | 2 | 0.027 | 0.240 | 0.360 | 810 | 1350 | 1620 | 2430 |
| | | 3.00 | 2 | 0.040 | 0.360 | 0.540 | 1200 | 2000 | 2400 | 3600 |
| | | 4.00 | 2 | 0.053 | 0.480 | 0.720 | 1590 | 2650 | 3180 | 4770 |
| | | 5.00 | 2 | 0.067 | 0.600 | 0.900 | 2010 | 3350 | 4020 | 6030 |
| 6.00 | 2 | 0.080 | 0.720 | 1.080 | 2400 | 4000 | 4800 | 7200 | | |
| | Grafite B B | 0.20 | 2 | 0.003 | 0.030 | 0.030 | 90 | 150 | 180 | 270 |
| | | 0.50 | 2 | 0.007 | 0.080 | 0.080 | 210 | 350 | 420 | 630 |
| | | 0.80 | 2 | 0.011 | 0.130 | 0.130 | 330 | 550 | 660 | 990 |
| | | 1.00 | 2 | 0.013 | 0.160 | 0.160 | 390 | 650 | 780 | 1170 |
| | | 2.00 | 2 | 0.027 | 0.320 | 0.320 | 810 | 1350 | 1620 | 2430 |
| | | 3.00 | 2 | 0.040 | 0.480 | 0.480 | 1200 | 2000 | 2400 | 3600 |
| | | 4.00 | 2 | 0.053 | 0.640 | 0.640 | 1590 | 2650 | 3180 | 4770 |
| | | 5.00 | 2 | 0.067 | 0.800 | 0.800 | 2010 | 3350 | 4020 | 6030 |
| 6.00 | 2 | 0.080 | 0.960 | 0.960 | 2400 | 4000 | 4800 | 7200 | | |

Frese con estremità emisferica MicroX (MicrospheroXG)

Gambo ø 6mm, scarico cilindrico, 8xd



HM λ 30°
XA γ 15°



| | | | | | | | | | | |
|--|--|--|--|---------------|--|--|--|--|--|---------------------------------------|
| | | | | C Graphite | | | | | | CF/GF Fiber Reinforced Plastics |
|--|--|--|--|---------------|--|--|--|--|--|---------------------------------------|

IV

| Esempio: N° Ordine | | | | | | | | | | | DIAPLUS |
|--|----------------|----------------------------------|----------------|----------------|----------------|----------------|----------------|-------------|-------|---|---------|
| Rivestimento B Articolo 6066 Codice-ø 010 | | | | | | | | | | | |
| Ø Code | d ₁ | d ₂ h ₄ | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.005 | α | z | EUR |
| 010 | 0.10 | 6.00 | 0.09 | 57 | 0.10 | 0.80 | 18.00 | 0.050 | 14.1° | 2 | 134.00 |
| 015 | 0.15 | 6.00 | 0.13 | 57 | 0.15 | 1.20 | 18.28 | 0.075 | 13.7° | 2 | 134.00 |
| 020 | 0.20 | 6.00 | 0.18 | 57 | 0.20 | 1.60 | 18.54 | 0.100 | 13.2° | 2 | 108.00 |
| 030 | 0.30 | 6.00 | 0.25 | 57 | 0.30 | 2.40 | 19.14 | 0.150 | 12.4° | 2 | 98.00 |
| 040 | 0.40 | 6.00 | 0.35 | 57 | 0.40 | 3.20 | 19.66 | 0.200 | 11.7° | 2 | 98.00 |
| 050 | 0.50 | 6.00 | 0.45 | 57 | 0.50 | 4.00 | 15.01 | 0.250 | 11.1° | 2 | 98.00 |
| 060 | 0.60 | 6.00 | 0.55 | 57 | 0.60 | 4.80 | 15.63 | 0.300 | 10.5° | 2 | 98.00 |
| 080 | 0.80 | 6.00 | 0.75 | 57 | 0.80 | 6.40 | 16.85 | 0.400 | 9.4° | 2 | 98.00 |
| 100 | 1.00 | 6.00 | 0.95 | 57 | 1.00 | 8.00 | 18.08 | 0.500 | 8.4° | 2 | 98.00 |
| 120 | 1.50 | 6.00 | 1.40 | 57 | 1.50 | 12.00 | 21.24 | 0.750 | 6.5° | 2 | 98.00 |
| 140 | 2.00 | 6.00 | 1.90 | 61 | 2.00 | 16.00 | 24.31 | 1.000 | 5.1° | 2 | 98.00 |
| 180 | 3.00 | 6.00 | 2.80 | 66 | 3.00 | 24.00 | 30.63 | 1.500 | 3.1° | 2 | 107.00 |
| 220 | 4.00 | 6.00 | 3.70 | 75 | 4.00 | 32.00 | 36.95 | 2.000 | 1.7° | 2 | 119.00 |
| 260 | 5.00 | 6.00 | 4.60 | 80 | 5.00 | 40.00 | 43.27 | 2.500 | 0.8° | 2 | 125.00 |
| 300 | 6.00 | 6.00 | 5.50 | 87 | 6.00 | 47.34 | 48.00 | 3.000 | 0.0° | 2 | 136.00 |
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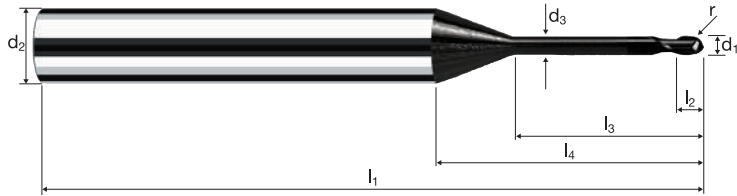
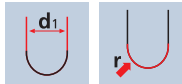
| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=15000 min vf [mm/min] | n=25000 min vf [mm/min] | n=30000 min vf [mm/min] | n=45000 min vf [mm/min] |
|--------------|-------------|------------|-------|------------------------|------------------------|------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| | Grafite | 0.20 | 2 | 0.002 | 0.080 | 0.080 | 60 | 100 | 120 | 180 |
| | | 0.50 | 2 | 0.006 | 0.200 | 0.200 | 180 | 300 | 360 | 540 |
| | | 0.80 | 2 | 0.009 | 0.300 | 0.300 | 270 | 450 | 540 | 810 |
| | | 1.00 | 2 | 0.012 | 0.400 | 0.400 | 360 | 600 | 720 | 1080 |
| | | 2.00 | 2 | 0.024 | 0.800 | 0.800 | 720 | 1200 | 1440 | 2160 |
| | | 3.00 | 2 | 0.035 | 1.200 | 1.200 | 1050 | 1750 | 2100 | 3150 |
| | | 4.00 | 2 | 0.047 | 1.600 | 1.600 | 1410 | 2350 | 2820 | 4230 |
| | | 5.00 | 2 | 0.059 | 2.000 | 2.000 | 1770 | 2950 | 3540 | 5310 |
| 6.00 | 2 | 0.071 | 2.400 | 2.400 | 2130 | 3550 | 4260 | 6390 | | |
| | Grafite | 0.20 | 2 | 0.001 | 0.060 | 0.200 | 30 | 50 | 60 | 90 |
| | | 0.50 | 2 | 0.004 | 0.150 | 0.500 | 120 | 200 | 240 | 360 |
| | | 0.80 | 2 | 0.006 | 0.250 | 0.800 | 180 | 300 | 360 | 540 |
| | | 1.00 | 2 | 0.007 | 0.300 | 1.000 | 210 | 350 | 420 | 630 |
| | | 2.00 | 2 | 0.015 | 0.600 | 2.000 | 450 | 750 | 900 | 1350 |
| | | 3.00 | 2 | 0.022 | 0.900 | 3.000 | 660 | 1100 | 1320 | 1980 |
| | | 4.00 | 2 | 0.029 | 1.200 | 4.000 | 870 | 1450 | 1740 | 2610 |
| | | 5.00 | 2 | 0.036 | 1.500 | 5.000 | 1080 | 1800 | 2160 | 3240 |
| 6.00 | 2 | 0.044 | 1.800 | 6.000 | 1320 | 2200 | 2640 | 3960 | | |
| | Grafite | 0.20 | 2 | 0.003 | 0.020 | 0.030 | 90 | 150 | 180 | 270 |
| | | 0.50 | 2 | 0.007 | 0.050 | 0.080 | 210 | 350 | 420 | 630 |
| | | 0.80 | 2 | 0.011 | 0.080 | 0.130 | 330 | 550 | 660 | 990 |
| | | 1.00 | 2 | 0.013 | 0.100 | 0.160 | 390 | 650 | 780 | 1170 |
| | | 2.00 | 2 | 0.027 | 0.200 | 0.320 | 810 | 1350 | 1620 | 2430 |
| | | 3.00 | 2 | 0.040 | 0.300 | 0.480 | 1200 | 2000 | 2400 | 3600 |
| | | 4.00 | 2 | 0.053 | 0.400 | 0.640 | 1590 | 2650 | 3180 | 4770 |
| | | 5.00 | 2 | 0.067 | 0.500 | 0.800 | 2010 | 3350 | 4020 | 6030 |
| 6.00 | 2 | 0.080 | 0.600 | 0.960 | 2400 | 4000 | 4800 | 7200 | | |
| | Grafite | 0.20 | 2 | 0.003 | 0.030 | 0.030 | 90 | 150 | 180 | 270 |
| | | 0.50 | 2 | 0.007 | 0.070 | 0.070 | 210 | 350 | 420 | 630 |
| | | 0.80 | 2 | 0.011 | 0.110 | 0.110 | 330 | 550 | 660 | 990 |
| | | 1.00 | 2 | 0.013 | 0.140 | 0.140 | 390 | 650 | 780 | 1170 |
| | | 2.00 | 2 | 0.027 | 0.280 | 0.280 | 810 | 1350 | 1620 | 2430 |
| | | 3.00 | 2 | 0.040 | 0.420 | 0.420 | 1200 | 2000 | 2400 | 3600 |
| | | 4.00 | 2 | 0.053 | 0.560 | 0.560 | 1590 | 2650 | 3180 | 4770 |
| | | 5.00 | 2 | 0.067 | 0.700 | 0.700 | 2010 | 3350 | 4020 | 6030 |
| 6.00 | 2 | 0.080 | 0.840 | 0.840 | 2400 | 4000 | 4800 | 7200 | | |

Frese con estremità emisferica MicroX (MicrospheroXG)

Gambo ø 6mm, scarico cilindrico, 10xd



HM λ 30°
XA γ 15°



C Graphite CF/GF Fiber Reinforced Plastics

IV

| Esempio: N° Ordine B 6068 020 | | | | | | | | | | | DIAPLUS |
|--|----------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------------|-------|---|---------|
| Rivestimento B Articolo 6068 Codice-ø 020 | | | | | | | | | | | B6068 |
| Ø Code | d ₁ | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.005 | α | z | EUR |
| 020 | 0.20 | 6.00 | 0.18 | 57 | 0.20 | 2.00 | 18.94 | 0.100 | 12.8° | 2 | 108.00 |
| 030 | 0.30 | 6.00 | 0.25 | 57 | 0.30 | 3.00 | 19.74 | 0.150 | 11.9° | 2 | 98.00 |
| 040 | 0.40 | 6.00 | 0.35 | 57 | 0.40 | 4.00 | 20.46 | 0.200 | 11.1° | 2 | 98.00 |
| 050 | 0.50 | 6.00 | 0.45 | 57 | 0.50 | 5.00 | 16.01 | 0.250 | 10.3° | 2 | 98.00 |
| 060 | 0.60 | 6.00 | 0.55 | 57 | 0.60 | 6.00 | 16.83 | 0.300 | 9.7° | 2 | 98.00 |
| 080 | 0.80 | 6.00 | 0.75 | 57 | 0.80 | 8.00 | 18.45 | 0.400 | 8.5° | 2 | 98.00 |
| 100 | 1.00 | 6.00 | 0.95 | 57 | 1.00 | 10.00 | 20.08 | 0.500 | 7.5° | 2 | 98.00 |
| 120 | 1.50 | 6.00 | 1.40 | 61 | 1.50 | 15.00 | 24.24 | 0.750 | 5.7° | 2 | 98.00 |
| 140 | 2.00 | 6.00 | 1.90 | 66 | 2.00 | 20.00 | 28.31 | 1.000 | 4.3° | 2 | 98.00 |
| 180 | 3.00 | 6.00 | 2.80 | 75 | 3.00 | 30.00 | 36.63 | 1.500 | 2.5° | 2 | 112.00 |
| 220 | 4.00 | 6.00 | 3.70 | 80 | 4.00 | 40.00 | 44.95 | 2.000 | 1.4° | 2 | 119.00 |
| 260 | 5.00 | 6.00 | 4.60 | 100 | 5.00 | 50.00 | 53.27 | 2.500 | 0.6° | 2 | 129.00 |
| 300 | 6.00 | 6.00 | 5.50 | 100 | 6.00 | 59.34 | 60.00 | 3.000 | 0.0° | 2 | 136.00 |
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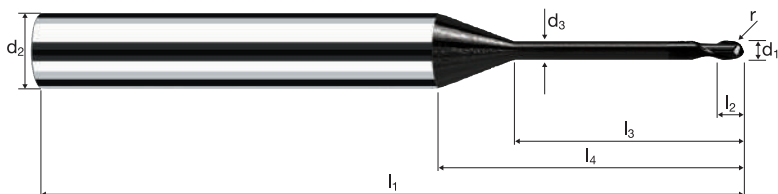
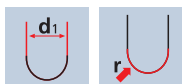
| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=15000 min vf [mm/min] | n=25000 min vf [mm/min] | n=30000 min vf [mm/min] | n=45000 min vf [mm/min] |
|--------------|---------------------------------|------------|---------------------------------|------------------------|------------------------|------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| | Grafite B B | 0.20 | 2 | 0.002 | 0.060 | 0.080 | 60 | 100 | 120 | 180 |
| | | 0.50 | 2 | 0.005 | 0.150 | 0.200 | 150 | 250 | 300 | 450 |
| | | 0.60 | 2 | 0.006 | 0.200 | 0.250 | 180 | 300 | 360 | 540 |
| | | 0.80 | 2 | 0.008 | 0.250 | 0.300 | 240 | 400 | 480 | 720 |
| | | 1.00 | 2 | 0.009 | 0.300 | 0.400 | 270 | 450 | 540 | 810 |
| | | 1.50 | 2 | 0.014 | 0.450 | 0.600 | 420 | 700 | 840 | 1260 |
| | | 2.00 | 2 | 0.019 | 0.600 | 0.800 | 570 | 950 | 1140 | 1710 |
| | | 3.00 | 2 | 0.028 | 0.900 | 1.200 | 840 | 1400 | 1680 | 2520 |
| | | 4.00 | 2 | 0.038 | 1.200 | 1.600 | 1140 | 1900 | 2280 | 3420 |
| | | | Grafite B B | 0.20 | 2 | 0.001 | 0.040 | 0.200 | 30 | 50 |
| 0.50 | 2 | | | 0.004 | 0.100 | 0.500 | 120 | 200 | 240 | 360 |
| 0.60 | 2 | | | 0.004 | 0.100 | 0.600 | 120 | 200 | 240 | 360 |
| 0.80 | 2 | | | 0.006 | 0.150 | 0.800 | 180 | 300 | 360 | 540 |
| 1.00 | 2 | | | 0.007 | 0.200 | 1.000 | 210 | 350 | 420 | 630 |
| 1.50 | 2 | | | 0.011 | 0.300 | 1.500 | 330 | 550 | 660 | 990 |
| 2.00 | 2 | | | 0.015 | 0.400 | 2.000 | 450 | 750 | 900 | 1350 |
| 3.00 | 2 | | | 0.022 | 0.600 | 3.000 | 660 | 1100 | 1320 | 1980 |
| 4.00 | 2 | | | 0.029 | 0.800 | 4.000 | 870 | 1450 | 1740 | 2610 |
| | Grafite B B | | | 0.20 | 2 | 0.002 | 0.020 | 0.030 | 60 | 100 |
| | | 0.50 | 2 | 0.005 | 0.050 | 0.070 | 150 | 250 | 300 | 450 |
| | | 0.60 | 2 | 0.006 | 0.060 | 0.080 | 180 | 300 | 360 | 540 |
| | | 0.80 | 2 | 0.009 | 0.080 | 0.110 | 270 | 450 | 540 | 810 |
| | | 1.00 | 2 | 0.011 | 0.100 | 0.140 | 330 | 550 | 660 | 990 |
| | | 1.50 | 2 | 0.016 | 0.150 | 0.210 | 480 | 800 | 960 | 1440 |
| | | 2.00 | 2 | 0.021 | 0.200 | 0.280 | 630 | 1050 | 1260 | 1890 |
| | | 3.00 | 2 | 0.032 | 0.300 | 0.420 | 960 | 1600 | 1920 | 2880 |
| | | 4.00 | 2 | 0.043 | 0.400 | 0.560 | 1290 | 2150 | 2580 | 3870 |
| | | | Grafite B B | 0.20 | 2 | 0.002 | 0.020 | 0.020 | 60 | 100 |
| 0.50 | 2 | | | 0.005 | 0.050 | 0.050 | 150 | 250 | 300 | 450 |
| 0.60 | 2 | | | 0.006 | 0.060 | 0.060 | 180 | 300 | 360 | 540 |
| 0.80 | 2 | | | 0.009 | 0.080 | 0.080 | 270 | 450 | 540 | 810 |
| 1.00 | 2 | | | 0.011 | 0.100 | 0.100 | 330 | 550 | 660 | 990 |
| 1.50 | 2 | | | 0.016 | 0.150 | 0.150 | 480 | 800 | 960 | 1440 |
| 2.00 | 2 | | | 0.021 | 0.200 | 0.200 | 630 | 1050 | 1260 | 1890 |
| 3.00 | 2 | | | 0.032 | 0.300 | 0.300 | 960 | 1600 | 1920 | 2880 |
| 4.00 | 2 | | | 0.043 | 0.400 | 0.400 | 1290 | 2150 | 2580 | 3870 |

Frese con estremità emisferica MicroX (MicrospheroXG)

Gambo \varnothing 6mm, scarico cilindrico, 12xd



| | |
|-----------|----------------------|
| HM | λ 30° |
| XA | γ 15° |

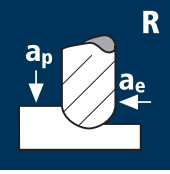


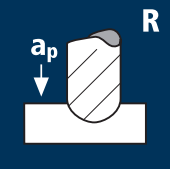


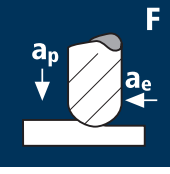


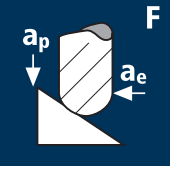




C
Graphite

CF/GF
Fiber Reinforced
Plastics

IV

| Esempio: N° Ordine | | | | | | | | | | | DIAPLUS | |
|-----------------------|-------|--------------------------|-------------------------|-------------------------------------|-------|-------|-------|--------------------|----------|-----|------------|--------------|
| | | Rivestimento B | Articolo 6070 | Codice- \varnothing 020 | | | | | | | | B6070 |
| \varnothing Code | d_1 | d_2 h4 | d_3 | l_1 | l_2 | l_3 | l_4 | r ± 0.005 | α | z | EUR | |
| 020 | 0.20 | 6.00 | 0.18 | 57 | 0.20 | 2.40 | 19.34 | 0.100 | 12.5° | 2 | 118.00 | |
| 030 | 0.30 | 6.00 | 0.25 | 57 | 0.30 | 3.60 | 20.34 | 0.150 | 11.4° | 2 | 107.00 | |
| 040 | 0.40 | 6.00 | 0.35 | 57 | 0.40 | 4.80 | 21.26 | 0.200 | 10.5° | 2 | 107.00 | |
| 050 | 0.50 | 6.00 | 0.45 | 57 | 0.50 | 6.00 | 17.01 | 0.250 | 9.9° | 2 | 107.00 | |
| 060 | 0.60 | 6.00 | 0.55 | 57 | 0.60 | 7.20 | 18.03 | 0.300 | 9.2° | 2 | 107.00 | |
| 080 | 0.80 | 6.00 | 0.75 | 57 | 0.80 | 9.60 | 20.05 | 0.400 | 8.0° | 2 | 107.00 | |
| 100 | 1.00 | 6.00 | 0.95 | 61 | 1.00 | 12.00 | 22.08 | 0.500 | 7.0° | 2 | 107.00 | |
| 120 | 1.50 | 6.00 | 1.40 | 66 | 1.50 | 18.00 | 27.24 | 0.750 | 5.1° | 2 | 107.00 | |
| 140 | 2.00 | 6.00 | 1.90 | 69 | 2.00 | 24.00 | 32.31 | 1.000 | 3.9° | 2 | 107.00 | |
| 180 | 3.00 | 6.00 | 2.80 | 80 | 3.00 | 36.00 | 42.63 | 1.500 | 2.2° | 2 | 112.00 | |
| 220 | 4.00 | 6.00 | 3.70 | 100 | 4.00 | 48.00 | 52.95 | 2.000 | 1.2° | 2 | 119.00 | |
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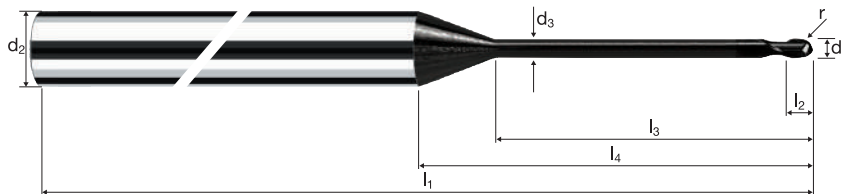
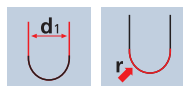
| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=15000 min ⁻¹ vf [mm/min] | n=25000 min ⁻¹ vf [mm/min] | n=30000 min ⁻¹ vf [mm/min] | n=45000 min ⁻¹ vf [mm/min] |
|--|---|---------|---|---------------------|---------------------|---------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
|  | Grafite  B  B | 0.30 | 2 | 0.002 | 0.060 | 0.090 | 60 | 100 | 120 | 180 |
| | | 0.50 | 2 | 0.004 | 0.100 | 0.150 | 120 | 200 | 240 | 360 |
| | | 0.60 | 2 | 0.005 | 0.100 | 0.200 | 150 | 250 | 300 | 450 |
| | | 0.80 | 2 | 0.007 | 0.150 | 0.250 | 210 | 350 | 420 | 630 |
| | | 1.00 | 2 | 0.008 | 0.200 | 0.300 | 240 | 400 | 480 | 720 |
| | | 1.50 | 2 | 0.012 | 0.300 | 0.450 | 360 | 600 | 720 | 1080 |
| | | 2.00 | 2 | 0.016 | 0.400 | 0.600 | 480 | 800 | 960 | 1440 |
| | | 3.00 | 2 | 0.025 | 0.600 | 0.900 | 750 | 1250 | 1500 | 2250 |
| | | 4.00 | 2 | 0.033 | 0.800 | 1.200 | 990 | 1650 | 1980 | 2970 |
|  | Grafite  B  B | 0.30 | 2 | 0.002 | 0.030 | 0.300 | 60 | 100 | 120 | 180 |
| | | 0.50 | 2 | 0.003 | 0.050 | 0.500 | 90 | 150 | 180 | 270 |
| | | 0.60 | 2 | 0.004 | 0.060 | 0.600 | 120 | 200 | 240 | 360 |
| | | 0.80 | 2 | 0.005 | 0.080 | 0.800 | 150 | 250 | 300 | 450 |
| | | 1.00 | 2 | 0.006 | 0.100 | 1.000 | 180 | 300 | 360 | 540 |
| | | 1.50 | 2 | 0.010 | 0.150 | 1.500 | 300 | 500 | 600 | 900 |
| | | 2.00 | 2 | 0.013 | 0.200 | 2.000 | 390 | 650 | 780 | 1170 |
| | | 3.00 | 2 | 0.019 | 0.300 | 3.000 | 570 | 950 | 1140 | 1710 |
| | | 4.00 | 2 | 0.025 | 0.400 | 4.000 | 750 | 1250 | 1500 | 2250 |
|  | Grafite  B  B | 0.30 | 2 | 0.003 | 0.020 | 0.030 | 90 | 150 | 180 | 270 |
| | | 0.50 | 2 | 0.005 | 0.040 | 0.050 | 150 | 250 | 300 | 450 |
| | | 0.60 | 2 | 0.006 | 0.050 | 0.060 | 180 | 300 | 360 | 540 |
| | | 0.80 | 2 | 0.007 | 0.060 | 0.080 | 210 | 350 | 420 | 630 |
| | | 1.00 | 2 | 0.009 | 0.080 | 0.100 | 270 | 450 | 540 | 810 |
| | | 1.50 | 2 | 0.014 | 0.120 | 0.150 | 420 | 700 | 840 | 1260 |
| | | 2.00 | 2 | 0.019 | 0.160 | 0.200 | 570 | 950 | 1140 | 1710 |
| | | 3.00 | 2 | 0.028 | 0.240 | 0.300 | 840 | 1400 | 1680 | 2520 |
| | | 4.00 | 2 | 0.037 | 0.320 | 0.400 | 1110 | 1850 | 2220 | 3330 |
|  | Grafite  B  B | 0.30 | 2 | 0.003 | 0.020 | 0.020 | 90 | 150 | 180 | 270 |
| | | 0.50 | 2 | 0.005 | 0.040 | 0.040 | 150 | 250 | 300 | 450 |
| | | 0.60 | 2 | 0.006 | 0.050 | 0.050 | 180 | 300 | 360 | 540 |
| | | 0.80 | 2 | 0.007 | 0.060 | 0.060 | 210 | 350 | 420 | 630 |
| | | 1.00 | 2 | 0.009 | 0.080 | 0.080 | 270 | 450 | 540 | 810 |
| | | 1.50 | 2 | 0.014 | 0.120 | 0.120 | 420 | 700 | 840 | 1260 |
| | | 2.00 | 2 | 0.019 | 0.160 | 0.160 | 570 | 950 | 1140 | 1710 |
| | | 3.00 | 2 | 0.028 | 0.240 | 0.240 | 840 | 1400 | 1680 | 2520 |
| | | 4.00 | 2 | 0.037 | 0.320 | 0.320 | 1110 | 1850 | 2220 | 3330 |

Frese con estremità emisferica MicroX (MicrospheroXG)

Gambo \varnothing 6mm, scarico cilindrico, 15xd



| | |
|----|---------------|
| HM | λ 30° |
| XA | γ 15° |



| | | | | | | | | | | | | | |
|--|--|--|--|----------|--|--|--|--|--|--|--|--|---------------------------------------|
| | | | | C | | | | | | | | | CF/GF Fiber Reinforced Plastics |
| | | | | Graphite | | | | | | | | | |

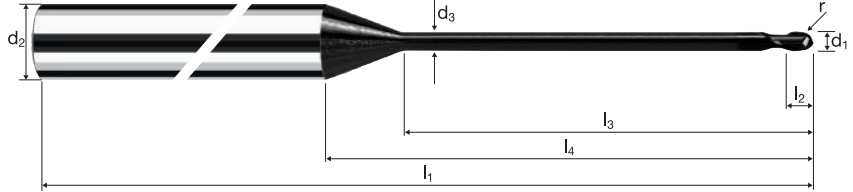
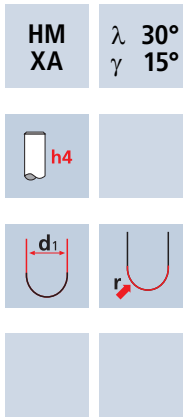
IV

| Esempio: N° Ordine | | | | | | | | | | | DIAPLUS | |
|-----------------------|-------|----------------|-------|-------|-------|-------|-------|--------------------|----------|-----|---------|--|
| | | | | | | | | | | | B6072 | |
| | | | | | | | | | | | EUR | |
| \varnothing Code | d_1 | d_2 h_4 | d_3 | l_1 | l_2 | l_3 | l_4 | r ± 0.005 | α | z | | |
| 030 | 0.30 | 6.00 | 0.25 | 61 | 0.30 | 4.50 | 21.24 | 0.150 | 10.7° | 2 | 112.00 | |
| 040 | 0.40 | 6.00 | 0.35 | 61 | 0.40 | 6.00 | 22.46 | 0.200 | 9.8° | 2 | 112.00 | |
| 050 | 0.50 | 6.00 | 0.45 | 57 | 0.50 | 7.50 | 18.51 | 0.250 | 8.9° | 2 | 112.00 | |
| 060 | 0.60 | 6.00 | 0.55 | 57 | 0.60 | 9.00 | 19.83 | 0.300 | 8.4° | 2 | 112.00 | |
| 080 | 0.80 | 6.00 | 0.75 | 61 | 0.80 | 12.00 | 22.45 | 0.400 | 7.0° | 2 | 112.00 | |
| 100 | 1.00 | 6.00 | 0.95 | 66 | 1.00 | 15.00 | 25.08 | 0.500 | 6.0° | 2 | 112.00 | |
| 120 | 1.50 | 6.00 | 1.40 | 69 | 1.50 | 22.50 | 31.74 | 0.750 | 4.3° | 2 | 112.00 | |
| 140 | 2.00 | 6.00 | 1.90 | 75 | 2.00 | 30.00 | 38.31 | 1.000 | 3.2° | 2 | 112.00 | |
| 180 | 3.00 | 6.00 | 2.80 | 100 | 3.00 | 45.00 | 51.63 | 1.500 | 1.8° | 2 | 112.00 | |
| 220 | 4.00 | 6.00 | 3.70 | 105 | 4.00 | 60.00 | 64.95 | 2.000 | 1.0° | 2 | 119.00 | |
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| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=15000 min ⁻¹ vf [mm/min] | n=25000 min ⁻¹ vf [mm/min] | n=30000 min ⁻¹ vf [mm/min] | n=45000 min ⁻¹ vf [mm/min] |
|--------------|-------------|------------|---|------------------------|------------------------|------------------------|--|--|--|--|
| | Grafite | 0.30 | 2 | 0.002 | 0.050 | 0.060 | 60 | 100 | 120 | 180 |
| | | 0.50 | 2 | 0.004 | 0.080 | 0.100 | 120 | 200 | 240 | 360 |
| | | 0.60 | 2 | 0.005 | 0.100 | 0.100 | 150 | 250 | 300 | 450 |
| | | 0.80 | 2 | 0.007 | 0.100 | 0.150 | 210 | 350 | 420 | 630 |
| | | 1.00 | 2 | 0.008 | 0.150 | 0.200 | 240 | 400 | 480 | 720 |
| | | 1.50 | 2 | 0.012 | 0.250 | 0.300 | 360 | 600 | 720 | 1080 |
| | | 2.00 | 2 | 0.016 | 0.300 | 0.400 | 480 | 800 | 960 | 1440 |
| | | 3.00 | 2 | 0.025 | 0.450 | 0.600 | 750 | 1250 | 1500 | 2250 |
| | | 4.00 | 2 | 0.033 | 0.600 | 0.800 | 990 | 1650 | 1980 | 2970 |
| | Grafite | 0.30 | 2 | 0.003 | 0.020 | 0.020 | 90 | 150 | 180 | 270 |
| | | 0.50 | 2 | 0.005 | 0.030 | 0.040 | 150 | 250 | 300 | 450 |
| | | 0.60 | 2 | 0.006 | 0.040 | 0.050 | 180 | 300 | 360 | 540 |
| | | 0.80 | 2 | 0.007 | 0.050 | 0.060 | 210 | 350 | 420 | 630 |
| | | 1.00 | 2 | 0.009 | 0.060 | 0.080 | 270 | 450 | 540 | 810 |
| | | 1.50 | 2 | 0.014 | 0.090 | 0.120 | 420 | 700 | 840 | 1260 |
| | | 2.00 | 2 | 0.019 | 0.120 | 0.160 | 570 | 950 | 1140 | 1710 |
| | | 3.00 | 2 | 0.028 | 0.180 | 0.240 | 840 | 1400 | 1680 | 2520 |
| | | 4.00 | 2 | 0.037 | 0.240 | 0.320 | 1110 | 1850 | 2220 | 3330 |
| | Grafite | 0.30 | 2 | 0.003 | 0.020 | 0.020 | 90 | 150 | 180 | 270 |
| | | 0.50 | 2 | 0.005 | 0.030 | 0.030 | 150 | 250 | 300 | 450 |
| | | 0.60 | 2 | 0.006 | 0.040 | 0.040 | 180 | 300 | 360 | 540 |
| | | 0.80 | 2 | 0.007 | 0.050 | 0.050 | 210 | 350 | 420 | 630 |
| | | 1.00 | 2 | 0.009 | 0.060 | 0.060 | 270 | 450 | 540 | 810 |
| | | 1.50 | 2 | 0.014 | 0.090 | 0.090 | 420 | 700 | 840 | 1260 |
| | | 2.00 | 2 | 0.019 | 0.120 | 0.120 | 570 | 950 | 1140 | 1710 |
| | | 3.00 | 2 | 0.028 | 0.180 | 0.180 | 840 | 1400 | 1680 | 2520 |
| | | 4.00 | 2 | 0.037 | 0.240 | 0.240 | 1110 | 1850 | 2220 | 3330 |

Frese con estremità emisferica MicroX (MicrospheroXG)

Gambo ø 6mm, scarico cilindrico, 20xd



IV

| Esempio: N° Ordine | | Rivestimento B | Articolo 6074 | Codice-ø 030 | | | | | | | | DIAPLUS |
|-----------------------|----------------|--------------------------|-------------------------|------------------------|----------------|----------------|----------------|-------------|------|---|--------|---------|
| Ø Code | d ₁ | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.005 | α | z | EUR | |
| 030 | 0.30 | 6.00 | 0.25 | 61 | 0.30 | 6.00 | 17.39 | 0.150 | 9.8° | 2 | 117.00 | |
| 040 | 0.40 | 6.00 | 0.35 | 61 | 0.40 | 8.00 | 19.20 | 0.200 | 8.7° | 2 | 117.00 | |
| 050 | 0.50 | 6.00 | 0.45 | 61 | 0.50 | 10.00 | 21.01 | 0.250 | 7.8° | 2 | 117.00 | |
| 060 | 0.60 | 6.00 | 0.55 | 61 | 0.60 | 12.00 | 22.83 | 0.300 | 7.1° | 2 | 117.00 | |
| 080 | 0.80 | 6.00 | 0.75 | 66 | 0.80 | 16.00 | 26.45 | 0.400 | 5.9° | 2 | 117.00 | |
| 100 | 1.00 | 6.00 | 0.95 | 69 | 1.00 | 20.00 | 30.08 | 0.500 | 5.0° | 2 | 117.00 | |
| 120 | 1.50 | 6.00 | 1.40 | 80 | 1.50 | 30.00 | 39.24 | 0.750 | 3.4° | 2 | 117.00 | |
| 140 | 2.00 | 6.00 | 1.90 | 87 | 2.00 | 40.00 | 48.31 | 1.000 | 2.5° | 2 | 117.00 | |
| 180 | 3.00 | 6.00 | 2.80 | 105 | 3.00 | 60.00 | 66.63 | 1.500 | 1.4° | 2 | 117.00 | |
| 220 | 4.00 | 6.00 | 3.70 | 122 | 4.00 | 80.00 | 84.95 | 2.000 | 0.7° | 2 | 123.00 | |
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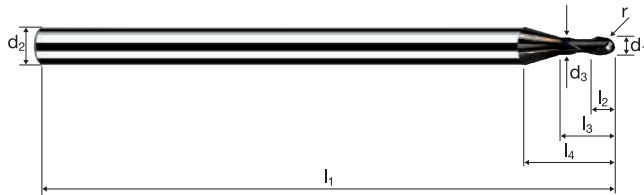
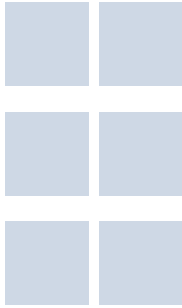
| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=15000 min ⁻¹ vf [mm/min] | n=25000 min ⁻¹ vf [mm/min] | n=30000 min ⁻¹ vf [mm/min] | n=45000 min ⁻¹ vf [mm/min] |
|--------------|---------------------------------|---------|---------------------------------|---------------------|---------------------|---------------------|--|--|--|--|
| | Grafite B B | 0.30 | 2 | 0.003 | 0.150 | 0.200 | 90 | 150 | 180 | 270 |
| | | 0.50 | 2 | 0.005 | 0.250 | 0.300 | 150 | 250 | 300 | 450 |
| | | 0.80 | 2 | 0.008 | 0.400 | 0.500 | 240 | 400 | 480 | 720 |
| | | 1.00 | 2 | 0.009 | 0.500 | 0.600 | 270 | 450 | 540 | 810 |
| | | 1.20 | 2 | 0.011 | 0.600 | 0.700 | 330 | 550 | 660 | 990 |
| | | 1.50 | 2 | 0.014 | 0.750 | 0.900 | 420 | 700 | 840 | 1260 |
| | | 2.00 | 2 | 0.019 | 1.000 | 1.200 | 570 | 950 | 1140 | 1710 |
| | | 2.50 | 2 | 0.024 | 1.250 | 1.500 | 720 | 1200 | 1440 | 2160 |
| | | 3.00 | 2 | 0.028 | 1.500 | 1.800 | 840 | 1400 | 1680 | 2520 |
| | | | Grafite B B | 0.30 | 2 | 0.002 | 0.150 | 0.300 | 60 | 100 |
| 0.50 | 2 | | | 0.004 | 0.250 | 0.500 | 120 | 200 | 240 | 360 |
| 0.80 | 2 | | | 0.006 | 0.400 | 0.800 | 180 | 300 | 360 | 540 |
| 1.00 | 2 | | | 0.007 | 0.500 | 1.000 | 210 | 350 | 420 | 630 |
| 1.20 | 2 | | | 0.009 | 0.600 | 1.200 | 270 | 450 | 540 | 810 |
| 1.50 | 2 | | | 0.011 | 0.750 | 1.500 | 330 | 550 | 660 | 990 |
| 2.00 | 2 | | | 0.015 | 1.000 | 2.000 | 450 | 750 | 900 | 1350 |
| 2.50 | 2 | | | 0.018 | 1.250 | 2.500 | 540 | 900 | 1080 | 1620 |
| 3.00 | 2 | | | 0.022 | 1.500 | 3.000 | 660 | 1100 | 1320 | 1980 |
| | Grafite B B | | | 0.30 | 2 | 0.003 | 0.050 | 0.060 | 90 | 150 |
| | | 0.50 | 2 | 0.005 | 0.080 | 0.100 | 150 | 250 | 300 | 450 |
| | | 0.80 | 2 | 0.009 | 0.120 | 0.160 | 270 | 450 | 540 | 810 |
| | | 1.00 | 2 | 0.011 | 0.150 | 0.200 | 330 | 550 | 660 | 990 |
| | | 1.20 | 2 | 0.013 | 0.180 | 0.240 | 390 | 650 | 780 | 1170 |
| | | 1.50 | 2 | 0.016 | 0.230 | 0.300 | 480 | 800 | 960 | 1440 |
| | | 2.00 | 2 | 0.021 | 0.300 | 0.400 | 630 | 1050 | 1260 | 1890 |
| | | 2.50 | 2 | 0.027 | 0.380 | 0.500 | 810 | 1350 | 1620 | 2430 |
| | | 3.00 | 2 | 0.032 | 0.450 | 0.600 | 960 | 1600 | 1920 | 2880 |
| | | | Grafite B B | 0.30 | 2 | 0.003 | 0.060 | 0.060 | 90 | 150 |
| 0.50 | 2 | | | 0.005 | 0.100 | 0.100 | 150 | 250 | 300 | 450 |
| 0.80 | 2 | | | 0.009 | 0.160 | 0.160 | 270 | 450 | 540 | 810 |
| 1.00 | 2 | | | 0.011 | 0.200 | 0.200 | 330 | 550 | 660 | 990 |
| 1.20 | 2 | | | 0.013 | 0.240 | 0.240 | 390 | 650 | 780 | 1170 |
| 1.50 | 2 | | | 0.016 | 0.300 | 0.300 | 480 | 800 | 960 | 1440 |
| 2.00 | 2 | | | 0.021 | 0.400 | 0.400 | 630 | 1050 | 1260 | 1890 |
| 2.50 | 2 | | | 0.027 | 0.500 | 0.500 | 810 | 1350 | 1620 | 2430 |
| 3.00 | 2 | | | 0.032 | 0.600 | 0.600 | 960 | 1600 | 1920 | 2880 |

Frese con estremità emisferica Microcut

Gambo \varnothing 3mm, scarico cilindrico, 3xd



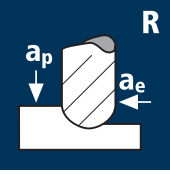


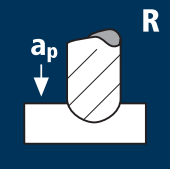


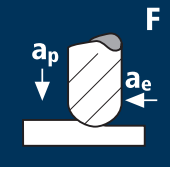


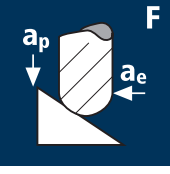


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|-------------|---------------|
| HM | λ 30° |
| MG10 | γ 5° |



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|---|----------|---|
| C | Graphite | CF / GF Fiber Reinforced Plastics |
|---|----------|---|

IV

| Esempio: N° Ordine | | Rivestimento B | Articolo 5782 | Codice- \varnothing 020 | | | | | | | | | DIAMANT |
|------------------------------|---------------------|--------------------------|-------------------------|-------------------------------------|-------|-------|-------|-------------------|----------|-----|--|--------------|----------------|
| \varnothing Code | d_1 ± 0.01 | d_2 $h6$ | d_3 | l_1 | l_2 | l_3 | l_4 | r ± 0.01 | α | z | | B5782 | |
| | | | | | | | | | | | | EUR | |
| 020 | 0.20 | 3.00 | 0.18 | 40 | 0.24 | 0.60 | 8.86 | 0.100 | 9.4° | 2 | | 89.00 | |
| 030 | 0.30 | 3.00 | 0.25 | 40 | 0.36 | 0.90 | 8.96 | 0.150 | 9.0° | 2 | | 81.00 | |
| 040 | 0.40 | 3.00 | 0.35 | 40 | 0.48 | 1.20 | 8.98 | 0.200 | 8.7° | 2 | | 78.00 | |
| 050 | 0.50 | 3.00 | 0.45 | 40 | 0.60 | 1.50 | 6.65 | 0.250 | 11.8° | 2 | | 78.00 | |
| 060 | 0.60 | 3.00 | 0.55 | 40 | 0.72 | 1.80 | 6.77 | 0.300 | 11.2° | 2 | | 74.00 | |
| 080 | 0.80 | 3.00 | 0.75 | 40 | 0.96 | 2.40 | 6.99 | 0.400 | 10.1° | 2 | | 74.00 | |
| 100 | 1.00 | 3.00 | 0.95 | 50 | 1.20 | 3.00 | 7.22 | 0.500 | 9.0° | 2 | | 74.00 | |
| 108 | 1.20 | 3.00 | 1.10 | 50 | 1.44 | 3.60 | 7.54 | 0.600 | 7.9° | 2 | | 74.00 | |
| 120 | 1.50 | 3.00 | 1.40 | 50 | 1.80 | 4.50 | 7.88 | 0.750 | 6.5° | 2 | | 74.00 | |
| 140 | 2.00 | 3.00 | 1.90 | 50 | 2.40 | 6.00 | 8.45 | 1.000 | 4.1° | 2 | | 74.00 | |
| 160 | 2.50 | 3.00 | 2.30 | 50 | 3.00 | 7.50 | 9.20 | 1.250 | 2.0° | 2 | | 74.00 | |
| 180 | 3.00 | 3.00 | 2.80 | 50 | 3.60 | 8.56 | 9.00 | 1.500 | 0.0° | 2 | | 74.00 | |
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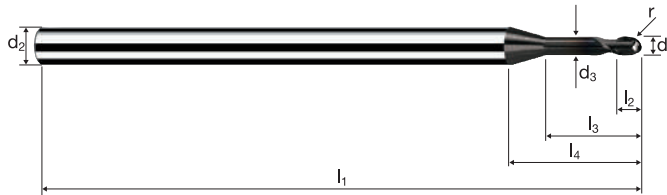
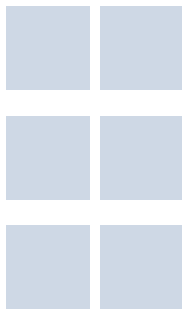
| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=15000 min vf [mm/min] | n=25000 min vf [mm/min] | n=30000 min vf [mm/min] | n=45000 min vf [mm/min] |
|--|---|--|---|------------------------|------------------------|------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
|  | Grafite  B  B | 0.50 | 2 | 0.005 | 0.250 | 0.300 | 150 | 250 | 300 | 450 |
| | | 0.60 | 2 | 0.006 | 0.250 | 0.350 | 180 | 300 | 360 | 540 |
| | | 0.80 | 2 | 0.008 | 0.350 | 0.500 | 240 | 400 | 480 | 720 |
| | | 1.00 | 2 | 0.009 | 0.450 | 0.600 | 270 | 450 | 540 | 810 |
| | | 1.20 | 2 | 0.011 | 0.550 | 0.700 | 330 | 550 | 660 | 990 |
| | | 1.50 | 2 | 0.014 | 0.700 | 0.900 | 420 | 700 | 840 | 1260 |
| | | 2.00 | 2 | 0.019 | 0.900 | 1.200 | 570 | 950 | 1140 | 1710 |
| | | 2.50 | 2 | 0.024 | 1.150 | 1.500 | 720 | 1200 | 1440 | 2160 |
| | | 3.00 | 2 | 0.028 | 1.350 | 1.800 | 840 | 1400 | 1680 | 2520 |
| | |  | Grafite  B  B | 0.50 | 2 | 0.004 | 0.250 | 0.500 | 120 | 200 |
| 0.60 | 2 | | | 0.004 | 0.250 | 0.600 | 120 | 200 | 240 | 360 |
| 0.80 | 2 | | | 0.006 | 0.350 | 0.800 | 180 | 300 | 360 | 540 |
| 1.00 | 2 | | | 0.007 | 0.450 | 1.000 | 210 | 350 | 420 | 630 |
| 1.20 | 2 | | | 0.009 | 0.550 | 1.200 | 270 | 450 | 540 | 810 |
| 1.50 | 2 | | | 0.011 | 0.700 | 1.500 | 330 | 550 | 660 | 990 |
| 2.00 | 2 | | | 0.015 | 0.900 | 2.000 | 450 | 750 | 900 | 1350 |
| 2.50 | 2 | | | 0.018 | 1.150 | 2.500 | 540 | 900 | 1080 | 1620 |
| 3.00 | 2 | | | 0.022 | 1.350 | 3.000 | 660 | 1100 | 1320 | 1980 |
|  | Grafite  B  B | | | 0.50 | 2 | 0.005 | 0.070 | 0.100 | 150 | 250 |
| | | 0.60 | 2 | 0.006 | 0.080 | 0.120 | 180 | 300 | 360 | 540 |
| | | 0.80 | 2 | 0.009 | 0.110 | 0.160 | 270 | 450 | 540 | 810 |
| | | 1.00 | 2 | 0.011 | 0.140 | 0.200 | 330 | 550 | 660 | 990 |
| | | 1.20 | 2 | 0.013 | 0.170 | 0.240 | 390 | 650 | 780 | 1170 |
| | | 1.50 | 2 | 0.016 | 0.210 | 0.300 | 480 | 800 | 960 | 1440 |
| | | 2.00 | 2 | 0.021 | 0.280 | 0.400 | 630 | 1050 | 1260 | 1890 |
| | | 2.50 | 2 | 0.027 | 0.350 | 0.500 | 810 | 1350 | 1620 | 2430 |
| | | 3.00 | 2 | 0.032 | 0.420 | 0.600 | 960 | 1600 | 1920 | 2880 |
| | |  | Grafite  B  B | 0.50 | 2 | 0.005 | 0.090 | 0.090 | 150 | 250 |
| 0.60 | 2 | | | 0.006 | 0.110 | 0.110 | 180 | 300 | 360 | 540 |
| 0.80 | 2 | | | 0.009 | 0.140 | 0.140 | 270 | 450 | 540 | 810 |
| 1.00 | 2 | | | 0.011 | 0.180 | 0.180 | 330 | 550 | 660 | 990 |
| 1.20 | 2 | | | 0.013 | 0.220 | 0.220 | 390 | 650 | 780 | 1170 |
| 1.50 | 2 | | | 0.016 | 0.270 | 0.270 | 480 | 800 | 960 | 1440 |
| 2.00 | 2 | | | 0.021 | 0.360 | 0.360 | 630 | 1050 | 1260 | 1890 |
| 2.50 | 2 | | | 0.027 | 0.450 | 0.450 | 810 | 1350 | 1620 | 2430 |
| 3.00 | 2 | | | 0.032 | 0.540 | 0.540 | 960 | 1600 | 1920 | 2880 |

Frese con estremità emisferica Microcut

Gambo ø 3mm, scarico cilindrico, 5xd



| | |
|------|---------------|
| HM | λ 30° |
| MG10 | γ 5° |



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|--|--|--|--|---------------|--|--|--|--|--|---|
| | | | | C Graphite | | | | | | CF / GF Fiber Reinforced Plastics |
|--|--|--|--|---------------|--|--|--|--|--|---|

IV

| Esempio: N° Ordine | | | | | | | | | | | DIAMANT |
|-----------------------|----------------|-------------|-------|-------|-------|-------|-------|--------------|----------|-----|---------|
| | | | | | | | | | | | B5784 |
| | | | | | | | | | | | EUR |
| Ø Code | d_1 ±0.01 | d_2 h6 | d_3 | l_1 | l_2 | l_3 | l_4 | r ±0.01 | α | z | |
| 050 | 0.50 | 3.00 | 0.45 | 40 | 0.60 | 2.50 | 7.65 | 0.250 | 10.1° | 2 | 78.00 |
| 060 | 0.60 | 3.00 | 0.55 | 40 | 0.72 | 3.00 | 7.97 | 0.300 | 9.4° | 2 | 74.00 |
| 070 | 0.70 | 3.00 | 0.65 | 40 | 0.84 | 3.50 | 8.28 | 0.350 | 8.7° | 2 | 74.00 |
| 080 | 0.80 | 3.00 | 0.75 | 40 | 0.96 | 4.00 | 8.59 | 0.400 | 8.1° | 2 | 74.00 |
| 090 | 0.90 | 3.00 | 0.85 | 40 | 1.08 | 4.50 | 8.91 | 0.450 | 7.4° | 2 | 74.00 |
| 100 | 1.00 | 3.00 | 0.95 | 50 | 1.20 | 5.00 | 9.22 | 0.500 | 6.9° | 2 | 74.00 |
| 108 | 1.20 | 3.00 | 1.10 | 50 | 1.44 | 6.00 | 9.94 | 0.600 | 5.8° | 2 | 74.00 |
| 120 | 1.50 | 3.00 | 1.40 | 50 | 1.80 | 7.50 | 10.88 | 0.750 | 4.5° | 2 | 74.00 |
| 132 | 1.80 | 3.00 | 1.70 | 50 | 2.16 | 9.00 | 11.82 | 0.900 | 3.3° | 2 | 74.00 |
| 140 | 2.00 | 3.00 | 1.90 | 50 | 2.40 | 10.00 | 12.45 | 1.000 | 2.7° | 2 | 74.00 |
| 152 | 2.30 | 3.00 | 2.10 | 50 | 2.76 | 11.50 | 13.57 | 1.150 | 1.8° | 2 | 74.00 |
| 160 | 2.50 | 3.00 | 2.30 | 50 | 3.00 | 12.50 | 14.20 | 1.250 | 1.2° | 2 | 74.00 |
| 172 | 2.80 | 3.00 | 2.60 | 50 | 3.36 | 14.00 | 15.14 | 1.400 | 0.5° | 2 | 74.00 |
| 180 | 3.00 | 3.00 | 2.80 | 50 | 3.60 | 14.56 | 15.00 | 1.500 | 0.0° | 2 | 74.00 |
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| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=15000 min vf [mm/min] | n=25000 min vf [mm/min] | n=30000 min vf [mm/min] | n=45000 min vf [mm/min] |
|--------------|---------------------------------|------------|---------------------------------|------------------------|------------------------|------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| | Grafite B B | 0.50 | 2 | 0.005 | 0.200 | 0.300 | 150 | 250 | 300 | 450 |
| | | 0.60 | 2 | 0.006 | 0.250 | 0.350 | 180 | 300 | 360 | 540 |
| | | 0.80 | 2 | 0.008 | 0.300 | 0.500 | 240 | 400 | 480 | 720 |
| | | 1.00 | 2 | 0.009 | 0.400 | 0.600 | 270 | 450 | 540 | 810 |
| | | 1.20 | 2 | 0.011 | 0.500 | 0.700 | 330 | 550 | 660 | 990 |
| | | 1.50 | 2 | 0.014 | 0.600 | 0.900 | 420 | 700 | 840 | 1260 |
| | | 2.00 | 2 | 0.019 | 0.800 | 1.200 | 570 | 950 | 1140 | 1710 |
| | | 2.50 | 2 | 0.024 | 1.000 | 1.500 | 720 | 1200 | 1440 | 2160 |
| | | 3.00 | 2 | 0.028 | 1.200 | 1.800 | 840 | 1400 | 1680 | 2520 |
| | | | Grafite B B | 0.50 | 2 | 0.004 | 0.200 | 0.500 | 120 | 200 |
| 0.60 | 2 | | | 0.004 | 0.250 | 0.600 | 120 | 200 | 240 | 360 |
| 0.80 | 2 | | | 0.006 | 0.300 | 0.800 | 180 | 300 | 360 | 540 |
| 1.00 | 2 | | | 0.007 | 0.400 | 1.000 | 210 | 350 | 420 | 630 |
| 1.20 | 2 | | | 0.009 | 0.500 | 1.200 | 270 | 450 | 540 | 810 |
| 1.50 | 2 | | | 0.011 | 0.600 | 1.500 | 330 | 550 | 660 | 990 |
| 2.00 | 2 | | | 0.015 | 0.800 | 2.000 | 450 | 750 | 900 | 1350 |
| 2.50 | 2 | | | 0.018 | 1.000 | 2.500 | 540 | 900 | 1080 | 1620 |
| 3.00 | 2 | | | 0.022 | 1.200 | 3.000 | 660 | 1100 | 1320 | 1980 |
| | Grafite B B | | | 0.50 | 2 | 0.005 | 0.060 | 0.090 | 150 | 250 |
| | | 0.60 | 2 | 0.006 | 0.070 | 0.110 | 180 | 300 | 360 | 540 |
| | | 0.80 | 2 | 0.009 | 0.100 | 0.140 | 270 | 450 | 540 | 810 |
| | | 1.00 | 2 | 0.011 | 0.120 | 0.180 | 330 | 550 | 660 | 990 |
| | | 1.20 | 2 | 0.013 | 0.140 | 0.220 | 390 | 650 | 780 | 1170 |
| | | 1.50 | 2 | 0.016 | 0.180 | 0.270 | 480 | 800 | 960 | 1440 |
| | | 2.00 | 2 | 0.021 | 0.240 | 0.360 | 630 | 1050 | 1260 | 1890 |
| | | 2.50 | 2 | 0.027 | 0.300 | 0.450 | 810 | 1350 | 1620 | 2430 |
| | | 3.00 | 2 | 0.032 | 0.360 | 0.540 | 960 | 1600 | 1920 | 2880 |
| | | | Grafite B B | 0.50 | 2 | 0.005 | 0.080 | 0.080 | 150 | 250 |
| 0.60 | 2 | | | 0.006 | 0.100 | 0.100 | 180 | 300 | 360 | 540 |
| 0.80 | 2 | | | 0.009 | 0.130 | 0.130 | 270 | 450 | 540 | 810 |
| 1.00 | 2 | | | 0.011 | 0.160 | 0.160 | 330 | 550 | 660 | 990 |
| 1.20 | 2 | | | 0.013 | 0.190 | 0.190 | 390 | 650 | 780 | 1170 |
| 1.50 | 2 | | | 0.016 | 0.240 | 0.240 | 480 | 800 | 960 | 1440 |
| 2.00 | 2 | | | 0.021 | 0.320 | 0.320 | 630 | 1050 | 1260 | 1890 |
| 2.50 | 2 | | | 0.027 | 0.400 | 0.400 | 810 | 1350 | 1620 | 2430 |
| 3.00 | 2 | | | 0.032 | 0.480 | 0.480 | 960 | 1600 | 1920 | 2880 |

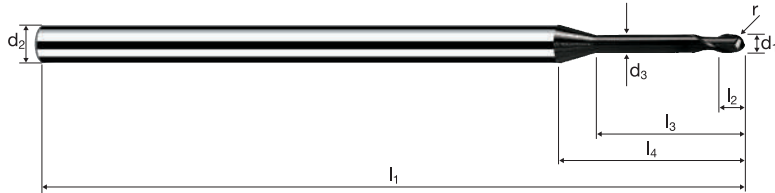
Frese con estremità emisferica Microcut

Gambo ø 3mm, scarico cilindrico, 8xd



HM
MG10

λ 30°
 γ 5°



C Graphite

CF / GF Fiber Reinforced Plastics

IV

| Esempio: N° Ordine | | | | | | | | | | | DIAMANT |
|--|-------------------------|----------------------|----------------|----------------|----------------|----------------|----------------|------------|------|---|---------|
| Rivestimento B Articolo 5786 Codice-ø 050 | | | | | | | | | | | B5786 |
| Ø Code | d ₁ ±0.01 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.01 | α | z | EUR |
| 050 | 0.50 | 3.00 | 0.45 | 40 | 0.60 | 4.00 | 9.15 | 0.250 | 8.4° | 2 | 78.00 |
| 060 | 0.60 | 3.00 | 0.55 | 40 | 0.72 | 4.80 | 9.77 | 0.300 | 7.6° | 2 | 74.00 |
| 080 | 0.80 | 3.00 | 0.75 | 40 | 0.96 | 6.40 | 10.99 | 0.400 | 6.2° | 2 | 74.00 |
| 100 | 1.00 | 3.00 | 0.95 | 50 | 1.20 | 8.00 | 12.22 | 0.500 | 5.1° | 2 | 74.00 |
| 108 | 1.20 | 3.00 | 1.10 | 50 | 1.44 | 9.60 | 13.54 | 0.600 | 4.2° | 2 | 74.00 |
| 120 | 1.50 | 3.00 | 1.40 | 60 | 1.80 | 12.00 | 15.38 | 0.750 | 3.1° | 2 | 74.00 |
| 140 | 2.00 | 3.00 | 1.90 | 60 | 2.40 | 16.00 | 18.45 | 1.000 | 1.7° | 2 | 74.00 |
| 160 | 2.50 | 3.00 | 2.30 | 60 | 3.00 | 20.00 | 21.70 | 1.250 | 0.8° | 2 | 74.00 |
| 180 | 3.00 | 3.00 | 2.80 | 60 | 3.60 | 23.56 | 24.00 | 1.500 | 0.0° | 2 | 74.00 |
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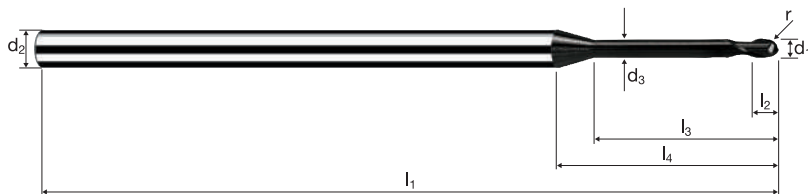
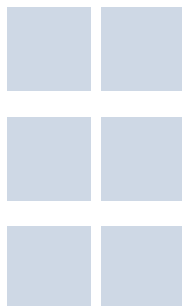
| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=15000 min vf [mm/min] | n=25000 min vf [mm/min] | n=30000 min vf [mm/min] | n=45000 min vf [mm/min] |
|--------------|---------------------------------|------------|---------------------------------|------------------------|------------------------|------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| | Grafite B B | 0.50 | 2 | 0.005 | 0.200 | 0.200 | 150 | 250 | 300 | 450 |
| | | 0.60 | 2 | 0.006 | 0.250 | 0.250 | 180 | 300 | 360 | 540 |
| | | 0.80 | 2 | 0.008 | 0.300 | 0.300 | 240 | 400 | 480 | 720 |
| | | 1.00 | 2 | 0.009 | 0.400 | 0.400 | 270 | 450 | 540 | 810 |
| | | 1.20 | 2 | 0.011 | 0.500 | 0.500 | 330 | 550 | 660 | 990 |
| | | 1.50 | 2 | 0.014 | 0.600 | 0.600 | 420 | 700 | 840 | 1260 |
| | | 2.00 | 2 | 0.019 | 0.800 | 0.800 | 570 | 950 | 1140 | 1710 |
| | | 2.50 | 2 | 0.024 | 1.000 | 1.000 | 720 | 1200 | 1440 | 2160 |
| | | 3.00 | 2 | 0.028 | 1.200 | 1.200 | 840 | 1400 | 1680 | 2520 |
| | | | Grafite B B | 0.50 | 2 | 0.003 | 0.150 | 0.500 | 90 | 150 |
| 0.60 | 2 | | | 0.003 | 0.200 | 0.600 | 90 | 150 | 180 | 270 |
| 0.80 | 2 | | | 0.004 | 0.250 | 0.800 | 120 | 200 | 240 | 360 |
| 1.00 | 2 | | | 0.005 | 0.300 | 1.000 | 150 | 250 | 300 | 450 |
| 1.20 | 2 | | | 0.007 | 0.350 | 1.200 | 210 | 350 | 420 | 630 |
| 1.50 | 2 | | | 0.008 | 0.450 | 1.500 | 240 | 400 | 480 | 720 |
| 2.00 | 2 | | | 0.011 | 0.600 | 2.000 | 330 | 550 | 660 | 990 |
| 2.50 | 2 | | | 0.014 | 0.750 | 2.500 | 420 | 700 | 840 | 1260 |
| 3.00 | 2 | | | 0.016 | 0.900 | 3.000 | 480 | 800 | 960 | 1440 |
| | Grafite B B | | | 0.50 | 2 | 0.005 | 0.050 | 0.080 | 150 | 250 |
| | | 0.60 | 2 | 0.006 | 0.060 | 0.100 | 180 | 300 | 360 | 540 |
| | | 0.80 | 2 | 0.009 | 0.080 | 0.130 | 270 | 450 | 540 | 810 |
| | | 1.00 | 2 | 0.011 | 0.100 | 0.160 | 330 | 550 | 660 | 990 |
| | | 1.20 | 2 | 0.013 | 0.120 | 0.190 | 390 | 650 | 780 | 1170 |
| | | 1.50 | 2 | 0.016 | 0.150 | 0.240 | 480 | 800 | 960 | 1440 |
| | | 2.00 | 2 | 0.021 | 0.200 | 0.320 | 630 | 1050 | 1260 | 1890 |
| | | 2.50 | 2 | 0.027 | 0.250 | 0.400 | 810 | 1350 | 1620 | 2430 |
| | | 3.00 | 2 | 0.032 | 0.300 | 0.480 | 960 | 1600 | 1920 | 2880 |
| | | | Grafite B B | 0.50 | 2 | 0.005 | 0.070 | 0.070 | 150 | 250 |
| 0.60 | 2 | | | 0.006 | 0.080 | 0.080 | 180 | 300 | 360 | 540 |
| 0.80 | 2 | | | 0.009 | 0.110 | 0.110 | 270 | 450 | 540 | 810 |
| 1.00 | 2 | | | 0.011 | 0.140 | 0.140 | 330 | 550 | 660 | 990 |
| 1.20 | 2 | | | 0.013 | 0.170 | 0.170 | 390 | 650 | 780 | 1170 |
| 1.50 | 2 | | | 0.016 | 0.210 | 0.210 | 480 | 800 | 960 | 1440 |
| 2.00 | 2 | | | 0.021 | 0.280 | 0.280 | 630 | 1050 | 1260 | 1890 |
| 2.50 | 2 | | | 0.027 | 0.350 | 0.350 | 810 | 1350 | 1620 | 2430 |
| 3.00 | 2 | | | 0.032 | 0.420 | 0.420 | 960 | 1600 | 1920 | 2880 |

Frese con estremità emisferica Microcut

Gambo ø 3mm, scarico cilindrico, 10xd



| | |
|------|---------------|
| HM | λ 30° |
| MG10 | γ 5° |



| | | | | | | | | | |
|--|--|--|--|---------------|--|--|--|--|---|
| | | | | C Graphite | | | | | CF / GF Fiber Reinforced Plastics |
|--|--|--|--|---------------|--|--|--|--|---|

IV

| | | | | | | | | | | | DIAMANT |
|-----------------------|-------------------------|----------------------|----------------|----------------|----------------|----------------|----------------|------------|------|---|---------|
| Esempio: N° Ordine | | | | | | | | | | | B5787 |
| | | | | | | | | | | | EUR |
| Ø Code | d ₁ ±0.01 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.01 | α | z | |
| 050 | 0.50 | 3.00 | 0.45 | 40 | 0.60 | 5.00 | 10.15 | 0.250 | 7.5° | 2 | 78.00 |
| 060 | 0.60 | 3.00 | 0.55 | 40 | 0.72 | 6.00 | 10.97 | 0.300 | 6.7° | 2 | 74.00 |
| 080 | 0.80 | 3.00 | 0.75 | 40 | 0.96 | 8.00 | 12.59 | 0.400 | 5.4° | 2 | 74.00 |
| 100 | 1.00 | 3.00 | 0.95 | 50 | 1.20 | 10.00 | 14.22 | 0.500 | 4.3° | 2 | 74.00 |
| 108 | 1.20 | 3.00 | 1.10 | 50 | 1.44 | 12.00 | 15.94 | 0.600 | 3.5° | 2 | 74.00 |
| 120 | 1.50 | 3.00 | 1.40 | 60 | 1.80 | 15.00 | 18.38 | 0.750 | 2.6° | 2 | 74.00 |
| 140 | 2.00 | 3.00 | 1.90 | 60 | 2.40 | 20.00 | 22.45 | 1.000 | 1.4° | 2 | 74.00 |
| 160 | 2.50 | 3.00 | 2.30 | 60 | 3.00 | 25.00 | 26.70 | 1.250 | 0.6° | 2 | 74.00 |
| 180 | 3.00 | 3.00 | 2.80 | 60 | 3.60 | 29.56 | 30.00 | 1.500 | 0.0° | 2 | 74.00 |
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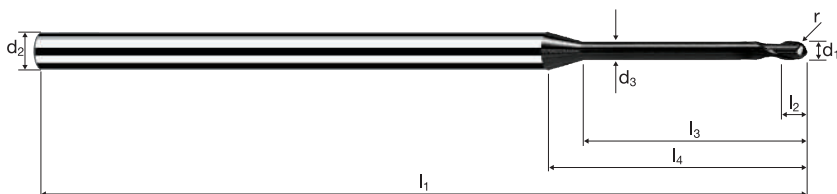
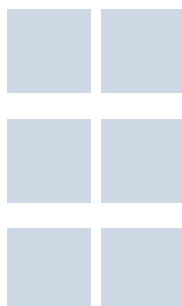
| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=15000 min ⁻¹ vf [mm/min] | n=25000 min ⁻¹ vf [mm/min] | n=30000 min ⁻¹ vf [mm/min] | n=45000 min ⁻¹ vf [mm/min] |
|--------------|---------------------------------|---------|---|---------------------|---------------------|---------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| | Grafite B B | 1.00 | 2 | 0.007 | 0.300 | 0.400 | 210 | 350 | 420 | 630 |
| | | 1.20 | 2 | 0.008 | 0.350 | 0.500 | 240 | 400 | 480 | 720 |
| | | 1.50 | 2 | 0.011 | 0.450 | 0.600 | 330 | 550 | 660 | 990 |
| | | 2.00 | 2 | 0.014 | 0.600 | 0.800 | 420 | 700 | 840 | 1260 |
| | | 2.50 | 2 | 0.018 | 0.750 | 1.000 | 540 | 900 | 1080 | 1620 |
| | | 3.00 | 2 | 0.021 | 0.900 | 1.200 | 630 | 1050 | 1260 | 1890 |
| | Grafite B B | 1.00 | 2 | 0.005 | 0.200 | 1.000 | 150 | 250 | 300 | 450 |
| | | 1.20 | 2 | 0.007 | 0.250 | 1.200 | 210 | 350 | 420 | 630 |
| | | 1.50 | 2 | 0.008 | 0.300 | 1.500 | 240 | 400 | 480 | 720 |
| | | 2.00 | 2 | 0.011 | 0.400 | 2.000 | 330 | 550 | 660 | 990 |
| | | 2.50 | 2 | 0.014 | 0.500 | 2.500 | 420 | 700 | 840 | 1260 |
| | | 3.00 | 2 | 0.016 | 0.600 | 3.000 | 480 | 800 | 960 | 1440 |
| | Grafite B B | 1.00 | 2 | 0.008 | 0.100 | 0.140 | 240 | 400 | 480 | 720 |
| | | 1.20 | 2 | 0.010 | 0.120 | 0.170 | 300 | 500 | 600 | 900 |
| | | 1.50 | 2 | 0.012 | 0.150 | 0.210 | 360 | 600 | 720 | 1080 |
| | | 2.00 | 2 | 0.016 | 0.200 | 0.280 | 480 | 800 | 960 | 1440 |
| | | 2.50 | 2 | 0.020 | 0.250 | 0.350 | 600 | 1000 | 1200 | 1800 |
| | | 3.00 | 2 | 0.024 | 0.300 | 0.420 | 720 | 1200 | 1440 | 2160 |
| | Grafite B B | 1.00 | 2 | 0.008 | 0.100 | 0.100 | 240 | 400 | 480 | 720 |
| | | 1.20 | 2 | 0.010 | 0.120 | 0.120 | 300 | 500 | 600 | 900 |
| | | 1.50 | 2 | 0.012 | 0.150 | 0.150 | 360 | 600 | 720 | 1080 |
| | | 2.00 | 2 | 0.016 | 0.200 | 0.200 | 480 | 800 | 960 | 1440 |
| | | 2.50 | 2 | 0.020 | 0.250 | 0.250 | 600 | 1000 | 1200 | 1800 |
| | | 3.00 | 2 | 0.024 | 0.300 | 0.300 | 720 | 1200 | 1440 | 2160 |

Frese con estremità emisferica Microcut

Gambo \varnothing 3mm, scarico cilindrico, 12xd



| | |
|-------------|---------------|
| HM | λ 30° |
| MG10 | γ 5° |



| | | | | | | | | | | | |
|--|--|--|--|----------------------|--|--|--|--|--|--|--|
| | | | | C Graphite | | | | | | | CF / GF Fiber Reinforced Plastics |
|--|--|--|--|----------------------|--|--|--|--|--|--|--|

IV

| Esempio: N° Ordine | | | | | | | | | | | Rivestimento | | Articolo | | Codice- \varnothing | | | | DIAMANT | |
|-----------------------|---------------------|-------------|-------|-------|-------|-------|-------|-------------------|----------|-----|--------------|--|-------------|--|-----------------------|--|--|--|--------------|--|
| | | | | | | | | | | | B | | 5791 | | 100 | | | | B5791 | |
| \varnothing Code | d_1 ± 0.01 | d_2 h6 | d_3 | l_1 | l_2 | l_3 | l_4 | r ± 0.01 | α | z | | | EUR | | | | | | | |
| 100 | 1.00 | 3.00 | 0.95 | 50 | 1.20 | 12.00 | 16.22 | 0.500 | 3.8° | 2 | | | 76.00 | | | | | | | |
| 108 | 1.20 | 3.00 | 1.10 | 60 | 1.44 | 14.40 | 18.34 | 0.600 | 3.0° | 2 | | | 76.00 | | | | | | | |
| 120 | 1.50 | 3.00 | 1.40 | 60 | 1.80 | 18.00 | 21.38 | 0.750 | 2.2° | 2 | | | 76.00 | | | | | | | |
| 140 | 2.00 | 3.00 | 1.90 | 60 | 2.40 | 24.00 | 26.45 | 1.000 | 1.2° | 2 | | | 76.00 | | | | | | | |
| 160 | 2.50 | 3.00 | 2.30 | 70 | 3.00 | 30.00 | 31.70 | 1.250 | 0.5° | 2 | | | 76.00 | | | | | | | |
| 180 | 3.00 | 3.00 | 2.80 | 70 | 3.60 | 35.56 | 36.00 | 1.500 | 0.0° | 2 | | | 76.00 | | | | | | | |
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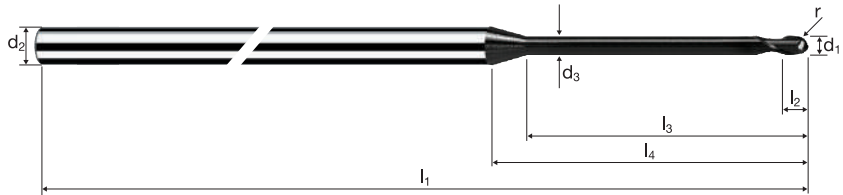
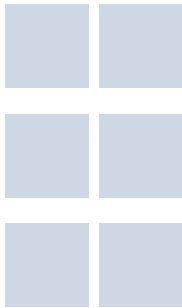
| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=15000 min vf [mm/min] | n=25000 min vf [mm/min] | n=30000 min vf [mm/min] | n=45000 min vf [mm/min] |
|--------------|---------------------------------|------------|---|------------------------|------------------------|------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| | Grafite B B | 1.00 | 2 | 0.007 | 0.200 | 0.300 | 210 | 350 | 420 | 630 |
| | | 1.20 | 2 | 0.008 | 0.250 | 0.350 | 240 | 400 | 480 | 720 |
| | | 1.50 | 2 | 0.011 | 0.300 | 0.450 | 330 | 550 | 660 | 990 |
| | | 2.00 | 2 | 0.014 | 0.400 | 0.600 | 420 | 700 | 840 | 1260 |
| | | 2.50 | 2 | 0.018 | 0.500 | 0.750 | 540 | 900 | 1080 | 1620 |
| | | 3.00 | 2 | 0.021 | 0.600 | 0.900 | 630 | 1050 | 1260 | 1890 |
| | Grafite B B | 1.00 | 2 | 0.005 | 0.100 | 1.000 | 150 | 250 | 300 | 450 |
| | | 1.20 | 2 | 0.007 | 0.100 | 1.200 | 210 | 350 | 420 | 630 |
| | | 1.50 | 2 | 0.008 | 0.150 | 1.500 | 240 | 400 | 480 | 720 |
| | | 2.00 | 2 | 0.011 | 0.200 | 2.000 | 330 | 550 | 660 | 990 |
| | | 2.50 | 2 | 0.014 | 0.250 | 2.500 | 420 | 700 | 840 | 1260 |
| | | 3.00 | 2 | 0.016 | 0.300 | 3.000 | 480 | 800 | 960 | 1440 |
| | Grafite B B | 1.00 | 2 | 0.008 | 0.080 | 0.100 | 240 | 400 | 480 | 720 |
| | | 1.20 | 2 | 0.010 | 0.100 | 0.120 | 300 | 500 | 600 | 900 |
| | | 1.50 | 2 | 0.012 | 0.120 | 0.150 | 360 | 600 | 720 | 1080 |
| | | 2.00 | 2 | 0.016 | 0.160 | 0.200 | 480 | 800 | 960 | 1440 |
| | | 2.50 | 2 | 0.020 | 0.200 | 0.250 | 600 | 1000 | 1200 | 1800 |
| | | 3.00 | 2 | 0.024 | 0.240 | 0.300 | 720 | 1200 | 1440 | 2160 |
| | Grafite B B | 1.00 | 2 | 0.008 | 0.080 | 0.080 | 240 | 400 | 480 | 720 |
| | | 1.20 | 2 | 0.010 | 0.100 | 0.100 | 300 | 500 | 600 | 900 |
| | | 1.50 | 2 | 0.012 | 0.120 | 0.120 | 360 | 600 | 720 | 1080 |
| | | 2.00 | 2 | 0.016 | 0.160 | 0.160 | 480 | 800 | 960 | 1440 |
| | | 2.50 | 2 | 0.020 | 0.200 | 0.200 | 600 | 1000 | 1200 | 1800 |
| | | 3.00 | 2 | 0.024 | 0.240 | 0.240 | 720 | 1200 | 1440 | 2160 |

Frese con estremità emisferica Microcut

Gambo ø 3mm, scarico cilindrico, 15xd



| | |
|------|---------------|
| HM | λ 30° |
| MG10 | γ 5° |



| | | | | | | | | | | | |
|--|--|--|--|---------------|--|--|--|--|--|--|---|
| | | | | C Graphite | | | | | | | CF / GF Fiber Reinforced Plastics |
|--|--|--|--|---------------|--|--|--|--|--|--|---|

IV

| | | | | | | | | | | | DIAMANT | |
|-----------------------|-------------------------|--------------------------|-------------------------|------------------------|----------------|----------------|----------------|------------|------|---|---------|-------|
| | | | | | | | | | | | B5793 | |
| | | | | | | | | | | | EUR | |
| Esempio: N° Ordine | | Rivestimento B | Articolo 5793 | Codice-ø 100 | | | | | | | | |
| Ø Code | d ₁ ±0.01 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.01 | α | z | | |
| 100 | 1.00 | 3.00 | 0.95 | 60 | 1.20 | 15.00 | 19.22 | 0.500 | 3.2° | 2 | | 78.00 |
| 108 | 1.20 | 3.00 | 1.10 | 60 | 1.44 | 18.00 | 21.94 | 0.600 | 2.5° | 2 | | 78.00 |
| 120 | 1.50 | 3.00 | 1.40 | 70 | 1.80 | 22.50 | 25.88 | 0.750 | 1.8° | 2 | | 78.00 |
| 140 | 2.00 | 3.00 | 1.90 | 70 | 2.40 | 30.00 | 32.45 | 1.000 | 1.0° | 2 | | 78.00 |
| 160 | 2.50 | 3.00 | 2.30 | 70 | 3.00 | 37.50 | 39.20 | 1.250 | 0.4° | 2 | | 78.00 |
| 180 | 3.00 | 3.00 | 2.80 | 80 | 3.60 | 44.56 | 45.00 | 1.500 | 0.0° | 2 | | 78.00 |
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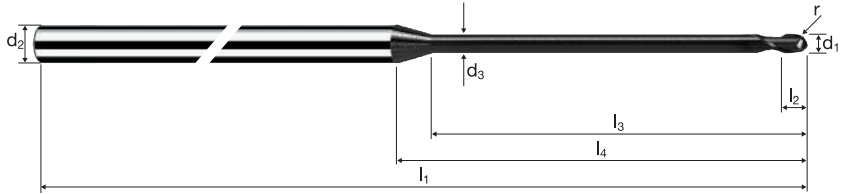
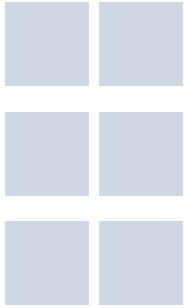
| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=15000 min vf [mm/min] | n=25000 min vf [mm/min] | n=30000 min vf [mm/min] | n=45000 min vf [mm/min] |
|--------------|---------------------------------|------------|---|------------------------|------------------------|------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| | Grafite B B | 1.00 | 2 | 0.007 | 0.150 | 0.200 | 210 | 350 | 420 | 630 |
| | | 1.20 | 2 | 0.008 | 0.200 | 0.250 | 240 | 400 | 480 | 720 |
| | | 1.50 | 2 | 0.011 | 0.250 | 0.300 | 330 | 550 | 660 | 990 |
| | | 2.00 | 2 | 0.014 | 0.300 | 0.400 | 420 | 700 | 840 | 1260 |
| | | 2.50 | 2 | 0.018 | 0.400 | 0.500 | 540 | 900 | 1080 | 1620 |
| | | 3.00 | 2 | 0.021 | 0.450 | 0.600 | 630 | 1050 | 1260 | 1890 |
| | Grafite B B | 1.00 | 2 | 0.008 | 0.060 | 0.080 | 240 | 400 | 480 | 720 |
| | | 1.20 | 2 | 0.010 | 0.070 | 0.100 | 300 | 500 | 600 | 900 |
| | | 1.50 | 2 | 0.012 | 0.090 | 0.120 | 360 | 600 | 720 | 1080 |
| | | 2.00 | 2 | 0.016 | 0.120 | 0.160 | 480 | 800 | 960 | 1440 |
| | | 2.50 | 2 | 0.020 | 0.150 | 0.200 | 600 | 1000 | 1200 | 1800 |
| | | 3.00 | 2 | 0.024 | 0.180 | 0.240 | 720 | 1200 | 1440 | 2160 |
| | Grafite B B | 1.00 | 2 | 0.008 | 0.060 | 0.060 | 240 | 400 | 480 | 720 |
| | | 1.20 | 2 | 0.010 | 0.070 | 0.070 | 300 | 500 | 600 | 900 |
| | | 1.50 | 2 | 0.012 | 0.090 | 0.090 | 360 | 600 | 720 | 1080 |
| | | 2.00 | 2 | 0.016 | 0.120 | 0.120 | 480 | 800 | 960 | 1440 |
| | | 2.50 | 2 | 0.020 | 0.150 | 0.150 | 600 | 1000 | 1200 | 1800 |
| | | 3.00 | 2 | 0.024 | 0.180 | 0.180 | 720 | 1200 | 1440 | 2160 |

Frese con estremità emisferica Microcut

Gambo ø 3mm, scarico cilindrico, 20xd



| | |
|--------------------|----------------------|
| HM MG10 | λ 30° |
| | γ 5° |



| | | | | | | |
|--|--|--|-----------------------|--|--|--|
| | | | C Graphite | | | CF / GF Fiber Reinforced Plastics |
|--|--|--|-----------------------|--|--|--|

IV

| | | | | | | | | | | | DIAMANT |
|--|----------------|-------------|-------|-------|-------|-------|-------|--------------|----------|-----|----------------|
| | | | | | | | | | | | B15795 |
| | | | | | | | | | | | EUR |
| Esempio: N° Ordine | | | | | | | | | | | |
| | | | | | | | | | | | |
| Rivestimento: B Articolo: 15795 Codice-ø: 100 | | | | | | | | | | | |
| Ø Code | d_1 ±0.01 | d_2 h6 | d_3 | l_1 | l_2 | l_3 | l_4 | r ±0.01 | α | z | |
| 100 | 1.00 | 3.00 | 0.95 | 60 | 1.20 | 20.00 | 24.22 | 0.500 | 2.5° | 2 | 83.00 |
| 108 | 1.20 | 3.00 | 1.10 | 60 | 1.44 | 24.00 | 27.94 | 0.600 | 2.0° | 2 | 83.00 |
| 120 | 1.50 | 3.00 | 1.40 | 70 | 1.80 | 30.00 | 33.38 | 0.750 | 1.4° | 2 | 83.00 |
| 140 | 2.00 | 3.00 | 1.90 | 80 | 2.40 | 40.00 | 42.45 | 1.000 | 0.8° | 2 | 83.00 |
| 160 | 2.50 | 3.00 | 2.30 | 80 | 3.00 | 50.00 | 51.70 | 1.250 | 0.3° | 2 | 83.00 |
| 180 | 3.00 | 3.00 | 2.80 | 90 | 3.60 | 59.56 | 60.00 | 1.500 | 0.0° | 2 | 83.00 |
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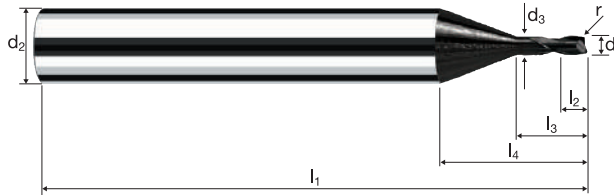
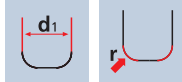
| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=15000 min ⁻¹ vf [mm/min] | n=25000 min ⁻¹ vf [mm/min] | n=30000 min ⁻¹ vf [mm/min] | n=45000 min ⁻¹ vf [mm/min] |
|--------------|---------------------------------|---------|---|---------------------|---------------------|---------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| | Grafite B B | 1.50 | 2 | 0.018 | 0.750 | 0.900 | 540 | 900 | 1080 | 1620 |
| | | 2.00 | 2 | 0.024 | 1.000 | 1.200 | 720 | 1200 | 1440 | 2160 |
| | | 3.00 | 2 | 0.035 | 1.500 | 1.800 | 1050 | 1750 | 2100 | 3150 |
| | | 4.00 | 2 | 0.047 | 2.000 | 2.400 | 1410 | 2350 | 2820 | 4230 |
| | | 5.00 | 2 | 0.059 | 2.500 | 3.000 | 1770 | 2950 | 3540 | 5310 |
| | | 6.00 | 2 | 0.071 | 3.000 | 3.600 | 2130 | 3550 | 4260 | 6390 |
| | Grafite B B | 1.50 | 2 | 0.014 | 0.750 | 1.500 | 420 | 700 | 840 | 1260 |
| | | 2.00 | 2 | 0.018 | 1.000 | 2.000 | 540 | 900 | 1080 | 1620 |
| | | 3.00 | 2 | 0.027 | 1.500 | 3.000 | 810 | 1350 | 1620 | 2430 |
| | | 4.00 | 2 | 0.036 | 2.000 | 4.000 | 1080 | 1800 | 2160 | 3240 |
| | | 5.00 | 2 | 0.045 | 2.500 | 5.000 | 1350 | 2250 | 2700 | 4050 |
| | | 6.00 | 2 | 0.055 | 3.000 | 6.000 | 1650 | 2750 | 3300 | 4950 |
| | Grafite B B | 1.50 | 2 | 0.020 | 0.230 | 0.300 | 600 | 1000 | 1200 | 1800 |
| | | 2.00 | 2 | 0.027 | 0.300 | 0.400 | 810 | 1350 | 1620 | 2430 |
| | | 3.00 | 2 | 0.040 | 0.450 | 0.600 | 1200 | 2000 | 2400 | 3600 |
| | | 4.00 | 2 | 0.053 | 0.600 | 0.800 | 1590 | 2650 | 3180 | 4770 |
| | | 5.00 | 2 | 0.067 | 0.750 | 1.000 | 2010 | 3350 | 4020 | 6030 |
| | | 6.00 | 2 | 0.080 | 0.900 | 1.200 | 2400 | 4000 | 4800 | 7200 |
| | Grafite B B | 1.50 | 2 | 0.020 | 0.300 | 0.300 | 600 | 1000 | 1200 | 1800 |
| | | 2.00 | 2 | 0.027 | 0.400 | 0.400 | 810 | 1350 | 1620 | 2430 |
| | | 3.00 | 2 | 0.040 | 0.600 | 0.600 | 1200 | 2000 | 2400 | 3600 |
| | | 4.00 | 2 | 0.053 | 0.800 | 0.800 | 1590 | 2650 | 3180 | 4770 |
| | | 5.00 | 2 | 0.067 | 1.000 | 1.000 | 2010 | 3350 | 4020 | 6030 |
| | | 6.00 | 2 | 0.080 | 1.200 | 1.200 | 2400 | 4000 | 4800 | 7200 |

Frese toriche MicroX (MicrotoroXG)

Gambo \varnothing 6mm, scarico cilindrico, 3xd



| | |
|----|---------------|
| HM | λ 30° |
| XA | γ 15° |



| | | | | | | | | | | | | |
|--|--|--|--|----------|--|--|--|--|--|--|--|---|
| | | | | C | | | | | | | | CF / GF Fiber Reinforced Plastics |
| | | | | Graphite | | | | | | | | |

IV

| Esempio: N° Ordine | | | | | | | | | | | DIAPLUS |
|---|------------------|-------------|-------|-------|-------|-------|-------|--------------------|----------|-----|---------|
| Rivestimento Articolo Codice- \varnothing | | | | | | | | | | | |
| B 6032 120 | | | | | | | | | | | B6032 |
| \varnothing Code | d_1 0/-0.01 | d_2 h4 | d_3 | l_1 | l_2 | l_3 | l_4 | r ± 0.005 | α | z | EUR |
| 120 | 1.50 | 6.00 | 1.40 | 57 | 1.50 | 4.50 | 13.74 | 0.200 | 10.0° | 2 | 94.00 |
| 140 | 2.00 | 6.00 | 1.90 | 57 | 2.00 | 6.00 | 14.31 | 0.200 | 8.6° | 2 | 94.00 |
| 180 | 3.00 | 6.00 | 2.80 | 57 | 3.00 | 9.00 | 15.63 | 0.200 | 6.0° | 2 | 94.00 |
| 215 | 4.00 | 6.00 | 3.70 | 57 | 4.00 | 12.00 | 16.95 | 0.200 | 3.7° | 2 | 100.00 |
| 255 | 5.00 | 6.00 | 4.60 | 57 | 5.00 | 15.00 | 18.27 | 0.200 | 1.8° | 2 | 106.00 |
| 295 | 6.00 | 6.00 | 5.50 | 57 | 6.00 | 17.34 | 18.00 | 0.200 | 0.0° | 2 | 112.00 |
| 220 | 4.00 | 6.00 | 3.70 | 57 | 4.00 | 12.00 | 16.95 | 0.500 | 3.7° | 2 | 100.00 |
| 260 | 5.00 | 6.00 | 4.60 | 57 | 5.00 | 15.00 | 18.27 | 0.500 | 2.0° | 2 | 106.00 |
| 300 | 6.00 | 6.00 | 5.50 | 57 | 6.00 | 17.34 | 18.00 | 0.500 | 0.0° | 2 | 112.00 |
| | | | | | | | | | | | |
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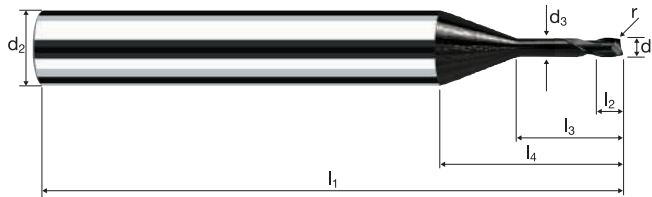
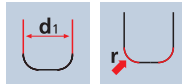
| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=15000 min vf [mm/min] | n=25000 min vf [mm/min] | n=30000 min vf [mm/min] | n=45000 min vf [mm/min] |
|--------------|-------------------|------------|---|------------------------|------------------------|------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| | Grafite B B | 0.20 | 2 | 0.002 | 0.100 | 0.100 | 60 | 100 | 120 | 180 |
| | | 0.30 | 2 | 0.004 | 0.150 | 0.200 | 120 | 200 | 240 | 360 |
| | | 0.40 | 2 | 0.005 | 0.200 | 0.250 | 150 | 250 | 300 | 450 |
| | | 0.50 | 2 | 0.006 | 0.250 | 0.300 | 180 | 300 | 360 | 540 |
| | | 0.60 | 2 | 0.007 | 0.250 | 0.350 | 210 | 350 | 420 | 630 |
| | | 0.80 | 2 | 0.009 | 0.350 | 0.500 | 270 | 450 | 540 | 810 |
| | | 1.00 | 2 | 0.012 | 0.450 | 0.600 | 360 | 600 | 720 | 1080 |
| | | 2.00 | 2 | 0.024 | 0.900 | 1.200 | 720 | 1200 | 1440 | 2160 |
| | Grafite B B | 0.20 | 2 | 0.002 | 0.100 | 0.200 | 60 | 100 | 120 | 180 |
| | | 0.30 | 2 | 0.003 | 0.150 | 0.300 | 90 | 150 | 180 | 270 |
| | | 0.40 | 2 | 0.004 | 0.200 | 0.400 | 120 | 200 | 240 | 360 |
| | | 0.50 | 2 | 0.005 | 0.250 | 0.500 | 150 | 250 | 300 | 450 |
| | | 0.60 | 2 | 0.005 | 0.250 | 0.600 | 150 | 250 | 300 | 450 |
| | | 0.80 | 2 | 0.007 | 0.350 | 0.800 | 210 | 350 | 420 | 630 |
| | | 1.00 | 2 | 0.009 | 0.450 | 1.000 | 270 | 450 | 540 | 810 |
| | | 2.00 | 2 | 0.018 | 0.900 | 2.000 | 540 | 900 | 1080 | 1620 |
| | Grafite B B | 0.20 | 2 | 0.003 | 0.030 | 0.040 | 90 | 150 | 180 | 270 |
| | | 0.30 | 2 | 0.004 | 0.040 | 0.060 | 120 | 200 | 240 | 360 |
| | | 0.40 | 2 | 0.005 | 0.060 | 0.080 | 150 | 250 | 300 | 450 |
| | | 0.50 | 2 | 0.007 | 0.070 | 0.100 | 210 | 350 | 420 | 630 |
| | | 0.60 | 2 | 0.008 | 0.080 | 0.120 | 240 | 400 | 480 | 720 |
| | | 0.80 | 2 | 0.011 | 0.110 | 0.160 | 330 | 550 | 660 | 990 |
| | | 1.00 | 2 | 0.013 | 0.140 | 0.200 | 390 | 650 | 780 | 1170 |
| | | 2.00 | 2 | 0.027 | 0.280 | 0.400 | 810 | 1350 | 1620 | 2430 |
| | Grafite B B | 0.20 | 2 | 0.003 | 0.040 | 0.040 | 90 | 150 | 180 | 270 |
| | | 0.30 | 2 | 0.004 | 0.050 | 0.050 | 120 | 200 | 240 | 360 |
| | | 0.40 | 2 | 0.005 | 0.070 | 0.070 | 150 | 250 | 300 | 450 |
| | | 0.50 | 2 | 0.007 | 0.090 | 0.090 | 210 | 350 | 420 | 630 |
| | | 0.60 | 2 | 0.008 | 0.110 | 0.110 | 240 | 400 | 480 | 720 |
| | | 0.80 | 2 | 0.011 | 0.140 | 0.140 | 330 | 550 | 660 | 990 |
| | | 1.00 | 2 | 0.013 | 0.180 | 0.180 | 390 | 650 | 780 | 1170 |
| | | 2.00 | 2 | 0.027 | 0.360 | 0.360 | 810 | 1350 | 1620 | 2430 |

Frese toriche MicroX (MicrotoroXG)

Gambo ø 6mm, scarico cilindrico, 5xd



| | |
|----|---------------|
| HM | λ 30° |
| XA | γ 15° |



| | | | | | | | | | | | | |
|--|--|--|--|----------------------|--|--|--|--|--|--|--|---|
| | | | | C Graphite | | | | | | | | CF / GF Fiber Reinforced Plastics |
|--|--|--|--|----------------------|--|--|--|--|--|--|--|---|

IV

| Esempio: N° Ordine | | | | | | | | | | | DIAPLUS |
|--|---------------------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------------|-------|---|---------|
| Rivestimento B Articolo 6034 Codice-ø 020 | | | | | | | | | | | |
| Ø Code | d ₁ 0/-0.01 | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.005 | α | z | EUR |
| 020 | 0.20 | 6.00 | 0.18 | 57 | 0.20 | 1.00 | 17.94 | - | 13.8° | 2 | 103.00 |
| 030 | 0.30 | 6.00 | 0.25 | 57 | 0.30 | 1.50 | 18.24 | - | 13.2° | 2 | 94.00 |
| 018 | 0.20 | 6.00 | 0.18 | 57 | 0.20 | 1.00 | 17.94 | 0.050 | 13.8° | 2 | 103.00 |
| 028 | 0.30 | 6.00 | 0.25 | 57 | 0.30 | 1.50 | 18.24 | 0.050 | 13.2° | 2 | 94.00 |
| 040 | 0.40 | 6.00 | 0.35 | 57 | 0.40 | 2.00 | 18.46 | 0.050 | 12.7° | 2 | 94.00 |
| 048 | 0.50 | 6.00 | 0.45 | 57 | 0.50 | 2.50 | 13.51 | 0.050 | 12.2° | 2 | 94.00 |
| 058 | 0.60 | 6.00 | 0.55 | 57 | 0.60 | 3.00 | 13.83 | 0.050 | 11.7° | 2 | 94.00 |
| 078 | 0.80 | 6.00 | 0.75 | 57 | 0.80 | 4.00 | 14.45 | 0.050 | 10.8° | 2 | 94.00 |
| 096 | 1.00 | 6.00 | 0.95 | 57 | 1.00 | 5.00 | 15.08 | 0.050 | 9.9° | 2 | 94.00 |
| 050 | 0.50 | 6.00 | 0.45 | 57 | 0.50 | 2.50 | 13.51 | 0.100 | 12.2° | 2 | 94.00 |
| 060 | 0.60 | 6.00 | 0.55 | 57 | 0.60 | 3.00 | 13.83 | 0.100 | 11.7° | 2 | 94.00 |
| 080 | 0.80 | 6.00 | 0.75 | 57 | 0.80 | 4.00 | 14.45 | 0.100 | 10.8° | 2 | 94.00 |
| 098 | 1.00 | 6.00 | 0.95 | 57 | 1.00 | 5.00 | 15.08 | 0.100 | 9.9° | 2 | 94.00 |
| 138 | 2.00 | 6.00 | 1.90 | 57 | 2.00 | 10.00 | 18.31 | 0.100 | 6.5° | 2 | 94.00 |

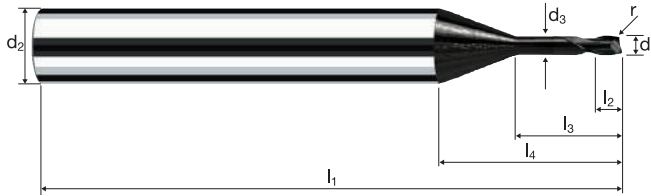
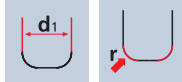
| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=15000 min ⁻¹ vf [mm/min] | n=25000 min ⁻¹ vf [mm/min] | n=30000 min ⁻¹ vf [mm/min] | n=45000 min ⁻¹ vf [mm/min] |
|--------------|-------------------|---------|---|---------------------|---------------------|---------------------|--|--|--|--|
| | Grafite B B | 0.80 | 2 | 0.009 | 0.350 | 0.500 | 270 | 450 | 540 | 810 |
| | | 1.00 | 2 | 0.012 | 0.450 | 0.600 | 360 | 600 | 720 | 1080 |
| | | 1.50 | 2 | 0.018 | 0.700 | 0.900 | 540 | 900 | 1080 | 1620 |
| | | 2.00 | 2 | 0.024 | 0.900 | 1.200 | 720 | 1200 | 1440 | 2160 |
| | | 3.00 | 2 | 0.035 | 1.350 | 1.800 | 1050 | 1750 | 2100 | 3150 |
| | | 4.00 | 2 | 0.047 | 1.800 | 2.400 | 1410 | 2350 | 2820 | 4230 |
| | | 5.00 | 2 | 0.059 | 2.250 | 3.000 | 1770 | 2950 | 3540 | 5310 |
| | | 6.00 | 2 | 0.071 | 2.700 | 3.600 | 2130 | 3550 | 4260 | 6390 |
| | Grafite B B | 0.80 | 2 | 0.007 | 0.350 | 0.800 | 210 | 350 | 420 | 630 |
| | | 1.00 | 2 | 0.009 | 0.450 | 1.000 | 270 | 450 | 540 | 810 |
| | | 1.50 | 2 | 0.014 | 0.700 | 1.500 | 420 | 700 | 840 | 1260 |
| | | 2.00 | 2 | 0.018 | 0.900 | 2.000 | 540 | 900 | 1080 | 1620 |
| | | 3.00 | 2 | 0.027 | 1.350 | 3.000 | 810 | 1350 | 1620 | 2430 |
| | | 4.00 | 2 | 0.036 | 1.800 | 4.000 | 1080 | 1800 | 2160 | 3240 |
| | | 5.00 | 2 | 0.045 | 2.250 | 5.000 | 1350 | 2250 | 2700 | 4050 |
| | | 6.00 | 2 | 0.055 | 2.700 | 6.000 | 1650 | 2750 | 3300 | 4950 |
| | Grafite B B | 0.80 | 2 | 0.011 | 0.110 | 0.160 | 330 | 550 | 660 | 990 |
| | | 1.00 | 2 | 0.013 | 0.140 | 0.200 | 390 | 650 | 780 | 1170 |
| | | 1.50 | 2 | 0.020 | 0.210 | 0.300 | 600 | 1000 | 1200 | 1800 |
| | | 2.00 | 2 | 0.027 | 0.280 | 0.400 | 810 | 1350 | 1620 | 2430 |
| | | 3.00 | 2 | 0.040 | 0.420 | 0.600 | 1200 | 2000 | 2400 | 3600 |
| | | 4.00 | 2 | 0.053 | 0.560 | 0.800 | 1590 | 2650 | 3180 | 4770 |
| | | 5.00 | 2 | 0.067 | 0.700 | 1.000 | 2010 | 3350 | 4020 | 6030 |
| | | 6.00 | 2 | 0.080 | 0.840 | 1.200 | 2400 | 4000 | 4800 | 7200 |
| | Grafite B B | 0.80 | 2 | 0.011 | 0.140 | 0.140 | 330 | 550 | 660 | 990 |
| | | 1.00 | 2 | 0.013 | 0.180 | 0.180 | 390 | 650 | 780 | 1170 |
| | | 1.50 | 2 | 0.020 | 0.270 | 0.270 | 600 | 1000 | 1200 | 1800 |
| | | 2.00 | 2 | 0.027 | 0.360 | 0.360 | 810 | 1350 | 1620 | 2430 |
| | | 3.00 | 2 | 0.040 | 0.540 | 0.540 | 1200 | 2000 | 2400 | 3600 |
| | | 4.00 | 2 | 0.053 | 0.720 | 0.720 | 1590 | 2650 | 3180 | 4770 |
| | | 5.00 | 2 | 0.067 | 0.900 | 0.900 | 2010 | 3350 | 4020 | 6030 |
| | | 6.00 | 2 | 0.080 | 1.080 | 1.080 | 2400 | 4000 | 4800 | 7200 |

Frese toriche MicroX (MicrotoroXG)

Gambo ø 6mm, scarico cilindrico, 5xd



| | |
|----|---------------|
| HM | λ 30° |
| XA | γ 15° |



| | | | | | | | | | | | |
|--|--|--|--|---------------|--|--|--|--|--|--|---------------------------------------|
| | | | | C Graphite | | | | | | | CF/GF Fiber Reinforced Plastics |
|--|--|--|--|---------------|--|--|--|--|--|--|---------------------------------------|

IV

| Esempio: N° Ordine | | | | | | | | | | | DIAPLUS |
|--------------------------------|---------------------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------------|-------|---|---------|
| Rivestimento Articolo Codice-ø | | | | | | | | | | | |
| B 6034 082 | | | | | | | | | | | B6034 |
| Ø Code | d ₁ 0/-0.01 | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.005 | α | z | EUR |
| 082 | 0.80 | 6.00 | 0.75 | 57 | 0.80 | 4.00 | 14.45 | 0.200 | 10.9° | 2 | 94.00 |
| 100 | 1.00 | 6.00 | 0.95 | 57 | 1.00 | 5.00 | 15.08 | 0.200 | 9.9° | 2 | 94.00 |
| 120 | 1.50 | 6.00 | 1.40 | 57 | 1.50 | 7.50 | 16.74 | 0.200 | 8.1° | 2 | 94.00 |
| 140 | 2.00 | 6.00 | 1.90 | 57 | 2.00 | 10.00 | 18.31 | 0.200 | 6.6° | 2 | 94.00 |
| 180 | 3.00 | 6.00 | 2.80 | 57 | 3.00 | 15.00 | 21.63 | 0.200 | 4.2° | 2 | 94.00 |
| 182 | 3.00 | 6.00 | 2.80 | 61 | 3.00 | 18.00 | 24.63 | 0.200 | 3.7° | 2 | 94.00 |
| 215 | 4.00 | 6.00 | 3.70 | 61 | 4.00 | 20.00 | 24.95 | 0.200 | 2.5° | 2 | 100.00 |
| 217 | 4.00 | 6.00 | 3.70 | 66 | 4.00 | 25.00 | 29.95 | 0.200 | 2.0° | 2 | 109.00 |
| 255 | 5.00 | 6.00 | 4.60 | 66 | 5.00 | 25.00 | 28.27 | 0.200 | 1.1° | 2 | 115.00 |
| 295 | 6.00 | 6.00 | 5.50 | 69 | 6.00 | 29.34 | 30.00 | 0.200 | 0.0° | 2 | 122.00 |
| 185 | 3.00 | 6.00 | 2.80 | 61 | 3.00 | 15.00 | 21.63 | 0.500 | 4.2° | 2 | 94.00 |
| 220 | 4.00 | 6.00 | 3.70 | 61 | 4.00 | 20.00 | 24.95 | 0.500 | 2.6° | 2 | 100.00 |
| 222 | 4.00 | 6.00 | 3.70 | 66 | 4.00 | 25.00 | 29.95 | 0.500 | 2.1° | 2 | 109.00 |
| 260 | 5.00 | 6.00 | 4.60 | 66 | 5.00 | 25.00 | 28.27 | 0.500 | 1.1° | 2 | 115.00 |
| 300 | 6.00 | 6.00 | 5.50 | 69 | 6.00 | 29.34 | 30.00 | 0.500 | 0.0° | 2 | 122.00 |
| | | | | | | | | | | | |
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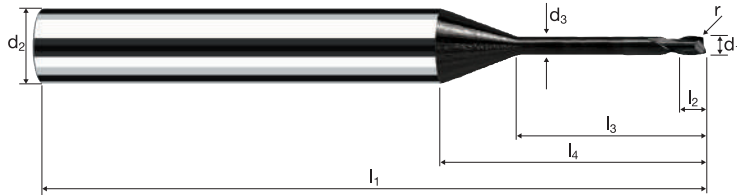
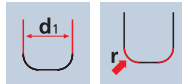
| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=15000 min vf [mm/min] | n=25000 min vf [mm/min] | n=30000 min vf [mm/min] | n=45000 min vf [mm/min] | | |
|--------------|---------------------------------|------------|---------------------------------|------------------------|------------------------|------------------------|----------------------------|----------------------------|----------------------------|----------------------------|-----|-----|
| | Grafite B B | 0.20 | 2 | 0.002 | 0.100 | 0.100 | 60 | 100 | 120 | 180 | | |
| | | 0.30 | 2 | 0.004 | 0.100 | 0.200 | 120 | 200 | 240 | 360 | | |
| | | 0.40 | 2 | 0.005 | 0.150 | 0.250 | 150 | 250 | 300 | 450 | | |
| | | 0.50 | 2 | 0.006 | 0.200 | 0.300 | 180 | 300 | 360 | 540 | | |
| | | 0.60 | 2 | 0.007 | 0.250 | 0.350 | 210 | 350 | 420 | 630 | | |
| | | 0.80 | 2 | 0.009 | 0.300 | 0.500 | 270 | 450 | 540 | 810 | | |
| | | 1.00 | 2 | 0.012 | 0.400 | 0.600 | 360 | 600 | 720 | 1080 | | |
| | | 2.00 | 2 | 0.024 | 0.800 | 1.200 | 720 | 1200 | 1440 | 2160 | | |
| | | | Grafite B B | 0.20 | 2 | 0.002 | 0.100 | 0.200 | 60 | 100 | 120 | 180 |
| | | | | 0.30 | 2 | 0.003 | 0.100 | 0.300 | 90 | 150 | 180 | 270 |
| 0.40 | 2 | | | 0.004 | 0.150 | 0.400 | 120 | 200 | 240 | 360 | | |
| 0.50 | 2 | | | 0.005 | 0.200 | 0.500 | 150 | 250 | 300 | 450 | | |
| 0.60 | 2 | | | 0.005 | 0.250 | 0.600 | 150 | 250 | 300 | 450 | | |
| 0.80 | 2 | | | 0.007 | 0.300 | 0.800 | 210 | 350 | 420 | 630 | | |
| 1.00 | 2 | | | 0.009 | 0.400 | 1.000 | 270 | 450 | 540 | 810 | | |
| 2.00 | 2 | | | 0.018 | 0.800 | 2.000 | 540 | 900 | 1080 | 1620 | | |
| | Grafite B B | | | 0.20 | 2 | 0.003 | 0.020 | 0.040 | 90 | 150 | 180 | 270 |
| | | | | 0.30 | 2 | 0.004 | 0.040 | 0.050 | 120 | 200 | 240 | 360 |
| | | 0.40 | 2 | 0.005 | 0.050 | 0.070 | 150 | 250 | 300 | 450 | | |
| | | 0.50 | 2 | 0.007 | 0.060 | 0.090 | 210 | 350 | 420 | 630 | | |
| | | 0.60 | 2 | 0.008 | 0.070 | 0.110 | 240 | 400 | 480 | 720 | | |
| | | 0.80 | 2 | 0.011 | 0.100 | 0.140 | 330 | 550 | 660 | 990 | | |
| | | 1.00 | 2 | 0.013 | 0.120 | 0.180 | 390 | 650 | 780 | 1170 | | |
| | | 2.00 | 2 | 0.027 | 0.240 | 0.360 | 810 | 1350 | 1620 | 2430 | | |
| | | | Grafite B B | 0.20 | 2 | 0.003 | 0.030 | 0.030 | 90 | 150 | 180 | 270 |
| | | | | 0.30 | 2 | 0.004 | 0.050 | 0.050 | 120 | 200 | 240 | 360 |
| 0.40 | 2 | | | 0.005 | 0.060 | 0.060 | 150 | 250 | 300 | 450 | | |
| 0.50 | 2 | | | 0.007 | 0.080 | 0.080 | 210 | 350 | 420 | 630 | | |
| 0.60 | 2 | | | 0.008 | 0.100 | 0.100 | 240 | 400 | 480 | 720 | | |
| 0.80 | 2 | | | 0.011 | 0.130 | 0.130 | 330 | 550 | 660 | 990 | | |
| 1.00 | 2 | | | 0.013 | 0.160 | 0.160 | 390 | 650 | 780 | 1170 | | |
| 2.00 | 2 | | | 0.027 | 0.320 | 0.320 | 810 | 1350 | 1620 | 2430 | | |

Frese toriche MicroX (MicrotoroXG)

Gambo ø 6mm, scarico cilindrico, 8xd



| | |
|----|---------------|
| HM | λ 30° |
| XA | γ 15° |



| | | | | | | | | | | | | |
|--|--|--|--|----------------------|--|--|--|--|--|--|--|---|
| | | | | C Graphite | | | | | | | | CF / GF Fiber Reinforced Plastics |
|--|--|--|--|----------------------|--|--|--|--|--|--|--|---|

IV

| Esempio: N° Ordine | | | | | | | | | | | DIAPLUS |
|--|---------------------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------------|-------|---|---------|
| Rivestimento B Articolo 6036 Codice-ø 020 | | | | | | | | | | | |
| Ø Code | d ₁ 0/-0.01 | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.005 | α | z | EUR |
| 020 | 0.20 | 6.00 | 0.18 | 57 | 0.20 | 1.60 | 18.54 | - | 13.2° | 2 | 103.00 |
| 030 | 0.30 | 6.00 | 0.25 | 57 | 0.30 | 2.40 | 19.14 | - | 12.5° | 2 | 94.00 |
| 018 | 0.20 | 6.00 | 0.18 | 57 | 0.20 | 1.60 | 18.54 | 0.050 | 13.2° | 2 | 103.00 |
| 028 | 0.30 | 6.00 | 0.25 | 57 | 0.30 | 2.40 | 19.14 | 0.050 | 12.3° | 2 | 94.00 |
| 040 | 0.40 | 6.00 | 0.35 | 57 | 0.40 | 3.20 | 19.66 | 0.050 | 11.6° | 2 | 94.00 |
| 048 | 0.50 | 6.00 | 0.45 | 57 | 0.50 | 4.00 | 15.01 | 0.050 | 11.0° | 2 | 94.00 |
| 058 | 0.60 | 6.00 | 0.55 | 57 | 0.60 | 4.80 | 15.63 | 0.050 | 10.3° | 2 | 94.00 |
| 078 | 0.80 | 6.00 | 0.75 | 57 | 0.80 | 6.40 | 16.85 | 0.050 | 9.2° | 2 | 94.00 |
| 096 | 1.00 | 6.00 | 0.95 | 57 | 1.00 | 8.00 | 18.08 | 0.050 | 8.2° | 2 | 94.00 |
| 050 | 0.50 | 6.00 | 0.45 | 57 | 0.50 | 4.00 | 15.01 | 0.100 | 11.0° | 2 | 94.00 |
| 060 | 0.60 | 6.00 | 0.55 | 57 | 0.60 | 4.80 | 15.63 | 0.100 | 10.3° | 2 | 94.00 |
| 080 | 0.80 | 6.00 | 0.75 | 57 | 0.80 | 6.40 | 16.85 | 0.100 | 9.2° | 2 | 94.00 |
| 098 | 1.00 | 6.00 | 0.95 | 57 | 1.00 | 8.00 | 18.08 | 0.100 | 8.2° | 2 | 94.00 |
| 138 | 2.00 | 6.00 | 1.90 | 61 | 2.00 | 16.00 | 24.31 | 0.100 | 4.9° | 2 | 94.00 |

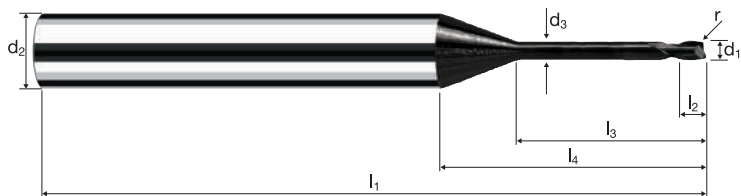
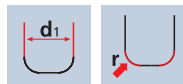
| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=15000 min ⁻¹ vf [mm/min] | n=25000 min ⁻¹ vf [mm/min] | n=30000 min ⁻¹ vf [mm/min] | n=45000 min ⁻¹ vf [mm/min] |
|--------------|-------------------|---------|---|---------------------|---------------------|---------------------|--|--|--|--|
| | Grafite B B | 0.80 | 2 | 0.009 | 0.300 | 0.500 | 270 | 450 | 540 | 810 |
| | | 1.00 | 2 | 0.012 | 0.400 | 0.600 | 360 | 600 | 720 | 1080 |
| | | 1.50 | 2 | 0.018 | 0.600 | 0.900 | 540 | 900 | 1080 | 1620 |
| | | 2.00 | 2 | 0.024 | 0.800 | 1.200 | 720 | 1200 | 1440 | 2160 |
| | | 3.00 | 2 | 0.035 | 1.200 | 1.800 | 1050 | 1750 | 2100 | 3150 |
| | | 4.00 | 2 | 0.047 | 1.600 | 2.400 | 1410 | 2350 | 2820 | 4230 |
| | | 5.00 | 2 | 0.059 | 2.000 | 3.000 | 1770 | 2950 | 3540 | 5310 |
| | | 6.00 | 2 | 0.071 | 2.400 | 3.600 | 2130 | 3550 | 4260 | 6390 |
| | Grafite B B | 0.80 | 2 | 0.007 | 0.300 | 0.800 | 210 | 350 | 420 | 630 |
| | | 1.00 | 2 | 0.009 | 0.400 | 1.000 | 270 | 450 | 540 | 810 |
| | | 1.50 | 2 | 0.014 | 0.600 | 1.500 | 420 | 700 | 840 | 1260 |
| | | 2.00 | 2 | 0.018 | 0.800 | 2.000 | 540 | 900 | 1080 | 1620 |
| | | 3.00 | 2 | 0.027 | 1.200 | 3.000 | 810 | 1350 | 1620 | 2430 |
| | | 4.00 | 2 | 0.036 | 1.600 | 4.000 | 1080 | 1800 | 2160 | 3240 |
| | | 5.00 | 2 | 0.045 | 2.000 | 5.000 | 1350 | 2250 | 2700 | 4050 |
| | | 6.00 | 2 | 0.055 | 2.400 | 6.000 | 1650 | 2750 | 3300 | 4950 |
| | Grafite B B | 0.80 | 2 | 0.011 | 0.100 | 0.140 | 330 | 550 | 660 | 990 |
| | | 1.00 | 2 | 0.013 | 0.120 | 0.180 | 390 | 650 | 780 | 1170 |
| | | 1.50 | 2 | 0.020 | 0.180 | 0.270 | 600 | 1000 | 1200 | 1800 |
| | | 2.00 | 2 | 0.027 | 0.240 | 0.360 | 810 | 1350 | 1620 | 2430 |
| | | 3.00 | 2 | 0.040 | 0.360 | 0.540 | 1200 | 2000 | 2400 | 3600 |
| | | 4.00 | 2 | 0.053 | 0.480 | 0.720 | 1590 | 2650 | 3180 | 4770 |
| | | 5.00 | 2 | 0.067 | 0.600 | 0.900 | 2010 | 3350 | 4020 | 6030 |
| | | 6.00 | 2 | 0.080 | 0.720 | 1.080 | 2400 | 4000 | 4800 | 7200 |
| | Grafite B B | 0.80 | 2 | 0.011 | 0.130 | 0.130 | 330 | 550 | 660 | 990 |
| | | 1.00 | 2 | 0.013 | 0.160 | 0.160 | 390 | 650 | 780 | 1170 |
| | | 1.50 | 2 | 0.020 | 0.240 | 0.240 | 600 | 1000 | 1200 | 1800 |
| | | 2.00 | 2 | 0.027 | 0.320 | 0.320 | 810 | 1350 | 1620 | 2430 |
| | | 3.00 | 2 | 0.040 | 0.480 | 0.480 | 1200 | 2000 | 2400 | 3600 |
| | | 4.00 | 2 | 0.053 | 0.640 | 0.640 | 1590 | 2650 | 3180 | 4770 |
| | | 5.00 | 2 | 0.067 | 0.800 | 0.800 | 2010 | 3350 | 4020 | 6030 |
| | | 6.00 | 2 | 0.080 | 0.960 | 0.960 | 2400 | 4000 | 4800 | 7200 |

Frese toriche MicroX (MicrotoroXG)

Gambo \varnothing 6mm, scarico cilindrico, 8xd



| | |
|-----------|---------------|
| HM | λ 30° |
| XA | γ 15° |



| | | | | | | | | | | | |
|--|--|--|----------------------|--|--|--|--|--|--|--|--|
| | | | C Graphite | | | | | | | | CF/GF Fiber Reinforced Plastics |
|--|--|--|----------------------|--|--|--|--|--|--|--|--|

IV

| Esempio: N° Ordine | | Rivestimento B | Articolo 6036 | Codice- \varnothing 082 | | | | | | | | DIAPLUS |
|------------------------------|------------------|--------------------------|-------------------------|-------------------------------------|-------|-------|-------|--------------------|----------|-----|--------------|----------------|
| \varnothing Code | d_1 0/-0.01 | d_2 h4 | d_3 | l_1 | l_2 | l_3 | l_4 | r ± 0.005 | α | z | B6036 | EUR |
| 082 | 0.80 | 6.00 | 0.75 | 57 | 0.80 | 6.40 | 16.85 | 0.200 | 9.3° | 2 | | 94.00 |
| 100 | 1.00 | 6.00 | 0.95 | 57 | 1.00 | 8.00 | 18.08 | 0.200 | 8.3° | 2 | | 94.00 |
| 120 | 1.50 | 6.00 | 1.40 | 57 | 1.50 | 12.00 | 21.24 | 0.200 | 6.4° | 2 | | 94.00 |
| 140 | 2.00 | 6.00 | 1.90 | 61 | 2.00 | 16.00 | 24.31 | 0.200 | 4.9° | 2 | | 94.00 |
| 180 | 3.00 | 6.00 | 2.80 | 66 | 3.00 | 24.00 | 30.63 | 0.200 | 2.9° | 2 | | 103.00 |
| 215 | 4.00 | 6.00 | 3.70 | 75 | 4.00 | 32.00 | 36.95 | 0.200 | 1.7° | 2 | | 115.00 |
| 255 | 5.00 | 6.00 | 4.60 | 80 | 5.00 | 40.00 | 43.27 | 0.200 | 0.7° | 2 | | 121.00 |
| 295 | 6.00 | 6.00 | 5.50 | 87 | 6.00 | 47.34 | 48.00 | 0.200 | 0.0° | 2 | | 131.00 |
| 185 | 3.00 | 6.00 | 2.80 | 69 | 3.00 | 24.00 | 30.63 | 0.500 | 3.0° | 2 | | 103.00 |
| 220 | 4.00 | 6.00 | 3.70 | 75 | 4.00 | 32.00 | 36.95 | 0.500 | 1.7° | 2 | | 115.00 |
| 260 | 5.00 | 6.00 | 4.60 | 80 | 5.00 | 40.00 | 43.27 | 0.500 | 0.7° | 2 | | 121.00 |
| 300 | 6.00 | 6.00 | 5.50 | 87 | 6.00 | 47.34 | 48.00 | 0.500 | 0.0° | 2 | | 131.00 |

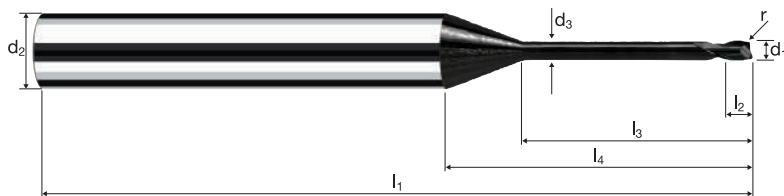
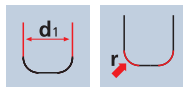
| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=15000 min vf [mm/min] | n=25000 min vf [mm/min] | n=30000 min vf [mm/min] | n=45000 min vf [mm/min] |
|--------------|-------------------|------------|---|------------------------|------------------------|------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| | Grafite B B | 0.20 | 2 | 0.002 | 0.100 | 0.100 | 60 | 100 | 120 | 180 |
| | | 0.30 | 2 | 0.004 | 0.100 | 0.100 | 120 | 200 | 240 | 360 |
| | | 0.40 | 2 | 0.005 | 0.150 | 0.150 | 150 | 250 | 300 | 450 |
| | | 0.50 | 2 | 0.006 | 0.200 | 0.200 | 180 | 300 | 360 | 540 |
| | | 0.60 | 2 | 0.007 | 0.250 | 0.250 | 210 | 350 | 420 | 630 |
| | | 0.80 | 2 | 0.009 | 0.300 | 0.300 | 270 | 450 | 540 | 810 |
| | | 1.00 | 2 | 0.012 | 0.400 | 0.400 | 360 | 600 | 720 | 1080 |
| | | 2.00 | 2 | 0.024 | 0.800 | 0.800 | 720 | 1200 | 1440 | 2160 |
| | Grafite B B | 0.20 | 2 | 0.002 | 0.050 | 0.200 | 60 | 100 | 120 | 180 |
| | | 0.30 | 2 | 0.003 | 0.100 | 0.300 | 90 | 150 | 180 | 270 |
| | | 0.40 | 2 | 0.004 | 0.100 | 0.400 | 120 | 200 | 240 | 360 |
| | | 0.50 | 2 | 0.005 | 0.150 | 0.500 | 150 | 250 | 300 | 450 |
| | | 0.60 | 2 | 0.005 | 0.200 | 0.600 | 150 | 250 | 300 | 450 |
| | | 0.80 | 2 | 0.007 | 0.250 | 0.800 | 210 | 350 | 420 | 630 |
| | | 1.00 | 2 | 0.009 | 0.300 | 1.000 | 270 | 450 | 540 | 810 |
| | | 2.00 | 2 | 0.018 | 0.600 | 2.000 | 540 | 900 | 1080 | 1620 |
| | Grafite B B | 0.20 | 2 | 0.003 | 0.020 | 0.030 | 90 | 150 | 180 | 270 |
| | | 0.30 | 2 | 0.004 | 0.030 | 0.050 | 120 | 200 | 240 | 360 |
| | | 0.40 | 2 | 0.005 | 0.040 | 0.060 | 150 | 250 | 300 | 450 |
| | | 0.50 | 2 | 0.007 | 0.050 | 0.080 | 210 | 350 | 420 | 630 |
| | | 0.60 | 2 | 0.008 | 0.060 | 0.100 | 240 | 400 | 480 | 720 |
| | | 0.80 | 2 | 0.011 | 0.080 | 0.130 | 330 | 550 | 660 | 990 |
| | | 1.00 | 2 | 0.013 | 0.100 | 0.160 | 390 | 650 | 780 | 1170 |
| | | 2.00 | 2 | 0.027 | 0.200 | 0.320 | 810 | 1350 | 1620 | 2430 |
| | Grafite B B | 0.20 | 2 | 0.003 | 0.030 | 0.030 | 90 | 150 | 180 | 270 |
| | | 0.30 | 2 | 0.004 | 0.040 | 0.040 | 120 | 200 | 240 | 360 |
| | | 0.40 | 2 | 0.005 | 0.060 | 0.060 | 150 | 250 | 300 | 450 |
| | | 0.50 | 2 | 0.007 | 0.070 | 0.070 | 210 | 350 | 420 | 630 |
| | | 0.60 | 2 | 0.008 | 0.080 | 0.080 | 240 | 400 | 480 | 720 |
| | | 0.80 | 2 | 0.011 | 0.110 | 0.110 | 330 | 550 | 660 | 990 |
| | | 1.00 | 2 | 0.013 | 0.140 | 0.140 | 390 | 650 | 780 | 1170 |
| | | 2.00 | 2 | 0.027 | 0.280 | 0.280 | 810 | 1350 | 1620 | 2430 |

Frese toriche MicroX (MicrotoroXG)

Gambo ø 6mm, scarico cilindrico, 10xd



| | |
|----|---------------|
| HM | λ 30° |
| XA | γ 15° |



C
Graphite

CF / GF
Fiber Reinforced
Plastics

IV

| Esempio: N° Ordine | | | | | | | | | | | DIAPLUS | |
|-----------------------|---------------------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------------|-------|---|---------|--|
| | | | | | | | | | | | B6038 | |
| | | | | | | | | | | | EUR | |
| Ø Code | d ₁ 0/-0.01 | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.005 | α | z | | |
| 018 | 0.20 | 6.00 | 0.18 | 57 | 0.20 | 2.00 | 18.94 | 0.050 | 12.8° | 2 | 103.00 | |
| 028 | 0.30 | 6.00 | 0.25 | 57 | 0.30 | 3.00 | 19.74 | 0.050 | 11.8° | 2 | 94.00 | |
| 040 | 0.40 | 6.00 | 0.35 | 57 | 0.40 | 4.00 | 20.46 | 0.050 | 11.0° | 2 | 94.00 | |
| 048 | 0.50 | 6.00 | 0.45 | 57 | 0.50 | 5.00 | 16.01 | 0.050 | 10.3° | 2 | 94.00 | |
| 058 | 0.60 | 6.00 | 0.55 | 57 | 0.60 | 6.00 | 16.83 | 0.050 | 9.6° | 2 | 94.00 | |
| 078 | 0.80 | 6.00 | 0.75 | 57 | 0.80 | 8.00 | 18.45 | 0.050 | 8.4° | 2 | 94.00 | |
| 096 | 1.00 | 6.00 | 0.95 | 57 | 1.00 | 10.00 | 20.08 | 0.050 | 7.4° | 2 | 94.00 | |
| 050 | 0.50 | 6.00 | 0.45 | 57 | 0.50 | 5.00 | 16.01 | 0.100 | 10.4° | 2 | 94.00 | |
| 060 | 0.60 | 6.00 | 0.55 | 57 | 0.60 | 6.00 | 16.83 | 0.100 | 9.6° | 2 | 94.00 | |
| 080 | 0.80 | 6.00 | 0.75 | 57 | 0.80 | 8.00 | 18.45 | 0.100 | 8.4° | 2 | 94.00 | |
| 098 | 1.00 | 6.00 | 0.95 | 57 | 1.00 | 10.00 | 20.08 | 0.100 | 7.4° | 2 | 94.00 | |
| 138 | 2.00 | 6.00 | 1.90 | 66 | 2.00 | 20.00 | 28.31 | 0.100 | 4.2° | 2 | 94.00 | |
| | | | | | | | | | | | | |
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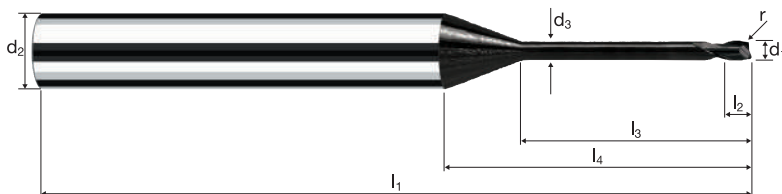
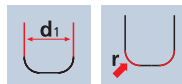
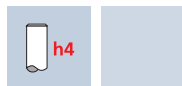
| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=15000 min vf [mm/min] | n=25000 min vf [mm/min] | n=30000 min vf [mm/min] | n=45000 min vf [mm/min] |
|--------------|---------------------------------|------------|---|------------------------|------------------------|------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| | Grafite B B | 0.80 | 2 | 0.009 | 0.300 | 0.300 | 270 | 450 | 540 | 810 |
| | | 1.00 | 2 | 0.012 | 0.400 | 0.400 | 360 | 600 | 720 | 1080 |
| | | 1.50 | 2 | 0.018 | 0.600 | 0.600 | 540 | 900 | 1080 | 1620 |
| | | 2.00 | 2 | 0.024 | 0.800 | 0.800 | 720 | 1200 | 1440 | 2160 |
| | | 3.00 | 2 | 0.035 | 1.200 | 1.200 | 1050 | 1750 | 2100 | 3150 |
| | | 4.00 | 2 | 0.047 | 1.600 | 1.600 | 1410 | 2350 | 2820 | 4230 |
| | | 5.00 | 2 | 0.059 | 2.000 | 2.000 | 1770 | 2950 | 3540 | 5310 |
| | | 6.00 | 2 | 0.071 | 2.400 | 2.400 | 2130 | 3550 | 4260 | 6390 |
| | Grafite B B | 0.80 | 2 | 0.007 | 0.250 | 0.800 | 210 | 350 | 420 | 630 |
| | | 1.00 | 2 | 0.009 | 0.300 | 1.000 | 270 | 450 | 540 | 810 |
| | | 1.50 | 2 | 0.014 | 0.450 | 1.500 | 420 | 700 | 840 | 1260 |
| | | 2.00 | 2 | 0.018 | 0.600 | 2.000 | 540 | 900 | 1080 | 1620 |
| | | 3.00 | 2 | 0.027 | 0.900 | 3.000 | 810 | 1350 | 1620 | 2430 |
| | | 4.00 | 2 | 0.036 | 1.200 | 4.000 | 1080 | 1800 | 2160 | 3240 |
| | | 5.00 | 2 | 0.045 | 1.500 | 5.000 | 1350 | 2250 | 2700 | 4050 |
| | | 6.00 | 2 | 0.055 | 1.800 | 6.000 | 1650 | 2750 | 3300 | 4950 |
| | Grafite B B | 0.80 | 2 | 0.011 | 0.080 | 0.130 | 330 | 550 | 660 | 990 |
| | | 1.00 | 2 | 0.013 | 0.100 | 0.160 | 390 | 650 | 780 | 1170 |
| | | 1.50 | 2 | 0.020 | 0.150 | 0.240 | 600 | 1000 | 1200 | 1800 |
| | | 2.00 | 2 | 0.027 | 0.200 | 0.320 | 810 | 1350 | 1620 | 2430 |
| | | 3.00 | 2 | 0.040 | 0.300 | 0.480 | 1200 | 2000 | 2400 | 3600 |
| | | 4.00 | 2 | 0.053 | 0.400 | 0.640 | 1590 | 2650 | 3180 | 4770 |
| | | 5.00 | 2 | 0.067 | 0.500 | 0.800 | 2010 | 3350 | 4020 | 6030 |
| | | 6.00 | 2 | 0.080 | 0.600 | 0.960 | 2400 | 4000 | 4800 | 7200 |
| | Grafite B B | 0.80 | 2 | 0.011 | 0.110 | 0.110 | 330 | 550 | 660 | 990 |
| | | 1.00 | 2 | 0.013 | 0.140 | 0.140 | 390 | 650 | 780 | 1170 |
| | | 1.50 | 2 | 0.020 | 0.210 | 0.210 | 600 | 1000 | 1200 | 1800 |
| | | 2.00 | 2 | 0.027 | 0.280 | 0.280 | 810 | 1350 | 1620 | 2430 |
| | | 3.00 | 2 | 0.040 | 0.420 | 0.420 | 1200 | 2000 | 2400 | 3600 |
| | | 4.00 | 2 | 0.053 | 0.560 | 0.560 | 1590 | 2650 | 3180 | 4770 |
| | | 5.00 | 2 | 0.067 | 0.700 | 0.700 | 2010 | 3350 | 4020 | 6030 |
| | | 6.00 | 2 | 0.080 | 0.840 | 0.840 | 2400 | 4000 | 4800 | 7200 |

Frese toriche MicroX (MicrotoroXG)

Gambo \varnothing 6mm, scarico cilindrico, 10xd



HM λ 30°
XA γ 15°



C Graphite CF/GF Fiber Reinforced Plastics

IV

| Esempio: N° Ordine | | | | | | | | | | | DIAPLUS |
|---|------------------|-------------|-------|-------|-------|-------|-------|--------------------|----------|-----|---------|
| Rivestimento B Articolo 6038 Codice- \varnothing 082 | | | | | | | | | | | B6038 |
| \varnothing Code | d_1 0/-0.01 | d_2 h4 | d_3 | l_1 | l_2 | l_3 | l_4 | r ± 0.005 | α | z | EUR |
| 082 | 0.80 | 6.00 | 0.75 | 57 | 0.80 | 8.00 | 18.45 | 0.200 | 8.4° | 2 | 94.00 |
| 100 | 1.00 | 6.00 | 0.95 | 57 | 1.00 | 10.00 | 20.08 | 0.200 | 7.4° | 2 | 94.00 |
| 120 | 1.50 | 6.00 | 1.40 | 61 | 1.50 | 15.00 | 24.24 | 0.200 | 5.5° | 2 | 94.00 |
| 140 | 2.00 | 6.00 | 1.90 | 66 | 2.00 | 20.00 | 28.31 | 0.200 | 4.2° | 2 | 94.00 |
| 180 | 3.00 | 6.00 | 2.80 | 75 | 3.00 | 30.00 | 36.63 | 0.200 | 2.5° | 2 | 108.00 |
| 215 | 4.00 | 6.00 | 3.70 | 80 | 4.00 | 40.00 | 44.95 | 0.200 | 1.4° | 2 | 115.00 |
| 255 | 5.00 | 6.00 | 4.60 | 100 | 5.00 | 50.00 | 53.27 | 0.200 | 0.6° | 2 | 125.00 |
| 295 | 6.00 | 6.00 | 5.50 | 100 | 6.00 | 59.34 | 60.00 | 0.200 | 0.0° | 2 | 131.00 |
| 185 | 3.00 | 6.00 | 2.80 | 75 | 3.00 | 30.00 | 36.63 | 0.500 | 2.5° | 2 | 108.00 |
| 220 | 4.00 | 6.00 | 3.70 | 80 | 4.00 | 40.00 | 44.95 | 0.500 | 1.4° | 2 | 115.00 |
| 260 | 5.00 | 6.00 | 4.60 | 100 | 5.00 | 50.00 | 53.27 | 0.500 | 0.6° | 2 | 125.00 |
| 300 | 6.00 | 6.00 | 5.50 | 100 | 6.00 | 59.34 | 60.00 | 0.500 | 0.0° | 2 | 131.00 |
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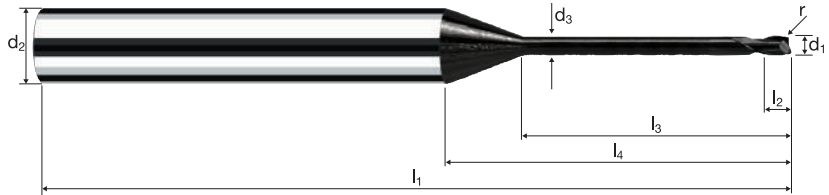
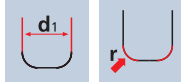
| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=15000 min vf [mm/min] | n=25000 min vf [mm/min] | n=30000 min vf [mm/min] | n=45000 min vf [mm/min] |
|--------------|-------------------|------------|-------------------|------------------------|------------------------|------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| | Grafite B B | 0.30 | 2 | 0.003 | 0.100 | 0.100 | 90 | 150 | 180 | 270 |
| | | 0.40 | 2 | 0.004 | 0.100 | 0.150 | 120 | 200 | 240 | 360 |
| | | 0.50 | 2 | 0.005 | 0.150 | 0.200 | 150 | 250 | 300 | 450 |
| | | 0.60 | 2 | 0.006 | 0.200 | 0.250 | 180 | 300 | 360 | 540 |
| | | 0.80 | 2 | 0.008 | 0.250 | 0.300 | 240 | 400 | 480 | 720 |
| | | 1.00 | 2 | 0.009 | 0.300 | 0.400 | 270 | 450 | 540 | 810 |
| | | 1.50 | 2 | 0.014 | 0.450 | 0.600 | 420 | 700 | 840 | 1260 |
| | | 2.00 | 2 | 0.019 | 0.600 | 0.800 | 570 | 950 | 1140 | 1710 |
| | | 3.00 | 2 | 0.028 | 0.900 | 1.200 | 840 | 1400 | 1680 | 2520 |
| | | | Grafite B B | 0.30 | 2 | 0.002 | 0.050 | 0.300 | 60 | 100 |
| 0.40 | 2 | | | 0.003 | 0.100 | 0.400 | 90 | 150 | 180 | 270 |
| 0.50 | 2 | | | 0.004 | 0.100 | 0.500 | 120 | 200 | 240 | 360 |
| 0.60 | 2 | | | 0.004 | 0.100 | 0.600 | 120 | 200 | 240 | 360 |
| 0.80 | 2 | | | 0.006 | 0.150 | 0.800 | 180 | 300 | 360 | 540 |
| 1.00 | 2 | | | 0.007 | 0.200 | 1.000 | 210 | 350 | 420 | 630 |
| 1.50 | 2 | | | 0.011 | 0.300 | 1.500 | 330 | 550 | 660 | 990 |
| 2.00 | 2 | | | 0.015 | 0.400 | 2.000 | 450 | 750 | 900 | 1350 |
| 3.00 | 2 | | | 0.022 | 0.600 | 3.000 | 660 | 1100 | 1320 | 1980 |
| | Grafite B B | | | 0.30 | 2 | 0.003 | 0.030 | 0.040 | 90 | 150 |
| | | 0.40 | 2 | 0.004 | 0.040 | 0.060 | 120 | 200 | 240 | 360 |
| | | 0.50 | 2 | 0.005 | 0.050 | 0.070 | 150 | 250 | 300 | 450 |
| | | 0.60 | 2 | 0.006 | 0.060 | 0.080 | 180 | 300 | 360 | 540 |
| | | 0.80 | 2 | 0.009 | 0.080 | 0.110 | 270 | 450 | 540 | 810 |
| | | 1.00 | 2 | 0.011 | 0.100 | 0.140 | 330 | 550 | 660 | 990 |
| | | 1.50 | 2 | 0.016 | 0.150 | 0.210 | 480 | 800 | 960 | 1440 |
| | | 2.00 | 2 | 0.021 | 0.200 | 0.280 | 630 | 1050 | 1260 | 1890 |
| | | 3.00 | 2 | 0.032 | 0.300 | 0.420 | 960 | 1600 | 1920 | 2880 |
| | | | Grafite B B | 0.30 | 2 | 0.003 | 0.030 | 0.030 | 90 | 150 |
| 0.40 | 2 | | | 0.004 | 0.040 | 0.040 | 120 | 200 | 240 | 360 |
| 0.50 | 2 | | | 0.005 | 0.050 | 0.050 | 150 | 250 | 300 | 450 |
| 0.60 | 2 | | | 0.006 | 0.060 | 0.060 | 180 | 300 | 360 | 540 |
| 0.80 | 2 | | | 0.009 | 0.080 | 0.080 | 270 | 450 | 540 | 810 |
| 1.00 | 2 | | | 0.011 | 0.100 | 0.100 | 330 | 550 | 660 | 990 |
| 1.50 | 2 | | | 0.016 | 0.150 | 0.150 | 480 | 800 | 960 | 1440 |
| 2.00 | 2 | | | 0.021 | 0.200 | 0.200 | 630 | 1050 | 1260 | 1890 |
| 3.00 | 2 | | | 0.032 | 0.300 | 0.300 | 960 | 1600 | 1920 | 2880 |

Frese toriche MicroX (MicrotoroXG)

Gambo ø 6mm, scarico cilindrico, 12xd



| | |
|----|---------------|
| HM | λ 30° |
| XA | γ 15° |



| | | | | | | | | | | | | |
|--|--|--|--|---------------|--|--|--|--|--|--|--|---------------------------------------|
| | | | | C Graphite | | | | | | | | CF/GF Fiber Reinforced Plastics |
|--|--|--|--|---------------|--|--|--|--|--|--|--|---------------------------------------|

IV

| Esempio: N° Ordine | | | | | | | | | | | DIAPLUS |
|--------------------------------------|---------------------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------------|-------|---|---------|
| Rivestimento Articolo Codice-ø | | | | | | | | | | | |
| B 6040 028 | | | | | | | | | | | B6040 |
| Ø Code | d ₁ 0/-0.01 | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.005 | α | z | EUR |
| 028 | 0.30 | 6.00 | 0.25 | 57 | 0.30 | 3.60 | 20.34 | 0.050 | 11.3° | 2 | 103.00 |
| 040 | 0.40 | 6.00 | 0.35 | 57 | 0.40 | 4.80 | 21.26 | 0.050 | 7.8° | 2 | 103.00 |
| 048 | 0.50 | 6.00 | 0.45 | 57 | 0.50 | 6.00 | 17.01 | 0.050 | 9.6° | 2 | 103.00 |
| 058 | 0.60 | 6.00 | 0.55 | 57 | 0.60 | 7.20 | 18.03 | 0.050 | 8.9° | 2 | 103.00 |
| 078 | 0.80 | 6.00 | 0.75 | 57 | 0.80 | 9.60 | 20.05 | 0.050 | 7.7° | 2 | 103.00 |
| 096 | 1.00 | 6.00 | 0.95 | 61 | 1.00 | 12.00 | 22.08 | 0.050 | 6.7° | 2 | 103.00 |
| 050 | 0.50 | 6.00 | 0.45 | 57 | 0.50 | 6.00 | 17.01 | 0.100 | 9.7° | 2 | 103.00 |
| 060 | 0.60 | 6.00 | 0.55 | 57 | 0.60 | 7.20 | 18.03 | 0.100 | 8.9° | 2 | 103.00 |
| 080 | 0.80 | 6.00 | 0.75 | 57 | 0.80 | 9.60 | 20.05 | 0.100 | 7.7° | 2 | 103.00 |
| 098 | 1.00 | 6.00 | 0.95 | 61 | 1.00 | 12.00 | 22.08 | 0.100 | 6.7° | 2 | 103.00 |
| 138 | 2.00 | 6.00 | 1.90 | 69 | 2.00 | 24.00 | 32.31 | 0.100 | 3.7° | 2 | 103.00 |
| 082 | 0.80 | 6.00 | 0.75 | 57 | 0.80 | 9.60 | 20.05 | 0.200 | 7.8° | 2 | 103.00 |
| 100 | 1.00 | 6.00 | 0.95 | 61 | 1.00 | 12.00 | 22.08 | 0.200 | 6.7° | 2 | 103.00 |
| 120 | 1.50 | 6.00 | 1.40 | 66 | 1.50 | 18.00 | 27.24 | 0.200 | 4.9° | 2 | 103.00 |
| 140 | 2.00 | 6.00 | 1.90 | 69 | 2.00 | 24.00 | 32.31 | 0.200 | 3.7° | 2 | 103.00 |
| 180 | 3.00 | 6.00 | 2.80 | 80 | 3.00 | 36.00 | 42.63 | 0.200 | 2.1° | 2 | 108.00 |
| 185 | 3.00 | 6.00 | 2.80 | 80 | 3.00 | 36.00 | 42.63 | 0.500 | 2.1° | 2 | 108.00 |

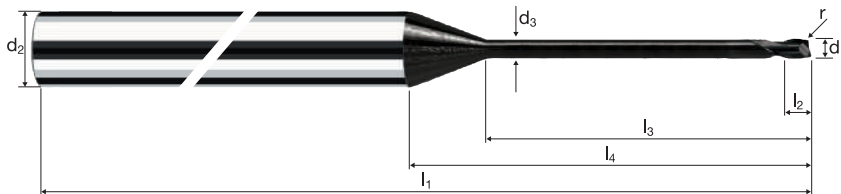
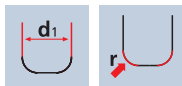
| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=15000 min ⁻¹ vf [mm/min] | n=25000 min ⁻¹ vf [mm/min] | n=30000 min ⁻¹ vf [mm/min] | n=45000 min ⁻¹ vf [mm/min] | | |
|--------------|-------------------|---------|-------------------|---------------------|---------------------|---------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|-----|-----|
| | Grafite B B | 0.40 | 2 | 0.003 | 0.080 | 0.100 | 90 | 150 | 180 | 270 | | |
| | | 0.50 | 2 | 0.004 | 0.100 | 0.150 | 120 | 200 | 240 | 360 | | |
| | | 0.60 | 2 | 0.005 | 0.100 | 0.200 | 150 | 250 | 300 | 450 | | |
| | | 0.80 | 2 | 0.007 | 0.150 | 0.250 | 210 | 350 | 420 | 630 | | |
| | | 1.00 | 2 | 0.008 | 0.200 | 0.300 | 240 | 400 | 480 | 720 | | |
| | | 1.50 | 2 | 0.012 | 0.300 | 0.450 | 360 | 600 | 720 | 1080 | | |
| | | 2.00 | 2 | 0.016 | 0.400 | 0.600 | 480 | 800 | 960 | 1440 | | |
| | | 3.00 | 2 | 0.025 | 0.600 | 0.900 | 750 | 1250 | 1500 | 2250 | | |
| | | | Grafite B B | 0.40 | 2 | 0.003 | 0.040 | 0.400 | 90 | 150 | 180 | 270 |
| | | | | 0.50 | 2 | 0.003 | 0.050 | 0.500 | 90 | 150 | 180 | 270 |
| 0.60 | 2 | | | 0.004 | 0.060 | 0.600 | 120 | 200 | 240 | 360 | | |
| 0.80 | 2 | | | 0.005 | 0.080 | 0.800 | 150 | 250 | 300 | 450 | | |
| 1.00 | 2 | | | 0.006 | 0.100 | 1.000 | 180 | 300 | 360 | 540 | | |
| 1.50 | 2 | | | 0.010 | 0.150 | 1.500 | 300 | 500 | 600 | 900 | | |
| 2.00 | 2 | | | 0.013 | 0.200 | 2.000 | 390 | 650 | 780 | 1170 | | |
| 3.00 | 2 | | | 0.019 | 0.300 | 3.000 | 570 | 950 | 1140 | 1710 | | |
| | Grafite B B | | | 0.40 | 2 | 0.004 | 0.030 | 0.040 | 120 | 200 | 240 | 360 |
| | | | | 0.50 | 2 | 0.005 | 0.040 | 0.050 | 150 | 250 | 300 | 450 |
| | | 0.60 | 2 | 0.006 | 0.050 | 0.060 | 180 | 300 | 360 | 540 | | |
| | | 0.80 | 2 | 0.007 | 0.060 | 0.080 | 210 | 350 | 420 | 630 | | |
| | | 1.00 | 2 | 0.009 | 0.080 | 0.100 | 270 | 450 | 540 | 810 | | |
| | | 1.50 | 2 | 0.014 | 0.120 | 0.150 | 420 | 700 | 840 | 1260 | | |
| | | 2.00 | 2 | 0.019 | 0.160 | 0.200 | 570 | 950 | 1140 | 1710 | | |
| | | 3.00 | 2 | 0.028 | 0.240 | 0.300 | 840 | 1400 | 1680 | 2520 | | |
| | | | Grafite B B | 0.40 | 2 | 0.004 | 0.030 | 0.030 | 120 | 200 | 240 | 360 |
| | | | | 0.50 | 2 | 0.005 | 0.040 | 0.040 | 150 | 250 | 300 | 450 |
| 0.60 | 2 | | | 0.006 | 0.050 | 0.050 | 180 | 300 | 360 | 540 | | |
| 0.80 | 2 | | | 0.007 | 0.060 | 0.060 | 210 | 350 | 420 | 630 | | |
| 1.00 | 2 | | | 0.009 | 0.080 | 0.080 | 270 | 450 | 540 | 810 | | |
| 1.50 | 2 | | | 0.014 | 0.120 | 0.120 | 420 | 700 | 840 | 1260 | | |
| 2.00 | 2 | | | 0.019 | 0.160 | 0.160 | 570 | 950 | 1140 | 1710 | | |
| 3.00 | 2 | | | 0.028 | 0.240 | 0.240 | 840 | 1400 | 1680 | 2520 | | |

Frese toriche MicroX (MicrotoroXG)

Gambo ø 6mm, scarico cilindrico, 15xd



HM λ 30°
XA γ 15°



C Graphite CF/GF Fiber Reinforced Plastics

IV

| Esempio: N° Ordine | | | | | | | | | | | DIAPLUS |
|--|---------------------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------------|------|---|--------------|
| Rivestimento B Articolo 6042 Codice-ø 040 | | | | | | | | | | | B6042 |
| Ø Code | d ₁ 0/-0.01 | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.005 | α | z | EUR |
| 040 | 0.40 | 6.00 | 0.35 | 61 | 0.40 | 6.00 | 22.46 | 0.050 | 9.7° | 2 | 108.00 |
| 048 | 0.50 | 6.00 | 0.45 | 57 | 0.50 | 7.50 | 18.51 | 0.050 | 8.8° | 2 | 108.00 |
| 058 | 0.60 | 6.00 | 0.55 | 57 | 0.60 | 9.00 | 19.83 | 0.050 | 8.1° | 2 | 108.00 |
| 078 | 0.80 | 6.00 | 0.75 | 61 | 0.80 | 12.00 | 22.45 | 0.050 | 6.9° | 2 | 108.00 |
| 096 | 1.00 | 6.00 | 0.95 | 66 | 1.00 | 15.00 | 25.08 | 0.050 | 5.9° | 2 | 108.00 |
| 050 | 0.50 | 6.00 | 0.45 | 57 | 0.50 | 7.50 | 18.51 | 0.100 | 8.8° | 2 | 108.00 |
| 060 | 0.60 | 6.00 | 0.55 | 57 | 0.60 | 9.00 | 19.83 | 0.100 | 8.1° | 2 | 108.00 |
| 080 | 0.80 | 6.00 | 0.75 | 61 | 0.80 | 12.00 | 22.45 | 0.100 | 6.9° | 2 | 108.00 |
| 098 | 1.00 | 6.00 | 0.95 | 66 | 1.00 | 15.00 | 25.08 | 0.100 | 5.9° | 2 | 108.00 |
| 138 | 2.00 | 6.00 | 1.90 | 75 | 2.00 | 30.00 | 38.31 | 0.100 | 3.1° | 2 | 108.00 |
| 082 | 0.80 | 6.00 | 0.75 | 61 | 0.80 | 12.00 | 22.45 | 0.200 | 6.9° | 2 | 108.00 |
| 100 | 1.00 | 6.00 | 0.95 | 66 | 1.00 | 15.00 | 25.08 | 0.200 | 5.9° | 2 | 108.00 |
| 120 | 1.50 | 6.00 | 1.40 | 69 | 1.50 | 22.50 | 31.74 | 0.200 | 4.2° | 2 | 108.00 |
| 140 | 2.00 | 6.00 | 1.90 | 75 | 2.00 | 30.00 | 38.31 | 0.200 | 3.1° | 2 | 108.00 |
| 180 | 3.00 | 6.00 | 2.80 | 100 | 3.00 | 45.00 | 51.63 | 0.200 | 1.7° | 2 | 108.00 |
| 185 | 3.00 | 6.00 | 2.80 | 100 | 3.00 | 45.00 | 51.63 | 0.500 | 1.7° | 2 | 108.00 |

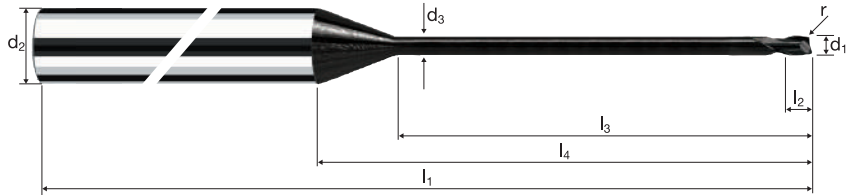
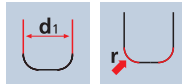
| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=15000 min vf [mm/min] | n=25000 min vf [mm/min] | n=30000 min vf [mm/min] | n=45000 min vf [mm/min] | | |
|--------------|---------------------------------|------------|---------------------------------|------------------------|------------------------|------------------------|----------------------------|----------------------------|----------------------------|----------------------------|-----|-----|
| | Grafite B B | 0.40 | 2 | 0.003 | 0.060 | 0.100 | 90 | 150 | 180 | 270 | | |
| | | 0.50 | 2 | 0.004 | 0.080 | 0.100 | 120 | 200 | 240 | 360 | | |
| | | 0.60 | 2 | 0.005 | 0.100 | 0.100 | 150 | 250 | 300 | 450 | | |
| | | 0.80 | 2 | 0.007 | 0.100 | 0.150 | 210 | 350 | 420 | 630 | | |
| | | 1.00 | 2 | 0.008 | 0.150 | 0.200 | 240 | 400 | 480 | 720 | | |
| | | 1.50 | 2 | 0.012 | 0.250 | 0.300 | 360 | 600 | 720 | 1080 | | |
| | | 2.00 | 2 | 0.016 | 0.300 | 0.400 | 480 | 800 | 960 | 1440 | | |
| | | 3.00 | 2 | 0.025 | 0.450 | 0.600 | 750 | 1250 | 1500 | 2250 | | |
| | | | Grafite B B | 0.40 | 2 | 0.004 | 0.020 | 0.030 | 120 | 200 | 240 | 360 |
| | | | | 0.50 | 2 | 0.005 | 0.030 | 0.040 | 150 | 250 | 300 | 450 |
| 0.60 | 2 | | | 0.006 | 0.040 | 0.050 | 180 | 300 | 360 | 540 | | |
| 0.80 | 2 | | | 0.007 | 0.050 | 0.060 | 210 | 350 | 420 | 630 | | |
| 1.00 | 2 | | | 0.009 | 0.060 | 0.080 | 270 | 450 | 540 | 810 | | |
| 1.50 | 2 | | | 0.014 | 0.090 | 0.120 | 420 | 700 | 840 | 1260 | | |
| 2.00 | 2 | | | 0.019 | 0.120 | 0.160 | 570 | 950 | 1140 | 1710 | | |
| 3.00 | 2 | | | 0.028 | 0.180 | 0.240 | 840 | 1400 | 1680 | 2520 | | |
| | Grafite B B | | | 0.40 | 2 | 0.004 | 0.020 | 0.020 | 120 | 200 | 240 | 360 |
| | | | | 0.50 | 2 | 0.005 | 0.030 | 0.030 | 150 | 250 | 300 | 450 |
| | | 0.60 | 2 | 0.006 | 0.040 | 0.040 | 180 | 300 | 360 | 540 | | |
| | | 0.80 | 2 | 0.007 | 0.050 | 0.050 | 210 | 350 | 420 | 630 | | |
| | | 1.00 | 2 | 0.009 | 0.060 | 0.060 | 270 | 450 | 540 | 810 | | |
| | | 1.50 | 2 | 0.014 | 0.090 | 0.090 | 420 | 700 | 840 | 1260 | | |
| | | 2.00 | 2 | 0.019 | 0.120 | 0.120 | 570 | 950 | 1140 | 1710 | | |
| | | 3.00 | 2 | 0.028 | 0.180 | 0.180 | 840 | 1400 | 1680 | 2520 | | |

Frese toriche MicroX (MicrotoroXG)

Gambo ø 6mm, scarico cilindrico, 20xd



HM λ 30°
XA γ 15°



C Graphite CF/GF Fiber Reinforced Plastics

IV

| Esempio: N° Ordine | | | | | | | | | | | DIAPLUS |
|--|---------------------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------------|------|---|---------|
| Rivestimento B Articolo 6044 Codice-ø 040 | | | | | | | | | | | B6044 |
| Ø Code | d ₁ 0/-0.01 | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.005 | α | z | EUR |
| 040 | 0.40 | 6.00 | 0.35 | 61 | 0.40 | 8.00 | 19.20 | 0.050 | 8.7° | 2 | 112.00 |
| 048 | 0.50 | 6.00 | 0.45 | 61 | 0.50 | 10.00 | 21.01 | 0.050 | 7.8° | 2 | 112.00 |
| 058 | 0.60 | 6.00 | 0.55 | 61 | 0.60 | 12.00 | 22.83 | 0.050 | 7.0° | 2 | 112.00 |
| 078 | 0.80 | 6.00 | 0.75 | 66 | 0.80 | 16.00 | 26.45 | 0.050 | 5.8° | 2 | 112.00 |
| 096 | 1.00 | 6.00 | 0.95 | 69 | 1.00 | 20.00 | 30.08 | 0.050 | 4.9° | 2 | 112.00 |
| 050 | 0.50 | 6.00 | 0.45 | 61 | 0.50 | 10.00 | 21.01 | 0.100 | 7.8° | 2 | 112.00 |
| 060 | 0.60 | 6.00 | 0.55 | 61 | 0.60 | 12.00 | 22.83 | 0.100 | 7.0° | 2 | 112.00 |
| 080 | 0.80 | 6.00 | 0.75 | 66 | 0.80 | 16.00 | 26.45 | 0.100 | 5.8° | 2 | 112.00 |
| 098 | 1.00 | 6.00 | 0.95 | 69 | 1.00 | 20.00 | 30.08 | 0.100 | 4.9° | 2 | 112.00 |
| 138 | 2.00 | 6.00 | 1.90 | 87 | 2.00 | 40.00 | 48.31 | 0.100 | 2.5° | 2 | 112.00 |
| 082 | 0.80 | 6.00 | 0.75 | 66 | 0.80 | 16.00 | 26.45 | 0.200 | 5.8° | 2 | 112.00 |
| 100 | 1.00 | 6.00 | 0.95 | 69 | 1.00 | 20.00 | 30.08 | 0.200 | 4.9° | 2 | 112.00 |
| 120 | 1.50 | 6.00 | 1.40 | 80 | 1.50 | 30.00 | 39.24 | 0.200 | 3.4° | 2 | 112.00 |
| 140 | 2.00 | 6.00 | 1.90 | 87 | 2.00 | 40.00 | 48.31 | 0.200 | 2.5° | 2 | 112.00 |
| 180 | 3.00 | 6.00 | 2.80 | 105 | 3.00 | 60.00 | 66.63 | 0.200 | 1.4° | 2 | 112.00 |
| 185 | 3.00 | 6.00 | 2.80 | 105 | 3.00 | 60.00 | 66.63 | 0.500 | 1.4° | 2 | 112.00 |

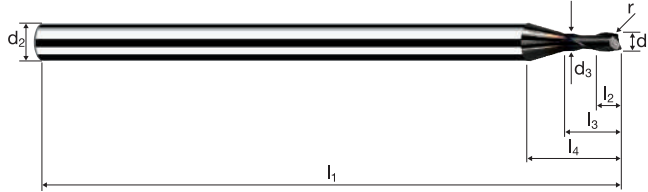
| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=15000 min vf [mm/min] | n=25000 min vf [mm/min] | n=30000 min vf [mm/min] | n=45000 min vf [mm/min] |
|--------------|-------------------|------------|---|------------------------|------------------------|------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| | Grafite B B | 1.00 | 2 | 0.009 | 0.500 | 0.600 | 270 | 450 | 540 | 810 |
| | | 1.20 | 2 | 0.011 | 0.600 | 0.700 | 330 | 550 | 660 | 990 |
| | | 1.50 | 2 | 0.014 | 0.750 | 0.900 | 420 | 700 | 840 | 1260 |
| | | 2.00 | 2 | 0.019 | 1.000 | 1.200 | 570 | 950 | 1140 | 1710 |
| | | 2.50 | 2 | 0.024 | 1.250 | 1.500 | 720 | 1200 | 1440 | 2160 |
| | | 3.00 | 2 | 0.028 | 1.500 | 1.800 | 840 | 1400 | 1680 | 2520 |
| | Grafite B B | 1.00 | 2 | 0.007 | 0.500 | 1.000 | 210 | 350 | 420 | 630 |
| | | 1.20 | 2 | 0.009 | 0.600 | 1.200 | 270 | 450 | 540 | 810 |
| | | 1.50 | 2 | 0.011 | 0.750 | 1.500 | 330 | 550 | 660 | 990 |
| | | 2.00 | 2 | 0.015 | 1.000 | 2.000 | 450 | 750 | 900 | 1350 |
| | | 2.50 | 2 | 0.018 | 1.250 | 2.500 | 540 | 900 | 1080 | 1620 |
| | | 3.00 | 2 | 0.022 | 1.500 | 3.000 | 660 | 1100 | 1320 | 1980 |
| | Grafite B B | 1.00 | 2 | 0.011 | 0.150 | 0.200 | 330 | 550 | 660 | 990 |
| | | 1.20 | 2 | 0.013 | 0.180 | 0.240 | 390 | 650 | 780 | 1170 |
| | | 1.50 | 2 | 0.016 | 0.230 | 0.300 | 480 | 800 | 960 | 1440 |
| | | 2.00 | 2 | 0.021 | 0.300 | 0.400 | 630 | 1050 | 1260 | 1890 |
| | | 2.50 | 2 | 0.027 | 0.380 | 0.500 | 810 | 1350 | 1620 | 2430 |
| | | 3.00 | 2 | 0.032 | 0.450 | 0.600 | 960 | 1600 | 1920 | 2880 |
| | Grafite B B | 1.00 | 2 | 0.011 | 0.200 | 0.200 | 330 | 550 | 660 | 990 |
| | | 1.20 | 2 | 0.013 | 0.240 | 0.240 | 390 | 650 | 780 | 1170 |
| | | 1.50 | 2 | 0.016 | 0.300 | 0.300 | 480 | 800 | 960 | 1440 |
| | | 2.00 | 2 | 0.021 | 0.400 | 0.400 | 630 | 1050 | 1260 | 1890 |
| | | 2.50 | 2 | 0.027 | 0.500 | 0.500 | 810 | 1350 | 1620 | 2430 |
| | | 3.00 | 2 | 0.032 | 0.600 | 0.600 | 960 | 1600 | 1920 | 2880 |

Frese toriche Microcut

Gambo ø 3mm, scarico cilindrico, 3xd



HM λ 25°
MG10 γ 6°



C Graphite CF / GF Fiber Reinforced Plastics

IV

| Esempio: N° Ordine | | | | | | | | | | | DIAMANT |
|--|----------------------|-------------------|----------------|----------------|----------------|----------------|----------------|-----------|------|---|--------------|
| Rivestimento B Articolo 5752 Codice-ø 100 | | | | | | | | | | | B5752 |
| Ø Code | d ₁ ±0.01 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r 0/+0.03 | α | z | EUR |
| 100 | 1.00 | 3.00 | 0.95 | 50 | 1.20 | 3.00 | 7.22 | 0.200 | 8.5° | 2 | 69.00 |
| 108 | 1.20 | 3.00 | 1.10 | 50 | 1.44 | 3.60 | 7.54 | 0.200 | 7.4° | 2 | 69.00 |
| 120 | 1.50 | 3.00 | 1.40 | 50 | 1.80 | 4.50 | 7.88 | 0.200 | 5.9° | 2 | 69.00 |
| 140 | 2.00 | 3.00 | 1.90 | 50 | 2.40 | 6.00 | 8.45 | 0.200 | 3.7° | 2 | 69.00 |
| 160 | 2.50 | 3.00 | 2.30 | 50 | 3.00 | 7.50 | 9.20 | 0.200 | 1.7° | 2 | 69.00 |
| 180 | 3.00 | 3.00 | 2.80 | 50 | 3.60 | 8.56 | 9.00 | 0.200 | 0.0° | 2 | 69.00 |
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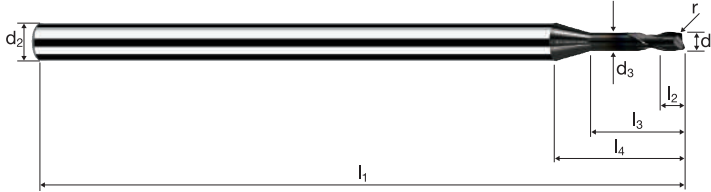
| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=15000 min vf [mm/min] | n=25000 min vf [mm/min] | n=30000 min vf [mm/min] | n=45000 min vf [mm/min] |
|--------------|---------------------------------|------------|---|------------------------|------------------------|------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| | Grafite B B | 1.00 | 2 | 0.009 | 0.450 | 0.600 | 270 | 450 | 540 | 810 |
| | | 1.20 | 2 | 0.011 | 0.550 | 0.700 | 330 | 550 | 660 | 990 |
| | | 1.50 | 2 | 0.014 | 0.700 | 0.900 | 420 | 700 | 840 | 1260 |
| | | 2.00 | 2 | 0.019 | 0.900 | 1.200 | 570 | 950 | 1140 | 1710 |
| | | 2.50 | 2 | 0.024 | 1.150 | 1.500 | 720 | 1200 | 1440 | 2160 |
| | | 3.00 | 2 | 0.028 | 1.350 | 1.800 | 840 | 1400 | 1680 | 2520 |
| | Grafite B B | 1.00 | 2 | 0.007 | 0.450 | 1.000 | 210 | 350 | 420 | 630 |
| | | 1.20 | 2 | 0.009 | 0.550 | 1.200 | 270 | 450 | 540 | 810 |
| | | 1.50 | 2 | 0.011 | 0.700 | 1.500 | 330 | 550 | 660 | 990 |
| | | 2.00 | 2 | 0.015 | 0.900 | 2.000 | 450 | 750 | 900 | 1350 |
| | | 2.50 | 2 | 0.018 | 1.150 | 2.500 | 540 | 900 | 1080 | 1620 |
| | | 3.00 | 2 | 0.022 | 1.350 | 3.000 | 660 | 1100 | 1320 | 1980 |
| | Grafite B B | 1.00 | 2 | 0.011 | 0.140 | 0.200 | 330 | 550 | 660 | 990 |
| | | 1.20 | 2 | 0.013 | 0.170 | 0.240 | 390 | 650 | 780 | 1170 |
| | | 1.50 | 2 | 0.016 | 0.210 | 0.300 | 480 | 800 | 960 | 1440 |
| | | 2.00 | 2 | 0.021 | 0.280 | 0.400 | 630 | 1050 | 1260 | 1890 |
| | | 2.50 | 2 | 0.027 | 0.350 | 0.500 | 810 | 1350 | 1620 | 2430 |
| | | 3.00 | 2 | 0.032 | 0.420 | 0.600 | 960 | 1600 | 1920 | 2880 |
| | Grafite B B | 1.00 | 2 | 0.011 | 0.180 | 0.180 | 330 | 550 | 660 | 990 |
| | | 1.20 | 2 | 0.013 | 0.220 | 0.220 | 390 | 650 | 780 | 1170 |
| | | 1.50 | 2 | 0.016 | 0.270 | 0.270 | 480 | 800 | 960 | 1440 |
| | | 2.00 | 2 | 0.021 | 0.360 | 0.360 | 630 | 1050 | 1260 | 1890 |
| | | 2.50 | 2 | 0.027 | 0.450 | 0.450 | 810 | 1350 | 1620 | 2430 |
| | | 3.00 | 2 | 0.032 | 0.540 | 0.540 | 960 | 1600 | 1920 | 2880 |

Frese toriche Microcut

Gambo ø 3mm, scarico cilindrico, 5xd



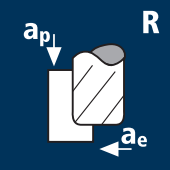


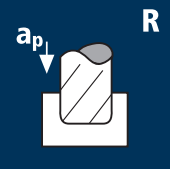


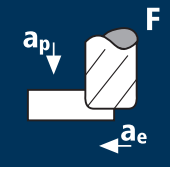





HM λ 25°
MG10 γ 6°



C Graphite CF / GF Fiber Reinforced Plastics

IV

| | | | | | | | | | | | DIAMANT |
|--------------------------------------|-------------|----------|-------|-------|-------|-------|-------|-------------|----------|-----|---------|
| Esempio: N° Ordine B 5754 100 | | | | | | | | | | | |
| | | | | | | | | | | | B5754 |
| \emptyset Code | d_1 ±0.01 | d_2 h6 | d_3 | l_1 | l_2 | l_3 | l_4 | r 0/+0.03 | α | z | EUR |
| 100 | 1.00 | 3.00 | 0.95 | 50 | 1.20 | 5.00 | 9.22 | 0.200 | 6.6° | 2 | 69.00 |
| 108 | 1.20 | 3.00 | 1.10 | 50 | 1.44 | 6.00 | 9.94 | 0.200 | 5.5° | 2 | 69.00 |
| 120 | 1.50 | 3.00 | 1.40 | 50 | 1.80 | 7.50 | 10.88 | 0.200 | 4.2° | 2 | 69.00 |
| 140 | 2.00 | 3.00 | 1.90 | 50 | 2.40 | 10.00 | 12.45 | 0.200 | 2.5° | 2 | 69.00 |
| 160 | 2.50 | 3.00 | 2.30 | 50 | 3.00 | 12.50 | 14.20 | 0.200 | 1.1° | 2 | 69.00 |
| 180 | 3.00 | 3.00 | 2.80 | 50 | 3.60 | 14.56 | 15.00 | 0.200 | 0.0° | 2 | 69.00 |
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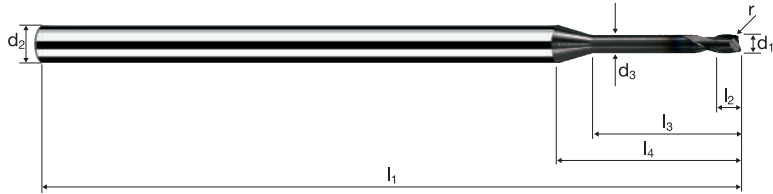
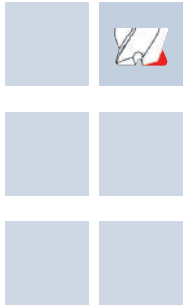
| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=15000 min ⁻¹ vf [mm/min] | n=25000 min ⁻¹ vf [mm/min] | n=30000 min ⁻¹ vf [mm/min] | n=45000 min ⁻¹ vf [mm/min] |
|--|---|---------|---|---------------------|---------------------|---------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
|  | Grafite  B  B | 1.00 | 2 | 0.009 | 0.400 | 0.600 | 270 | 450 | 540 | 810 |
| | | 1.20 | 2 | 0.011 | 0.500 | 0.700 | 330 | 550 | 660 | 990 |
| | | 1.50 | 2 | 0.014 | 0.600 | 0.900 | 420 | 700 | 840 | 1260 |
| | | 2.00 | 2 | 0.019 | 0.800 | 1.200 | 570 | 950 | 1140 | 1710 |
| | | 2.50 | 2 | 0.024 | 1.000 | 1.500 | 720 | 1200 | 1440 | 2160 |
| | | 3.00 | 2 | 0.028 | 1.200 | 1.800 | 840 | 1400 | 1680 | 2520 |
|  | Grafite  B  B | 1.00 | 2 | 0.007 | 0.400 | 1.000 | 210 | 350 | 420 | 630 |
| | | 1.20 | 2 | 0.009 | 0.500 | 1.200 | 270 | 450 | 540 | 810 |
| | | 1.50 | 2 | 0.011 | 0.600 | 1.500 | 330 | 550 | 660 | 990 |
| | | 2.00 | 2 | 0.015 | 0.800 | 2.000 | 450 | 750 | 900 | 1350 |
| | | 2.50 | 2 | 0.018 | 1.000 | 2.500 | 540 | 900 | 1080 | 1620 |
| | | 3.00 | 2 | 0.022 | 1.200 | 3.000 | 660 | 1100 | 1320 | 1980 |
|  | Grafite  B  B | 1.00 | 2 | 0.011 | 0.120 | 0.180 | 330 | 550 | 660 | 990 |
| | | 1.20 | 2 | 0.013 | 0.140 | 0.220 | 390 | 650 | 780 | 1170 |
| | | 1.50 | 2 | 0.016 | 0.180 | 0.270 | 480 | 800 | 960 | 1440 |
| | | 2.00 | 2 | 0.021 | 0.240 | 0.360 | 630 | 1050 | 1260 | 1890 |
| | | 2.50 | 2 | 0.027 | 0.300 | 0.450 | 810 | 1350 | 1620 | 2430 |
| | | 3.00 | 2 | 0.032 | 0.360 | 0.540 | 960 | 1600 | 1920 | 2880 |
|  | Grafite  B  B | 1.00 | 2 | 0.011 | 0.160 | 0.160 | 330 | 550 | 660 | 990 |
| | | 1.20 | 2 | 0.013 | 0.190 | 0.190 | 390 | 650 | 780 | 1170 |
| | | 1.50 | 2 | 0.016 | 0.240 | 0.240 | 480 | 800 | 960 | 1440 |
| | | 2.00 | 2 | 0.021 | 0.320 | 0.320 | 630 | 1050 | 1260 | 1890 |
| | | 2.50 | 2 | 0.027 | 0.400 | 0.400 | 810 | 1350 | 1620 | 2430 |
| | | 3.00 | 2 | 0.032 | 0.480 | 0.480 | 960 | 1600 | 1920 | 2880 |

Frese toriche Microcut

Gambo \emptyset 3mm, scarico cilindrico, 8xd




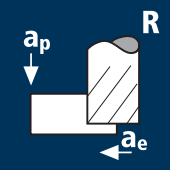

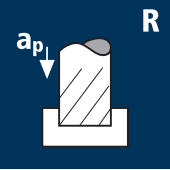

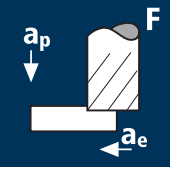

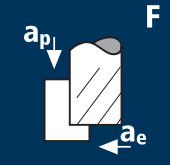

HM λ 25°
 MG10 γ 6°



C Graphite CF / GF Fiber Reinforced Plastics

IV

| Esempio: N° Ordine | Rivestimento | | Articolo | | Codice- \emptyset | | | | | | | DIAMANT |
|-----------------------|---------------------|---------------|----------|---|---------------------|-------|-------|------------------|----------|-----|-------|---------|
| | B | 5756 | 100 |  | | | | | | | | B5756 |
| \emptyset Code | d_1 ± 0.01 | d_2 $h6$ | d_3 | l_1 | l_2 | l_3 | l_4 | r $0/+0.03$ | α | z | EUR | |
| 100 | 1.00 | 3.00 | 0.95 | 50 | 1.20 | 8.00 | 12.22 | 0.200 | 4.9° | 2 | 69.00 | |
| 108 | 1.20 | 3.00 | 1.10 | 50 | 1.44 | 9.60 | 13.54 | 0.200 | 4.0° | 2 | 69.00 | |
| 120 | 1.50 | 3.00 | 1.40 | 60 | 1.80 | 12.00 | 15.38 | 0.200 | 3.0° | 2 | 69.00 | |
| 140 | 2.00 | 3.00 | 1.90 | 60 | 2.40 | 16.00 | 18.45 | 0.200 | 1.7° | 2 | 69.00 | |
| 160 | 2.50 | 3.00 | 2.30 | 60 | 3.00 | 20.00 | 21.70 | 0.200 | 0.7° | 2 | 69.00 | |
| 180 | 3.00 | 3.00 | 2.80 | 60 | 3.60 | 23.56 | 24.00 | 0.200 | 0.0° | 2 | 69.00 | |
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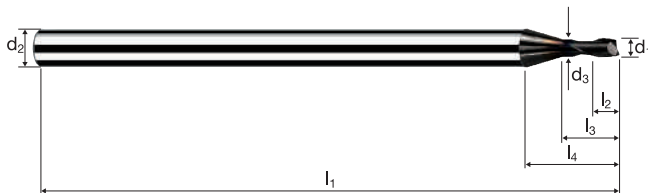
| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=15000 min vf [mm/min] | n=25000 min vf [mm/min] | n=30000 min vf [mm/min] | n=45000 min vf [mm/min] |
|--|--|--|--|------------------------|------------------------|------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
|  | Grafite  | 0.20 | 2 | 0.002 | 0.100 | 0.100 | 60 | 100 | 120 | 180 |
| | | 0.50 | 2 | 0.005 | 0.250 | 0.300 | 150 | 250 | 300 | 450 |
| | | 0.80 | 2 | 0.008 | 0.350 | 0.500 | 240 | 400 | 480 | 720 |
| | | 1.00 | 2 | 0.009 | 0.450 | 0.600 | 270 | 450 | 540 | 810 |
| | | 1.20 | 2 | 0.011 | 0.550 | 0.700 | 330 | 550 | 660 | 990 |
| | | 1.50 | 2 | 0.014 | 0.700 | 0.900 | 420 | 700 | 840 | 1260 |
| | | 2.00 | 2 | 0.019 | 0.900 | 1.200 | 570 | 950 | 1140 | 1710 |
| | | 2.50 | 2 | 0.024 | 1.150 | 1.500 | 720 | 1200 | 1440 | 2160 |
| | | 3.00 | 2 | 0.028 | 1.350 | 1.800 | 840 | 1400 | 1680 | 2520 |
| | |  | Grafite  | 0.20 | 2 | 0.001 | 0.100 | 0.200 | 30 | 50 |
| 0.50 | 2 | | | 0.004 | 0.250 | 0.500 | 120 | 200 | 240 | 360 |
| 0.80 | 2 | | | 0.006 | 0.350 | 0.800 | 180 | 300 | 360 | 540 |
| 1.00 | 2 | | | 0.007 | 0.450 | 1.000 | 210 | 350 | 420 | 630 |
| 1.20 | 2 | | | 0.009 | 0.550 | 1.200 | 270 | 450 | 540 | 810 |
| 1.50 | 2 | | | 0.011 | 0.700 | 1.500 | 330 | 550 | 660 | 990 |
| 2.00 | 2 | | | 0.015 | 0.900 | 2.000 | 450 | 750 | 900 | 1350 |
| 2.50 | 2 | | | 0.018 | 1.150 | 2.500 | 540 | 900 | 1080 | 1620 |
| 3.00 | 2 | | | 0.022 | 1.350 | 3.000 | 660 | 1100 | 1320 | 1980 |
|  | Grafite  | | | 0.20 | 2 | 0.002 | 0.030 | 0.040 | 60 | 100 |
| | | 0.50 | 2 | 0.005 | 0.070 | 0.100 | 150 | 250 | 300 | 450 |
| | | 0.80 | 2 | 0.009 | 0.110 | 0.160 | 270 | 450 | 540 | 810 |
| | | 1.00 | 2 | 0.011 | 0.140 | 0.200 | 330 | 550 | 660 | 990 |
| | | 1.20 | 2 | 0.013 | 0.170 | 0.240 | 390 | 650 | 780 | 1170 |
| | | 1.50 | 2 | 0.016 | 0.210 | 0.300 | 480 | 800 | 960 | 1440 |
| | | 2.00 | 2 | 0.021 | 0.280 | 0.400 | 630 | 1050 | 1260 | 1890 |
| | | 2.50 | 2 | 0.027 | 0.350 | 0.500 | 810 | 1350 | 1620 | 2430 |
| | | 3.00 | 2 | 0.032 | 0.420 | 0.600 | 960 | 1600 | 1920 | 2880 |
| | |  | Grafite  | 0.20 | 2 | 0.002 | 0.040 | 0.040 | 60 | 100 |
| 0.50 | 2 | | | 0.005 | 0.090 | 0.090 | 150 | 250 | 300 | 450 |
| 0.80 | 2 | | | 0.009 | 0.140 | 0.140 | 270 | 450 | 540 | 810 |
| 1.00 | 2 | | | 0.011 | 0.180 | 0.180 | 330 | 550 | 660 | 990 |
| 1.20 | 2 | | | 0.013 | 0.220 | 0.220 | 390 | 650 | 780 | 1170 |
| 1.50 | 2 | | | 0.016 | 0.270 | 0.270 | 480 | 800 | 960 | 1440 |
| 2.00 | 2 | | | 0.021 | 0.360 | 0.360 | 630 | 1050 | 1260 | 1890 |
| 2.50 | 2 | | | 0.027 | 0.450 | 0.450 | 810 | 1350 | 1620 | 2430 |
| 3.00 | 2 | | | 0.032 | 0.540 | 0.540 | 960 | 1600 | 1920 | 2880 |

Frese cilindriche Microcut

Gambo \varnothing 3mm, scarico cilindrico, 3xd



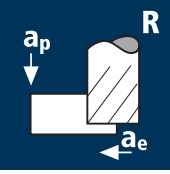



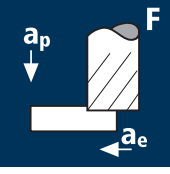

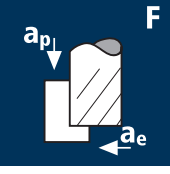

HM λ 25°
MG10 γ 6°



C Graphite CF / GF Fiber Reinforced Plastics

IV

| Esempio: N° Ordine B 5712 020 | | | | | | | | | | | DIAMANT |
|--------------------------------------|---------------------|-------------|-------|-------|-------|-------|-------|------|----------|---|--------------|
| \varnothing Code | d_1 ± 0.01 | d_2 h6 | d_3 | l_1 | l_2 | l_3 | l_4 | 45° | α | z | B5712 |
| | | | | | | | | | | | EUR |
| 020 | 0.20 | 3.00 | 0.18 | 40 | 0.24 | 0.60 | 8.86 | - | 9.4° | 2 | 78.00 |
| 030 | 0.30 | 3.00 | 0.25 | 40 | 0.36 | 0.90 | 8.96 | - | 9.0° | 2 | 71.00 |
| 040 | 0.40 | 3.00 | 0.35 | 40 | 0.48 | 1.20 | 8.98 | - | 8.5° | 2 | 68.00 |
| 050 | 0.50 | 3.00 | 0.45 | 40 | 0.60 | 1.50 | 6.65 | - | 11.5° | 2 | 68.00 |
| 060 | 0.60 | 3.00 | 0.55 | 40 | 0.72 | 1.80 | 6.77 | - | 11.9° | 2 | 65.00 |
| 080 | 0.80 | 3.00 | 0.75 | 40 | 0.96 | 2.40 | 6.99 | - | 9.6° | 2 | 65.00 |
| 100 | 1.00 | 3.00 | 0.95 | 50 | 1.20 | 3.00 | 7.22 | 0.07 | 8.5° | 2 | 65.00 |
| 108 | 1.20 | 3.00 | 1.10 | 50 | 1.44 | 3.60 | 7.54 | 0.07 | 7.4° | 2 | 65.00 |
| 120 | 1.50 | 3.00 | 1.40 | 50 | 1.80 | 4.50 | 7.88 | 0.07 | 5.9° | 2 | 65.00 |
| 140 | 2.00 | 3.00 | 1.90 | 50 | 2.40 | 6.00 | 8.45 | 0.10 | 3.7° | 2 | 65.00 |
| 160 | 2.50 | 3.00 | 2.30 | 50 | 3.00 | 7.50 | 9.20 | 0.10 | 1.7° | 2 | 65.00 |
| 180 | 3.00 | 3.00 | 2.80 | 50 | 3.60 | 8.56 | 9.00 | 0.10 | 0.0° | 2 | 65.00 |

| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=15000 min vf [mm/min] | n=25000 min vf [mm/min] | n=30000 min vf [mm/min] | n=45000 min vf [mm/min] |
|--|--|--|--|------------------------|------------------------|------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
|  | Grafite  | 0.50 | 2 | 0.005 | 0.250 | 0.300 | 150 | 250 | 300 | 450 |
| | | 0.60 | 2 | 0.006 | 0.250 | 0.350 | 180 | 300 | 360 | 540 |
| | | 0.80 | 2 | 0.008 | 0.350 | 0.500 | 240 | 400 | 480 | 720 |
| | | 1.00 | 2 | 0.009 | 0.450 | 0.600 | 270 | 450 | 540 | 810 |
| | | 1.20 | 2 | 0.011 | 0.550 | 0.700 | 330 | 550 | 660 | 990 |
| | | 1.50 | 2 | 0.014 | 0.700 | 0.900 | 420 | 700 | 840 | 1260 |
| | | 2.00 | 2 | 0.019 | 0.900 | 1.200 | 570 | 950 | 1140 | 1710 |
| | | 2.50 | 2 | 0.024 | 1.150 | 1.500 | 720 | 1200 | 1440 | 2160 |
| | | 3.00 | 2 | 0.028 | 1.350 | 1.800 | 840 | 1400 | 1680 | 2520 |
| | |  | Grafite  | 0.50 | 2 | 0.004 | 0.250 | 0.500 | 120 | 200 |
| 0.60 | 2 | | | 0.004 | 0.250 | 0.600 | 120 | 200 | 240 | 360 |
| 0.80 | 2 | | | 0.006 | 0.350 | 0.800 | 180 | 300 | 360 | 540 |
| 1.00 | 2 | | | 0.007 | 0.450 | 1.000 | 210 | 350 | 420 | 630 |
| 1.20 | 2 | | | 0.009 | 0.550 | 1.200 | 270 | 450 | 540 | 810 |
| 1.50 | 2 | | | 0.011 | 0.700 | 1.500 | 330 | 550 | 660 | 990 |
| 2.00 | 2 | | | 0.015 | 0.900 | 2.000 | 450 | 750 | 900 | 1350 |
| 2.50 | 2 | | | 0.018 | 1.150 | 2.500 | 540 | 900 | 1080 | 1620 |
| 3.00 | 2 | | | 0.022 | 1.350 | 3.000 | 660 | 1100 | 1320 | 1980 |
|  | Grafite  | | | 0.50 | 2 | 0.005 | 0.070 | 0.100 | 150 | 250 |
| | | 0.60 | 2 | 0.006 | 0.080 | 0.120 | 180 | 300 | 360 | 540 |
| | | 0.80 | 2 | 0.009 | 0.110 | 0.160 | 270 | 450 | 540 | 810 |
| | | 1.00 | 2 | 0.011 | 0.140 | 0.200 | 330 | 550 | 660 | 990 |
| | | 1.20 | 2 | 0.013 | 0.170 | 0.240 | 390 | 650 | 780 | 1170 |
| | | 1.50 | 2 | 0.016 | 0.210 | 0.300 | 480 | 800 | 960 | 1440 |
| | | 2.00 | 2 | 0.021 | 0.280 | 0.400 | 630 | 1050 | 1260 | 1890 |
| | | 2.50 | 2 | 0.027 | 0.350 | 0.500 | 810 | 1350 | 1620 | 2430 |
| | | 3.00 | 2 | 0.032 | 0.420 | 0.600 | 960 | 1600 | 1920 | 2880 |
| | |  | Grafite  | 0.50 | 2 | 0.005 | 0.090 | 0.090 | 150 | 250 |
| 0.60 | 2 | | | 0.006 | 0.110 | 0.110 | 180 | 300 | 360 | 540 |
| 0.80 | 2 | | | 0.009 | 0.140 | 0.140 | 270 | 450 | 540 | 810 |
| 1.00 | 2 | | | 0.011 | 0.180 | 0.180 | 330 | 550 | 660 | 990 |
| 1.20 | 2 | | | 0.013 | 0.220 | 0.220 | 390 | 650 | 780 | 1170 |
| 1.50 | 2 | | | 0.016 | 0.270 | 0.270 | 480 | 800 | 960 | 1440 |
| 2.00 | 2 | | | 0.021 | 0.360 | 0.360 | 630 | 1050 | 1260 | 1890 |
| 2.50 | 2 | | | 0.027 | 0.450 | 0.450 | 810 | 1350 | 1620 | 2430 |
| 3.00 | 2 | | | 0.032 | 0.540 | 0.540 | 960 | 1600 | 1920 | 2880 |

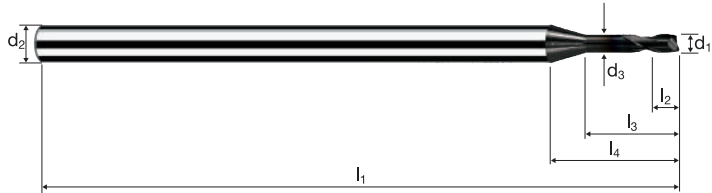
Frese cilindriche Microcut

Gambo ø 3mm, scarico cilindrico, 5xd



HM
MG10

λ 25°
 γ 6°

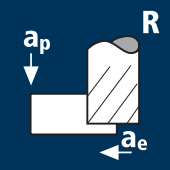

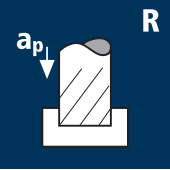

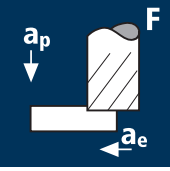

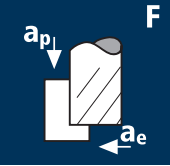



C Graphite

CF / GF Fiber Reinforced Plastics

IV

| Esempio: N° Ordine | | | | | | | | | | | DIAMANT | |
|-----------------------|-------------------------|----------------------|----------------|----------------|----------------|----------------|----------------|------|------|---|---------|--|
| | | | | | | | | | | | B5714 | |
| | | | | | | | | | | | EUR | |
| Ø Code | d ₁ ±0.01 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | 45° | α | z | | |
| 050 | 0.50 | 3.00 | 0.45 | 40 | 0.60 | 2.50 | 7.65 | - | 9.9° | 2 | 68.00 | |
| 060 | 0.60 | 3.00 | 0.55 | 40 | 0.72 | 3.00 | 7.97 | - | 9.2° | 2 | 65.00 | |
| 070 | 0.70 | 3.00 | 0.65 | 40 | 0.84 | 3.50 | 8.28 | - | 8.4° | 2 | 65.00 | |
| 080 | 0.80 | 3.00 | 0.75 | 40 | 0.96 | 4.00 | 8.59 | - | 7.8° | 2 | 65.00 | |
| 090 | 0.90 | 3.00 | 0.85 | 40 | 1.08 | 4.50 | 8.91 | - | 7.2° | 2 | 65.00 | |
| 100 | 1.00 | 3.00 | 0.95 | 50 | 1.20 | 5.00 | 9.22 | 0.07 | 6.6° | 2 | 65.00 | |
| 108 | 1.20 | 3.00 | 1.10 | 50 | 1.44 | 6.00 | 9.94 | 0.07 | 5.5° | 2 | 65.00 | |
| 120 | 1.50 | 3.00 | 1.40 | 50 | 1.80 | 7.50 | 10.88 | 0.07 | 4.2° | 2 | 65.00 | |
| 132 | 1.80 | 3.00 | 1.70 | 50 | 2.16 | 9.00 | 11.82 | 0.07 | 3.1° | 2 | 65.00 | |
| 140 | 2.00 | 3.00 | 1.90 | 50 | 2.40 | 10.00 | 12.45 | 0.10 | 2.4° | 2 | 65.00 | |
| 152 | 2.30 | 3.00 | 2.10 | 50 | 2.76 | 11.50 | 13.57 | 0.10 | 1.6° | 2 | 65.00 | |
| 160 | 2.50 | 3.00 | 2.30 | 50 | 3.00 | 12.50 | 14.20 | 0.10 | 1.1° | 2 | 65.00 | |
| 172 | 2.80 | 3.00 | 2.60 | 50 | 3.36 | 14.00 | 15.14 | 0.10 | 0.5° | 2 | 65.00 | |
| 180 | 3.00 | 3.00 | 2.80 | 50 | 3.60 | 14.56 | 15.00 | 0.10 | 0.0° | 2 | 65.00 | |
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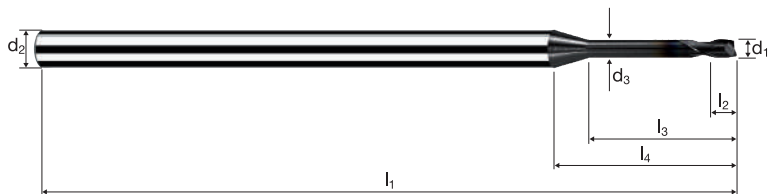
| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=15000 min ⁻¹ vf [mm/min] | n=25000 min ⁻¹ vf [mm/min] | n=30000 min ⁻¹ vf [mm/min] | n=45000 min ⁻¹ vf [mm/min] |
|--|--|--|--|---------------------|---------------------|---------------------|--|--|--|--|
|  | Grafite  | 0.50 | 2 | 0.005 | 0.200 | 0.300 | 150 | 250 | 300 | 450 |
| | | 0.60 | 2 | 0.006 | 0.250 | 0.350 | 180 | 300 | 360 | 540 |
| | | 0.80 | 2 | 0.008 | 0.300 | 0.500 | 240 | 400 | 480 | 720 |
| | | 1.00 | 2 | 0.009 | 0.400 | 0.600 | 270 | 450 | 540 | 810 |
| | | 1.20 | 2 | 0.011 | 0.500 | 0.700 | 330 | 550 | 660 | 990 |
| | | 1.50 | 2 | 0.014 | 0.600 | 0.900 | 420 | 700 | 840 | 1260 |
| | | 2.00 | 2 | 0.019 | 0.800 | 1.200 | 570 | 950 | 1140 | 1710 |
| | | 2.50 | 2 | 0.024 | 1.000 | 1.500 | 720 | 1200 | 1440 | 2160 |
| | | 3.00 | 2 | 0.028 | 1.200 | 1.800 | 840 | 1400 | 1680 | 2520 |
| | |  | Grafite  | 0.50 | 2 | 0.004 | 0.200 | 0.500 | 120 | 200 |
| 0.60 | 2 | | | 0.004 | 0.250 | 0.600 | 120 | 200 | 240 | 360 |
| 0.80 | 2 | | | 0.006 | 0.300 | 0.800 | 180 | 300 | 360 | 540 |
| 1.00 | 2 | | | 0.007 | 0.400 | 1.000 | 210 | 350 | 420 | 630 |
| 1.20 | 2 | | | 0.009 | 0.500 | 1.200 | 270 | 450 | 540 | 810 |
| 1.50 | 2 | | | 0.011 | 0.600 | 1.500 | 330 | 550 | 660 | 990 |
| 2.00 | 2 | | | 0.015 | 0.800 | 2.000 | 450 | 750 | 900 | 1350 |
| 2.50 | 2 | | | 0.018 | 1.000 | 2.500 | 540 | 900 | 1080 | 1620 |
| 3.00 | 2 | | | 0.022 | 1.200 | 3.000 | 660 | 1100 | 1320 | 1980 |
|  | Grafite  | | | 0.50 | 2 | 0.005 | 0.060 | 0.090 | 150 | 250 |
| | | 0.60 | 2 | 0.006 | 0.070 | 0.110 | 180 | 300 | 360 | 540 |
| | | 0.80 | 2 | 0.009 | 0.100 | 0.140 | 270 | 450 | 540 | 810 |
| | | 1.00 | 2 | 0.011 | 0.120 | 0.180 | 330 | 550 | 660 | 990 |
| | | 1.20 | 2 | 0.013 | 0.140 | 0.220 | 390 | 650 | 780 | 1170 |
| | | 1.50 | 2 | 0.016 | 0.180 | 0.270 | 480 | 800 | 960 | 1440 |
| | | 2.00 | 2 | 0.021 | 0.240 | 0.360 | 630 | 1050 | 1260 | 1890 |
| | | 2.50 | 2 | 0.027 | 0.300 | 0.450 | 810 | 1350 | 1620 | 2430 |
| | | 3.00 | 2 | 0.032 | 0.360 | 0.540 | 960 | 1600 | 1920 | 2880 |
| | |  | Grafite  | 0.50 | 2 | 0.005 | 0.080 | 0.080 | 150 | 250 |
| 0.60 | 2 | | | 0.006 | 0.100 | 0.100 | 180 | 300 | 360 | 540 |
| 0.80 | 2 | | | 0.009 | 0.130 | 0.130 | 270 | 450 | 540 | 810 |
| 1.00 | 2 | | | 0.011 | 0.160 | 0.160 | 330 | 550 | 660 | 990 |
| 1.20 | 2 | | | 0.013 | 0.190 | 0.190 | 390 | 650 | 780 | 1170 |
| 1.50 | 2 | | | 0.016 | 0.240 | 0.240 | 480 | 800 | 960 | 1440 |
| 2.00 | 2 | | | 0.021 | 0.320 | 0.320 | 630 | 1050 | 1260 | 1890 |
| 2.50 | 2 | | | 0.027 | 0.400 | 0.400 | 810 | 1350 | 1620 | 2430 |
| 3.00 | 2 | | | 0.032 | 0.480 | 0.480 | 960 | 1600 | 1920 | 2880 |

Frese cilindriche Microcut

Gambo ø 3mm, scarico cilindrico, 8xd



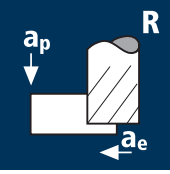



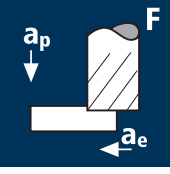

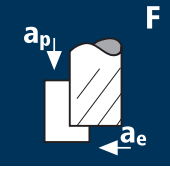

HM
MG10 λ 25°
 γ 6°



| | | | | | | | | | | | |
|--|--|--|--|----------------------|--|--|--|--|--|--|---|
| | | | | C Graphite | | | | | | | CF / GF Fiber Reinforced Plastics |
|--|--|--|--|----------------------|--|--|--|--|--|--|---|

IV

| Esempio: N° Ordine | | | | | | | | | | | DIAMANT | |
|--|-------------------------|----------------------|----------------|----------------|----------------|----------------|----------------|------|------|---|---------|--|
| Rivestimento B Articolo 5716 Codice-ø 050 | | | | | | | | | | | | |
| Ø Code | d ₁ ±0.01 | d ₂ h6 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | 45° | α | z | B5716 | |
| | | | | | | | | | | | EUR | |
| 050 | 0.50 | 3.00 | 0.45 | 40 | 0.60 | 4.00 | 9.15 | - | 8.3° | 2 | 68.00 | |
| 060 | 0.60 | 3.00 | 0.55 | 40 | 0.72 | 4.80 | 9.77 | - | 7.4° | 2 | 65.00 | |
| 080 | 0.80 | 3.00 | 0.75 | 40 | 0.96 | 6.40 | 10.99 | - | 6.0° | 2 | 65.00 | |
| 100 | 1.00 | 3.00 | 0.95 | 50 | 1.20 | 8.00 | 12.22 | 0.07 | 4.9° | 2 | 65.00 | |
| 108 | 1.20 | 3.00 | 1.10 | 50 | 1.44 | 9.60 | 13.54 | 0.07 | 4.0° | 2 | 65.00 | |
| 120 | 1.50 | 3.00 | 1.40 | 60 | 1.80 | 12.00 | 15.38 | 0.07 | 3.0° | 2 | 65.00 | |
| 140 | 2.00 | 3.00 | 1.90 | 60 | 2.40 | 16.00 | 18.45 | 0.10 | 1.7° | 2 | 65.00 | |
| 160 | 2.50 | 3.00 | 2.30 | 60 | 3.00 | 20.00 | 21.70 | 0.10 | 0.7° | 2 | 65.00 | |
| 180 | 3.00 | 3.00 | 2.80 | 60 | 3.60 | 23.56 | 24.00 | 0.10 | 0.0° | 2 | 65.00 | |
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| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=15000 min vf [mm/min] | n=25000 min vf [mm/min] | n=30000 min vf [mm/min] | n=45000 min vf [mm/min] |
|--|--|--|--|------------------------|------------------------|------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
|  | Grafite  | 0.50 | 2 | 0.005 | 0.200 | 0.200 | 150 | 250 | 300 | 450 |
| | | 0.60 | 2 | 0.006 | 0.250 | 0.250 | 180 | 300 | 360 | 540 |
| | | 0.80 | 2 | 0.008 | 0.300 | 0.300 | 240 | 400 | 480 | 720 |
| | | 1.00 | 2 | 0.009 | 0.400 | 0.400 | 270 | 450 | 540 | 810 |
| | | 1.20 | 2 | 0.011 | 0.500 | 0.500 | 330 | 550 | 660 | 990 |
| | | 1.50 | 2 | 0.014 | 0.600 | 0.600 | 420 | 700 | 840 | 1260 |
| | | 2.00 | 2 | 0.019 | 0.800 | 0.800 | 570 | 950 | 1140 | 1710 |
| | | 2.50 | 2 | 0.024 | 1.000 | 1.000 | 720 | 1200 | 1440 | 2160 |
| | | 3.00 | 2 | 0.028 | 1.200 | 1.200 | 840 | 1400 | 1680 | 2520 |
| | |  | Grafite  | 0.50 | 2 | 0.003 | 0.150 | 0.500 | 90 | 150 |
| 0.60 | 2 | | | 0.003 | 0.200 | 0.600 | 90 | 150 | 180 | 270 |
| 0.80 | 2 | | | 0.004 | 0.250 | 0.800 | 120 | 200 | 240 | 360 |
| 1.00 | 2 | | | 0.005 | 0.300 | 1.000 | 150 | 250 | 300 | 450 |
| 1.20 | 2 | | | 0.007 | 0.350 | 1.200 | 210 | 350 | 420 | 630 |
| 1.50 | 2 | | | 0.008 | 0.450 | 1.500 | 240 | 400 | 480 | 720 |
| 2.00 | 2 | | | 0.011 | 0.600 | 2.000 | 330 | 550 | 660 | 990 |
| 2.50 | 2 | | | 0.014 | 0.750 | 2.500 | 420 | 700 | 840 | 1260 |
| 3.00 | 2 | | | 0.016 | 0.900 | 3.000 | 480 | 800 | 960 | 1440 |
|  | Grafite  | | | 0.50 | 2 | 0.005 | 0.050 | 0.080 | 150 | 250 |
| | | 0.60 | 2 | 0.006 | 0.060 | 0.090 | 180 | 300 | 360 | 540 |
| | | 0.80 | 2 | 0.009 | 0.080 | 0.120 | 270 | 450 | 540 | 810 |
| | | 1.00 | 2 | 0.011 | 0.100 | 0.150 | 330 | 550 | 660 | 990 |
| | | 1.20 | 2 | 0.013 | 0.120 | 0.180 | 390 | 650 | 780 | 1170 |
| | | 1.50 | 2 | 0.016 | 0.150 | 0.230 | 480 | 800 | 960 | 1440 |
| | | 2.00 | 2 | 0.021 | 0.200 | 0.300 | 630 | 1050 | 1260 | 1890 |
| | | 2.50 | 2 | 0.027 | 0.250 | 0.380 | 810 | 1350 | 1620 | 2430 |
| | | 3.00 | 2 | 0.032 | 0.300 | 0.450 | 960 | 1600 | 1920 | 2880 |
| | |  | Grafite  | 0.50 | 2 | 0.005 | 0.070 | 0.070 | 150 | 250 |
| 0.60 | 2 | | | 0.006 | 0.080 | 0.080 | 180 | 300 | 360 | 540 |
| 0.80 | 2 | | | 0.009 | 0.110 | 0.110 | 270 | 450 | 540 | 810 |
| 1.00 | 2 | | | 0.011 | 0.140 | 0.140 | 330 | 550 | 660 | 990 |
| 1.20 | 2 | | | 0.013 | 0.170 | 0.170 | 390 | 650 | 780 | 1170 |
| 1.50 | 2 | | | 0.016 | 0.210 | 0.210 | 480 | 800 | 960 | 1440 |
| 2.00 | 2 | | | 0.021 | 0.280 | 0.280 | 630 | 1050 | 1260 | 1890 |
| 2.50 | 2 | | | 0.027 | 0.350 | 0.350 | 810 | 1350 | 1620 | 2430 |
| 3.00 | 2 | | | 0.032 | 0.420 | 0.420 | 960 | 1600 | 1920 | 2880 |

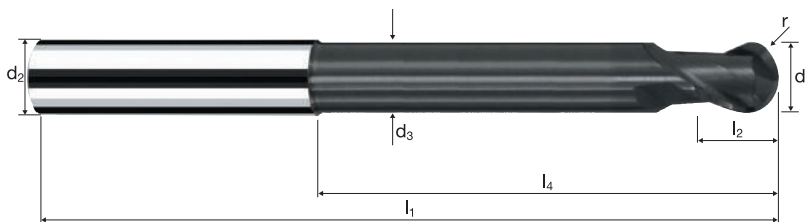
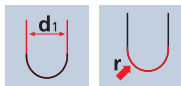
| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=10000 min vf [mm/min] | n=15000 min vf [mm/min] | n=20000 min vf [mm/min] | n=30000 min vf [mm/min] |
|--------------|---------------------------------|------------|---|------------------------|------------------------|------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| | Grafite B B | 6.00 | 2 | 0.071 | 2.700 | 3.600 | 1420 | 2130 | 2840 | 4260 |
| | | 8.00 | 2 | 0.094 | 3.600 | 4.800 | 1880 | 2820 | 3760 | 5640 |
| | | 10.00 | 2 | 0.118 | 4.500 | 6.000 | 2360 | 3540 | 4720 | 7080 |
| | | 12.00 | 2 | 0.141 | 5.400 | 7.200 | 2820 | 4230 | 5640 | 8460 |
| | Grafite B B | 6.00 | 2 | 0.055 | 2.700 | 6.000 | 1100 | 1650 | 2200 | 3300 |
| | | 8.00 | 2 | 0.073 | 3.600 | 8.000 | 1460 | 2190 | 2920 | 4380 |
| | | 10.00 | 2 | 0.091 | 4.500 | 10.000 | 1820 | 2730 | 3640 | 5460 |
| | | 12.00 | 2 | 0.109 | 5.400 | 12.000 | 2180 | 3270 | 4360 | 6540 |
| | Grafite B B | 6.00 | 2 | 0.080 | 0.850 | 1.200 | 1600 | 2400 | 3200 | 4800 |
| | | 8.00 | 2 | 0.107 | 1.100 | 1.600 | 2140 | 3210 | 4280 | 6420 |
| | | 10.00 | 2 | 0.133 | 1.400 | 2.000 | 2660 | 3990 | 5320 | 7980 |
| | | 12.00 | 2 | 0.160 | 1.700 | 2.400 | 3200 | 4800 | 6400 | 9600 |
| | Grafite B B | 6.00 | 2 | 0.080 | 1.100 | 0.350 | 1600 | 2400 | 3200 | 4800 |
| | | 8.00 | 2 | 0.107 | 1.450 | 0.350 | 2140 | 3210 | 4280 | 6420 |
| | | 10.00 | 2 | 0.133 | 1.800 | 0.350 | 2660 | 3990 | 5320 | 7980 |
| | | 12.00 | 2 | 0.160 | 2.150 | 0.350 | 3200 | 4800 | 6400 | 9600 |

Frese con estremità emisferica SpheroX (SpheroXG)

Tolleranza $r \pm 0.005$, 6xd



HM λ 30°
XA γ 15°



C Graphite CF / GF Fiber Reinforced Plastics

IV

| Esempio: N° Ordine | | Rivestimento B | Articolo 7484 | Codice-ø 300 | | | | | | z | DIAPLUS |
|-----------------------|----------------|----------------------------------|-------------------------|------------------------|----------------|----------------|----------------|-------------|---|---|--------------|
| Ø Code | d ₁ | d ₂ h ₄ | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.005 | | | B7484 |
| | | | | | | | | | | | EUR |
| 300 | 6.00 | 6.00 | 5.50 | 80 | 7.00 | 42.34 | 43.00 | 3.000 | 2 | | 131.00 |
| 391 | 8.00 | 8.00 | 7.40 | 90 | 9.00 | 52.29 | 53.00 | 4.000 | 2 | | 164.00 |
| 450 | 10.00 | 10.00 | 9.20 | 105 | 11.00 | 63.20 | 64.00 | 5.000 | 2 | | 223.00 |
| 501 | 12.00 | 12.00 | 11.00 | 120 | 13.00 | 73.13 | 74.00 | 6.000 | 2 | | 276.00 |
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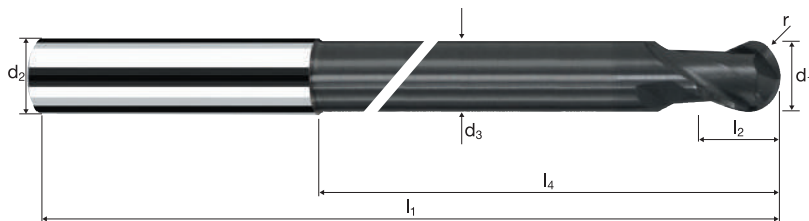
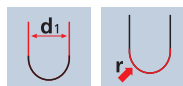
| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=10000 min vf [mm/min] | n=15000 min vf [mm/min] | n=20000 min vf [mm/min] | n=30000 min vf [mm/min] |
|--------------|---------------------------------|------------|---|------------------------|------------------------|------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| | Grafite B B | 6.00 | 2 | 0.071 | 2.400 | 2.400 | 1420 | 2130 | 2840 | 4260 |
| | | 8.00 | 2 | 0.094 | 3.200 | 3.200 | 1880 | 2820 | 3760 | 5640 |
| | | 10.00 | 2 | 0.118 | 4.000 | 4.000 | 2360 | 3540 | 4720 | 7080 |
| | | 12.00 | 2 | 0.141 | 4.800 | 4.800 | 2820 | 4230 | 5640 | 8460 |
| | Grafite B B | 6.00 | 2 | 0.044 | 1.800 | 6.000 | 880 | 1320 | 1760 | 2640 |
| | | 8.00 | 2 | 0.058 | 2.400 | 8.000 | 1160 | 1740 | 2320 | 3480 |
| | | 10.00 | 2 | 0.073 | 3.000 | 10.000 | 1460 | 2190 | 2920 | 4380 |
| | | 12.00 | 2 | 0.087 | 3.600 | 12.000 | 1740 | 2610 | 3480 | 5220 |
| | Grafite B B | 6.00 | 2 | 0.080 | 0.600 | 0.950 | 1600 | 2400 | 3200 | 4800 |
| | | 8.00 | 2 | 0.107 | 0.800 | 1.300 | 2140 | 3210 | 4280 | 6420 |
| | | 10.00 | 2 | 0.133 | 1.000 | 1.600 | 2660 | 3990 | 5320 | 7980 |
| | | 12.00 | 2 | 0.160 | 1.200 | 1.900 | 3200 | 4800 | 6400 | 9600 |
| | Grafite B B | 6.00 | 2 | 0.080 | 0.850 | 0.300 | 1600 | 2400 | 3200 | 4800 |
| | | 8.00 | 2 | 0.107 | 1.100 | 0.300 | 2140 | 3210 | 4280 | 6420 |
| | | 10.00 | 2 | 0.133 | 1.400 | 0.300 | 2660 | 3990 | 5320 | 7980 |
| | | 12.00 | 2 | 0.160 | 1.700 | 0.300 | 3200 | 4800 | 6400 | 9600 |

Frese con estremità emisferica SpheroX (SpheroXG)

Tolleranza $r \pm 0.005$, 9xd



HM $\lambda 30^\circ$
XA $\gamma 15^\circ$



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|--|--|--|--|---------------|--|--|--|--|--|---|
| | | | | C Graphite | | | | | | CF / GF Fiber Reinforced Plastics |
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IV

| Esempio: N° Ordine | | | | | | | | | | DIAPLUS |
|-----------------------|----------------|----------------------|----------------|----------------|----------------|----------------|----------------|-------------|---|---------|
| | Rivestimento | | Articolo | | Codice-Ø | | | | | |
| | B | | 7488 | | 300 | | | | | B7488 |
| Ø Code | d ₁ | d ₂ h4 | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r ±0.005 | z | EUR |
| 300 | 6.00 | 6.00 | 5.50 | 100 | 7.00 | 62.34 | 63.00 | 3.000 | 2 | 136.00 |
| 391 | 8.00 | 8.00 | 7.40 | 120 | 9.00 | 82.29 | 83.00 | 4.000 | 2 | 169.00 |
| 450 | 10.00 | 10.00 | 9.20 | 135 | 11.00 | 93.20 | 94.00 | 5.000 | 2 | 230.00 |
| 501 | 12.00 | 12.00 | 11.00 | 160 | 13.00 | 113.13 | 114.00 | 6.000 | 2 | 285.00 |
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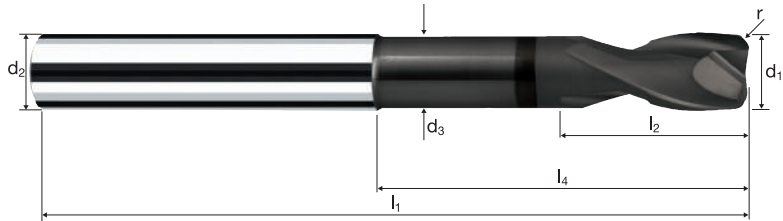
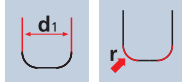
| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=10000 min vf [mm/min] | n=15000 min vf [mm/min] | n=20000 min vf [mm/min] | n=30000 min vf [mm/min] |
|--------------|-----------------------|------------|---|------------------------|------------------------|------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| | Grafite B B | 6.00 | 2 | 0.056 | 4.800 | 2.400 | 1120 | 1680 | 2240 | 3360 |
| | | 8.00 | 2 | 0.075 | 6.400 | 3.200 | 1500 | 2250 | 3000 | 4500 |
| | | 10.00 | 2 | 0.094 | 8.000 | 4.000 | 1880 | 2820 | 3760 | 5640 |
| | | 12.00 | 2 | 0.113 | 9.600 | 4.800 | 2260 | 3390 | 4520 | 6780 |
| | Grafite B B | 6.00 | 2 | 0.044 | 3.000 | 6.000 | 880 | 1320 | 1760 | 2640 |
| | | 8.00 | 2 | 0.058 | 4.000 | 8.000 | 1160 | 1740 | 2320 | 3480 |
| | | 10.00 | 2 | 0.073 | 5.000 | 10.000 | 1460 | 2190 | 2920 | 4380 |
| | | 12.00 | 2 | 0.087 | 6.000 | 12.000 | 1740 | 2610 | 3480 | 5220 |
| | Grafite B B | 6.00 | 2 | 0.080 | 0.480 | 2.700 | 1600 | 2400 | 3200 | 4800 |
| | | 8.00 | 2 | 0.107 | 0.640 | 3.600 | 2140 | 3210 | 4280 | 6420 |
| | | 10.00 | 2 | 0.133 | 0.800 | 4.500 | 2660 | 3990 | 5320 | 7980 |
| | | 12.00 | 2 | 0.160 | 0.960 | 5.400 | 3200 | 4800 | 6400 | 9600 |
| | Grafite B B | 6.00 | 2 | 0.080 | 0.900 | 0.900 | 1600 | 2400 | 3200 | 4800 |
| | | 8.00 | 2 | 0.107 | 1.200 | 1.200 | 2140 | 3210 | 4280 | 6420 |
| | | 10.00 | 2 | 0.133 | 1.500 | 1.500 | 2660 | 3990 | 5320 | 7980 |
| | | 12.00 | 2 | 0.160 | 1.800 | 1.800 | 3200 | 4800 | 6400 | 9600 |

Frese toriche ToroX (ToroXG)

Tolleranza r ± 0.005 , 6xd



| | |
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| HM | λ 30° |
| XA | γ 15° |



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|--|--|--|--|----------|--|--|--|--|--|---|
| | | | | C | | | | | | CF / GF Fiber Reinforced Plastics |
| | | | | Graphite | | | | | | |

IV

| | | | | | | | | | | DIAPLUS |
|--|------------------|-------------|-------|-------|-------|-------|-------|------------------|---|---------|
| Esempio: Rivestimento Articolo Codice- \emptyset | | | | | | | | | | |
| N° Ordine B 7284 300 | | | | | | | | | | |
| \emptyset Code | d_1 0/-0.01 | d_2 h4 | d_3 | l_1 | l_2 | l_3 | l_4 | r ± 0.005 | z | EUR |
| 300 | 6.00 | 6.00 | 5.50 | 80 | 7.00 | 42.34 | 43.00 | 0.500 | 2 | 127.00 |
| 391 | 8.00 | 8.00 | 7.40 | 90 | 9.00 | 52.29 | 53.00 | 0.500 | 2 | 159.00 |
| 450 | 10.00 | 10.00 | 9.20 | 105 | 11.00 | 63.20 | 64.00 | 0.500 | 2 | 216.00 |
| 501 | 12.00 | 12.00 | 11.00 | 120 | 13.00 | 73.13 | 74.00 | 0.500 | 2 | 267.00 |
| 297 | 6.00 | 6.00 | 5.50 | 80 | 7.00 | 42.34 | 43.00 | 1.000 | 2 | 127.00 |
| 388 | 8.00 | 8.00 | 7.40 | 90 | 9.00 | 52.29 | 53.00 | 1.000 | 2 | 159.00 |
| 445 | 10.00 | 10.00 | 9.20 | 105 | 11.00 | 63.20 | 64.00 | 1.000 | 2 | 216.00 |
| 496 | 12.00 | 12.00 | 11.00 | 120 | 13.00 | 73.13 | 74.00 | 1.000 | 2 | 267.00 |
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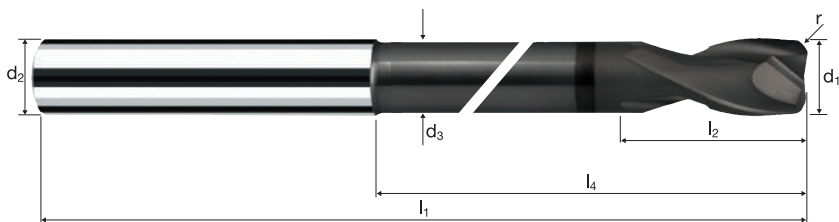
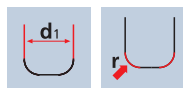
| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=10000 min vf [mm/min] | n=15000 min vf [mm/min] | n=20000 min vf [mm/min] | n=30000 min vf [mm/min] |
|--------------|-----------------------|------------|---|------------------------|------------------------|------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| | Grafite B B | 6.00 | 2 | 0.056 | 4.800 | 1.200 | 1120 | 1680 | 2240 | 3360 |
| | | 8.00 | 2 | 0.075 | 6.400 | 1.600 | 1500 | 2250 | 3000 | 4500 |
| | | 10.00 | 2 | 0.094 | 8.000 | 2.000 | 1880 | 2820 | 3760 | 5640 |
| | | 12.00 | 2 | 0.113 | 9.600 | 2.400 | 2260 | 3390 | 4520 | 6780 |
| | Grafite B B | 6.00 | 2 | 0.044 | 2.100 | 6.000 | 880 | 1320 | 1760 | 2640 |
| | | 8.00 | 2 | 0.058 | 2.800 | 8.000 | 1160 | 1740 | 2320 | 3480 |
| | | 10.00 | 2 | 0.073 | 3.500 | 10.000 | 1460 | 2190 | 2920 | 4380 |
| | | 12.00 | 2 | 0.087 | 4.200 | 12.000 | 1740 | 2610 | 3480 | 5220 |
| | Grafite B B | 6.00 | 2 | 0.080 | 0.360 | 1.500 | 1600 | 2400 | 3200 | 4800 |
| | | 8.00 | 2 | 0.107 | 0.480 | 2.000 | 2140 | 3210 | 4280 | 6420 |
| | | 10.00 | 2 | 0.133 | 0.600 | 2.500 | 2660 | 3990 | 5320 | 7980 |
| | | 12.00 | 2 | 0.160 | 0.720 | 3.000 | 3200 | 4800 | 6400 | 9600 |
| | Grafite B B | 6.00 | 2 | 0.080 | 0.840 | 0.840 | 1600 | 2400 | 3200 | 4800 |
| | | 8.00 | 2 | 0.107 | 1.120 | 1.120 | 2140 | 3210 | 4280 | 6420 |
| | | 10.00 | 2 | 0.133 | 1.400 | 1.400 | 2660 | 3990 | 5320 | 7980 |
| | | 12.00 | 2 | 0.160 | 1.680 | 1.680 | 3200 | 4800 | 6400 | 9600 |

Frese toriche ToroX (ToroXG)

Tolleranza $r \pm 0.005$, 9xd



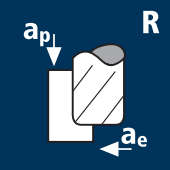


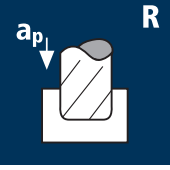


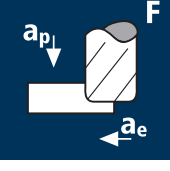





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|----|---------------|
| HM | λ 30° |
| XA | γ 15° |



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| | | | | C Graphite | | | | CF / GF Fiber Reinforced Plastics |
|--|--|--|--|---------------|--|--|--|---|

IV

| | | Esempio: N° Ordine | | | | Rivestimento | | Articolo | Codice-ø | | | DIAPLUS |
|------|----------------|-----------------------|----------------|----------------|----------------|----------------|----------------|----------|----------|--|--|---------|
| Ø | d ₁ | d ₂ | d ₃ | l ₁ | l ₂ | l ₃ | l ₄ | r | z | | | |
| Code | 0/-0.01 | h4 | | | | | | ±0.005 | | | | EUR |
| 300 | 6.00 | 6.00 | 5.50 | 100 | 7.00 | 62.34 | 63.00 | 0.500 | 2 | | | 131.00 |
| 391 | 8.00 | 8.00 | 7.40 | 120 | 9.00 | 82.29 | 83.00 | 0.500 | 2 | | | 164.00 |
| 450 | 10.00 | 10.00 | 9.20 | 135 | 11.00 | 93.20 | 94.00 | 0.500 | 2 | | | 223.00 |
| 501 | 12.00 | 12.00 | 11.00 | 160 | 13.00 | 113.13 | 114.00 | 0.500 | 2 | | | 276.00 |
| 297 | 6.00 | 6.00 | 5.50 | 100 | 7.00 | 62.34 | 63.00 | 1.000 | 2 | | | 131.00 |
| 388 | 8.00 | 8.00 | 7.40 | 120 | 9.00 | 82.29 | 83.00 | 1.000 | 2 | | | 164.00 |
| 445 | 10.00 | 10.00 | 9.20 | 135 | 11.00 | 93.20 | 94.00 | 1.000 | 2 | | | 223.00 |
| 496 | 12.00 | 12.00 | 11.00 | 160 | 13.00 | 113.13 | 114.00 | 1.000 | 2 | | | 276.00 |
| | | | | | | | | | | | | |
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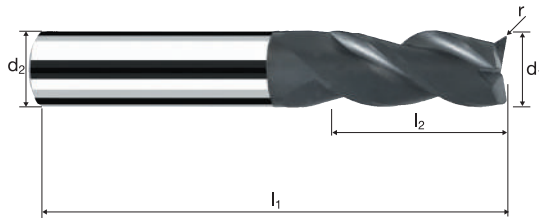
| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=10000 min vf [mm/min] | n=15000 min vf [mm/min] | n=20000 min vf [mm/min] | n=30000 min vf [mm/min] |
|--|---|------------|--------|------------------------|------------------------|------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
|  | Grafite  B  B | 2.00 | 3 | 0.024 | 4.000 | 0.500 | 720 | 1080 | 1440 | 2160 |
| | | 3.00 | 3 | 0.035 | 6.000 | 0.750 | 1050 | 1575 | 2100 | 3150 |
| | | 4.00 | 3 | 0.047 | 8.000 | 1.000 | 1410 | 2115 | 2820 | 4230 |
| | | 5.00 | 3 | 0.059 | 10.000 | 1.250 | 1770 | 2655 | 3540 | 5310 |
| | | 6.00 | 3 | 0.071 | 12.000 | 1.500 | 2130 | 3195 | 4260 | 6390 |
| | | 8.00 | 3 | 0.094 | 16.000 | 2.000 | 2820 | 4230 | 5640 | 8460 |
| | | 10.00 | 3 | 0.118 | 20.000 | 2.500 | 3540 | 5310 | 7080 | 10620 |
| 12.00 | 3 | 0.141 | 24.000 | 3.000 | 4230 | 6345 | 8460 | 12690 | | |
|  | Grafite  B  B | 2.00 | 3 | 0.018 | 0.600 | 2.000 | 540 | 810 | 1080 | 1620 |
| | | 3.00 | 3 | 0.027 | 0.900 | 3.000 | 810 | 1215 | 1620 | 2430 |
| | | 4.00 | 3 | 0.036 | 1.200 | 4.000 | 1080 | 1620 | 2160 | 3240 |
| | | 5.00 | 3 | 0.045 | 1.500 | 5.000 | 1350 | 2025 | 2700 | 4050 |
| | | 6.00 | 3 | 0.055 | 1.800 | 6.000 | 1650 | 2475 | 3300 | 4950 |
| | | 8.00 | 3 | 0.073 | 2.400 | 8.000 | 2190 | 3285 | 4380 | 6570 |
| | | 10.00 | 3 | 0.091 | 3.000 | 10.000 | 2730 | 4095 | 5460 | 8190 |
| 12.00 | 3 | 0.109 | 3.600 | 12.000 | 3270 | 4905 | 6540 | 9810 | | |
|  | Grafite  B  B | 2.00 | 3 | 0.027 | 0.200 | 0.800 | 810 | 1215 | 1620 | 2430 |
| | | 3.00 | 3 | 0.040 | 0.300 | 1.200 | 1200 | 1800 | 2400 | 3600 |
| | | 4.00 | 3 | 0.053 | 0.400 | 1.600 | 1590 | 2385 | 3180 | 4770 |
| | | 5.00 | 3 | 0.067 | 0.500 | 2.000 | 2010 | 3015 | 4020 | 6030 |
| | | 6.00 | 3 | 0.080 | 0.600 | 2.400 | 2400 | 3600 | 4800 | 7200 |
| | | 8.00 | 3 | 0.107 | 0.800 | 3.200 | 3210 | 4815 | 6420 | 9630 |
| | | 10.00 | 3 | 0.133 | 1.000 | 4.000 | 3990 | 5985 | 7980 | 11970 |
| 12.00 | 3 | 0.160 | 1.200 | 4.800 | 4800 | 7200 | 9600 | 14400 | | |
|  | Grafite  B  B | 2.00 | 3 | 0.027 | 4.000 | 0.300 | 810 | 1215 | 1620 | 2430 |
| | | 3.00 | 3 | 0.040 | 6.000 | 0.450 | 1200 | 1800 | 2400 | 3600 |
| | | 4.00 | 3 | 0.053 | 8.000 | 0.600 | 1590 | 2385 | 3180 | 4770 |
| | | 5.00 | 3 | 0.067 | 10.000 | 0.750 | 2010 | 3015 | 4020 | 6030 |
| | | 6.00 | 3 | 0.080 | 12.000 | 0.900 | 2400 | 3600 | 4800 | 7200 |
| | | 8.00 | 3 | 0.107 | 16.000 | 1.200 | 3210 | 4815 | 6420 | 9630 |
| | | 10.00 | 3 | 0.133 | 20.000 | 1.500 | 3990 | 5985 | 7980 | 11970 |
| 12.00 | 3 | 0.160 | 24.000 | 1.800 | 4800 | 7200 | 9600 | 14400 | | |

Frese toriche

Tolleranza r 0/+0.03



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|----|---------------|
| HM | λ 40° |
| XA | γ 15° |



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|--|--|--|--|---------------|--|--|--|--|---|
| | | | | C Graphite | | | | | CF / GF Fiber Reinforced Plastics |
|--|--|--|--|---------------|--|--|--|--|---|

IV

| Esempio: N° Ordine | | | | | | | | | | DIAMANT |
|--------------------------------------|----------------------|----------------------|----------------|----------------|----------------|--------------|------|---|--|---------|
| Rivestimento Articolo Codice-Ø | | | | | | | | | | |
| B 5640 140 | | | | | | | | | | B5640 |
| Ø Code | d ₁ e8 | d ₂ h6 | l ₁ | l ₂ | l ₄ | r 0/+0.03 | α | z | | EUR |
| 140 | 2.00 | 3.00 | 40 | 6.00 | 9.06 | 0.150 | 3.4° | 3 | | 96.00 |
| 180 | 3.00 | 3.00 | 40 | 12.00 | - | 0.150 | 0.0° | 3 | | 96.00 |
| 220 | 4.00 | 4.00 | 50 | 14.00 | - | 0.200 | 0.0° | 3 | | 96.00 |
| 260 | 5.00 | 5.00 | 50 | 16.00 | - | 0.300 | 0.0° | 3 | | 96.00 |
| 300 | 6.00 | 6.00 | 63 | 19.00 | - | 0.300 | 0.0° | 3 | | 96.00 |
| 391 | 8.00 | 8.00 | 63 | 19.00 | - | 0.500 | 0.0° | 3 | | 120.00 |
| 450 | 10.00 | 10.00 | 72 | 22.00 | - | 0.500 | 0.0° | 3 | | 163.00 |
| 501 | 12.00 | 12.00 | 75 | 25.00 | - | 0.500 | 0.0° | 3 | | 201.00 |
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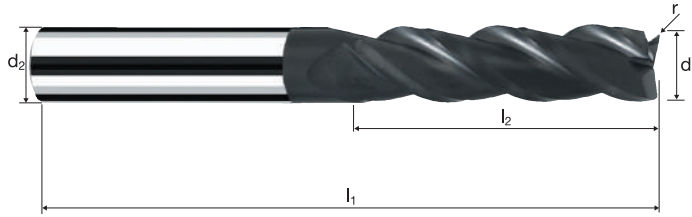
| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=10000 min vf [mm/min] | n=15000 min vf [mm/min] | n=20000 min vf [mm/min] | n=30000 min vf [mm/min] | | |
|--------------|-------------------|------------|-------------------|------------------------|------------------------|------------------------|----------------------------|----------------------------|----------------------------|----------------------------|------|------|
| | Grafite B B | 2.00 | 3 | 0.019 | 6.000 | 0.400 | 570 | 855 | 1140 | 1710 | | |
| | | 3.00 | 3 | 0.028 | 9.000 | 0.600 | 840 | 1260 | 1680 | 2520 | | |
| | | 4.00 | 3 | 0.038 | 12.000 | 0.800 | 1140 | 1710 | 2280 | 3420 | | |
| | | 5.00 | 3 | 0.047 | 15.000 | 1.000 | 1410 | 2115 | 2820 | 4230 | | |
| | | 6.00 | 3 | 0.056 | 18.000 | 1.200 | 1680 | 2520 | 3360 | 5040 | | |
| | | 8.00 | 3 | 0.075 | 24.000 | 1.600 | 2250 | 3375 | 4500 | 6750 | | |
| | | 10.00 | 3 | 0.094 | 30.000 | 2.000 | 2820 | 4230 | 5640 | 8460 | | |
| | | 12.00 | 3 | 0.113 | 36.000 | 2.400 | 3390 | 5085 | 6780 | 10170 | | |
| | | | Grafite B B | 2.00 | 3 | 0.021 | 0.200 | 0.700 | 630 | 945 | 1260 | 1890 |
| | | | | 3.00 | 3 | 0.032 | 0.300 | 1.050 | 960 | 1440 | 1920 | 2880 |
| 4.00 | 3 | | | 0.043 | 0.400 | 1.400 | 1290 | 1935 | 2580 | 3870 | | |
| 5.00 | 3 | | | 0.053 | 0.500 | 1.750 | 1590 | 2385 | 3180 | 4770 | | |
| 6.00 | 3 | | | 0.064 | 0.600 | 2.100 | 1920 | 2880 | 3840 | 5760 | | |
| 8.00 | 3 | | | 0.085 | 0.800 | 2.800 | 2550 | 3825 | 5100 | 7650 | | |
| 10.00 | 3 | | | 0.107 | 1.000 | 3.500 | 3210 | 4815 | 6420 | 9630 | | |
| 12.00 | 3 | | | 0.128 | 1.200 | 4.200 | 3840 | 5760 | 7680 | 11520 | | |
| | Grafite B B | | | 2.00 | 3 | 0.021 | 6.000 | 0.300 | 630 | 945 | 1260 | 1890 |
| | | | | 3.00 | 3 | 0.032 | 9.000 | 0.450 | 960 | 1440 | 1920 | 2880 |
| | | 4.00 | 3 | 0.043 | 12.000 | 0.600 | 1290 | 1935 | 2580 | 3870 | | |
| | | 5.00 | 3 | 0.053 | 15.000 | 0.750 | 1590 | 2385 | 3180 | 4770 | | |
| | | 6.00 | 3 | 0.064 | 18.000 | 0.900 | 1920 | 2880 | 3840 | 5760 | | |
| | | 8.00 | 3 | 0.085 | 24.000 | 1.200 | 2550 | 3825 | 5100 | 7650 | | |
| | | 10.00 | 3 | 0.107 | 30.000 | 1.500 | 3210 | 4815 | 6420 | 9630 | | |
| | | 12.00 | 3 | 0.128 | 36.000 | 1.800 | 3840 | 5760 | 7680 | 11520 | | |

Frese toriche

Tolleranza r 0/+0.03



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| HM | λ 40° |
| XA | γ 15° |
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|--|--|--|--|---------------|--|--|--|--|---|
| | | | | C Graphite | | | | | CF / GF Fiber Reinforced Plastics |
|--|--|--|--|---------------|--|--|--|--|---|

IV

| Esempio: N° Ordine | | | | | | | | | | DIAMANT |
|--------------------------------------|----------------------|----------------------|----------------|----------------|----------------|--------------|------|---|--|---------|
| Rivestimento Articolo Codice-Ø | | | | | | | | | | |
| B 5645 140 | | | | | | | | | | B5645 |
| Ø Code | d ₁ e8 | d ₂ h6 | l ₁ | l ₂ | l ₄ | r 0/+0.03 | α | z | | EUR |
| 140 | 2.00 | 3.00 | 60 | 9.00 | 12.06 | 0.150 | 2.5° | 3 | | 112.00 |
| 180 | 3.00 | 3.00 | 60 | 30.00 | - | 0.150 | 0.0° | 3 | | 112.00 |
| 220 | 4.00 | 4.00 | 60 | 30.00 | - | 0.200 | 0.0° | 3 | | 112.00 |
| 260 | 5.00 | 5.00 | 70 | 35.00 | - | 0.300 | 0.0° | 3 | | 112.00 |
| 300 | 6.00 | 6.00 | 100 | 40.00 | - | 0.300 | 0.0° | 3 | | 112.00 |
| 391 | 8.00 | 8.00 | 100 | 40.00 | - | 0.500 | 0.0° | 3 | | 141.00 |
| 450 | 10.00 | 10.00 | 100 | 40.00 | - | 0.500 | 0.0° | 3 | | 191.00 |
| 501 | 12.00 | 12.00 | 97 | 42.00 | - | 0.500 | 0.0° | 3 | | 236.00 |
| | | | | | | | | | | |
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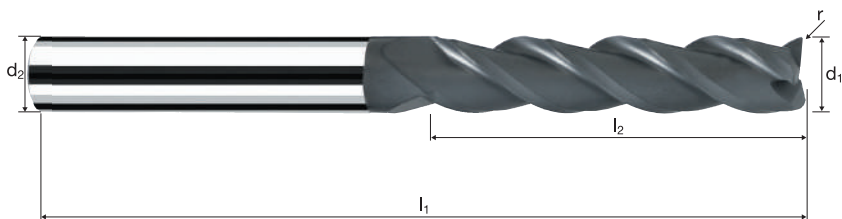
| Applicazione | Materiale | d1 [mm] | z | f _z [mm] | a _p [mm] | a _e [mm] | n=10000 min vf [mm/min] | n=15000 min vf [mm/min] | n=20000 min vf [mm/min] | n=30000 min vf [mm/min] |
|--------------|-----------|------------|---|------------------------|------------------------|------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| | Grafite | 10.00 | 3 | 0.071 | 40.000 | 1.500 | 2130 | 3195 | 4260 | 6390 |
| | | 12.00 | 3 | 0.085 | 48.000 | 1.800 | 2550 | 3825 | 5100 | 7650 |
| | Grafite | 10.00 | 3 | 0.080 | 1.000 | 3.000 | 2400 | 3600 | 4800 | 7200 |
| | | 12.00 | 3 | 0.096 | 1.200 | 3.600 | 2880 | 4320 | 5760 | 8640 |
| | Grafite | 10.00 | 3 | 0.080 | 40.000 | 1.000 | 2400 | 3600 | 4800 | 7200 |
| | | 12.00 | 3 | 0.096 | 48.000 | 1.200 | 2880 | 4320 | 5760 | 8640 |

Frese toriche

Tolleranza r 0/+0.03



| | |
|----|---------------|
| HM | λ 40° |
| XA | γ 15° |



| | | | | | | | | | |
|--|--|--|--|---------------|--|--|--|--|---|
| | | | | C Graphite | | | | | CF / GF Fiber Reinforced Plastics |
|--|--|--|--|---------------|--|--|--|--|---|

IV

| Esempio: N° Ordine | | | | | | | | | DIAMANT |
|-----------------------|----------------------|--------------------------|-------------------------|------------------------|----------------|--------------|---|--|--------------|
| | | Rivestimento B | Articolo 5650 | Codice-Ø 450 | | | | | B5650 |
| Ø Code | d ₁ e8 | d ₂ h6 | | l ₁ | l ₂ | r 0/+0.03 | z | | EUR |
| 450 | 10.00 | 10.00 | | 125 | 55.00 | 0.500 | 3 | | 198.00 |
| 501 | 12.00 | 12.00 | | 125 | 55.00 | 0.500 | 3 | | 245.00 |
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Frese per forme speciali

Frese a forma

N° 7920



| | | | | | | |
|--------|----------|--|------------------------|--|--|-----|
| Base-X | B | | Rm <850-1300 | | | 745 |
|--------|----------|--|------------------------|--|--|-----|

N° 0920



| | | | | | | |
|------------|--|--|------------------------|--|--|-----|
| HSS | | | Rm <850-1100 | | | 747 |
|------------|--|--|------------------------|--|--|-----|

N° 0915



| | | | | | | |
|------------|--|--|------------------------|--|--|-----|
| HSS | | | Rm <850-1100 | | | 749 |
|------------|--|--|------------------------|--|--|-----|

N° 0910



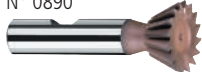
| | | | | | | |
|------------|--|--|------------------------|--|--|-----|
| HSS | | | Rm <850-1100 | | | 751 |
|------------|--|--|------------------------|--|--|-----|

N° 0905



| | | | | | | |
|------------|--|--|------------------------|--|--|-----|
| HSS | | | Rm <850-1100 | | | 753 |
|------------|--|--|------------------------|--|--|-----|

N° 0890



| | | | | | | |
|------------|--|--|------------------------|--|--|-----|
| HSS | | | Rm <850-1100 | | | 757 |
|------------|--|--|------------------------|--|--|-----|

Frese per forme speciali

Frese per sbavatura

N° 7930



| | | | | | | |
|--------|---|--|-----------|--|--|-----|
| Base-X | B | | Rm | | | 759 |
| | | | <850-1100 | | | |

N° 7940



| | | | | | | |
|--------|---|--|-----------|--|--|-----|
| Base-X | B | | Rm | | | 761 |
| | | | <850-1100 | | | |

N° 7942



| | | | | | | |
|--------|---|--|-----------|--|--|-----|
| Base-X | B | | Rm | | | 763 |
| | | | <850-1100 | | | |

Multifrese

N° 7960



| | | | | | | |
|--------|---|--|-----------|--|--|-----|
| Base-X | B | | Rm | | | 765 |
| | | | <850-1100 | | | |

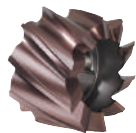
Frese cilindriche frontali

N° 3490



| | | | | | | |
|-----|--|--|-----------|--|--|-----|
| HSS | | | Rm | | | 767 |
| | | | <850-1100 | | | |

N° 3209



| | | | | | | |
|-----|--|--|----------|--|--|-----|
| HSS | | | Rm | | | 769 |
| | | | 850-1300 | | | |

Frese per CFC

Cilindrico MD

N° 20020



| | | | | | | |
|--------|----------|---|--------------------------|---------------------------|--|-----|
| Base-X | B | Resistenza all'usura d, 4 – 12 45° | CFK GFK I | CFK GFK II | | 771 |
| | B | Resistenza all'usura d, 4 – 12 45° | CFK GFK I | CFK GFK II | | 773 |
| | B | Resistenza all'usura d, 4 – 12 45° | CFK GFK I | CFK GFK II | | 775 |

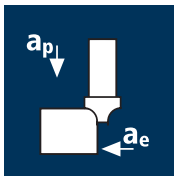
N° 20025



N° 20030



Applicazione



Materiale

Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _e [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|
| 6.00 | 4 | 120 | 0.025 | 0.500 | 0.500 | 6365 | 635 |
| 8.00 | 4 | 120 | 0.030 | 1.000 | 1.000 | 4775 | 575 |
| 10.00 | 4 | 120 | 0.040 | 2.000 | 2.000 | 3820 | 610 |
| 12.00 | 4 | 120 | 0.050 | 3.000 | 3.000 | 3185 | 635 |

Acciaio
850 - 1100 N/mm²



| | | | | | | | |
|-------|---|-----|-------|-------|-------|------|-----|
| 6.00 | 4 | 100 | 0.020 | 0.500 | 0.500 | 5305 | 425 |
| 8.00 | 4 | 100 | 0.025 | 1.000 | 1.000 | 3980 | 400 |
| 10.00 | 4 | 100 | 0.035 | 2.000 | 2.000 | 3185 | 445 |
| 12.00 | 4 | 100 | 0.040 | 3.000 | 3.000 | 2655 | 425 |

Acciaio
1100 - 1300 N/mm²



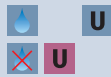
| | | | | | | | |
|-------|---|----|-------|-------|-------|------|-----|
| 6.00 | 4 | 60 | 0.015 | 0.500 | 0.500 | 3185 | 190 |
| 8.00 | 4 | 60 | 0.025 | 1.000 | 1.000 | 2385 | 240 |
| 10.00 | 4 | 60 | 0.030 | 2.000 | 2.000 | 1910 | 230 |
| 12.00 | 4 | 60 | 0.035 | 3.000 | 3.000 | 1590 | 225 |

Acciaio inossidabile
[Cr-Ni/1.4301]



| | | | | | | | |
|-------|---|----|-------|-------|-------|------|-----|
| 6.00 | 4 | 50 | 0.015 | 0.500 | 0.500 | 2655 | 160 |
| 8.00 | 4 | 50 | 0.025 | 1.000 | 1.000 | 1990 | 200 |
| 10.00 | 4 | 50 | 0.030 | 2.000 | 2.000 | 1590 | 190 |
| 12.00 | 4 | 50 | 0.035 | 3.000 | 3.000 | 1325 | 185 |

Ghisa
(grigia / sferoidale)



| | | | | | | | |
|-------|---|-----|-------|-------|-------|------|-----|
| 6.00 | 4 | 140 | 0.025 | 0.500 | 0.500 | 7425 | 745 |
| 8.00 | 4 | 140 | 0.030 | 1.000 | 1.000 | 5570 | 670 |
| 10.00 | 4 | 140 | 0.040 | 2.000 | 2.000 | 4455 | 715 |
| 12.00 | 4 | 140 | 0.050 | 3.000 | 3.000 | 3715 | 745 |

Rame non legato



| | | | | | | | |
|-------|---|-----|-------|-------|-------|------|-----|
| 6.00 | 4 | 160 | 0.020 | 0.500 | 0.500 | 8490 | 680 |
| 8.00 | 4 | 160 | 0.025 | 1.000 | 1.000 | 6365 | 635 |
| 10.00 | 4 | 160 | 0.035 | 2.000 | 2.000 | 5095 | 715 |
| 12.00 | 4 | 160 | 0.040 | 3.000 | 3.000 | 4245 | 680 |

Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]



| | | | | | | | |
|-------|---|----|-------|-------|-------|------|-----|
| 6.00 | 4 | 60 | 0.015 | 0.500 | 0.500 | 3185 | 190 |
| 8.00 | 4 | 60 | 0.025 | 1.000 | 1.000 | 2385 | 240 |
| 10.00 | 4 | 60 | 0.030 | 2.000 | 2.000 | 1910 | 230 |
| 12.00 | 4 | 60 | 0.035 | 3.000 | 3.000 | 1590 | 225 |

Alluminio malleabile
Si < 6%



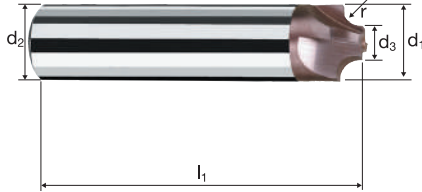
| | | | | | | | |
|-------|---|-----|-------|-------|-------|------|-----|
| 6.00 | 4 | 180 | 0.025 | 0.500 | 0.500 | 9550 | 955 |
| 8.00 | 4 | 180 | 0.030 | 1.000 | 1.000 | 7160 | 860 |
| 10.00 | 4 | 180 | 0.040 | 2.000 | 2.000 | 5730 | 915 |
| 12.00 | 4 | 180 | 0.050 | 3.000 | 3.000 | 4775 | 955 |

Frese a quarto di cerchio



| | | |
|------|-----------|----|
| HM | λ | 0° |
| MG10 | γ | 0° |

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| | |

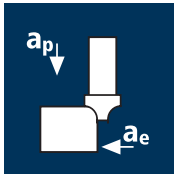


ReTool®

| | | | | | | | | |
|-------------|----------------|-----------------|-----------------|--|--|-------------------|----------------|------------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | | | Inox Stainless | Ti Titanium | GG(G) Aluminium Copper |
|-------------|----------------|-----------------|-----------------|--|--|-------------------|----------------|------------------------------|

| Esempio: N° Ordine | | | | | | | UNICUT-4X |
|-----------------------|----------------|----------------------|------------------------|-----------------|-----------|---|-----------|
| | | Rivestimento U | Articolo 7920 | Codice-ø 300 | | | U7920 |
| Ø Code | d ₁ | d ₂ h6 | d ₃ ±0.1 | l ₁ | r J510 | z | EUR |
| 300 | 6.00 | 6.00 | 4.50 | 57 | 0.500 | 4 | 99.00 |
| 303 | 6.00 | 6.00 | 4.00 | 57 | 0.750 | 4 | 99.00 |
| 391 | 8.00 | 8.00 | 5.50 | 63 | 1.000 | 4 | 109.00 |
| 394 | 8.00 | 8.00 | 5.00 | 63 | 1.250 | 4 | 109.00 |
| 397 | 8.00 | 8.00 | 4.50 | 63 | 1.500 | 4 | 109.00 |
| 450 | 10.00 | 10.00 | 5.00 | 72 | 2.000 | 4 | 119.00 |
| 453 | 10.00 | 10.00 | 4.50 | 72 | 2.500 | 4 | 119.00 |
| 501 | 12.00 | 12.00 | 5.00 | 83 | 3.000 | 4 | 131.00 |
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Applicazione



Materiale

Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|
| 10.00 | 4 | 55 | 0.010 | 2.000 | 2.000 | 1750 | 70 |
| 12.00 | 4 | 55 | 0.010 | 2.500 | 2.500 | 1460 | 60 |
| 16.00 | 4 | 55 | 0.025 | 4.000 | 4.000 | 1095 | 110 |
| 20.00 | 4 | 55 | 0.030 | 5.000 | 5.000 | 875 | 105 |
| 22.00 | 4 | 55 | 0.035 | 6.000 | 6.000 | 795 | 110 |
| 24.00 | 5 | 55 | 0.040 | 7.000 | 7.000 | 730 | 145 |
| 28.00 | 5 | 55 | 0.045 | 8.000 | 8.000 | 625 | 140 |
| 32.00 | 5 | 55 | 0.050 | 10.000 | 10.000 | 545 | 135 |
| 38.00 | 6 | 55 | 0.060 | 12.000 | 12.000 | 460 | 165 |

Acciaio
850 - 1100 N/mm²



| | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|
| 10.00 | 4 | 45 | 0.010 | 2.000 | 2.000 | 1430 | 55 |
| 12.00 | 4 | 45 | 0.010 | 2.500 | 2.500 | 1195 | 50 |
| 16.00 | 4 | 45 | 0.025 | 4.000 | 4.000 | 895 | 90 |
| 20.00 | 4 | 45 | 0.030 | 5.000 | 5.000 | 715 | 85 |
| 22.00 | 4 | 45 | 0.035 | 6.000 | 6.000 | 650 | 90 |
| 24.00 | 5 | 45 | 0.040 | 7.000 | 7.000 | 595 | 120 |
| 28.00 | 5 | 45 | 0.045 | 8.000 | 8.000 | 510 | 115 |
| 32.00 | 5 | 45 | 0.050 | 10.000 | 10.000 | 450 | 110 |
| 38.00 | 6 | 45 | 0.060 | 12.000 | 12.000 | 375 | 135 |

Acciaio
1100 - 1300 N/mm²



| | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|
| 10.00 | 4 | 34 | 0.010 | 2.000 | 2.000 | 1080 | 45 |
| 12.00 | 4 | 34 | 0.010 | 2.500 | 2.500 | 900 | 35 |
| 16.00 | 4 | 34 | 0.025 | 4.000 | 4.000 | 675 | 70 |
| 20.00 | 4 | 34 | 0.030 | 5.000 | 5.000 | 540 | 65 |
| 22.00 | 4 | 34 | 0.035 | 6.000 | 6.000 | 490 | 70 |
| 24.00 | 5 | 34 | 0.040 | 7.000 | 7.000 | 450 | 90 |
| 28.00 | 5 | 34 | 0.045 | 8.000 | 8.000 | 385 | 85 |
| 32.00 | 5 | 34 | 0.050 | 10.000 | 10.000 | 340 | 85 |
| 38.00 | 6 | 34 | 0.060 | 12.000 | 12.000 | 285 | 105 |

Acciaio inossidabile
[Cr-Ni/1.4301]



| | | | | | | | |
|-------|---|----|-------|--------|--------|-----|----|
| 10.00 | 4 | 21 | 0.010 | 2.000 | 2.000 | 670 | 25 |
| 12.00 | 4 | 21 | 0.010 | 2.500 | 2.500 | 555 | 20 |
| 16.00 | 4 | 21 | 0.025 | 4.000 | 4.000 | 420 | 40 |
| 20.00 | 4 | 21 | 0.030 | 5.000 | 5.000 | 335 | 40 |
| 22.00 | 4 | 21 | 0.035 | 6.000 | 6.000 | 305 | 45 |
| 24.00 | 5 | 21 | 0.040 | 7.000 | 7.000 | 280 | 55 |
| 28.00 | 5 | 21 | 0.045 | 8.000 | 8.000 | 240 | 55 |
| 32.00 | 5 | 21 | 0.050 | 10.000 | 10.000 | 210 | 50 |
| 38.00 | 6 | 21 | 0.060 | 12.000 | 12.000 | 175 | 65 |

Ghisa
(grigia / sferoidale)



| | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|
| 10.00 | 4 | 42 | 0.010 | 2.000 | 2.000 | 1335 | 55 |
| 12.00 | 4 | 42 | 0.010 | 2.500 | 2.500 | 1115 | 45 |
| 16.00 | 4 | 42 | 0.025 | 4.000 | 4.000 | 835 | 85 |
| 20.00 | 4 | 42 | 0.030 | 5.000 | 5.000 | 670 | 80 |
| 22.00 | 4 | 42 | 0.035 | 6.000 | 6.000 | 610 | 85 |
| 24.00 | 5 | 42 | 0.040 | 7.000 | 7.000 | 555 | 110 |
| 28.00 | 5 | 42 | 0.045 | 8.000 | 8.000 | 475 | 105 |
| 32.00 | 5 | 42 | 0.050 | 10.000 | 10.000 | 420 | 105 |
| 38.00 | 6 | 42 | 0.060 | 12.000 | 12.000 | 350 | 125 |

Rame non legato



| | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|
| 10.00 | 4 | 65 | 0.010 | 2.000 | 2.000 | 2070 | 85 |
| 12.00 | 4 | 65 | 0.010 | 2.500 | 2.500 | 1725 | 70 |
| 16.00 | 4 | 65 | 0.025 | 4.000 | 4.000 | 1295 | 130 |
| 20.00 | 4 | 65 | 0.030 | 5.000 | 5.000 | 1035 | 125 |
| 22.00 | 4 | 65 | 0.035 | 6.000 | 6.000 | 940 | 130 |
| 24.00 | 5 | 65 | 0.040 | 7.000 | 7.000 | 860 | 170 |
| 28.00 | 5 | 65 | 0.045 | 8.000 | 8.000 | 740 | 165 |
| 32.00 | 5 | 65 | 0.050 | 10.000 | 10.000 | 645 | 160 |
| 38.00 | 6 | 65 | 0.060 | 12.000 | 12.000 | 545 | 195 |

Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]



| | | | | | | | |
|-------|---|----|-------|--------|--------|-----|----|
| 10.00 | 4 | 23 | 0.010 | 2.000 | 2.000 | 730 | 30 |
| 12.00 | 4 | 23 | 0.010 | 2.500 | 2.500 | 610 | 25 |
| 16.00 | 4 | 23 | 0.025 | 4.000 | 4.000 | 460 | 45 |
| 20.00 | 4 | 23 | 0.030 | 5.000 | 5.000 | 365 | 45 |
| 22.00 | 4 | 23 | 0.035 | 6.000 | 6.000 | 335 | 45 |
| 24.00 | 5 | 23 | 0.040 | 7.000 | 7.000 | 305 | 60 |
| 28.00 | 5 | 23 | 0.045 | 8.000 | 8.000 | 260 | 60 |
| 32.00 | 5 | 23 | 0.050 | 10.000 | 10.000 | 230 | 55 |
| 38.00 | 6 | 23 | 0.060 | 12.000 | 12.000 | 195 | 70 |

Alluminio malleabile
Si < 6%

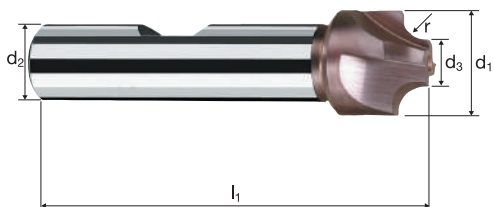


| | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|
| 10.00 | 4 | 80 | 0.010 | 2.000 | 2.000 | 2545 | 100 |
| 12.00 | 4 | 80 | 0.010 | 2.500 | 2.500 | 2120 | 85 |
| 16.00 | 4 | 80 | 0.025 | 4.000 | 4.000 | 1590 | 160 |
| 20.00 | 4 | 80 | 0.030 | 5.000 | 5.000 | 1275 | 155 |
| 22.00 | 4 | 80 | 0.035 | 6.000 | 6.000 | 1155 | 160 |
| 24.00 | 5 | 80 | 0.040 | 7.000 | 7.000 | 1060 | 210 |
| 28.00 | 5 | 80 | 0.045 | 8.000 | 8.000 | 910 | 205 |
| 32.00 | 5 | 80 | 0.050 | 10.000 | 10.000 | 795 | 200 |
| 38.00 | 6 | 80 | 0.060 | 12.000 | 12.000 | 670 | 240 |

Frese a quarto di cerchio

HSS

HSS-E λ 8°
Co8 γ 0°

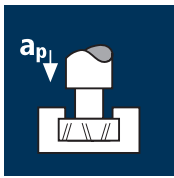


ReTool®

| | | | | | | | | | |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|------------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | | | | | Inox Stainless | Ti Titanium | GG(G) Aluminium Copper |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|------------------------------|

| Ø Code | d ₁ | d ₂ h6 | d ₃ 0/+0.1 | l ₁ | r H11 | z | UNICUT-4X | |
|------------|----------------|----------------------|--------------------------|----------------|----------|---|-----------|--------------|
| | | | | | | | | |
| | | | | | | | | U0920 |
| | | | | | | | | |
| | | | | | | | | EUR |
| 080 | 8.00 | 10.00 | 5.30 | 56 | 1.000 | 4 | | 76.00 |
| 090 | 9.00 | 10.00 | 5.30 | 56 | 1.500 | 4 | | 70.00 |
| 100 | 10.00 | 10.00 | 5.10 | 56 | 2.000 | 4 | | 61.00 |
| 120 | 12.00 | 12.00 | 6.10 | 63 | 2.500 | 4 | | 71.00 |
| 140 | 14.00 | 12.00 | 7.10 | 63 | 3.000 | 4 | | 71.00 |
| 160 | 16.00 | 12.00 | 7.10 | 63 | 4.000 | 4 | | 78.00 |
| 200 | 20.00 | 16.00 | 8.70 | 70 | 5.000 | 4 | | 89.00 |
| 220 | 22.00 | 16.00 | 8.70 | 70 | 6.000 | 4 | | 102.00 |
| 240 | 24.00 | 16.00 | 8.70 | 70 | 7.000 | 5 | | 134.00 |
| 280 | 28.00 | 16.00 | 10.20 | 70 | 8.000 | 5 | | 134.00 |
| 320 | 32.00 | 16.00 | 10.20 | 75 | 10.000 | 5 | | 176.00 |
| 380 | 38.00 | 20.00 | 11.70 | 80 | 12.000 | 6 | | 191.00 |
| 460 | 46.00 | 25.00 | 14.00 | 94 | 15.000 | 6 | | 318.00 |
| 580 | 58.00 | 25.00 | 15.00 | 100 | 20.000 | 6 | | 536.00 |
| | | | | | | | | |
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| | | | | | | | | |

Applicazione



Materiale

Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|
| 16.00 | 6 | 55 | 0.020 | 8.000 | 16.000 | 1095 | 130 |
| 18.00 | 6 | 55 | 0.020 | 8.000 | 18.000 | 975 | 115 |
| 21.00 | 6 | 55 | 0.030 | 9.000 | 21.000 | 835 | 150 |
| 25.00 | 6 | 55 | 0.040 | 11.000 | 25.000 | 700 | 170 |
| 28.00 | 6 | 55 | 0.040 | 12.000 | 28.000 | 625 | 150 |
| 32.00 | 6 | 55 | 0.050 | 14.000 | 32.000 | 545 | 165 |
| 40.00 | 8 | 55 | 0.060 | 18.000 | 40.000 | 440 | 210 |

Acciaio
850 - 1100 N/mm²



| | | | | | | | |
|-------|---|----|-------|--------|--------|-----|-----|
| 16.00 | 6 | 45 | 0.020 | 8.000 | 16.000 | 895 | 105 |
| 18.00 | 6 | 45 | 0.020 | 8.000 | 18.000 | 795 | 95 |
| 21.00 | 6 | 45 | 0.030 | 9.000 | 21.000 | 680 | 125 |
| 25.00 | 6 | 45 | 0.040 | 11.000 | 25.000 | 575 | 140 |
| 28.00 | 6 | 45 | 0.040 | 12.000 | 28.000 | 510 | 125 |
| 32.00 | 6 | 45 | 0.050 | 14.000 | 32.000 | 450 | 135 |
| 40.00 | 8 | 45 | 0.060 | 18.000 | 40.000 | 360 | 170 |

Acciaio
1100 - 1300 N/mm²



| | | | | | | | |
|-------|---|----|-------|--------|--------|-----|-----|
| 16.00 | 6 | 34 | 0.020 | 8.000 | 16.000 | 675 | 80 |
| 18.00 | 6 | 34 | 0.020 | 8.000 | 18.000 | 600 | 70 |
| 21.00 | 6 | 34 | 0.030 | 9.000 | 21.000 | 515 | 95 |
| 25.00 | 6 | 34 | 0.040 | 11.000 | 25.000 | 435 | 105 |
| 28.00 | 6 | 34 | 0.040 | 12.000 | 28.000 | 385 | 95 |
| 32.00 | 6 | 34 | 0.050 | 14.000 | 32.000 | 340 | 100 |
| 40.00 | 8 | 34 | 0.060 | 18.000 | 40.000 | 270 | 130 |

Acciaio inossidabile
[Cr-Ni/1.4301]



| | | | | | | | |
|-------|---|----|-------|--------|--------|-----|----|
| 16.00 | 6 | 21 | 0.020 | 8.000 | 16.000 | 420 | 50 |
| 18.00 | 6 | 21 | 0.020 | 8.000 | 18.000 | 370 | 45 |
| 21.00 | 6 | 21 | 0.030 | 9.000 | 21.000 | 320 | 55 |
| 25.00 | 6 | 21 | 0.040 | 11.000 | 25.000 | 265 | 65 |
| 28.00 | 6 | 21 | 0.040 | 12.000 | 28.000 | 240 | 55 |
| 32.00 | 6 | 21 | 0.050 | 14.000 | 32.000 | 210 | 65 |
| 40.00 | 8 | 21 | 0.060 | 18.000 | 40.000 | 165 | 80 |

Ghisa
(grigia / sferoidale)



| | | | | | | | |
|-------|---|----|-------|--------|--------|-----|-----|
| 16.00 | 6 | 42 | 0.020 | 8.000 | 16.000 | 835 | 100 |
| 18.00 | 6 | 42 | 0.020 | 8.000 | 18.000 | 745 | 90 |
| 21.00 | 6 | 42 | 0.030 | 9.000 | 21.000 | 635 | 115 |
| 25.00 | 6 | 42 | 0.040 | 11.000 | 25.000 | 535 | 130 |
| 28.00 | 6 | 42 | 0.040 | 12.000 | 28.000 | 475 | 115 |
| 32.00 | 6 | 42 | 0.050 | 14.000 | 32.000 | 420 | 125 |
| 40.00 | 8 | 42 | 0.060 | 18.000 | 40.000 | 335 | 160 |

Rame non legato



| | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|
| 16.00 | 6 | 65 | 0.020 | 8.000 | 16.000 | 1295 | 155 |
| 18.00 | 6 | 65 | 0.020 | 8.000 | 18.000 | 1150 | 140 |
| 21.00 | 6 | 65 | 0.030 | 9.000 | 21.000 | 985 | 175 |
| 25.00 | 6 | 65 | 0.040 | 11.000 | 25.000 | 830 | 200 |
| 28.00 | 6 | 65 | 0.040 | 12.000 | 28.000 | 740 | 175 |
| 32.00 | 6 | 65 | 0.050 | 14.000 | 32.000 | 645 | 195 |
| 40.00 | 8 | 65 | 0.060 | 18.000 | 40.000 | 515 | 250 |

Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]



| | | | | | | | |
|-------|---|----|-------|--------|--------|-----|----|
| 16.00 | 6 | 23 | 0.020 | 8.000 | 16.000 | 460 | 55 |
| 18.00 | 6 | 23 | 0.020 | 8.000 | 18.000 | 405 | 50 |
| 21.00 | 6 | 23 | 0.030 | 9.000 | 21.000 | 350 | 65 |
| 25.00 | 6 | 23 | 0.040 | 11.000 | 25.000 | 295 | 70 |
| 28.00 | 6 | 23 | 0.040 | 12.000 | 28.000 | 260 | 65 |
| 32.00 | 6 | 23 | 0.050 | 14.000 | 32.000 | 230 | 70 |
| 40.00 | 8 | 23 | 0.060 | 18.000 | 40.000 | 185 | 90 |

Alluminio malleabile
Si < 6%

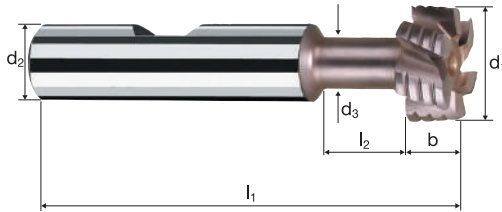


| | | | | | | | |
|-------|---|----|-------|--------|--------|------|-----|
| 16.00 | 6 | 80 | 0.020 | 8.000 | 16.000 | 1590 | 190 |
| 18.00 | 6 | 80 | 0.020 | 8.000 | 18.000 | 1415 | 170 |
| 21.00 | 6 | 80 | 0.030 | 9.000 | 21.000 | 1215 | 220 |
| 25.00 | 6 | 80 | 0.040 | 11.000 | 25.000 | 1020 | 245 |
| 28.00 | 6 | 80 | 0.040 | 12.000 | 28.000 | 910 | 220 |
| 32.00 | 6 | 80 | 0.050 | 14.000 | 32.000 | 795 | 240 |
| 40.00 | 8 | 80 | 0.060 | 18.000 | 40.000 | 635 | 305 |

Frese per cave a T

HSS

HSS-E λ 7°
Co8 γ 10°



ReTool®

Rm
< 850

Rm
850-1100

Rm
1100-1300

Inox
Stainless

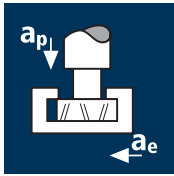
Ti
Titanium

GG(G)
Aluminium
Copper

| Ø Code | d ₁ d11 | d ₂ h6 | d ₃ h12 | l ₁ | l ₂ | b d11 | z | UNICUT-4X | |
|---|-----------------------|----------------------|-----------------------|----------------|----------------|----------|---|------------|--------------|
| | | | | | | | | | |
| Esempio: N° Ordine | | | | | | | | | |
| Rivestimento U Articollo 0915 Codice-ø 140 | | | | | | | | | |
| | | | | | | | | | U0915 |
| | | | | | | | | EUR | |
| 140 | 16.00 | 10.00 | 7.00 | 62 | 12.00 | 8.0 | 6 | | 114.00 |
| 160 | 18.00 | 12.00 | 8.00 | 70 | 14.00 | 8.0 | 6 | | 125.00 |
| 180 | 21.00 | 12.00 | 10.00 | 74 | 18.00 | 9.0 | 6 | | 144.00 |
| 200 | 25.00 | 16.00 | 12.00 | 82 | 20.00 | 11.0 | 6 | | 168.00 |
| 220 | 28.00 | 16.00 | 12.00 | 83 | 21.00 | 12.0 | 6 | | 194.00 |
| 240 | 32.00 | 16.00 | 15.00 | 90 | 27.00 | 14.0 | 6 | | 221.00 |
| 260 | 40.00 | 25.00 | 19.00 | 108 | 31.00 | 18.0 | 8 | | 340.00 |
| | | | | | | | | | |
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| | | | | | | | | | |



Applicazione



Materiale

Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|
| 11.00 | 4 | 55 | 0.010 | 4.000 | 1.100 | 1590 | 65 |
| 12.50 | 4 | 55 | 0.010 | 6.000 | 1.250 | 1400 | 55 |
| 16.00 | 4 | 55 | 0.025 | 8.000 | 1.600 | 1095 | 110 |
| 18.00 | 6 | 55 | 0.025 | 8.000 | 1.800 | 975 | 145 |
| 21.00 | 6 | 55 | 0.040 | 9.000 | 2.100 | 835 | 200 |
| 25.00 | 6 | 55 | 0.045 | 11.000 | 2.500 | 700 | 190 |
| 32.00 | 6 | 55 | 0.060 | 14.000 | 3.200 | 545 | 195 |
| 40.00 | 8 | 55 | 0.070 | 18.000 | 4.000 | 440 | 245 |
| 50.00 | 8 | 55 | 0.090 | 22.000 | 5.000 | 350 | 250 |

Acciaio
850 - 1100 N/mm²



| | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|
| 11.00 | 4 | 45 | 0.010 | 4.000 | 1.100 | 1300 | 50 |
| 12.50 | 4 | 45 | 0.010 | 6.000 | 1.250 | 1145 | 45 |
| 16.00 | 4 | 45 | 0.025 | 8.000 | 1.600 | 895 | 90 |
| 18.00 | 6 | 45 | 0.025 | 8.000 | 1.800 | 795 | 120 |
| 21.00 | 6 | 45 | 0.040 | 9.000 | 2.100 | 680 | 165 |
| 25.00 | 6 | 45 | 0.045 | 11.000 | 2.500 | 575 | 155 |
| 32.00 | 6 | 45 | 0.060 | 14.000 | 3.200 | 450 | 160 |
| 40.00 | 8 | 45 | 0.070 | 18.000 | 4.000 | 360 | 200 |
| 50.00 | 8 | 45 | 0.090 | 22.000 | 5.000 | 285 | 205 |

Acciaio
1100 - 1300 N/mm²



| | | | | | | | |
|-------|---|----|-------|--------|-------|-----|-----|
| 11.00 | 4 | 34 | 0.010 | 4.000 | 1.100 | 985 | 40 |
| 12.50 | 4 | 34 | 0.010 | 6.000 | 1.250 | 865 | 35 |
| 16.00 | 4 | 34 | 0.025 | 8.000 | 1.600 | 675 | 70 |
| 18.00 | 6 | 34 | 0.025 | 8.000 | 1.800 | 600 | 90 |
| 21.00 | 6 | 34 | 0.040 | 9.000 | 2.100 | 515 | 125 |
| 25.00 | 6 | 34 | 0.045 | 11.000 | 2.500 | 435 | 115 |
| 32.00 | 6 | 34 | 0.060 | 14.000 | 3.200 | 340 | 120 |
| 40.00 | 8 | 34 | 0.070 | 18.000 | 4.000 | 270 | 150 |
| 50.00 | 8 | 34 | 0.090 | 22.000 | 5.000 | 215 | 155 |

Acciaio inossidabile
[Cr-Ni/1.4301]



| | | | | | | | |
|-------|---|----|-------|--------|-------|-----|----|
| 11.00 | 4 | 21 | 0.010 | 4.000 | 1.100 | 610 | 25 |
| 12.50 | 4 | 21 | 0.010 | 6.000 | 1.250 | 535 | 20 |
| 16.00 | 4 | 21 | 0.025 | 8.000 | 1.600 | 420 | 40 |
| 18.00 | 6 | 21 | 0.025 | 8.000 | 1.800 | 370 | 55 |
| 21.00 | 6 | 21 | 0.040 | 9.000 | 2.100 | 320 | 75 |
| 25.00 | 6 | 21 | 0.045 | 11.000 | 2.500 | 265 | 70 |
| 32.00 | 6 | 21 | 0.060 | 14.000 | 3.200 | 210 | 75 |
| 40.00 | 8 | 21 | 0.070 | 18.000 | 4.000 | 165 | 95 |
| 50.00 | 8 | 21 | 0.090 | 22.000 | 5.000 | 135 | 95 |

Ghisa
(grigia / sferoidale)



| | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|
| 11.00 | 4 | 42 | 0.010 | 4.000 | 1.100 | 1215 | 50 |
| 12.50 | 4 | 42 | 0.010 | 6.000 | 1.250 | 1070 | 45 |
| 16.00 | 4 | 42 | 0.025 | 8.000 | 1.600 | 835 | 85 |
| 18.00 | 6 | 42 | 0.025 | 8.000 | 1.800 | 745 | 110 |
| 21.00 | 6 | 42 | 0.040 | 9.000 | 2.100 | 635 | 155 |
| 25.00 | 6 | 42 | 0.045 | 11.000 | 2.500 | 535 | 145 |
| 32.00 | 6 | 42 | 0.060 | 14.000 | 3.200 | 420 | 150 |
| 40.00 | 8 | 42 | 0.070 | 18.000 | 4.000 | 335 | 185 |
| 50.00 | 8 | 42 | 0.090 | 22.000 | 5.000 | 265 | 195 |

Rame non legato



| | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|
| 11.00 | 4 | 65 | 0.010 | 4.000 | 1.100 | 1880 | 75 |
| 12.50 | 4 | 65 | 0.010 | 6.000 | 1.250 | 1655 | 65 |
| 16.00 | 4 | 65 | 0.025 | 8.000 | 1.600 | 1295 | 130 |
| 18.00 | 6 | 65 | 0.025 | 8.000 | 1.800 | 1150 | 170 |
| 21.00 | 6 | 65 | 0.040 | 9.000 | 2.100 | 985 | 235 |
| 25.00 | 6 | 65 | 0.045 | 11.000 | 2.500 | 830 | 225 |
| 32.00 | 6 | 65 | 0.060 | 14.000 | 3.200 | 645 | 235 |
| 40.00 | 8 | 65 | 0.070 | 18.000 | 4.000 | 515 | 290 |
| 50.00 | 8 | 65 | 0.090 | 22.000 | 5.000 | 415 | 300 |

Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]



| | | | | | | | |
|-------|---|----|-------|--------|-------|-----|-----|
| 11.00 | 4 | 23 | 0.010 | 4.000 | 1.100 | 665 | 25 |
| 12.50 | 4 | 23 | 0.010 | 6.000 | 1.250 | 585 | 25 |
| 16.00 | 4 | 23 | 0.025 | 8.000 | 1.600 | 460 | 45 |
| 18.00 | 6 | 23 | 0.025 | 8.000 | 1.800 | 405 | 60 |
| 21.00 | 6 | 23 | 0.040 | 9.000 | 2.100 | 350 | 85 |
| 25.00 | 6 | 23 | 0.045 | 11.000 | 2.500 | 295 | 80 |
| 32.00 | 6 | 23 | 0.060 | 14.000 | 3.200 | 230 | 80 |
| 40.00 | 8 | 23 | 0.070 | 18.000 | 4.000 | 185 | 100 |
| 50.00 | 8 | 23 | 0.090 | 22.000 | 5.000 | 145 | 105 |

Alluminio malleabile
Si < 6%

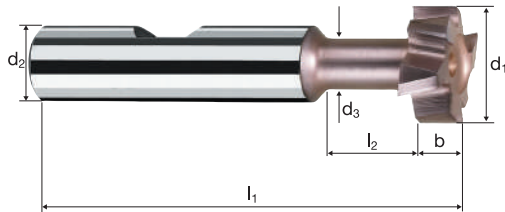


| | | | | | | | |
|-------|---|----|-------|--------|-------|------|-----|
| 11.00 | 4 | 80 | 0.010 | 4.000 | 1.100 | 2315 | 95 |
| 12.50 | 4 | 80 | 0.010 | 6.000 | 1.250 | 2035 | 80 |
| 16.00 | 4 | 80 | 0.025 | 8.000 | 1.600 | 1590 | 160 |
| 18.00 | 6 | 80 | 0.025 | 8.000 | 1.800 | 1415 | 210 |
| 21.00 | 6 | 80 | 0.040 | 9.000 | 2.100 | 1215 | 290 |
| 25.00 | 6 | 80 | 0.045 | 11.000 | 2.500 | 1020 | 275 |
| 32.00 | 6 | 80 | 0.060 | 14.000 | 3.200 | 795 | 285 |
| 40.00 | 8 | 80 | 0.070 | 18.000 | 4.000 | 635 | 355 |
| 50.00 | 8 | 80 | 0.090 | 22.000 | 5.000 | 510 | 365 |

Frese per cave a T

HSS

HSS-E λ 12°
Co8 γ 12°

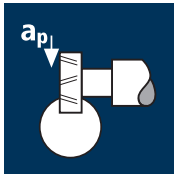


ReTool®

| | | | | | | | | | |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|------------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | | | | | Inox Stainless | Ti Titanium | GG(G) Aluminium Copper |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|------------------------------|

| Esempio: N° Ordine | | Rivestimento U | Articolo 0910 | Codice-ø 100 | | | | | UNICUT-4X U0910 |
|-----------------------|-----------------------|----------------------|------------------|-----------------|----------------|----------|----|--------|--------------------|
| Ø Code | d ₁ d11 | d ₂ h6 | d ₃ | l ₁ | l ₂ | b k11 | z | EUR | |
| 100 | 11.00 | 10.00 | 4.00 | 54 | 8.00 | 4.0 | 4 | 87.00 | |
| 120 | 12.50 | 10.00 | 5.00 | 57 | 9.00 | 6.0 | 4 | 93.00 | |
| 140 | 16.00 | 10.00 | 7.00 | 62 | 12.00 | 8.0 | 4 | 101.00 | |
| 160 | 18.00 | 12.00 | 8.00 | 70 | 15.00 | 8.0 | 6 | 111.00 | |
| 180 | 21.00 | 12.00 | 10.00 | 74 | 19.00 | 9.0 | 6 | 125.00 | |
| 200 | 25.00 | 16.00 | 12.00 | 82 | 21.00 | 11.0 | 6 | 148.00 | |
| 220 | 32.00 | 16.00 | 15.00 | 90 | 27.00 | 14.0 | 6 | 205.00 | |
| 240 | 40.00 | 25.00 | 19.00 | 108 | 30.00 | 18.0 | 8 | 356.00 | |
| 260 | 50.00 | 32.00 | 25.00 | 124 | 40.00 | 22.0 | 8 | 452.00 | |
| 500* | 12.00 | 8.00 | 5.00 | 54 | 14.00 | 2.5 | 8 | 110.00 | |
| 520* | 16.00 | 8.00 | 6.00 | 56 | 16.00 | 3.0 | 8 | 123.00 | |
| 540* | 20.00 | 10.00 | 8.00 | 62 | 17.00 | 4.0 | 8 | 148.00 | |
| 560* | 25.00 | 10.00 | 9.00 | 65 | 19.00 | 5.0 | 10 | 182.00 | |
| 580* | 32.00 | 12.00 | 10.00 | 73 | 21.00 | 6.0 | 12 | 247.00 | |
| 600* | 40.00 | 12.00 | 11.00 | 77 | 23.00 | 8.0 | 12 | 352.00 | |
| 620* | 50.00 | 16.00 | 14.00 | 84 | 25.00 | 10.0 | 14 | 473.00 | |
| * Scarico conico | | | | | | | | | |

Applicazione



Materiale

Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|------------|----|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|
| 7.50 | 8 | 55 | 0.005 | 2.000 | 2.000 | 2335 | 95 |
| 10.50 | 8 | 55 | 0.010 | 2.900 | 3.000 | 1665 | 135 |
| 13.50 | 8 | 55 | 0.010 | 3.800 | 4.000 | 1295 | 105 |
| 16.50 | 8 | 55 | 0.025 | 5.000 | 5.000 | 1060 | 210 |
| 19.50 | 10 | 55 | 0.035 | 5.500 | 6.000 | 900 | 315 |
| 22.50 | 10 | 55 | 0.040 | 6.600 | 8.000 | 780 | 310 |

Acciaio
850 - 1100 N/mm²



| | | | | | | | |
|-------|----|----|-------|-------|-------|------|-----|
| 7.50 | 8 | 45 | 0.005 | 2.000 | 2.000 | 1910 | 75 |
| 10.50 | 8 | 45 | 0.010 | 2.900 | 3.000 | 1365 | 110 |
| 13.50 | 8 | 45 | 0.010 | 3.800 | 4.000 | 1060 | 85 |
| 16.50 | 8 | 45 | 0.025 | 5.000 | 5.000 | 870 | 175 |
| 19.50 | 10 | 45 | 0.035 | 5.500 | 6.000 | 735 | 255 |
| 22.50 | 10 | 45 | 0.040 | 6.600 | 8.000 | 635 | 255 |

Acciaio
1100 - 1300 N/mm²



| | | | | | | | |
|-------|----|----|-------|-------|-------|------|-----|
| 7.50 | 8 | 34 | 0.005 | 2.000 | 2.000 | 1445 | 60 |
| 10.50 | 8 | 34 | 0.010 | 2.900 | 3.000 | 1030 | 80 |
| 13.50 | 8 | 34 | 0.010 | 3.800 | 4.000 | 800 | 65 |
| 16.50 | 8 | 34 | 0.025 | 5.000 | 5.000 | 655 | 130 |
| 19.50 | 10 | 34 | 0.035 | 5.500 | 6.000 | 555 | 195 |
| 22.50 | 10 | 34 | 0.040 | 6.600 | 8.000 | 480 | 190 |

Acciaio inossidabile
[Cr-Ni/1.4301]



| | | | | | | | |
|-------|----|----|-------|-------|-------|-----|-----|
| 7.50 | 8 | 21 | 0.005 | 2.000 | 2.000 | 890 | 35 |
| 10.50 | 8 | 21 | 0.010 | 2.900 | 3.000 | 635 | 50 |
| 13.50 | 8 | 21 | 0.010 | 3.800 | 4.000 | 495 | 40 |
| 16.50 | 8 | 21 | 0.025 | 5.000 | 5.000 | 405 | 80 |
| 19.50 | 10 | 21 | 0.035 | 5.500 | 6.000 | 345 | 120 |
| 22.50 | 10 | 21 | 0.040 | 6.600 | 8.000 | 295 | 120 |

Ghisa
(grigia / sferoidale)



| | | | | | | | |
|-------|----|----|-------|-------|-------|-----|-----|
| 7.50 | 8 | 21 | 0.005 | 2.000 | 2.000 | 890 | 35 |
| 10.50 | 8 | 21 | 0.010 | 2.900 | 3.000 | 635 | 50 |
| 13.50 | 8 | 21 | 0.010 | 3.800 | 4.000 | 495 | 40 |
| 16.50 | 8 | 21 | 0.025 | 5.000 | 5.000 | 405 | 80 |
| 19.50 | 10 | 21 | 0.035 | 5.500 | 6.000 | 345 | 120 |
| 22.50 | 10 | 21 | 0.040 | 6.600 | 8.000 | 295 | 120 |

Rame non legato



| | | | | | | | |
|-------|----|----|-------|-------|-------|------|-----|
| 7.50 | 8 | 65 | 0.005 | 2.000 | 2.000 | 2760 | 110 |
| 10.50 | 8 | 65 | 0.010 | 2.900 | 3.000 | 1970 | 160 |
| 13.50 | 8 | 65 | 0.010 | 3.800 | 4.000 | 1535 | 125 |
| 16.50 | 8 | 65 | 0.025 | 5.000 | 5.000 | 1255 | 250 |
| 19.50 | 10 | 65 | 0.035 | 5.500 | 6.000 | 1060 | 370 |
| 22.50 | 10 | 65 | 0.040 | 6.600 | 8.000 | 920 | 370 |

Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]



| | | | | | | | |
|-------|----|----|-------|-------|-------|-----|-----|
| 7.50 | 8 | 23 | 0.005 | 2.000 | 2.000 | 975 | 40 |
| 10.50 | 8 | 23 | 0.010 | 2.900 | 3.000 | 695 | 55 |
| 13.50 | 8 | 23 | 0.010 | 3.800 | 4.000 | 540 | 45 |
| 16.50 | 8 | 23 | 0.025 | 5.000 | 5.000 | 445 | 90 |
| 19.50 | 10 | 23 | 0.035 | 5.500 | 6.000 | 375 | 130 |
| 22.50 | 10 | 23 | 0.040 | 6.600 | 8.000 | 325 | 130 |

Alluminio malleabile
Si < 6%

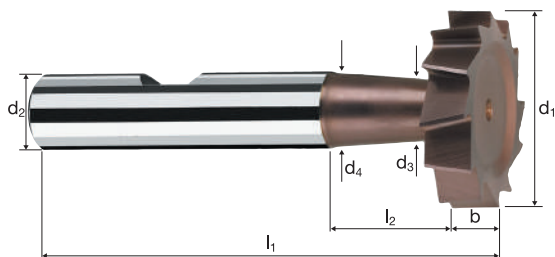


| | | | | | | | |
|-------|----|----|-------|-------|-------|------|-----|
| 7.50 | 8 | 80 | 0.005 | 2.000 | 2.000 | 3395 | 135 |
| 10.50 | 8 | 80 | 0.010 | 2.900 | 3.000 | 2425 | 195 |
| 13.50 | 8 | 80 | 0.010 | 3.800 | 4.000 | 1885 | 150 |
| 16.50 | 8 | 80 | 0.025 | 5.000 | 5.000 | 1545 | 310 |
| 19.50 | 10 | 80 | 0.035 | 5.500 | 6.000 | 1305 | 455 |
| 22.50 | 10 | 80 | 0.040 | 6.600 | 8.000 | 1130 | 455 |

Frese per cave

HSS

HSS-E λ 10°
Co8 γ 8°

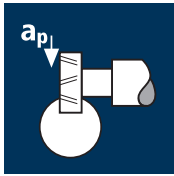


ReTool®

| | | | | | | | | | |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|------------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | | | | | Inox Stainless | Ti Titanium | GG(G) Aluminium Copper |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|------------------------------|

| Esempio: N° Ordine | | | | | | | | | | UNICUT-4X |
|-----------------------|-----------------------|----------------------|----------------|----------------|----------------|----------------|---------|----|--|-----------|
| Rivestimento | | | | | | | | | | |
| Articolo | | | | | | | | | | |
| Codice-ø | | | | | | | | | | |
| Ø Code | d ₁ h11 | d ₂ h6 | d ₃ | d ₄ | l ₁ | l ₂ | b e8 | z | | EUR |
| 100 | 4.50 | 6.00 | 1.80 | 5.50 | 50 | 12.00 | 1.0 | 8 | | 52.40 |
| 150 | 7.50 | 6.00 | 2.80 | 5.50 | 50 | 11.00 | 1.5 | 8 | | 54.20 |
| 160 | 7.50 | 6.00 | 3.20 | 5.50 | 50 | 10.00 | 2.0 | 8 | | 54.20 |
| 200 | 10.50 | 6.00 | 4.00 | 5.50 | 50 | 11.00 | 2.0 | 8 | | 59.30 |
| 210 | 10.50 | 6.00 | 4.00 | 5.50 | 50 | 10.00 | 2.5 | 8 | | 59.30 |
| 220 | 10.50 | 6.00 | 4.20 | 5.50 | 50 | 9.00 | 3.0 | 8 | | 59.30 |
| 310 | 13.50 | 10.00 | 4.60 | 9.50 | 56 | 13.00 | 2.5 | 8 | | 58.70 |
| 320 | 13.50 | 10.00 | 4.60 | 9.50 | 56 | 12.00 | 3.0 | 8 | | 58.70 |
| 330 | 13.50 | 10.00 | 4.60 | 9.50 | 56 | 11.00 | 4.0 | 8 | | 58.70 |
| 360 | 16.50 | 10.00 | 4.60 | 9.50 | 56 | 12.00 | 3.0 | 8 | | 60.00 |
| 370 | 16.50 | 10.00 | 4.60 | 9.50 | 56 | 11.00 | 4.0 | 8 | | 60.00 |
| 380 | 16.50 | 10.00 | 5.00 | 9.50 | 56 | 10.00 | 5.0 | 8 | | 60.00 |
| 410 | 19.50 | 10.00 | 5.60 | 9.50 | 63 | 18.00 | 3.0 | 10 | | 73.00 |
| 420 | 19.50 | 10.00 | 5.60 | 9.50 | 63 | 17.00 | 4.0 | 10 | | 73.00 |
| 430 | 19.50 | 10.00 | 6.00 | 9.50 | 63 | 16.00 | 5.0 | 10 | | 73.00 |
| 440 | 19.50 | 10.00 | 6.50 | 9.50 | 63 | 15.00 | 6.0 | 10 | | 73.00 |
| 500 | 22.50 | 10.00 | 6.00 | 9.50 | 63 | 17.00 | 4.0 | 10 | | 79.00 |
| 510 | 22.50 | 10.00 | 6.00 | 9.50 | 63 | 16.00 | 5.0 | 10 | | 79.00 |
| 520 | 22.50 | 10.00 | 6.50 | 9.50 | 63 | 15.00 | 6.0 | 10 | | 79.00 |
| 540 | 22.50 | 10.00 | 6.50 | 9.50 | 63 | 14.00 | 8.0 | 10 | | 79.00 |

Applicazione



Materiale

Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _e [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|------------|----|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|
| 25.50 | 12 | 55 | 0.045 | 7.000 | 6.000 | 685 | 370 |
| 28.50 | 12 | 55 | 0.050 | 8.200 | 10.000 | 615 | 370 |
| 32.50 | 12 | 55 | 0.060 | 9.800 | 10.000 | 540 | 390 |
| 45.50 | 14 | 55 | 0.080 | 12.000 | 10.000 | 385 | 430 |
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Acciaio
850 - 1100 N/mm²



| d1 [mm] | z | v _c [m/min] | f _e [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|------------|----|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|
| 25.50 | 12 | 45 | 0.045 | 7.000 | 6.000 | 560 | 305 |
| 28.50 | 12 | 45 | 0.050 | 8.200 | 10.000 | 505 | 300 |
| 32.50 | 12 | 45 | 0.060 | 9.800 | 10.000 | 440 | 315 |
| 45.50 | 14 | 45 | 0.080 | 12.000 | 10.000 | 315 | 355 |
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Acciaio
1100 - 1300 N/mm²



| d1 [mm] | z | v _c [m/min] | f _e [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|------------|----|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|
| 25.50 | 12 | 34 | 0.045 | 7.000 | 6.000 | 425 | 230 |
| 28.50 | 12 | 34 | 0.050 | 8.200 | 10.000 | 380 | 230 |
| 32.50 | 12 | 34 | 0.060 | 9.800 | 10.000 | 335 | 240 |
| 45.50 | 14 | 34 | 0.080 | 12.000 | 10.000 | 240 | 265 |
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Acciaio inossidabile
[Cr-Ni/1.4301]



| d1 [mm] | z | v _c [m/min] | f _e [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|------------|----|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|
| 25.50 | 12 | 21 | 0.045 | 7.000 | 6.000 | 260 | 140 |
| 28.50 | 12 | 21 | 0.050 | 8.200 | 10.000 | 235 | 140 |
| 32.50 | 12 | 21 | 0.060 | 9.800 | 10.000 | 205 | 150 |
| 45.50 | 14 | 21 | 0.080 | 12.000 | 10.000 | 145 | 165 |
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Ghisa
(grigia / sferoidale)



| d1 [mm] | z | v _c [m/min] | f _e [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|------------|----|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|
| 25.50 | 12 | 21 | 0.045 | 7.000 | 6.000 | 260 | 140 |
| 28.50 | 12 | 21 | 0.050 | 8.200 | 10.000 | 235 | 140 |
| 32.50 | 12 | 21 | 0.060 | 9.800 | 10.000 | 205 | 150 |
| 45.50 | 14 | 21 | 0.080 | 12.000 | 10.000 | 145 | 165 |
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Rame non legato



| d1 [mm] | z | v _c [m/min] | f _e [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|------------|----|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|
| 25.50 | 12 | 65 | 0.045 | 7.000 | 6.000 | 810 | 440 |
| 28.50 | 12 | 65 | 0.050 | 8.200 | 10.000 | 725 | 435 |
| 32.50 | 12 | 65 | 0.060 | 9.800 | 10.000 | 635 | 460 |
| 45.50 | 14 | 65 | 0.080 | 12.000 | 10.000 | 455 | 510 |
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Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]



| d1 [mm] | z | v _c [m/min] | f _e [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|------------|----|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|
| 25.50 | 12 | 23 | 0.045 | 7.000 | 6.000 | 285 | 155 |
| 28.50 | 12 | 23 | 0.050 | 8.200 | 10.000 | 255 | 155 |
| 32.50 | 12 | 23 | 0.060 | 9.800 | 10.000 | 225 | 160 |
| 45.50 | 14 | 23 | 0.080 | 12.000 | 10.000 | 160 | 180 |
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Alluminio malleabile
Si < 6%

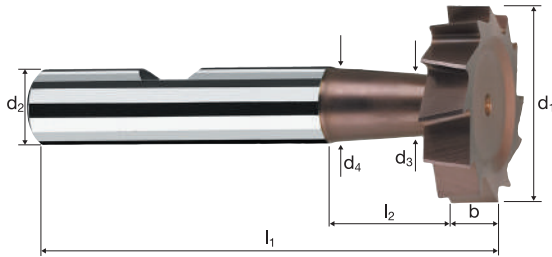


| d1 [mm] | z | v _c [m/min] | f _e [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|------------|----|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|
| 25.50 | 12 | 80 | 0.045 | 7.000 | 6.000 | 1000 | 540 |
| 28.50 | 12 | 80 | 0.050 | 8.200 | 10.000 | 895 | 535 |
| 32.50 | 12 | 80 | 0.060 | 9.800 | 10.000 | 785 | 565 |
| 45.50 | 14 | 80 | 0.080 | 12.000 | 10.000 | 560 | 625 |
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Frese per cave

HSS

HSS-E λ 10°
Co8 γ 8°

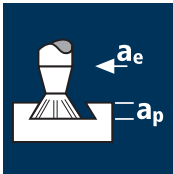


ReTool®

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|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|------------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | | | | | Inox Stainless | Ti Titanium | GG(G) Aluminium Copper |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|------------------------------|

| Esempio: N° Ordine | | | | | | | | | | UNICUT-4X |
|---|-----------------------|----------------------|----------------|----------------|----------------|----------------|---------|----|--|-----------|
| Rivestimento U Articolo 0905 Codice-Ø 600 | | | | | | | | | | U0905 |
| Ø Code | d ₁ h11 | d ₂ h6 | d ₃ | d ₄ | l ₁ | l ₂ | b e8 | z | | EUR |
| 600 | 25.50 | 10.00 | 7.50 | 9.50 | 63 | 16.00 | 5.0 | 12 | | 97.00 |
| 610 | 25.50 | 10.00 | 7.50 | 9.50 | 63 | 15.00 | 6.0 | 12 | | 97.00 |
| 650 | 28.50 | 10.00 | 8.50 | 9.50 | 63 | 14.00 | 6.0 | 12 | | 126.00 |
| 660 | 28.50 | 10.00 | 8.50 | 9.50 | 63 | 13.00 | 8.0 | 12 | | 126.00 |
| 700 | 28.50 | 12.00 | 9.30 | 11.50 | 71 | 14.00 | 10.0 | 12 | | 126.00 |
| 750 | 32.50 | 12.00 | 8.50 | 11.50 | 71 | 18.00 | 6.0 | 12 | | 144.00 |
| 760 | 32.50 | 12.00 | 8.50 | 11.50 | 71 | 17.00 | 7.0 | 12 | | 144.00 |
| 770 | 32.50 | 12.00 | 8.50 | 11.50 | 71 | 16.00 | 8.0 | 12 | | 144.00 |
| 800 | 32.50 | 12.00 | 9.30 | 11.50 | 71 | 15.00 | 10.0 | 12 | | 144.00 |
| 900 | 45.50 | 12.00 | 11.00 | 11.50 | 71 | 14.00 | 10.0 | 14 | | 252.00 |
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Applicazione



Materiale

Acciaio
< 850 N/mm²



| d1 [mm] | z | ve [m/min] | fe [mm] | ap [mm] | ae [mm] | n [min ⁻¹] | vr [mm/min] |
|------------|----|---------------|------------|------------|------------|---------------------------|----------------|
| 8.00 | 7 | 55 | 0.005 | 2.500 | 1.500 | 2190 | 75 |
| 12.00 | 8 | 55 | 0.010 | 3.000 | 2.000 | 1460 | 115 |
| 16.00 | 10 | 55 | 0.015 | 4.000 | 2.200 | 1095 | 165 |
| 20.00 | 12 | 55 | 0.018 | 6.000 | 2.400 | 875 | 190 |
| 25.00 | 14 | 55 | 0.020 | 8.000 | 2.600 | 700 | 195 |
| 32.00 | 16 | 55 | 0.025 | 10.000 | 3.000 | 545 | 220 |

Acciaio
850 - 1100 N/mm²



| d1 [mm] | z | ve [m/min] | fe [mm] | ap [mm] | ae [mm] | n [min ⁻¹] | vr [mm/min] |
|------------|----|---------------|------------|------------|------------|---------------------------|----------------|
| 8.00 | 7 | 45 | 0.005 | 2.500 | 1.500 | 1790 | 65 |
| 12.00 | 8 | 45 | 0.010 | 3.000 | 2.000 | 1195 | 95 |
| 16.00 | 10 | 45 | 0.015 | 4.000 | 2.200 | 895 | 135 |
| 20.00 | 12 | 45 | 0.018 | 6.000 | 2.400 | 715 | 155 |
| 25.00 | 14 | 45 | 0.020 | 8.000 | 2.600 | 575 | 160 |
| 32.00 | 16 | 45 | 0.025 | 10.000 | 3.000 | 450 | 180 |

Acciaio
1100 - 1300 N/mm²



| d1 [mm] | z | ve [m/min] | fe [mm] | ap [mm] | ae [mm] | n [min ⁻¹] | vr [mm/min] |
|------------|----|---------------|------------|------------|------------|---------------------------|----------------|
| 8.00 | 7 | 34 | 0.005 | 2.500 | 1.500 | 1355 | 45 |
| 12.00 | 8 | 34 | 0.010 | 3.000 | 2.000 | 900 | 70 |
| 16.00 | 10 | 34 | 0.015 | 4.000 | 2.200 | 675 | 100 |
| 20.00 | 12 | 34 | 0.018 | 6.000 | 2.400 | 540 | 115 |
| 25.00 | 14 | 34 | 0.020 | 8.000 | 2.600 | 435 | 120 |
| 32.00 | 16 | 34 | 0.025 | 10.000 | 3.000 | 340 | 135 |

Acciaio inossidabile
[Cr-Ni/1.4301]



| d1 [mm] | z | ve [m/min] | fe [mm] | ap [mm] | ae [mm] | n [min ⁻¹] | vr [mm/min] |
|------------|----|---------------|------------|------------|------------|---------------------------|----------------|
| 8.00 | 7 | 21 | 0.005 | 2.500 | 1.500 | 835 | 30 |
| 12.00 | 8 | 21 | 0.010 | 3.000 | 2.000 | 555 | 45 |
| 16.00 | 10 | 21 | 0.015 | 4.000 | 2.200 | 420 | 65 |
| 20.00 | 12 | 21 | 0.018 | 6.000 | 2.400 | 335 | 70 |
| 25.00 | 14 | 21 | 0.020 | 8.000 | 2.600 | 265 | 75 |
| 32.00 | 16 | 21 | 0.025 | 10.000 | 3.000 | 210 | 85 |

Ghisa
(grigia / sferoidale)



| d1 [mm] | z | ve [m/min] | fe [mm] | ap [mm] | ae [mm] | n [min ⁻¹] | vr [mm/min] |
|------------|----|---------------|------------|------------|------------|---------------------------|----------------|
| 8.00 | 7 | 42 | 0.005 | 2.500 | 1.500 | 1670 | 60 |
| 12.00 | 8 | 42 | 0.010 | 3.000 | 2.000 | 1115 | 90 |
| 16.00 | 10 | 42 | 0.015 | 4.000 | 2.200 | 835 | 125 |
| 20.00 | 12 | 42 | 0.018 | 6.000 | 2.400 | 670 | 145 |
| 25.00 | 14 | 42 | 0.020 | 8.000 | 2.600 | 535 | 150 |
| 32.00 | 16 | 42 | 0.025 | 10.000 | 3.000 | 420 | 165 |

Rame non legato



| d1 [mm] | z | ve [m/min] | fe [mm] | ap [mm] | ae [mm] | n [min ⁻¹] | vr [mm/min] |
|------------|----|---------------|------------|------------|------------|---------------------------|----------------|
| 8.00 | 7 | 65 | 0.005 | 2.500 | 1.500 | 2585 | 90 |
| 12.00 | 8 | 65 | 0.010 | 3.000 | 2.000 | 1725 | 140 |
| 16.00 | 10 | 65 | 0.015 | 4.000 | 2.200 | 1295 | 195 |
| 20.00 | 12 | 65 | 0.018 | 6.000 | 2.400 | 1035 | 225 |
| 25.00 | 14 | 65 | 0.020 | 8.000 | 2.600 | 830 | 230 |
| 32.00 | 16 | 65 | 0.025 | 10.000 | 3.000 | 645 | 260 |

Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]



| d1 [mm] | z | ve [m/min] | fe [mm] | ap [mm] | ae [mm] | n [min ⁻¹] | vr [mm/min] |
|------------|----|---------------|------------|------------|------------|---------------------------|----------------|
| 8.00 | 7 | 23 | 0.005 | 2.500 | 1.500 | 915 | 30 |
| 12.00 | 8 | 23 | 0.010 | 3.000 | 2.000 | 610 | 50 |
| 16.00 | 10 | 23 | 0.015 | 4.000 | 2.200 | 460 | 70 |
| 20.00 | 12 | 23 | 0.018 | 6.000 | 2.400 | 365 | 80 |
| 25.00 | 14 | 23 | 0.020 | 8.000 | 2.600 | 295 | 80 |
| 32.00 | 16 | 23 | 0.025 | 10.000 | 3.000 | 230 | 90 |

Alluminio malleabile
Si < 6%

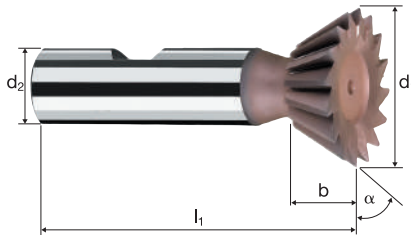


| d1 [mm] | z | ve [m/min] | fe [mm] | ap [mm] | ae [mm] | n [min ⁻¹] | vr [mm/min] |
|------------|----|---------------|------------|------------|------------|---------------------------|----------------|
| 8.00 | 7 | 80 | 0.005 | 2.500 | 1.500 | 3185 | 110 |
| 12.00 | 8 | 80 | 0.010 | 3.000 | 2.000 | 2120 | 170 |
| 16.00 | 10 | 80 | 0.015 | 4.000 | 2.200 | 1590 | 240 |
| 20.00 | 12 | 80 | 0.018 | 6.000 | 2.400 | 1275 | 275 |
| 25.00 | 14 | 80 | 0.020 | 8.000 | 2.600 | 1020 | 285 |
| 32.00 | 16 | 80 | 0.025 | 10.000 | 3.000 | 795 | 320 |

Frese ad angolo

HSS

HSS-E λ 0°
Co8 γ 0°



ReTool®

Rm
< 850

Rm
850-1100

Rm
1100-1300

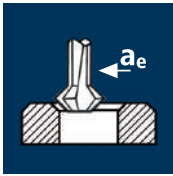
Inox
Stainless

Ti
Titanium

GG(G)
Aluminium
Copper

| Esempio: N° Ordine | | Rivestimento U | Articolo 0890 | Codice-ø 100 | | | | UNICUT-4X |
|-----------------------|------------------------|----------------------|------------------|-----------------|-------|----|--------|-----------|
| Ø Code | d ₁ js12 | d ₂ h6 | l ₁ | b | α | z | EUR | |
| 100 | 12.00 | 10.00 | 54 | 3.0 | 45.0° | 8 | 56.20 | |
| 120 | 16.00 | 12.00 | 60 | 4.0 | 45.0° | 10 | 66.00 | |
| 140 | 20.00 | 12.00 | 63 | 5.0 | 45.0° | 12 | 81.00 | |
| 160 | 25.00 | 12.00 | 67 | 6.3 | 45.0° | 14 | 104.00 | |
| 180 | 32.00 | 16.00 | 71 | 8.0 | 45.0° | 16 | 160.00 | |
| 300 | 8.00 | 6.00 | 49 | 3.0 | 60.0° | 7 | 51.40 | |
| 320 | 12.00 | 10.00 | 54 | 4.0 | 60.0° | 8 | 56.20 | |
| 340 | 16.00 | 12.00 | 60 | 6.3 | 60.0° | 10 | 66.00 | |
| 360 | 20.00 | 12.00 | 63 | 8.0 | 60.0° | 12 | 81.00 | |
| 380 | 25.00 | 12.00 | 67 | 10.0 | 60.0° | 14 | 104.00 | |
| 400 | 32.00 | 16.00 | 71 | 12.5 | 60.0° | 16 | 160.00 | |
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Applicazione



Materiale

Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|------------|---|---------------------------|------------------------|------------------------|---------------------------|----------------------------|
| 3.00 | 4 | 150 | 0.008 | 0.150 | 15915 | 510 |
| 4.00 | 4 | 150 | 0.012 | 0.200 | 11935 | 575 |
| 5.00 | 4 | 150 | 0.014 | 0.250 | 9550 | 535 |
| 6.00 | 4 | 150 | 0.018 | 0.250 | 7960 | 575 |
| 8.00 | 4 | 150 | 0.022 | 0.300 | 5970 | 525 |
| 10.00 | 4 | 150 | 0.028 | 0.400 | 4775 | 535 |
| 12.00 | 4 | 150 | 0.034 | 0.500 | 3980 | 540 |

Acciaio
850 - 1100 N/mm²



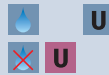
| | | | | | | |
|-------|---|-----|-------|-------|-------|-----|
| 3.00 | 4 | 120 | 0.008 | 0.150 | 12730 | 405 |
| 4.00 | 4 | 120 | 0.012 | 0.200 | 9550 | 460 |
| 5.00 | 4 | 120 | 0.014 | 0.250 | 7640 | 430 |
| 6.00 | 4 | 120 | 0.018 | 0.250 | 6365 | 460 |
| 8.00 | 4 | 120 | 0.022 | 0.300 | 4775 | 420 |
| 10.00 | 4 | 120 | 0.028 | 0.400 | 3820 | 430 |
| 12.00 | 4 | 120 | 0.034 | 0.500 | 3185 | 435 |

Acciaio inossidabile
[Cr-Ni/1.4301]



| | | | | | | |
|-------|---|----|-------|-------|------|-----|
| 3.00 | 4 | 50 | 0.008 | 0.150 | 5305 | 170 |
| 4.00 | 4 | 50 | 0.012 | 0.200 | 3980 | 190 |
| 5.00 | 4 | 50 | 0.014 | 0.250 | 3185 | 180 |
| 6.00 | 4 | 50 | 0.018 | 0.250 | 2655 | 190 |
| 8.00 | 4 | 50 | 0.022 | 0.300 | 1990 | 175 |
| 10.00 | 4 | 50 | 0.028 | 0.400 | 1590 | 180 |
| 12.00 | 4 | 50 | 0.034 | 0.500 | 1325 | 180 |

Ghisa
(grigia / sferoidale)



| | | | | | | |
|-------|---|-----|-------|-------|-------|-----|
| 3.00 | 4 | 180 | 0.008 | 0.150 | 19100 | 610 |
| 4.00 | 4 | 180 | 0.012 | 0.200 | 14325 | 690 |
| 5.00 | 4 | 180 | 0.014 | 0.250 | 11460 | 640 |
| 6.00 | 4 | 180 | 0.018 | 0.250 | 9550 | 690 |
| 8.00 | 4 | 180 | 0.022 | 0.300 | 7160 | 630 |
| 10.00 | 4 | 180 | 0.028 | 0.400 | 5730 | 640 |
| 12.00 | 4 | 180 | 0.034 | 0.500 | 4775 | 650 |



Acciaio
< 850 N/mm²



| | | | | | | |
|-------|---|-----|-------|-------|-------|-----|
| 3.00 | 4 | 150 | 0.008 | 0.150 | 15915 | 510 |
| 4.00 | 4 | 150 | 0.012 | 0.200 | 11935 | 575 |
| 5.00 | 4 | 150 | 0.014 | 0.250 | 9550 | 535 |
| 6.00 | 4 | 150 | 0.018 | 0.250 | 7960 | 575 |
| 8.00 | 4 | 150 | 0.022 | 0.300 | 5970 | 525 |
| 10.00 | 4 | 150 | 0.028 | 0.400 | 4775 | 535 |
| 12.00 | 4 | 150 | 0.034 | 0.500 | 3980 | 540 |

Acciaio
850 - 1100 N/mm²



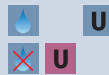
| | | | | | | |
|-------|---|-----|-------|-------|-------|-----|
| 3.00 | 4 | 120 | 0.008 | 0.150 | 12730 | 405 |
| 4.00 | 4 | 120 | 0.012 | 0.200 | 9550 | 460 |
| 5.00 | 4 | 120 | 0.014 | 0.250 | 7640 | 430 |
| 6.00 | 4 | 120 | 0.018 | 0.250 | 6365 | 460 |
| 8.00 | 4 | 120 | 0.022 | 0.300 | 4775 | 420 |
| 10.00 | 4 | 120 | 0.028 | 0.400 | 3820 | 430 |
| 12.00 | 4 | 120 | 0.034 | 0.500 | 3185 | 435 |

Acciaio inossidabile
[Cr-Ni/1.4301]



| | | | | | | |
|-------|---|----|-------|-------|------|-----|
| 3.00 | 4 | 50 | 0.008 | 0.150 | 5305 | 170 |
| 4.00 | 4 | 50 | 0.012 | 0.200 | 3980 | 190 |
| 5.00 | 4 | 50 | 0.014 | 0.250 | 3185 | 180 |
| 6.00 | 4 | 50 | 0.018 | 0.250 | 2655 | 190 |
| 8.00 | 4 | 50 | 0.022 | 0.300 | 1990 | 175 |
| 10.00 | 4 | 50 | 0.028 | 0.400 | 1590 | 180 |
| 12.00 | 4 | 50 | 0.034 | 0.500 | 1325 | 180 |

Ghisa
(grigia / sferoidale)



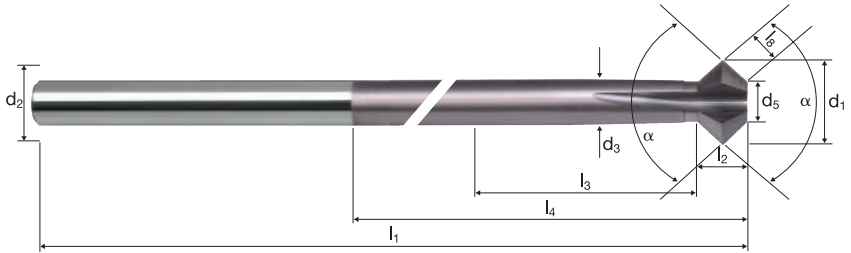
| | | | | | | |
|-------|---|-----|-------|-------|-------|-----|
| 3.00 | 4 | 180 | 0.008 | 0.150 | 19100 | 610 |
| 4.00 | 4 | 180 | 0.012 | 0.200 | 14325 | 690 |
| 5.00 | 4 | 180 | 0.014 | 0.250 | 11460 | 640 |
| 6.00 | 4 | 180 | 0.018 | 0.250 | 9550 | 690 |
| 8.00 | 4 | 180 | 0.022 | 0.300 | 7160 | 630 |
| 10.00 | 4 | 180 | 0.028 | 0.400 | 5730 | 640 |
| 12.00 | 4 | 180 | 0.034 | 0.500 | 4775 | 650 |

Frese per sbavatura avanti-indietro

Smussatura a 45°



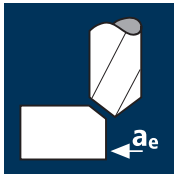
| | |
|----|--------------|
| HM | λ 0° |
| | γ 8° |
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|----------|-------------|--------------|--|--|--|--|--|----------------|-------------|------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | | | | | | Inox Stainless | Ti Titanium | GG(G) Aluminium Copper |
|----------|-------------|--------------|--|--|--|--|--|----------------|-------------|------------------------|

| | | | | | | | | | | | | UNICUT-4X |
|--------------------|------------|-------|------|-----|-----|------|-------|-------|-----|----------|---|-----------|
| Esempio: N° Ordine | | | | | | | | | | | | |
| | | | | | | | | | | | | U7930 |
| | | | | | | | | | | | | EUR |
| \emptyset Code | d1 0/-0.05 | d2 h6 | d3 | d5 | l1 | l2 | l3 | l4 | l8 | α | z | |
| 180 | 3.00 | 6.00 | 2.20 | 1.2 | 100 | 1.30 | 10.00 | 60.00 | 1.3 | 90.0° | 4 | 80.00 |
| 220 | 4.00 | 6.00 | 2.90 | 1.6 | 100 | 1.75 | 12.00 | 60.00 | 1.7 | 90.0° | 4 | 83.00 |
| 260 | 5.00 | 6.00 | 3.40 | 2.0 | 100 | 2.30 | 15.00 | 60.00 | 2.1 | 90.0° | 4 | 87.00 |
| 300 | 6.00 | 6.00 | 3.80 | 2.4 | 100 | 2.90 | 18.00 | 60.00 | 2.5 | 90.0° | 4 | 92.00 |
| 391 | 8.00 | 6.00 | 4.90 | 4.9 | 100 | 3.10 | 35.00 | 60.00 | 2.2 | 90.0° | 4 | 120.00 |
| 450 | 10.00 | 6.00 | 5.90 | 5.9 | 100 | 4.10 | 35.00 | 60.00 | 2.9 | 90.0° | 4 | 147.00 |
| 501 | 12.00 | 6.00 | 5.90 | 5.9 | 100 | 6.10 | 35.00 | 60.00 | 4.3 | 90.0° | 4 | 177.00 |
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Applicazione



Materiale

Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _e [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|
| 6.00 | 4 | 150 | 0.020 | 0.200 | 0.200 | 7960 | 635 |
| 8.00 | 4 | 150 | 0.025 | 0.250 | 0.250 | 5970 | 595 |
| 10.00 | 4 | 150 | 0.030 | 0.300 | 0.300 | 4775 | 575 |
| 12.00 | 4 | 150 | 0.035 | 0.400 | 0.400 | 3980 | 555 |
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Acciaio
850 - 1100 N/mm²



| | | | | | | | |
|-------|---|-----|-------|-------|-------|------|-----|
| 6.00 | 4 | 120 | 0.020 | 0.200 | 0.200 | 6365 | 510 |
| 8.00 | 4 | 120 | 0.025 | 0.250 | 0.250 | 4775 | 475 |
| 10.00 | 4 | 120 | 0.030 | 0.300 | 0.300 | 3820 | 460 |
| 12.00 | 4 | 120 | 0.035 | 0.400 | 0.400 | 3185 | 445 |
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Acciaio
1100 - 1300 N/mm²



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|-------|---|----|-------|-------|-------|------|-----|
| 6.00 | 4 | 55 | 0.020 | 0.200 | 0.200 | 2920 | 235 |
| 8.00 | 4 | 55 | 0.025 | 0.250 | 0.250 | 2190 | 220 |
| 10.00 | 4 | 55 | 0.030 | 0.300 | 0.300 | 1750 | 210 |
| 12.00 | 4 | 55 | 0.035 | 0.400 | 0.400 | 1460 | 205 |
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Acciaio inossidabile
[Cr-Ni/1.4301]



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|-------|---|----|-------|-------|-------|------|-----|
| 6.00 | 4 | 60 | 0.020 | 0.200 | 0.200 | 3185 | 255 |
| 8.00 | 4 | 60 | 0.025 | 0.250 | 0.250 | 2385 | 240 |
| 10.00 | 4 | 60 | 0.030 | 0.300 | 0.300 | 1910 | 230 |
| 12.00 | 4 | 60 | 0.035 | 0.400 | 0.400 | 1590 | 225 |
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Ghisa
(grigia / sferoidale)



| | | | | | | | |
|-------|---|-----|-------|-------|-------|------|-----|
| 6.00 | 4 | 160 | 0.020 | 0.200 | 0.200 | 8490 | 680 |
| 8.00 | 4 | 160 | 0.025 | 0.250 | 0.250 | 6365 | 635 |
| 10.00 | 4 | 160 | 0.030 | 0.300 | 0.300 | 5095 | 610 |
| 12.00 | 4 | 160 | 0.035 | 0.400 | 0.400 | 4245 | 595 |
| | | | | | | | |
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Rame non legato



| | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-----|
| 6.00 | 4 | 200 | 0.020 | 0.200 | 0.200 | 10610 | 850 |
| 8.00 | 4 | 200 | 0.025 | 0.250 | 0.250 | 7960 | 795 |
| 10.00 | 4 | 200 | 0.030 | 0.300 | 0.300 | 6365 | 765 |
| 12.00 | 4 | 200 | 0.035 | 0.400 | 0.400 | 5305 | 745 |
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Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]



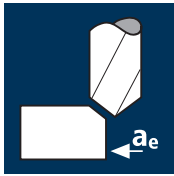
| | | | | | | | |
|-------|---|----|-------|-------|-------|------|-----|
| 6.00 | 4 | 70 | 0.020 | 0.200 | 0.200 | 3715 | 295 |
| 8.00 | 4 | 70 | 0.025 | 0.250 | 0.250 | 2785 | 280 |
| 10.00 | 4 | 70 | 0.030 | 0.300 | 0.300 | 2230 | 265 |
| 12.00 | 4 | 70 | 0.035 | 0.400 | 0.400 | 1855 | 260 |
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Alluminio malleabile
Si < 6%



| | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|------|
| 6.00 | 4 | 300 | 0.020 | 0.200 | 0.200 | 15915 | 1275 |
| 8.00 | 4 | 300 | 0.025 | 0.250 | 0.250 | 11935 | 1195 |
| 10.00 | 4 | 300 | 0.030 | 0.300 | 0.300 | 9550 | 1145 |
| 12.00 | 4 | 300 | 0.035 | 0.400 | 0.400 | 7960 | 1115 |
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Applicazione



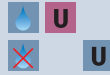
Materiale

Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _e [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|
| 2.00 | 3 | 150 | 0.005 | 0.050 | 0.050 | 23875 | 360 |
| 3.00 | 3 | 150 | 0.010 | 0.100 | 0.100 | 15915 | 475 |
| 4.00 | 3 | 150 | 0.015 | 0.150 | 0.150 | 11935 | 535 |
| 6.00 | 3 | 150 | 0.020 | 0.200 | 0.200 | 7960 | 475 |
| | | | | | | | |
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Acciaio
850 - 1100 N/mm²



| | | | | | | | |
|------|---|-----|-------|-------|-------|-------|-----|
| 2.00 | 3 | 120 | 0.005 | 0.050 | 0.050 | 19100 | 285 |
| 3.00 | 3 | 120 | 0.010 | 0.100 | 0.100 | 12730 | 380 |
| 4.00 | 3 | 120 | 0.015 | 0.150 | 0.150 | 9550 | 430 |
| 6.00 | 3 | 120 | 0.020 | 0.200 | 0.200 | 6365 | 380 |
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Acciaio
1100 - 1300 N/mm²



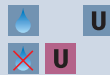
| | | | | | | | |
|------|---|----|-------|-------|-------|-------|-----|
| 2.00 | 3 | 70 | 0.005 | 0.050 | 0.050 | 11140 | 165 |
| 3.00 | 3 | 70 | 0.010 | 0.100 | 0.100 | 7425 | 225 |
| 4.00 | 3 | 70 | 0.015 | 0.150 | 0.150 | 5570 | 250 |
| 6.00 | 3 | 70 | 0.020 | 0.200 | 0.200 | 3715 | 225 |
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Acciaio inossidabile
[Cr-Ni/1.4301]



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|------|---|----|-------|-------|-------|------|-----|
| 2.00 | 3 | 60 | 0.005 | 0.050 | 0.050 | 9550 | 145 |
| 3.00 | 3 | 60 | 0.010 | 0.100 | 0.100 | 6365 | 190 |
| 4.00 | 3 | 60 | 0.015 | 0.150 | 0.150 | 4775 | 215 |
| 6.00 | 3 | 60 | 0.020 | 0.200 | 0.200 | 3185 | 190 |
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Ghisa
(grigia / sferoidale)



| | | | | | | | |
|------|---|-----|-------|-------|-------|-------|-----|
| 2.00 | 3 | 160 | 0.005 | 0.050 | 0.050 | 25465 | 380 |
| 3.00 | 3 | 160 | 0.010 | 0.100 | 0.100 | 16975 | 510 |
| 4.00 | 3 | 160 | 0.015 | 0.150 | 0.150 | 12730 | 575 |
| 6.00 | 3 | 160 | 0.020 | 0.200 | 0.200 | 8490 | 510 |
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Rame non legato



| | | | | | | | |
|------|---|-----|-------|-------|-------|-------|-----|
| 2.00 | 3 | 180 | 0.005 | 0.050 | 0.050 | 28650 | 430 |
| 3.00 | 3 | 180 | 0.010 | 0.100 | 0.100 | 19100 | 575 |
| 4.00 | 3 | 180 | 0.015 | 0.150 | 0.150 | 14325 | 645 |
| 6.00 | 3 | 180 | 0.020 | 0.200 | 0.200 | 9550 | 575 |
| | | | | | | | |
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Leghe di titanio
fino a 300 HB
[Ti5Al2.5Sn]



| | | | | | | | |
|------|---|----|-------|-------|-------|-------|-----|
| 2.00 | 3 | 70 | 0.005 | 0.050 | 0.050 | 11140 | 165 |
| 3.00 | 3 | 70 | 0.010 | 0.100 | 0.100 | 7425 | 225 |
| 4.00 | 3 | 70 | 0.015 | 0.150 | 0.150 | 5570 | 250 |
| 6.00 | 3 | 70 | 0.020 | 0.200 | 0.200 | 3715 | 225 |
| | | | | | | | |
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| | | | | | | | |

Alluminio malleabile
Si < 6%



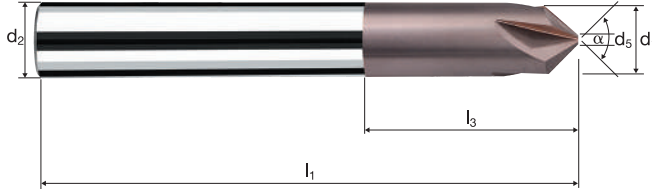
| | | | | | | | |
|------|---|-----|-------|-------|-------|-------|-----|
| 2.00 | 3 | 200 | 0.005 | 0.050 | 0.050 | 31830 | 475 |
| 3.00 | 3 | 200 | 0.010 | 0.100 | 0.100 | 21220 | 635 |
| 4.00 | 3 | 200 | 0.015 | 0.150 | 0.150 | 15915 | 715 |
| 6.00 | 3 | 200 | 0.020 | 0.200 | 0.200 | 10610 | 635 |
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Frese per sbavatura

Smussatura a 45°



| | | |
|----|-----------|----|
| HM | λ | 0° |
| | γ | 0° |

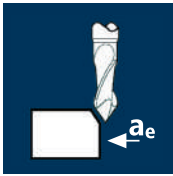


ReTool®

| | | | | | | | | | |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|------------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | | | | | Inox Stainless | Ti Titanium | GG(G) Aluminium Copper |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|------------------------------|

| | | | | | | | | UNICUT-4X | |
|---|----------------------|----------------------|-------------------------|----------------|----------------|-------|---|-----------|--|
| Esempio: N° Ordine Rivestimento U Articolo 7942 Codice-Ø 140 | | | | | | | | | |
| Ø Code | d ₁ h6 | d ₂ h6 | d ₃ ±0.05 | l ₁ | l ₃ | α | z | EUR | |
| 140 | 2.00 | 3.00 | 0.2 | 40 | 7.20 | 90.0° | 3 | 49.50 | |
| 180 | 3.00 | 3.00 | 0.3 | 40 | - | 90.0° | 3 | 49.50 | |
| 220 | 4.00 | 4.00 | 0.4 | 50 | - | 90.0° | 3 | 49.50 | |
| 300 | 6.00 | 6.00 | 0.6 | 57 | - | 90.0° | 3 | 49.50 | |
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Applicazione



Materiale

Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _t [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|
| 2.00 | 2 | 120 | 0.006 | 0.050 | 0.050 | 19100 | 230 |
| 3.00 | 2 | 120 | 0.008 | 0.100 | 0.100 | 12730 | 205 |
| 4.00 | 2 | 120 | 0.012 | 0.150 | 0.150 | 9550 | 230 |
| 5.00 | 2 | 120 | 0.014 | 0.200 | 0.200 | 7640 | 215 |
| 6.00 | 2 | 120 | 0.018 | 0.200 | 0.200 | 6365 | 230 |
| 8.00 | 2 | 120 | 0.022 | 0.250 | 0.250 | 4775 | 210 |
| 10.00 | 2 | 120 | 0.028 | 0.350 | 0.350 | 3820 | 215 |
| 12.00 | 2 | 120 | 0.034 | 0.450 | 0.450 | 3185 | 215 |
| 16.00 | 2 | 120 | 0.046 | 0.500 | 0.500 | 2385 | 220 |

Acciaio
850 - 1100 N/mm²



| | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-----|
| 2.00 | 2 | 100 | 0.006 | 0.050 | 0.050 | 15915 | 190 |
| 3.00 | 2 | 100 | 0.008 | 0.100 | 0.100 | 10610 | 170 |
| 4.00 | 2 | 100 | 0.012 | 0.150 | 0.150 | 7960 | 190 |
| 5.00 | 2 | 100 | 0.014 | 0.200 | 0.200 | 6365 | 180 |
| 6.00 | 2 | 100 | 0.018 | 0.200 | 0.200 | 5305 | 190 |
| 8.00 | 2 | 100 | 0.022 | 0.250 | 0.250 | 3980 | 175 |
| 10.00 | 2 | 100 | 0.028 | 0.350 | 0.350 | 3185 | 180 |
| 12.00 | 2 | 100 | 0.034 | 0.450 | 0.450 | 2655 | 180 |
| 16.00 | 2 | 100 | 0.046 | 0.500 | 0.500 | 1990 | 185 |

Acciaio inossidabile
[Cr-Ni/1.4301]

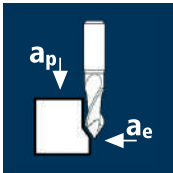


| | | | | | | | |
|-------|---|----|-------|-------|-------|------|----|
| 2.00 | 2 | 50 | 0.006 | 0.050 | 0.050 | 7960 | 95 |
| 3.00 | 2 | 50 | 0.008 | 0.100 | 0.100 | 5305 | 85 |
| 4.00 | 2 | 50 | 0.012 | 0.150 | 0.150 | 3980 | 95 |
| 5.00 | 2 | 50 | 0.014 | 0.200 | 0.200 | 3185 | 90 |
| 6.00 | 2 | 50 | 0.018 | 0.200 | 0.200 | 2655 | 95 |
| 8.00 | 2 | 50 | 0.022 | 0.250 | 0.250 | 1990 | 90 |
| 10.00 | 2 | 50 | 0.028 | 0.350 | 0.350 | 1590 | 90 |
| 12.00 | 2 | 50 | 0.034 | 0.450 | 0.450 | 1325 | 90 |
| 16.00 | 2 | 50 | 0.046 | 0.500 | 0.500 | 995 | 90 |

Ghisa
(griglia / sferoidale)



| | | | | | | | |
|-------|---|-----|-------|-------|-------|-------|-----|
| 2.00 | 2 | 140 | 0.006 | 0.050 | 0.050 | 22280 | 265 |
| 3.00 | 2 | 140 | 0.008 | 0.100 | 0.100 | 14855 | 240 |
| 4.00 | 2 | 140 | 0.012 | 0.150 | 0.150 | 11140 | 265 |
| 5.00 | 2 | 140 | 0.014 | 0.200 | 0.200 | 8915 | 250 |
| 6.00 | 2 | 140 | 0.018 | 0.200 | 0.200 | 7425 | 265 |
| 8.00 | 2 | 140 | 0.022 | 0.250 | 0.250 | 5570 | 245 |
| 10.00 | 2 | 140 | 0.028 | 0.350 | 0.350 | 4455 | 250 |
| 12.00 | 2 | 140 | 0.034 | 0.450 | 0.450 | 3715 | 255 |
| 16.00 | 2 | 140 | 0.046 | 0.500 | 0.500 | 2785 | 255 |



Acciaio
< 850 N/mm²



| | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|-----|
| 2.00 | 2 | 100 | 0.006 | 2.000 | 0.100 | 15915 | 190 |
| 3.00 | 2 | 100 | 0.008 | 3.000 | 0.150 | 10610 | 170 |
| 4.00 | 2 | 100 | 0.012 | 4.000 | 0.150 | 7960 | 190 |
| 5.00 | 2 | 100 | 0.014 | 5.000 | 0.200 | 6365 | 180 |
| 6.00 | 2 | 100 | 0.018 | 6.000 | 0.200 | 5305 | 190 |
| 8.00 | 2 | 100 | 0.022 | 8.000 | 0.250 | 3980 | 175 |
| 10.00 | 2 | 100 | 0.028 | 10.000 | 0.250 | 3185 | 180 |
| 12.00 | 2 | 100 | 0.034 | 12.000 | 0.300 | 2655 | 180 |
| 16.00 | 2 | 100 | 0.046 | 16.000 | 0.400 | 1990 | 185 |

Acciaio
850 - 1100 N/mm²



| | | | | | | | |
|-------|---|----|-------|--------|-------|-------|-----|
| 2.00 | 2 | 80 | 0.006 | 2.000 | 0.100 | 12730 | 155 |
| 3.00 | 2 | 80 | 0.008 | 3.000 | 0.150 | 8490 | 135 |
| 4.00 | 2 | 80 | 0.012 | 4.000 | 0.150 | 6365 | 155 |
| 5.00 | 2 | 80 | 0.014 | 5.000 | 0.200 | 5095 | 145 |
| 6.00 | 2 | 80 | 0.018 | 6.000 | 0.200 | 4245 | 155 |
| 8.00 | 2 | 80 | 0.022 | 8.000 | 0.250 | 3185 | 140 |
| 10.00 | 2 | 80 | 0.028 | 10.000 | 0.250 | 2545 | 145 |
| 12.00 | 2 | 80 | 0.034 | 12.000 | 0.300 | 2120 | 145 |
| 16.00 | 2 | 80 | 0.046 | 16.000 | 0.400 | 1590 | 145 |

Acciaio inossidabile
[Cr-Ni/1.4301]



| | | | | | | | |
|-------|---|----|-------|--------|-------|------|----|
| 2.00 | 2 | 45 | 0.006 | 2.000 | 0.100 | 7160 | 85 |
| 3.00 | 2 | 45 | 0.008 | 3.000 | 0.150 | 4775 | 75 |
| 4.00 | 2 | 45 | 0.012 | 4.000 | 0.150 | 3580 | 85 |
| 5.00 | 2 | 45 | 0.014 | 5.000 | 0.200 | 2865 | 80 |
| 6.00 | 2 | 45 | 0.018 | 6.000 | 0.200 | 2385 | 85 |
| 8.00 | 2 | 45 | 0.022 | 8.000 | 0.250 | 1790 | 80 |
| 10.00 | 2 | 45 | 0.028 | 10.000 | 0.250 | 1430 | 80 |
| 12.00 | 2 | 45 | 0.034 | 12.000 | 0.300 | 1195 | 80 |
| 16.00 | 2 | 45 | 0.046 | 16.000 | 0.400 | 895 | 80 |

Ghisa
(griglia / sferoidale)



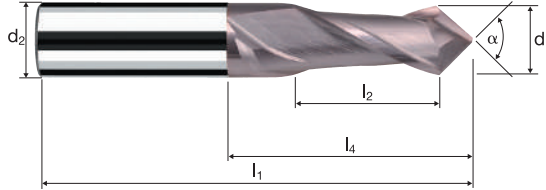
| | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|-----|
| 2.00 | 2 | 120 | 0.006 | 2.000 | 0.100 | 19100 | 230 |
| 3.00 | 2 | 120 | 0.008 | 3.000 | 0.150 | 12730 | 205 |
| 4.00 | 2 | 120 | 0.012 | 4.000 | 0.150 | 9550 | 230 |
| 5.00 | 2 | 120 | 0.014 | 5.000 | 0.200 | 7640 | 215 |
| 6.00 | 2 | 120 | 0.018 | 6.000 | 0.200 | 6365 | 230 |
| 8.00 | 2 | 120 | 0.022 | 8.000 | 0.250 | 4775 | 210 |
| 10.00 | 2 | 120 | 0.028 | 10.000 | 0.250 | 3820 | 215 |
| 12.00 | 2 | 120 | 0.034 | 12.000 | 0.300 | 3185 | 215 |
| 16.00 | 2 | 120 | 0.046 | 16.000 | 0.400 | 2385 | 220 |

Multifrese

Fresatura, smussatura, foratura, centratura



HM λ 30°
 γ 12°



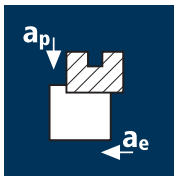
ReTool®

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|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|------------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | | | | | Inox Stainless | Ti Titanium | GG(G) Aluminium Copper |
|-------------|----------------|-----------------|--|--|--|--|-------------------|----------------|------------------------------|

| Esempio: N° Ordine | | | | | | | | | UNICUT-4X |
|--------------------------------------|----------------------|----------------------|--|----------------|----------------|----------------|-------|---|-----------|
| Rivestimento Articolo Codice-ø | | | | | | | | | |
| U 7960 050 | | | | | | | | | |
| Ø Code | d ₁ h9 | d ₂ h6 | | l ₁ | l ₂ | l ₄ | α | z | EUR |
| 050 | 0.50 | 3.00 | | 39 | 1.00 | 5.65 | 90.0° | 2 | 41.30 |
| 100 | 1.00 | 3.00 | | 39 | 2.00 | 7.15 | 90.0° | 2 | 41.30 |
| 120 | 1.50 | 3.00 | | 39 | 3.00 | 8.92 | 90.0° | 2 | 41.30 |
| 140 | 2.00 | 3.00 | | 39 | 4.00 | 9.15 | 90.0° | 2 | 41.30 |
| 160 | 2.50 | 3.00 | | 39 | 5.00 | 8.98 | 90.0° | 2 | 41.30 |
| 180 | 3.00 | 4.00 | | 50 | 6.00 | 11.20 | 90.0° | 2 | 41.30 |
| 220 | 4.00 | 5.00 | | 50 | 8.00 | 13.70 | 90.0° | 2 | 45.40 |
| 260 | 5.00 | 6.00 | | 50 | 10.00 | 16.70 | 90.0° | 2 | 49.50 |
| 300 | 6.00 | 8.00 | | 60 | 12.00 | 21.07 | 90.0° | 2 | 53.70 |
| 391 | 8.00 | 10.00 | | 70 | 16.00 | 26.07 | 90.0° | 2 | 86.00 |
| 450 | 10.00 | 12.00 | | 70 | 18.00 | 31.07 | 90.0° | 2 | 108.00 |
| 501 | 12.00 | 12.00 | | 70 | 20.00 | 35.00 | 90.0° | 2 | 121.00 |
| 610 | 16.00 | 16.00 | | 80 | 26.00 | 49.00 | 90.0° | 2 | 162.00 |
| 682 | 20.00 | 20.00 | | 100 | 32.00 | 57.00 | 90.0° | 2 | 250.00 |
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Applicazione



Materiale

Acciaio
< 850 N/mm²



| d1 [mm] | z | v _c [m/min] | f _s [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|------------|----|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 32.00 | 6 | 65 | 0.060 | 6.400 | 24.000 | 645 | 235 | 35.8 |
| 40.00 | 8 | 65 | 0.080 | 8.000 | 30.000 | 515 | 330 | 79.5 |
| 50.00 | 8 | 65 | 0.100 | 10.000 | 37.500 | 415 | 330 | 124.1 |
| 63.00 | 10 | 65 | 0.120 | 12.600 | 47.250 | 330 | 395 | 234.6 |
| 80.00 | 10 | 65 | 0.120 | 16.000 | 60.000 | 260 | 310 | 297.9 |

Acciaio
850 - 1100 N/mm²



| | | | | | | | | |
|-------|----|----|-------|--------|--------|-----|-----|-------|
| 32.00 | 6 | 48 | 0.060 | 6.400 | 24.000 | 475 | 170 | 26.4 |
| 40.00 | 8 | 48 | 0.080 | 8.000 | 30.000 | 380 | 245 | 58.7 |
| 50.00 | 8 | 48 | 0.100 | 10.000 | 37.500 | 305 | 245 | 91.7 |
| 63.00 | 10 | 48 | 0.120 | 12.600 | 47.250 | 245 | 290 | 173.3 |
| 80.00 | 10 | 48 | 0.120 | 16.000 | 60.000 | 190 | 230 | 220.0 |

Acciaio
1100 - 1300 N/mm²

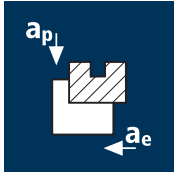


| | | | | | | | | |
|-------|----|----|-------|--------|--------|-----|-----|-------|
| 32.00 | 6 | 35 | 0.060 | 6.400 | 24.000 | 350 | 125 | 19.3 |
| 40.00 | 8 | 35 | 0.080 | 8.000 | 30.000 | 280 | 180 | 42.8 |
| 50.00 | 8 | 35 | 0.100 | 10.000 | 37.500 | 225 | 180 | 66.8 |
| 63.00 | 10 | 35 | 0.120 | 12.600 | 47.250 | 175 | 210 | 126.3 |
| 80.00 | 10 | 35 | 0.120 | 16.000 | 60.000 | 140 | 165 | 160.4 |

Acciaio inossidabile
[Cr-Ni/1.4301]



| | | | | | | | | |
|-------|----|----|-------|--------|--------|-----|-----|-------|
| 32.00 | 6 | 26 | 0.060 | 6.400 | 24.000 | 260 | 95 | 14.3 |
| 40.00 | 8 | 26 | 0.080 | 8.000 | 30.000 | 205 | 130 | 31.8 |
| 50.00 | 8 | 26 | 0.100 | 10.000 | 37.500 | 165 | 130 | 49.7 |
| 63.00 | 10 | 26 | 0.120 | 12.600 | 47.250 | 130 | 160 | 93.9 |
| 80.00 | 10 | 26 | 0.120 | 16.000 | 60.000 | 105 | 125 | 119.2 |



Acciaio
< 850 N/mm²



| | | | | | | | | |
|-------|----|----|-------|--------|--------|-----|-----|-------|
| 32.00 | 6 | 68 | 0.070 | 6.400 | 9.600 | 675 | 285 | 17.5 |
| 40.00 | 8 | 68 | 0.090 | 8.000 | 12.000 | 540 | 390 | 37.4 |
| 50.00 | 8 | 68 | 0.110 | 10.000 | 15.000 | 435 | 380 | 57.1 |
| 63.00 | 10 | 68 | 0.125 | 12.600 | 18.900 | 345 | 430 | 102.3 |
| 80.00 | 10 | 68 | 0.145 | 16.000 | 24.000 | 270 | 390 | 150.6 |

Acciaio
850 - 1100 N/mm²



| | | | | | | | | |
|-------|----|----|-------|--------|--------|-----|-----|-------|
| 32.00 | 6 | 55 | 0.070 | 6.400 | 9.600 | 545 | 230 | 14.1 |
| 40.00 | 8 | 55 | 0.090 | 8.000 | 12.000 | 440 | 315 | 30.3 |
| 50.00 | 8 | 55 | 0.110 | 10.000 | 15.000 | 350 | 310 | 46.2 |
| 63.00 | 10 | 55 | 0.125 | 12.600 | 18.900 | 280 | 345 | 82.7 |
| 80.00 | 10 | 55 | 0.145 | 16.000 | 24.000 | 220 | 315 | 121.8 |

Acciaio
1100 - 1300 N/mm²



| | | | | | | | | |
|-------|----|----|-------|--------|--------|-----|-----|------|
| 32.00 | 6 | 40 | 0.070 | 6.400 | 9.600 | 400 | 165 | 10.3 |
| 40.00 | 8 | 40 | 0.090 | 8.000 | 12.000 | 320 | 230 | 22.0 |
| 50.00 | 8 | 40 | 0.110 | 10.000 | 15.000 | 255 | 225 | 33.6 |
| 63.00 | 10 | 40 | 0.125 | 12.600 | 18.900 | 200 | 255 | 60.2 |
| 80.00 | 10 | 40 | 0.145 | 16.000 | 24.000 | 160 | 230 | 88.6 |

Acciaio inossidabile
[Cr-Ni/1.4301]



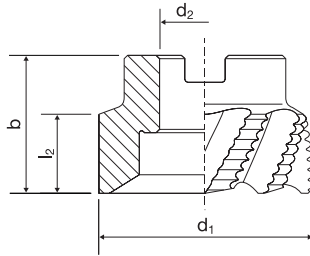
| | | | | | | | | |
|-------|----|----|-------|--------|--------|-----|-----|------|
| 32.00 | 6 | 29 | 0.070 | 6.400 | 9.600 | 290 | 120 | 7.4 |
| 40.00 | 8 | 29 | 0.090 | 8.000 | 12.000 | 230 | 165 | 16.0 |
| 50.00 | 8 | 29 | 0.110 | 10.000 | 15.000 | 185 | 160 | 24.4 |
| 63.00 | 10 | 29 | 0.125 | 12.600 | 18.900 | 145 | 185 | 43.6 |
| 80.00 | 10 | 29 | 0.145 | 16.000 | 24.000 | 115 | 165 | 64.2 |

Frese cilindriche frontali

Profilata

HSS

HSS λ 25°
PM/F γ 10°



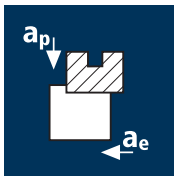
ReTool®

| | | | | | | | | |
|----------|-------------|--------------|--|--|--|----------------|-------------|------------------------|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | | | | Inox Stainless | Ti Titanium | GG(G) Aluminium Copper |
|----------|-------------|--------------|--|--|--|----------------|-------------|------------------------|

| Esempio: N° Ordine | | | | | | | | UNICUT-4X |
|--------------------|-------------------|-------------------|----------------|-------|------|----|--------|-----------|
| | | | | | | | | U3490 |
| Ø Code | d ₁ k9 | d ₂ H7 | l ₂ | b k13 | 45° | z | EUR | |
| 100 | 32.00 | 13.00 | 15.00 | 28.0 | 0.70 | 6 | 180.00 | |
| 110 | 40.00 | 16.00 | 18.00 | 32.0 | 0.90 | 8 | 209.00 | |
| 130 | 50.00 | 22.00 | 20.00 | 36.0 | 0.90 | 8 | 269.00 | |
| 160 | 63.00 | 27.00 | 22.00 | 40.0 | 1.20 | 10 | 389.00 | |
| 180 | 80.00 | 27.00 | 25.00 | 45.0 | 1.20 | 10 | 547.00 | |
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V

Applicazione



Materiale

Acciaio
850 - 1100 N/mm²



| d1 [mm] | z | v _c [m/min] | f _c [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|------------|----|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 40.00 | 8 | 45 | 0.065 | 2.000 | 30.000 | 360 | 185 | 11.2 |
| 50.00 | 8 | 45 | 0.080 | 2.500 | 37.500 | 285 | 185 | 17.2 |
| 63.00 | 10 | 45 | 0.080 | 3.150 | 47.250 | 225 | 180 | 27.1 |
| 80.00 | 12 | 45 | 0.100 | 4.000 | 60.000 | 180 | 215 | 51.6 |
| | | | | | | | | |
| | | | | | | | | |
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Acciaio
1100 - 1300 N/mm²



| d1 [mm] | z | v _c [m/min] | f _c [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|------------|----|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 40.00 | 8 | 30 | 0.065 | 2.000 | 30.000 | 240 | 125 | 7.4 |
| 50.00 | 8 | 30 | 0.080 | 2.500 | 37.500 | 190 | 120 | 11.5 |
| 63.00 | 10 | 30 | 0.080 | 3.150 | 47.250 | 150 | 120 | 18.0 |
| 80.00 | 12 | 30 | 0.100 | 4.000 | 60.000 | 120 | 145 | 34.4 |
| | | | | | | | | |
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| | | | | | | | | |

Acciaio per lavorazione
a freddo (12% Cr)
fortemente legati
[1.2379]

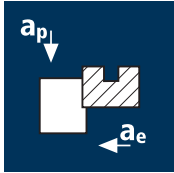


| d1 [mm] | z | v _c [m/min] | f _c [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|------------|----|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 40.00 | 8 | 20 | 0.065 | 2.000 | 30.000 | 160 | 85 | 5.0 |
| 50.00 | 8 | 20 | 0.080 | 2.500 | 37.500 | 125 | 80 | 7.6 |
| 63.00 | 10 | 20 | 0.080 | 3.150 | 47.250 | 100 | 80 | 12.0 |
| 80.00 | 12 | 20 | 0.100 | 4.000 | 60.000 | 80 | 95 | 22.9 |
| | | | | | | | | |
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Ghisa
(griglia / sferoidale)



| d1 [mm] | z | v _c [m/min] | f _c [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|------------|----|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 40.00 | 8 | 42 | 0.065 | 2.000 | 30.000 | 335 | 175 | 10.4 |
| 50.00 | 8 | 42 | 0.080 | 2.500 | 37.500 | 265 | 170 | 16.0 |
| 63.00 | 10 | 42 | 0.080 | 3.150 | 47.250 | 210 | 170 | 25.3 |
| 80.00 | 12 | 42 | 0.100 | 4.000 | 60.000 | 165 | 200 | 48.1 |
| | | | | | | | | |
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Acciaio
850 - 1100 N/mm²



| d1 [mm] | z | v _c [m/min] | f _c [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|------------|----|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 40.00 | 8 | 50 | 0.065 | 20.000 | 1.000 | 400 | 205 | 4.1 |
| 50.00 | 8 | 50 | 0.080 | 25.000 | 1.250 | 320 | 205 | 6.4 |
| 63.00 | 10 | 50 | 0.080 | 31.500 | 1.575 | 255 | 200 | 10.0 |
| 80.00 | 12 | 50 | 0.100 | 40.000 | 2.000 | 200 | 240 | 19.1 |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Acciaio
1100 - 1300 N/mm²



| d1 [mm] | z | v _c [m/min] | f _c [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|------------|----|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 40.00 | 8 | 35 | 0.065 | 20.000 | 1.000 | 280 | 145 | 2.9 |
| 50.00 | 8 | 35 | 0.080 | 25.000 | 1.250 | 225 | 145 | 4.5 |
| 63.00 | 10 | 35 | 0.080 | 31.500 | 1.575 | 175 | 140 | 7.0 |
| 80.00 | 12 | 35 | 0.100 | 40.000 | 2.000 | 140 | 165 | 13.4 |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Acciaio per lavorazione
a freddo (12% Cr)
fortemente legati
[1.2379]



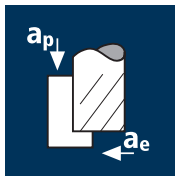
| d1 [mm] | z | v _c [m/min] | f _c [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|------------|----|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 40.00 | 8 | 25 | 0.065 | 20.000 | 1.000 | 200 | 105 | 2.1 |
| 50.00 | 8 | 25 | 0.080 | 25.000 | 1.250 | 160 | 100 | 3.2 |
| 63.00 | 10 | 25 | 0.080 | 31.500 | 1.575 | 125 | 100 | 5.0 |
| 80.00 | 12 | 25 | 0.100 | 40.000 | 2.000 | 100 | 120 | 9.5 |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Ghisa
(griglia / sferoidale)



| d1 [mm] | z | v _c [m/min] | f _c [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] | Q [cm ³ /min] |
|------------|----|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|-----------------------------|
| 40.00 | 8 | 45 | 0.065 | 20.000 | 1.000 | 360 | 185 | 3.7 |
| 50.00 | 8 | 45 | 0.080 | 25.000 | 1.250 | 285 | 185 | 5.7 |
| 63.00 | 10 | 45 | 0.080 | 31.500 | 1.575 | 225 | 180 | 9.0 |
| 80.00 | 12 | 45 | 0.100 | 40.000 | 2.000 | 180 | 215 | 17.2 |
| | | | | | | | | |
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Applicazione



Materiale

CFC

B

B

PRFV

B

B



CFC

B

B

PRFV

B

B

| d1 [mm] | z | v _c [m/min] | f _z [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|
| 4.00 | 8 | 200 | 0.025 | 7.200 | 1.600 | 15915 | 3185 |
| 5.00 | 8 | 200 | 0.030 | 9.000 | 2.000 | 12730 | 3055 |
| 6.00 | 8 | 200 | 0.040 | 10.800 | 2.400 | 10610 | 3395 |
| 8.00 | 8 | 200 | 0.045 | 14.400 | 3.200 | 7960 | 2865 |
| 10.00 | 8 | 200 | 0.050 | 18.000 | 4.000 | 6365 | 2545 |
| 12.00 | 8 | 200 | 0.060 | 21.600 | 4.800 | 5305 | 2545 |

| | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|------|
| 4.00 | 8 | 150 | 0.030 | 7.200 | 1.600 | 11935 | 2865 |
| 5.00 | 8 | 150 | 0.035 | 9.000 | 2.000 | 9550 | 2675 |
| 6.00 | 8 | 150 | 0.040 | 10.800 | 2.400 | 7960 | 2545 |
| 8.00 | 8 | 150 | 0.050 | 14.400 | 3.200 | 5970 | 2385 |
| 10.00 | 8 | 150 | 0.055 | 18.000 | 4.000 | 4775 | 2100 |
| 12.00 | 8 | 150 | 0.065 | 21.600 | 4.800 | 3980 | 2070 |

| | | | | | | | |
|-------|---|-----|-------|-------|--------|-------|------|
| 4.00 | 8 | 150 | 0.020 | 3.200 | 4.000 | 11935 | 1910 |
| 5.00 | 8 | 150 | 0.025 | 4.000 | 5.000 | 9550 | 1910 |
| 6.00 | 8 | 150 | 0.030 | 4.800 | 6.000 | 7960 | 1910 |
| 8.00 | 8 | 150 | 0.035 | 6.400 | 8.000 | 5970 | 1670 |
| 10.00 | 8 | 150 | 0.040 | 8.000 | 10.000 | 4775 | 1530 |
| 12.00 | 8 | 150 | 0.050 | 9.600 | 12.000 | 3980 | 1590 |

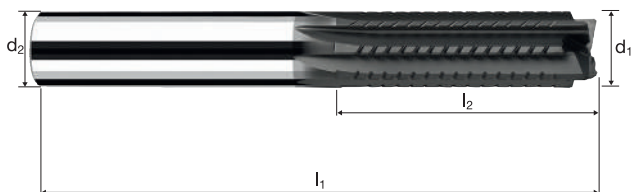
| | | | | | | | |
|-------|---|-----|-------|-------|--------|------|------|
| 4.00 | 8 | 100 | 0.025 | 3.200 | 4.000 | 7960 | 1590 |
| 5.00 | 8 | 100 | 0.030 | 4.000 | 5.000 | 6365 | 1530 |
| 6.00 | 8 | 100 | 0.030 | 4.800 | 6.000 | 5305 | 1275 |
| 8.00 | 8 | 100 | 0.040 | 6.400 | 8.000 | 3980 | 1275 |
| 10.00 | 8 | 100 | 0.045 | 8.000 | 10.000 | 3185 | 1145 |
| 12.00 | 8 | 100 | 0.050 | 9.600 | 12.000 | 2655 | 1060 |

Frese cilindriche

Esecuzione normale, tagliente diritto



| | | |
|------------|-----------|------------|
| HM | λ | 0° |
| MG6 | γ | 18° |



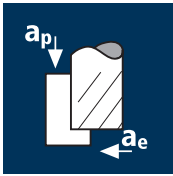
Resistenza all'usura



| | | | | | | | | | | DIAMANT |
|---|-----------------------|----------------------|----------------|----------------|----------------|------|------|---|--|------------|
| Esempio: N° Ordine | | | | | | | | | | |
| Rivestimento B Articolo 20020 Codice-ø 220 | | | | | | | | | | |
| Ø Code | d ₁ h10 | d ₂ h6 | l ₁ | l ₂ | l ₄ | 45° | α | z | | EUR |
| 220 | 4.00 | 6.00 | 60 | 16.00 | 24.00 | 0.10 | 2.9° | 8 | | 205.00 |
| 260 | 5.00 | 6.00 | 60 | 18.00 | 24.00 | 0.10 | 1.4° | 8 | | 207.00 |
| 300 | 6.00 | 6.00 | 60 | 20.00 | 24.00 | 0.10 | 0.0° | 8 | | 221.00 |
| 302 | 6.00 | 6.00 | 65 | 25.00 | 29.00 | 0.10 | 0.0° | 8 | | 233.00 |
| 304 | 6.00 | 6.00 | 75 | 28.00 | 39.00 | 0.10 | 0.0° | 8 | | 240.00 |
| 391 | 8.00 | 8.00 | 63 | 22.00 | 27.00 | 0.20 | 0.0° | 8 | | 258.00 |
| 393 | 8.00 | 8.00 | 75 | 32.00 | 39.00 | 0.20 | 0.0° | 8 | | 285.00 |
| 450 | 10.00 | 10.00 | 72 | 32.00 | 32.00 | 0.20 | 0.0° | 8 | | 320.00 |
| 501 | 12.00 | 12.00 | 83 | 32.00 | 38.00 | 0.20 | 0.0° | 8 | | 348.00 |
| | | | | | | | | | | |
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| | | | | | | | | | | |

Applicazione

Materiale



CFC

B

B

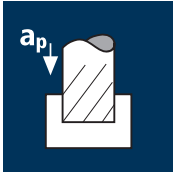
| d1 [mm] | z | v _c [m/min] | f _z [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|---------|---|------------------------|---------------------|---------------------|---------------------|------------------------|-------------------------|
| 4.00 | 8 | 200 | 0.025 | 7.200 | 1.600 | 15915 | 3185 |
| 5.00 | 8 | 200 | 0.030 | 9.000 | 2.000 | 12730 | 3055 |
| 6.00 | 8 | 200 | 0.040 | 10.800 | 2.400 | 10610 | 3395 |
| 8.00 | 8 | 200 | 0.045 | 14.400 | 3.200 | 7960 | 2865 |
| 10.00 | 8 | 200 | 0.050 | 18.000 | 4.000 | 6365 | 2545 |
| 12.00 | 8 | 200 | 0.060 | 21.600 | 4.800 | 5305 | 2545 |

PRFV

B

B

| | | | | | | | |
|-------|---|-----|-------|--------|-------|-------|------|
| 4.00 | 8 | 150 | 0.030 | 7.200 | 1.600 | 11935 | 2865 |
| 5.00 | 8 | 150 | 0.035 | 9.000 | 2.000 | 9550 | 2675 |
| 6.00 | 8 | 150 | 0.040 | 10.800 | 2.400 | 7960 | 2545 |
| 8.00 | 8 | 150 | 0.050 | 14.400 | 3.200 | 5970 | 2385 |
| 10.00 | 8 | 150 | 0.055 | 18.000 | 4.000 | 4775 | 2100 |
| 12.00 | 8 | 150 | 0.065 | 21.600 | 4.800 | 3980 | 2070 |



CFC

B

B

| | | | | | | | |
|-------|---|-----|-------|-------|--------|-------|------|
| 4.00 | 8 | 150 | 0.020 | 3.200 | 4.000 | 11935 | 1910 |
| 5.00 | 8 | 150 | 0.025 | 4.000 | 5.000 | 9550 | 1910 |
| 6.00 | 8 | 150 | 0.030 | 4.800 | 6.000 | 7960 | 1910 |
| 8.00 | 8 | 150 | 0.035 | 6.400 | 8.000 | 5970 | 1670 |
| 10.00 | 8 | 150 | 0.040 | 8.000 | 10.000 | 4775 | 1530 |
| 12.00 | 8 | 150 | 0.050 | 9.600 | 12.000 | 3980 | 1590 |

PRFV

B

B

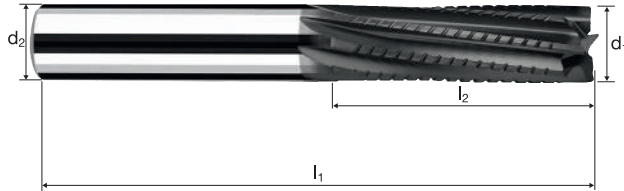
| | | | | | | | |
|-------|---|-----|-------|-------|--------|------|------|
| 4.00 | 8 | 100 | 0.025 | 3.200 | 4.000 | 7960 | 1590 |
| 5.00 | 8 | 100 | 0.030 | 4.000 | 5.000 | 6365 | 1530 |
| 6.00 | 8 | 100 | 0.030 | 4.800 | 6.000 | 5305 | 1275 |
| 8.00 | 8 | 100 | 0.040 | 6.400 | 8.000 | 3980 | 1275 |
| 10.00 | 8 | 100 | 0.045 | 8.000 | 10.000 | 3185 | 1145 |
| 12.00 | 8 | 100 | 0.050 | 9.600 | 12.000 | 2655 | 1060 |

Frese cilindriche

Esecuzione normale, tagliente a trazione



| | | |
|-----|-----------|-----|
| HM | λ | 8° |
| MG6 | γ | 18° |

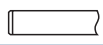


Resistenza all'usura

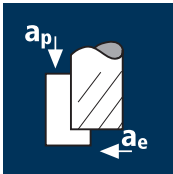


| Ø Code | d ₁ h10 | d ₂ h6 | l ₁ | l ₂ | l ₄ | 45° | α | z | DIAMANT |
|-----------|-----------------------|----------------------|----------------|----------------|----------------|------|------|---|---------|
| | | | | | | | | | B20025 |
| | | | | | | | | | EUR |
| 220 | 4.00 | 6.00 | 60 | 16.00 | 24.00 | 0.10 | 2.9° | 8 | 205.00 |
| 260 | 5.00 | 6.00 | 60 | 18.00 | 24.00 | 0.10 | 1.4° | 8 | 207.00 |
| 300 | 6.00 | 6.00 | 60 | 20.00 | 24.00 | 0.10 | 0.0° | 8 | 221.00 |
| 302 | 6.00 | 6.00 | 65 | 25.00 | 29.00 | 0.10 | 0.0° | 8 | 233.00 |
| 304 | 6.00 | 6.00 | 75 | 28.00 | 39.00 | 0.10 | 0.0° | 8 | 240.00 |
| 391 | 8.00 | 8.00 | 63 | 22.00 | 27.00 | 0.20 | 0.0° | 8 | 258.00 |
| 393 | 8.00 | 8.00 | 75 | 32.00 | 39.00 | 0.20 | 0.0° | 8 | 285.00 |
| 450 | 10.00 | 10.00 | 72 | 32.00 | 32.00 | 0.20 | 0.0° | 8 | 320.00 |
| 501 | 12.00 | 12.00 | 83 | 32.00 | 38.00 | 0.20 | 0.0° | 8 | 348.00 |
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Esempio: Rivestimento **B** Articolo **20025** Codice-ø **220**



Applicazione



Materiale

CFC



PRFV



CFC



PRFV



| d ₁ [mm] | z | v _c [m/min] | f _z [mm] | a _p [mm] | a _e [mm] | n [min ⁻¹] | v _r [mm/min] |
|------------------------|---|---------------------------|------------------------|------------------------|------------------------|---------------------------|----------------------------|
| 4.00 | 8 | 200 | 0.025 | 7.200 | 1.600 | 15915 | 3185 |
| 5.00 | 8 | 200 | 0.030 | 9.000 | 2.000 | 12730 | 3055 |
| 6.00 | 8 | 200 | 0.040 | 10.800 | 2.400 | 10610 | 3395 |
| 8.00 | 8 | 200 | 0.045 | 14.400 | 3.200 | 7960 | 2865 |
| 10.00 | 8 | 200 | 0.050 | 18.000 | 4.000 | 6365 | 2545 |
| 12.00 | 8 | 200 | 0.060 | 21.600 | 4.800 | 5305 | 2545 |
| | | | | | | | |
| | | | | | | | |
| 4.00 | 8 | 150 | 0.030 | 7.200 | 1.600 | 11935 | 2865 |
| 5.00 | 8 | 150 | 0.035 | 9.000 | 2.000 | 9550 | 2675 |
| 6.00 | 8 | 150 | 0.040 | 10.800 | 2.400 | 7960 | 2545 |
| 8.00 | 8 | 150 | 0.050 | 14.400 | 3.200 | 5970 | 2385 |
| 10.00 | 8 | 150 | 0.055 | 18.000 | 4.000 | 4775 | 2100 |
| 12.00 | 8 | 150 | 0.065 | 21.600 | 4.800 | 3980 | 2070 |
| | | | | | | | |
| | | | | | | | |
| 4.00 | 8 | 150 | 0.020 | 3.200 | 4.000 | 11935 | 1910 |
| 5.00 | 8 | 150 | 0.025 | 4.000 | 5.000 | 9550 | 1910 |
| 6.00 | 8 | 150 | 0.030 | 4.800 | 6.000 | 7960 | 1910 |
| 8.00 | 8 | 150 | 0.035 | 6.400 | 8.000 | 5970 | 1670 |
| 10.00 | 8 | 150 | 0.040 | 8.000 | 10.000 | 4775 | 1530 |
| 12.00 | 8 | 150 | 0.050 | 9.600 | 12.000 | 3980 | 1590 |
| | | | | | | | |
| | | | | | | | |
| 4.00 | 8 | 100 | 0.025 | 3.200 | 4.000 | 7960 | 1590 |
| 5.00 | 8 | 100 | 0.030 | 4.000 | 5.000 | 6365 | 1530 |
| 6.00 | 8 | 100 | 0.030 | 4.800 | 6.000 | 5305 | 1275 |
| 8.00 | 8 | 100 | 0.040 | 6.400 | 8.000 | 3980 | 1275 |
| 10.00 | 8 | 100 | 0.045 | 8.000 | 10.000 | 3185 | 1145 |
| 12.00 | 8 | 100 | 0.050 | 9.600 | 12.000 | 2655 | 1060 |
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Frese con inserti circolari

779 – 793

Frese con inserti HFC

795 – 809

Frese con inserti a spianare

811 – 815

Frese con inserti ad angolo/per scanalature

817 – 827

Accessori

828 – 829



Frese con inserti circolari

Frese a spianare circolari per inserti 10mm

N° W03140



N° W03185



| | | | | | | |
|-----------|--------------|------------|---------------------------------|--------------------------------|---------------------|-----|
| NX | λ 5° | d, 20 – 32 | Rm 850-1500 | | | 783 |
| | γ 15° | | | | | |
| SX | λ 5° | d, 20 – 32 | Inox Stainless | Rm <850 | | |
| | γ 20° | | | | | |
| HX | λ 5° | d, 20 – 32 | Rm 1300-1500 | HRC 48-60 | | |
| | γ -4° | | | | | |
| ZX | λ 5° | d, 20 – 32 | Ni Alloys | Inox Stainless | Rm <850 | |
| | γ 14° | | | | | |
| AX | λ 5° | d, 20 – 32 | Al Aluminium Alloy | Al Aluminium Cast | Cu Copper | |
| | γ 21° | | | | | |

Frese a spianare circolari per inserti 12mm

N° W03150



N° W03195



| | | | | | | |
|-----------|--------------|------------|---------------------------------|--------------------------------|---------------------|-----|
| NX | λ 0° | d, 25 – 32 | Rm 850-1500 | | | 785 |
| | γ 14° | | | | | |
| SX | λ 0° | d, 25 – 32 | Inox Stainless | Rm <850 | | |
| | γ 19° | | | | | |
| HX | λ 0° | d, 25 – 32 | Rm 1300-1500 | HRC 48-60 | | |
| | γ -4° | | | | | |
| ZX | λ 0° | d, 25 – 32 | Ni Alloys | Inox Stainless | Rm <850 | |
| | γ 13° | | | | | |
| AX | λ 0° | d, 25 – 32 | Al Aluminium Alloy | Al Aluminium Cast | Cu Copper | |
| | γ 20° | | | | | |

Frese con inserti circolari

Frese a spianare circolari per inserti 10mm

N° W03410



| | | | | | | |
|-----------|--------------|------------|---------------------------------|--------------------------------|---------------------|-----|
| NX | λ 5° | d. 40 – 52 | Rm 850-1500 | | | 787 |
| | γ 15° | | | | | |
| SX | λ 5° | d. 40 – 52 | Inox Stainless | Rm <850 | | |
| | γ 20° | | | | | |
| HX | λ 5° | d. 40 – 52 | Rm 1300-1500 | HRC 48-60 | | |
| | γ -4° | | | | | |
| ZX | λ 5° | d. 40 – 52 | Ni Alloys | Inox Stainless | Rm <850 | |
| | γ 14° | | | | | |
| AX | λ 5° | d. 40 – 52 | Al Aluminium Alloy | Al Aluminium Cast | Cu Copper | |
| | γ 21° | | | | | |

Frese a spianare circolari per inserti 12mm

N° W03412



| | | | | | | |
|-----------|--------------|-------------|---------------------------------|--------------------------------|---------------------|-----|
| NX | λ 5° | d. 40 – 100 | Rm 850-1500 | | | 789 |
| | γ 15° | | | | | |
| SX | λ 5° | d. 40 – 100 | Inox Stainless | Rm <850 | | |
| | γ 20° | | | | | |
| HX | λ 5° | d. 40 – 100 | Rm 1300-1500 | HRC 48-60 | | |
| | γ -4° | | | | | |
| ZX | λ 5° | d. 40 – 100 | Ni Alloys | Inox Stainless | Rm <850 | |
| | γ 14° | | | | | |
| AX | λ 5° | d. 40 – 100 | Al Aluminium Alloy | Al Aluminium Cast | Cu Copper | |
| | γ 21° | | | | | |

Frese con inserti circolari

Frese a spianare circolari per inserti 10mm

N° W03210



| | | | | | | |
|-----------|--------------|------------|---------------------------------|--------------------------------|---------------------|-----|
| NX | λ 5° | d. 25 – 35 | Rm 850-1500 | | | 791 |
| | γ 15° | | | | | |
| SX | λ 5° | d. 25 – 35 | Inox Stainless | Rm <850 | | |
| | γ 20° | | | | | |
| HX | λ 5° | d. 25 – 35 | Rm 1300-1500 | HRC 48-60 | | |
| | γ -4° | | | | | |
| ZX | λ 5° | d. 25 – 35 | Ni Alloys | Inox Stainless | Rm <850 | |
| | γ 14° | | | | | |
| AX | λ 5° | d. 25 – 35 | Al Aluminium Alloy | Al Aluminium Cast | Cu Copper | |
| | γ 21° | | | | | |

Frese a spianare circolari per inserti 12mm






N° W03212



| | | | | | | |
|-----------|--------------|------------|---------------------------------|--------------------------------|---------------------|-----|
| NX | λ 5° | d. 35 – 42 | Rm 850-1500 | | | 793 |
| | γ 15° | | | | | |
| SX | λ 5° | d. 35 – 42 | Inox Stainless | Rm <850 | | |
| | γ 20° | | | | | |
| HX | λ 5° | d. 35 – 42 | Rm 1300-1500 | HRC 48-60 | | |
| | γ -4° | | | | | |
| ZX | λ 5° | d. 35 – 42 | Ni Alloys | Inox Stainless | Rm <850 | |
| | γ 14° | | | | | |
| AX | λ 5° | d. 35 – 42 | Al Aluminium Alloy | Al Aluminium Cast | Cu Copper | |
| | γ 21° | | | | | |

Inserti

10mm

| NX Acciaio | SX Inox | HX Acciaio temprato | ZX Materiali difficilmente truciolabili | AX Alluminio |
|---|---|---|---|---|
|  |  |  |  |  |
| W53110010 | W53310010 | W53210010 | W53410010 | W53510010 |

| Inserti | | | | | | Composizione fornitura: Confezione minima: 10 pezzi |
|-----------|---------------|----------------|-----|-------|-----------|---|
| N° Ordine | ISO-Norm | D ₁ | D | r | EUR / pz. | |
| W53110010 | RPMX 10T3MOSN | 10.0 | 4.0 | 5.000 | 8.50 | |
| W53310010 | RPMX 10T3MOEN | 10.0 | 4.0 | 5.000 | 9.40 | |
| W53210010 | RDHW 10T3MOSN | 10.0 | 4.0 | 5.000 | 9.00 | |
| W53410010 | RPHX 10T3MOEN | 10.0 | 4.0 | 5.000 | 10.20 | |
| W53510010 | RDHX 10T3MOFN | 10.0 | 4.0 | 5.000 | 10.70 | |
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ToolExpert 2.0

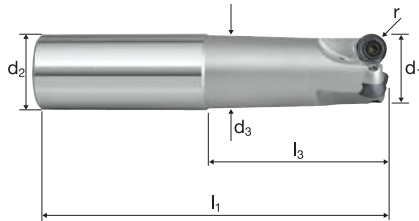
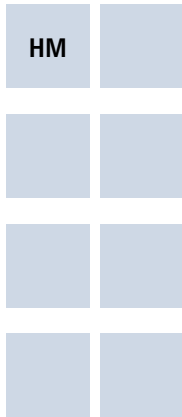
Il nuovo tool online per i dati di taglio che vi permette un impiego ottimale dell'utensile.



Qui si può accedere al nuovo calcolatore dei dati di taglio ToolExpert 2.0 o sul sito FRAISA a <http://www.fraisa.com/it/toolexpert>

Frese a spianare circolari

Inserti 10mm, con canale di aerazione/raffreddamento integrato

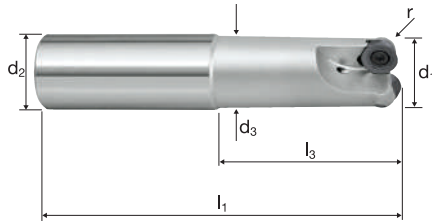
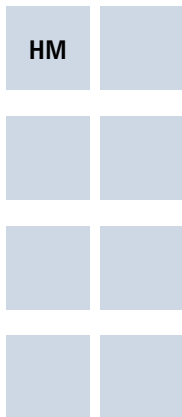


| Frese a spianare circolari | | Composizione fornitura: Corpo fresa comprese viti per serraggio inserto | | | | | | | |
|----------------------------|----------------|---|----------------|----------------|----------------|--------------------|---|-------|--------|
| N° Ordine | d ₁ | d ₂ h6 | d ₃ | l ₁ | l ₃ | ap _{max.} | z | L-Typ | EUR |
| W03140202 | 20.00 | 20.00 | 19.00 | 110 | 57.00 | 1.40 | 2 | M | 228.00 |
| W03185202 | 20.00 | 20.00 | 19.00 | 185 | 57.00 | 1.40 | 2 | XL | 233.00 |
| W03140253 | 25.00 | 25.00 | 24.00 | 124 | 65.00 | 1.40 | 3 | M | 317.00 |
| W03185253 | 25.00 | 25.00 | 24.00 | 210 | 65.00 | 1.40 | 3 | XL | 317.00 |
| W03140324 | 32.00 | 32.00 | 31.00 | 144 | 81.00 | 1.40 | 4 | M | 350.00 |
| W03185324 | 32.00 | 32.00 | 31.00 | 250 | 81.00 | 1.40 | 4 | XL | 393.00 |
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| Accessori | | Viti per serraggio inserti, confezione da 10 pezzi |
|-----------|--|--|
| N° Ordine | | EUR / pz. |
| W93110010 | Cacciavite dinamometrico 2.0 Nm con stelo Torx TX 10 | 159.00 |
| W93111010 | Stelo intercambiabile di ricambio per cacciavite dinamometrico TX 10 | 7.80 |
| W93100010 | Cacciavite Torx TX 10 | 14.80 |
| W93500010 | Vite di fissaggio per l'inserto Torx TX 10 / M 3 x 7.3 | 3.80 |

Frese a spianare circolari

Inserti 12mm, con canale di aerazione/raffreddamento integrato








| Frese a spianare circolari | | Composizione fornitura: Corpo fresa comprese viti per serraggio inserto | | | | | | | |
|----------------------------|----------------|---|----------------|----------------|----------------|--------------------|---|-------|--------|
| N° Ordine | d ₁ | d ₂ h ₆ | d ₃ | l ₁ | l ₃ | ap _{max.} | z | L-Typ | EUR |
| W03150252 | 25.00 | 25.00 | 24.00 | 124 | 65.00 | 1.70 | 2 | M | 260.00 |
| W03195252 | 25.00 | 25.00 | 24.00 | 210 | 65.00 | 1.70 | 2 | XL | 283.00 |
| W03150323 | 32.00 | 32.00 | 31.00 | 144 | 81.00 | 1.70 | 3 | M | 328.00 |
| W03195323 | 32.00 | 32.00 | 31.00 | 250 | 81.00 | 1.70 | 3 | XL | 374.00 |
| | | | | | | | | | |
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| Accessori | | Viti per serraggio inserti, confezione da 10 pezzi | |
|-----------|--|--|-----------|
| N° Ordine | | | EUR / pz. |
| W93110012 | Cacciavite dinamometrico 4.2 Nm con stelo Torx TX 15 | | 161.00 |
| W90111013 | Stelo intercambiabile di ricambio per cacciavite dinamometrico TX 15 | | 7.80 |
| W90100013 | Cacciavite Torx TX 15 | | 14.80 |
| W93500012 | Vite di fissaggio per l'inserto Torx TX 15 / M 4 x 8.5 | | 5.10 |


Inserti

10mm

| NX Acciaio | SX Inox | HX Acciaio temprato | ZX Materiali difficilmente truciolabili | AX Alluminio |
|---|---|---|---|---|
|  |  |  |  |  |
| W53110010 | W53310010 | W53210010 | W53410010 | W53510010 |

| Inserti Composizione fornitura: Confezione minima: 10 pezzi | | | | | |
|--|---------------|----------------|-----|-------|-----------|
| N° Ordine | ISO-Norm | D ₁ | D | r | EUR / pz. |
| W53110010 | RPMX 10T3MOSN | 10.0 | 4.0 | 5.000 | 8.50 |
| W53310010 | RPMX 10T3MOEN | 10.0 | 4.0 | 5.000 | 9.40 |
| W53210010 | RDHW 10T3MOSN | 10.0 | 4.0 | 5.000 | 9.00 |
| W53410010 | RPHX 10T3MOEN | 10.0 | 4.0 | 5.000 | 10.20 |
| W53510010 | RDHX 10T3MOFN | 10.0 | 4.0 | 5.000 | 10.70 |
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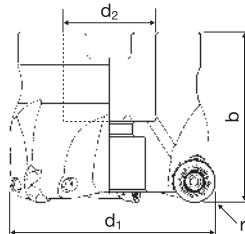
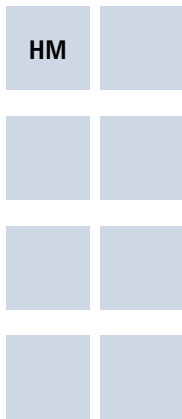
ToolExpert 2.0
 Il nuovo tool online per i dati di taglio che vi permette un impiego ottimale dell'utensile.



Qui si può accedere al nuovo calcolatore dei dati di taglio ToolExpert 2.0 o sul sito FRAISA a <http://www.fraisa.com/it/toolexpert>

Frese a spianare circolari

Inserti 10mm, con canale di aerazione/raffreddamento integrato








| Frese a spianare circolari | | Composizione fornitura: Corpo fresa comprese viti per serraggio inserto | | | | | |
|----------------------------|----------------|---|------|--------------------|---|--------|--|
| N° Ordine | d ₁ | d ₂ | b | ap _{max.} | z | EUR | |
| W03410404* | 40.00 | 16.00 | 40.0 | 1.40 | 4 | 354.00 | |
| W03410424* | 42.00 | 16.00 | 40.0 | 1.40 | 4 | 399.00 | |
| W03410505 | 50.00 | 22.00 | 40.0 | 1.40 | 5 | 412.00 | |
| W03410525 | 52.00 | 22.00 | 40.0 | 1.40 | 5 | 438.00 | |
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| Accessori | | Viti per serraggio inserti, confezione da 10 pezzi | |
|------------|--|--|-----------|
| N° Ordine | | | EUR / pz. |
| W93110010 | Cacciavite dinamometrico 2.0 Nm con stelo Torx TX 10 | | 159.00 |
| W93111010 | Stelo intercambiabile di ricambio per cacciavite dinamometrico TX 10 | | 7.80 |
| W93100010 | Cacciavite Torx TX 10 | | 14.80 |
| W93500010 | Vite di fissaggio per l'inserto Torx TX 10 / M 3 x 7.3 | | 3.80 |
| W99510010* | Power-Vite M8.0 x 30.0 (Momento di serraggio 15.0 Nm) | | 16.60 |

Inserti

12mm

| NX Acciaio | SX Inox | HX Acciaio temprato | ZX Materiali difficilmente truciolabili | AX Alluminio |
|---|---|---|---|---|
|  |  |  |  |  |
| W53110012 | W53310012 | W53210012 | W53410012 | W53510012 |

| Inserti | | | | | | Composizione fornitura: Confezione minima: 10 pezzi |
|-----------|---------------|----------------|-----|-------|-----------|---|
| N° Ordine | ISO-Norm | D ₁ | D | r | EUR / pz. | |
| W53110012 | RPMX 1204MOSN | 12.0 | 4.8 | 6.000 | 9.80 | |
| W53310012 | RPMX 1204MOEN | 12.0 | 4.8 | 6.000 | 10.80 | |
| W53210012 | RDHW 1204MOSN | 12.0 | 4.8 | 6.000 | 10.30 | |
| W53410012 | RPHX 1204MOEN | 12.0 | 4.8 | 6.000 | 11.80 | |
| W53510012 | RDHX 1204MOFN | 12.0 | 4.8 | 6.000 | 12.30 | |
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ToolExpert 2.0

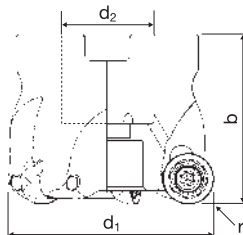
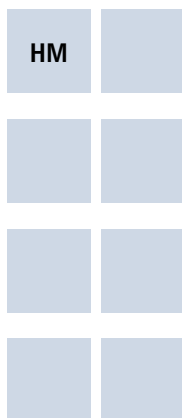
Il nuovo tool online per i dati di taglio che vi permette un impiego ottimale dell'utensile.



Qui si può accedere al nuovo calcolatore dei dati di taglio ToolExpert 2.0 o sul sito FRAISA a <http://www.fraisa.com/it/toolexpert>

Frese a spianare circolari

Inserti 12mm, con canale di aerazione/raffreddamento integrato








| Frese a spianare circolari | | Composizione fornitura: Corpo fresa comprese viti per serraggio inserto | | | | | |
|----------------------------|----------------|---|------|-------------------|----|--------|--|
| N° Ordine | d ₁ | d ₂ | b | ap _{max} | z | EUR | |
| W03412404* | 40.00 | 16.00 | 40.0 | 1.70 | 4 | 347.00 | |
| W03412424* | 42.00 | 16.00 | 40.0 | 1.70 | 4 | 345.00 | |
| W03412505 | 50.00 | 22.00 | 40.0 | 1.70 | 5 | 416.00 | |
| W03412525 | 52.00 | 22.00 | 40.0 | 1.70 | 5 | 434.00 | |
| W03412636 | 63.00 | 22.00 | 40.0 | 1.70 | 6 | 518.00 | |
| W03412666 | 66.00 | 22.00 | 40.0 | 1.70 | 6 | 540.00 | |
| W03412808 | 80.00 | 27.00 | 50.0 | 1.70 | 8 | 594.00 | |
| W03412100 | 100.00 | 32.00 | 50.0 | 1.70 | 10 | 784.00 | |
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| Accessori | | Viti per serraggio inserti, confezione da 10 pezzi | |
|------------|--|--|-----------|
| N° Ordine | | | EUR / pz. |
| W93110012 | Cacciavite dinamometrico 4.2 Nm con stelo Torx TX 15 | | 161.00 |
| W90111013 | Stelo intercambiabile di ricambio per cacciavite dinamometrico TX 15 | | 7.80 |
| W90100013 | Cacciavite Torx TX 15 | | 14.80 |
| W93500012 | Vite di fissaggio per l'inserto Torx TX 15 / M 4 x 8.5 | | 5.10 |
| W99510010* | Power-Vite M8.0 x 30.0 (Momento di serraggio 15.0 Nm) | | 16.60 |

Inserti

10mm

| NX Acciaio | SX Inox | HX Acciaio temprato | ZX Materiali difficilmente truciolabili | AX Alluminio |
|---|---|---|---|---|
|  |  |  |  |  |
| W53110010 | W53310010 | W53210010 | W53410010 | W53510010 |

| Inserti | | | | | | Composizione fornitura: Confezione minima: 10 pezzi |
|-----------|---------------|----------------|-----|-------|-----------|---|
| N° Ordine | ISO-Norm | D ₁ | D | r | EUR / pz. | |
| W53110010 | RPMX 10T3MOSN | 10.0 | 4.0 | 5.000 | 8.50 | |
| W53310010 | RPMX 10T3MOEN | 10.0 | 4.0 | 5.000 | 9.40 | |
| W53210010 | RDHW 10T3MOSN | 10.0 | 4.0 | 5.000 | 9.00 | |
| W53410010 | RPHX 10T3MOEN | 10.0 | 4.0 | 5.000 | 10.20 | |
| W53510010 | RDHX 10T3MOFN | 10.0 | 4.0 | 5.000 | 10.70 | |
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ToolExpert 2.0

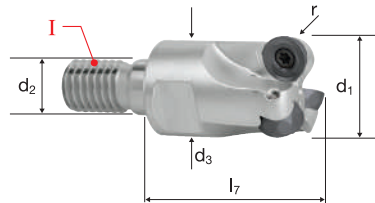
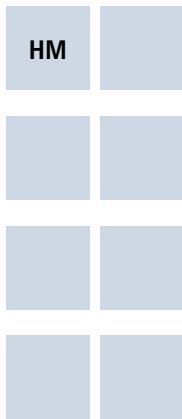
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Frese a spianare circolari

Inserti 10mm, con canale di aerazione/raffreddamento integrato








| Frese a spianare circolari | | Composizione fornitura: Corpo fresa comprese viti per serraggio inserto | | | | | | | |
|----------------------------|----------------|---|----------------|----------------|-------------------|---|---|-----|--------|
| N° Ordine | d ₁ | d ₂ | d ₃ | l ₇ | ap _{max} | z |  | I | EUR |
| W03210253 | 25.00 | 12.50 | 21.00 | 35 | 1.40 | 3 | 17 | M12 | 298.00 |
| W03210354 | 35.00 | 17.00 | 29.00 | 35 | 1.40 | 4 | 24 | M16 | 362.00 |
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| Accessori | | Viti per serraggio inserti, confezione da 10 pezzi | |
|-----------|--|--|--|
| N° Ordine | | EUR / pz. | |
| W93110010 | Cacciavite dinamometrico 2.0 Nm con stelo Torx TX 10 | 159.00 | |
| W93111010 | Stelo intercambiabile di ricambio per cacciavite dinamometrico TX 10 | 7.80 | |
| W93100010 | Cacciavite Torx TX 10 | 14.80 | |
| W93500010 | Vite di fissaggio per l'inserto Torx TX 10 / M 3 x 7.3 | 3.80 | |

Inserti

12mm

| NX Acciaio | SX Inox | HX Acciaio temprato | ZX Materiali difficilmente truciolabili | AX Alluminio |
|---|---|---|---|---|
|  |  |  |  |  |
| W53110012 | W53310012 | W53210012 | W53410012 | W53510012 |

| Inserti | | | | | | Composizione fornitura: Confezione minima: 10 pezzi |
|------------------|---------------|----------------|-----|-------|-----------|---|
| N° Ordine | ISO-Norm | D ₁ | D | r | EUR / pz. | |
| W53110012 | RPMX 1204MOSN | 12.0 | 4.8 | 6.000 | 9.80 | |
| W53310012 | RPMX 1204MOEN | 12.0 | 4.8 | 6.000 | 10.80 | |
| W53210012 | RDHW 1204MOSN | 12.0 | 4.8 | 6.000 | 10.30 | |
| W53410012 | RPHX 1204MOEN | 12.0 | 4.8 | 6.000 | 11.80 | |
| W53510012 | RDHX 1204MOFN | 12.0 | 4.8 | 6.000 | 12.30 | |
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ToolExpert 2.0

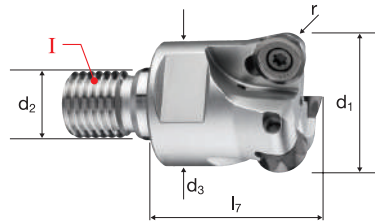
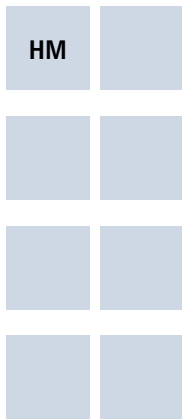
Il nuovo tool online per i dati di taglio che vi permette un impiego ottimale dell'utensile.




Qui si può accedere al nuovo calcolatore dei dati di taglio ToolExpert 2.0 o sul sito FRAISA a <http://www.fraisa.com/it/toolexpert>

Frese a spianare circolari

Inserti 12mm, con canale di aerazione/raffreddamento integrato



| Frese a spianare circolari | | Composizione fornitura: Corpo fresa comprese viti per serraggio inserto | | | | | | | |
|----------------------------|----------------|---|----------------|----------------|-------------------|---|---|-----|--------|
| N° Ordine | d ₁ | d ₂ | d ₃ | l ₇ | ap _{max} | z |  | I | EUR |
| W03212353 | 35.00 | 17.00 | 29.00 | 35 | 1.70 | 3 | 24 | M16 | 296.00 |
| W03212424 | 42.00 | 17.00 | 31.00 | 40 | 1.70 | 4 | 24 | M16 | 347.00 |
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VI

| Accessori | | Viti per serraggio inserti, confezione da 10 pezzi |
|-----------|--|--|
| N° Ordine | | EUR / pz. |
| W93110012 | Cacciavite dinamometrico 4.2 Nm con stelo Torx TX 15 | 161.00 |
| W90111013 | Stelo intercambiabile di ricambio per cacciavite dinamometrico TX 15 | 7.80 |
| W90100013 | Cacciavite Torx TX 15 | 14.80 |
| W93500012 | Vite di fissaggio per l'inserto Torx TX 15 / M 4 x 8.5 | 5.10 |



Inserti - Utensili frese HFC

Frese ad alto avanzamento per inserti 10mm

N° W02140



N° W02180



| | | | | | | |
|-----------|--------------|-------|--------------------------|--------------------------|-------------------|-----|
| NX | λ 2° | d, 25 | Rm 850-1500 | | | 799 |
| | γ 14° | | | | | |
| SX | λ 2° | d, 25 | Inox Stainless | Rm <850 | | |
| | γ 15° | | | | | |
| HX | λ 2° | d, 25 | Rm 1300-1500 | HRC 48- >60 | | |
| | γ 2° | | | | | |
| ZX | λ 2° | d, 25 | Ni Alloys | Inox Stainless | Rm <850 | |
| | γ 15° | | | | | |

Frese ad alto avanzamento per inserti 13mm

N° W02150



N° W02190



| | | | | | | |
|-----------|--------------|-------|--------------------------|--------------------------|-------------------|-----|
| NX | λ 0° | d, 35 | Rm 850-1500 | | | 801 |
| | γ 12° | | | | | |
| SX | λ 0° | d, 35 | Inox Stainless | Rm <850 | | |
| | γ 13° | | | | | |
| HX | λ 0° | d, 35 | Rm 1300-1500 | HRC 48- >60 | | |
| | γ 0° | | | | | |
| ZX | λ 0° | d, 35 | Ni Alloys | Inox Stainless | Rm <850 | |
| | γ 13° | | | | | |

Inserti - Utensili frese HFC

Frese ad alto avanzamento per inserti 10mm

N° W02400



| | | | | | | |
|-----------|--------------|------------|--------------------------|--------------------------|-------------------|-----|
| NX | λ 4° | d, 40 – 63 | Rm 850-1500 | | | 803 |
| | γ 16° | | | | | |
| SX | λ 4° | d, 40 – 63 | Inox Stainless | Rm <850 | | |
| | γ 17° | | | | | |
| HX | λ 4° | d, 40 – 63 | Rm 1300-1500 | HRC 48- >60 | | |
| | γ 4° | | | | | |
| ZX | λ 4° | d, 40 – 63 | Ni Alloys | Inox Stainless | Rm <850 | |
| | γ 17° | | | | | |

Frese ad alto avanzamento per inserti 13mm

N° W02410



| | | | | | | |
|-----------|--------------|------------|--------------------------|--------------------------|-------------------|-----|
| NX | λ 4° | d, 50 – 80 | Rm 850-1500 | | | 805 |
| | γ 16° | | | | | |
| SX | λ 4° | d, 50 – 80 | Inox Stainless | Rm <850 | | |
| | γ 17° | | | | | |
| HX | λ 4° | d, 50 – 80 | Rm 1300-1500 | HRC 48- >60 | | |
| | γ 4° | | | | | |
| ZX | λ 4° | d, 50 – 80 | Ni Alloys | Inox Stainless | Rm <850 | |
| | γ 17° | | | | | |

Inserti - Utensili frese HFC

Frese ad alto avanzamento per inserti 10mm

N° W02200



| | | | | | | |
|-----------|--------------|-------|--------------------------|--------------------------|-------------------|-----|
| NX | λ 2° | d, 25 | Rm 850-1500 | | | 807 |
| | γ 14° | | | | | |
| SX | λ 2° | d, 25 | Inox Stainless | Rm <850 | | |
| | γ 15° | | | | | |
| HX | λ 2° | d, 25 | Rm 1300-1500 | HRC 48- >60 | | |
| | γ 2° | | | | | |
| ZX | λ 2° | d, 25 | Ni Alloys | Inox Stainless | Rm <850 | |
| | γ 15° | | | | | |

Frese ad alto avanzamento per inserti 13mm



N° W02210



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|-----------|--------------|-------|--------------------------|--------------------------|-------------------|-----|
| NX | λ 0° | d, 35 | Rm 850-1500 | | | 809 |
| | γ 12° | | | | | |
| SX | λ 0° | d, 35 | Inox Stainless | Rm <850 | | |
| | γ 13° | | | | | |
| HX | λ 0° | d, 35 | Rm 1300-1500 | HRC 48- >60 | | |
| | γ 0° | | | | | |
| ZX | λ 0° | d, 35 | Ni Alloys | Inox Stainless | Rm <850 | |
| | γ 13° | | | | | |

Inserti

10mm

| NX Acciaio | SX Inox | HX Acciaio temprato | ZX Materiali difficilmente truciolabili |
|---|---|---|--|
|  |  |  |  |
| W52110010 | W52310010 | W52210010 | W52410010 |

| Inserti | | | | | | | |
|---|---------------|------|------|-----|-------|--------------------|-----------|
| Composizione fornitura: Confezione minima: 10 pezzi | | | | | | | |
| N° Ordine | ISO-Norm | H | B | D | r | R _{theo.} | EUR / pz. |
| W52110010 | XDLT 10T308SR | 10.2 | 10.0 | 4.0 | 0.800 | 2.00 | 11.70 |
| W52310010 | XDLT 10T308ER | 10.2 | 10.0 | 4.0 | 0.800 | 2.00 | 12.90 |
| W52210010 | XDLW 10T308SR | 10.2 | 10.0 | 4.0 | 0.800 | 2.00 | 12.30 |
| W52410010 | XDLT 10T308ER | 10.2 | 10.0 | 4.0 | 0.800 | 2.00 | 14.10 |
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ToolExpert 2.0

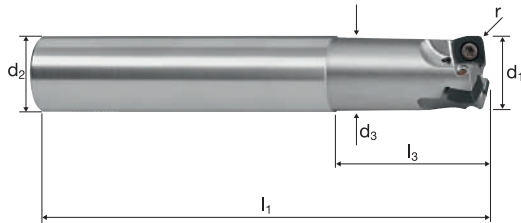
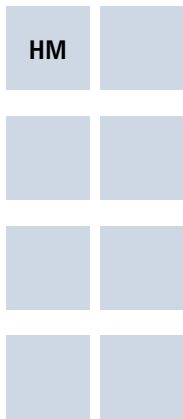
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Frese ad alto avanzamento

Inserti 10mm, con canale di aerazione/raffreddamento integrato



| Frese ad alto avanzamento | | Composizione fornitura: Corpo fresa comprese viti per serraggio inserto | | | | | | | |
|---------------------------|----------------|---|----------------|----------------|----------------|--------------------|---|-------|--------|
| N° Ordine | d ₁ | d ₂ h ₆ | d ₃ | l ₁ | l ₃ | ap _{max.} | z | L-Typ | EUR |
| W02140253* | 25.00 | 25.00 | 24.00 | 125 | 65.00 | 1.00 | 3 | M | 258.00 |
| W02180253 | 25.00 | 25.00 | 24.00 | 225 | 50.00 | 1.00 | 3 | XL | 257.00 |
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| * Con weldon | | | | | | | | | |

VI

| Accessori | | Viti per serraggio inserti, confezione da 10 pezzi |
|-----------|--|--|
| N° Ordine | | EUR / pz. |
| W90110013 | Cacciavite dinamometrico 3.2 Nm con stelo Torx TX 15 | 156.00 |
| W90111013 | Stelo intercambiabile di ricambio per cacciavite dinamometrico TX 15 | 7.80 |
| W90100013 | Cacciavite Torx TX 15 | 14.80 |
| W90500013 | Vite di fissaggio per l'inserto Torx TX 15 / M 3.5 x 7.2 | 3.50 |

Inserti

13mm

| NX Acciaio | SX Inox | HX Acciaio temprato | ZX Materiali difficilmente truciolabili |
|---|---|---|--|
|  |  |  |  |
| W52110013 | W52310013 | W52210013 | W52410013 |

| Inserti | | | | | | | |
|---|---------------|------|------|-----|-------|--------------------|-----------|
| Composizione fornitura: Confezione minima: 10 pezzi | | | | | | | |
| N° Ordine | ISO-Norm | H | B | D | r | R _{theo.} | EUR / pz. |
| W52110013 | XOLT 130410SR | 13.6 | 13.1 | 4.8 | 1.000 | 3.00 | 13.50 |
| W52310013 | XOLT 130410ER | 13.6 | 13.1 | 4.8 | 1.000 | 3.00 | 14.80 |
| W52210013 | XOLW 130410SR | 13.6 | 13.1 | 4.8 | 1.000 | 3.00 | 14.20 |
| W52410013 | XOLT 130410ER | 13.6 | 13.1 | 4.8 | 1.000 | 3.00 | 16.20 |
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ToolExpert 2.0

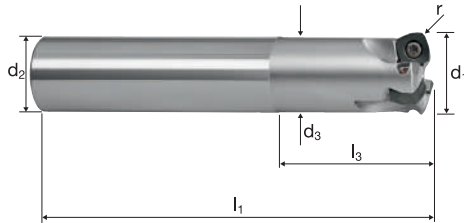
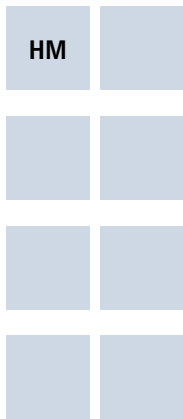
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Frese ad alto avanzamento

Inserti 13mm, con canale di aerazione/raffreddamento integrato




| Frese ad alto avanzamento | | Composizione fornitura: Corpo fresa comprese viti per serraggio inserto | | | | | | | | |
|---------------------------|-------|---|-------|-------|-------|-------------|-----|-------|--------|--|
| N° Ordine | d_1 | d_2 <small>h6</small> | d_3 | l_1 | l_3 | $ap_{max.}$ | z | L-Typ | EUR | |
| W02150353* | 35.00 | 32.00 | 31.40 | 144 | 63.00 | 2.00 | 3 | M | 259.00 | |
| W02190353 | 35.00 | 32.00 | 31.40 | 255 | 63.00 | 2.00 | 3 | XL | 269.00 | |
| * Con weldon | | | | | | | | | | |



| Accessori | | Viti per serraggio inserti, confezione da 10 pezzi | |
|-----------|--|--|-----------|
| N° Ordine | | | EUR / pz. |
| W91110013 | Cacciavite dinamometrico 5.0 Nm con stelo Torx TX 20 | | 171.00 |
| W91111013 | Stelo intercambiabile di ricambio per cacciavite dinamometrico TX 20 | | 7.80 |
| W91100013 | Cacciavite Torx TX 20 | | 14.80 |
| W91500013 | Vite di fissaggio per l'inserto Torx TX 20 / M 4.5 x 10.5 | | 3.70 |


Inserti

10mm

| NX Acciaio | SX Inox | HX Acciaio temprato | ZX Materiali difficilmente truciolabili |
|---|---|---|--|
|  |  |  |  |
| W52110010 | W52310010 | W52210010 | W52410010 |

| Inserti Composizione fornitura: Confezione minima: 10 pezzi | | | | | | | |
|--|---------------|------|------|-----|-------|--------------------|-----------|
| N° Ordine | ISO-Norm | H | B | D | r | R _{theo.} | EUR / pz. |
| W52110010 | XDLT 10T308SR | 10.2 | 10.0 | 4.0 | 0.800 | 2.00 | 11.70 |
| W52310010 | XDLT 10T308ER | 10.2 | 10.0 | 4.0 | 0.800 | 2.00 | 12.90 |
| W52210010 | XDLW 10T308SR | 10.2 | 10.0 | 4.0 | 0.800 | 2.00 | 12.30 |
| W52410010 | XDLT 10T308ER | 10.2 | 10.0 | 4.0 | 0.800 | 2.00 | 14.10 |
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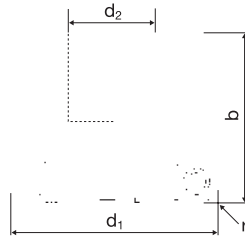
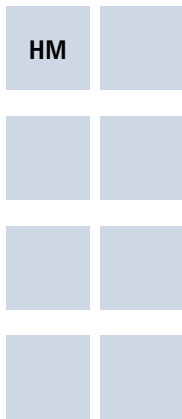
ToolExpert 2.0
 Il nuovo tool online per i dati di taglio che vi permette un impiego ottimale dell'utensile.



Qui si può accedere al nuovo calcolatore dei dati di taglio ToolExpert 2.0 o sul sito FRAISA a <http://www.fraisa.com/it/toolexpert>

Frese ad alto avanzamento

Inserti 10mm, con canale di aerazione/raffreddamento integrato



| Frese ad alto avanzamento | | Composizione fornitura: Corpo fresa comprese viti per serraggio inserto | | | | | |
|---------------------------|----------------|---|------|--------------------|---|--------|--|
| N° Ordine | d ₁ | d ₂ | b | ap _{max.} | z | EUR | |
| W02400404* | 40.00 | 16.00 | 40.0 | 1.00 | 4 | 299.00 | |
| W02400505 | 50.00 | 22.00 | 40.0 | 1.00 | 5 | 353.00 | |
| W02400636 | 63.00 | 22.00 | 40.0 | 1.00 | 6 | 404.00 | |
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| Accessori | | Viti per serraggio inserti, confezione da 10 pezzi | |
|------------|--|--|-----------|
| N° Ordine | | | EUR / pz. |
| W90110013 | Cacciavite dinamometrico 3.2 Nm con stelo Torx TX 15 | | 156.00 |
| W90111013 | Stelo intercambiabile di ricambio per cacciavite dinamometrico TX 15 | | 7.80 |
| W90100013 | Cacciavite Torx TX 15 | | 14.80 |
| W92500010 | Vite di fissaggio per l'inserto Torx TX 15 / M 3.5 x 8.6 | | 3.10 |
| W99510010* | Power-Vite M8.0 x 30.0 (Momento di serraggio 15.0 Nm) | | 16.60 |


Inserti

13mm

| NX Acciaio | SX Inox | HX Acciaio temprato | ZX Materiali difficilmente truciolabili |
|---|---|---|--|
|  |  |  |  |
| W52110013 | W52310013 | W52210013 | W52410013 |

| Inserti Composizione fornitura: Confezione minima: 10 pezzi | | | | | | | |
|--|---------------|------|------|-----|-------|--------------------|-----------|
| N° Ordine | ISO-Norm | H | B | D | r | R _{theo.} | EUR / pz. |
| W52110013 | XOLT 130410SR | 13.6 | 13.1 | 4.8 | 1.000 | 3.00 | 13.50 |
| W52310013 | XOLT 130410ER | 13.6 | 13.1 | 4.8 | 1.000 | 3.00 | 14.80 |
| W52210013 | XOLW 130410SR | 13.6 | 13.1 | 4.8 | 1.000 | 3.00 | 14.20 |
| W52410013 | XOLT 130410ER | 13.6 | 13.1 | 4.8 | 1.000 | 3.00 | 16.20 |
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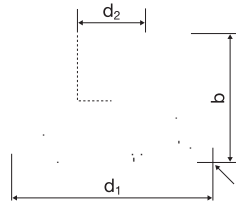
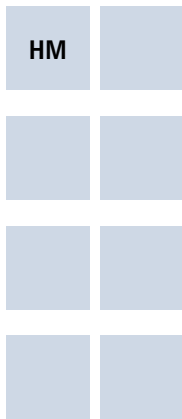
ToolExpert 2.0
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Qui si può accedere al nuovo calcolatore dei dati di taglio ToolExpert 2.0 o sul sito FRAISA a <http://www.fraisa.com/it/toolexpert>

Frese ad alto avanzamento

Inseri 13mm, con canale di aerazione/raffreddamento integrato




| Frese ad alto avanzamento | | Composizione fornitura: Corpo fresa comprese viti per serraggio inserto | | | | | |
|---------------------------|----------------|---|------|--------------------|---|--------|--|
| N° Ordine | d ₁ | d ₂ | b | ap _{max.} | z | EUR | |
| W02410504 | 50.00 | 22.00 | 40.0 | 2.00 | 4 | 338.00 | |
| W02410635 | 63.00 | 22.00 | 40.0 | 2.00 | 5 | 382.00 | |
| W02410807 | 80.00 | 27.00 | 50.0 | 2.00 | 7 | 463.00 | |
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| Accessori | | Viti per serraggio inserti, confezione da 10 pezzi | |
|-----------|--|--|-----------|
| N° Ordine | | | EUR / pz. |
| W91110013 | Cacciavite dinamometrico 5.0 Nm con stelo Torx TX 20 | | 171.00 |
| W91111013 | Stelo intercambiabile di ricambio per cacciavite dinamometrico TX 20 | | 7.80 |
| W91100013 | Cacciavite Torx TX 20 | | 14.80 |
| W91500013 | Vite di fissaggio per l'inserto Torx TX 20 / M 4.5 x 10.5 | | 3.70 |


Inserti

10mm

| NX Acciaio | SX Inox | HX Acciaio temprato | ZX Materiali difficilmente truciolabili |
|---|---|---|--|
|  |  |  |  |
| W52110010 | W52310010 | W52210010 | W52410010 |

| Inserti | | Composizione fornitura: Confezione minima: 10 pezzi | | | | | | |
|-----------|---------------|---|------|-----|-------|--------------------|-----------|--|
| N° Ordine | ISO-Norm | H | B | D | r | R _{theo.} | EUR / pz. | |
| W52110010 | XDLT 10T308SR | 10.2 | 10.0 | 4.0 | 0.800 | 2.00 | 11.70 | |
| W52310010 | XDLT 10T308ER | 10.2 | 10.0 | 4.0 | 0.800 | 2.00 | 12.90 | |
| W52210010 | XDLW 10T308SR | 10.2 | 10.0 | 4.0 | 0.800 | 2.00 | 12.30 | |
| W52410010 | XDLT 10T308ER | 10.2 | 10.0 | 4.0 | 0.800 | 2.00 | 14.10 | |
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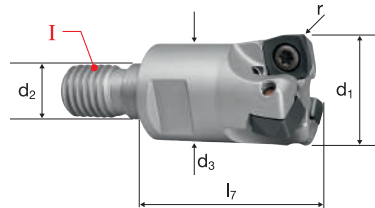
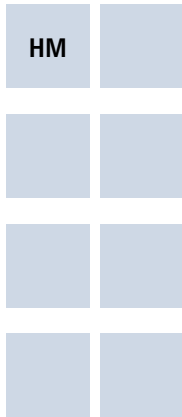
ToolExpert 2.0
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Frese ad alto avanzamento

Inseri 10mm, con canale di aerazione/raffreddamento integrato



| Frese ad alto avanzamento | | Composizione fornitura: Corpo fresa comprese viti per serraggio inserto | | | | | | | | |
|---------------------------|----------------|---|----------------|----------------|-------------------|---|---|-----|--------|--|
| N° Ordine | d ₁ | d ₂ | d ₃ | l ₇ | ap _{max} | z |  | I | EUR | |
| W02200253 | 25.00 | 12.50 | 21.00 | 35 | 1.00 | 3 | 17 | M12 | 257.00 | |
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| Accessori | | Viti per serraggio inserti, confezione da 10 pezzi | |
|-----------|--|--|-----------|
| N° Ordine | | | EUR / pz. |
| W90110013 | Cacciavite dinamometrico 3.2 Nm con stelo Torx TX 15 | | 156.00 |
| W90111013 | Stelo intercambiabile di ricambio per cacciavite dinamometrico TX 15 | | 7.80 |
| W90100013 | Cacciavite Torx TX 15 | | 14.80 |
| W90500013 | Vite di fissaggio per l'inserto Torx TX 15 / M 3.5 x 7.2 | | 3.50 |


Inserti

13mm

| NX Acciaio | SX Inox | HX Acciaio temprato | ZX Materiali difficilmente truciolabili |
|---|---|---|--|
|  |  |  |  |
| W52110013 | W52310013 | W52210013 | W52410013 |

| Inserti | | | | | | | | Composizione fornitura: Confezione minima: 10 pezzi | |
|------------------|---------------|------|------|-----|-------|--------------------|-----------|---|--|
| N° Ordine | ISO-Norm | H | B | D | r | R _{theo.} | EUR / pz. | | |
| W52110013 | XOLT 130410SR | 13.6 | 13.1 | 4.8 | 1.000 | 3.00 | 13.50 | | |
| W52310013 | XOLT 130410ER | 13.6 | 13.1 | 4.8 | 1.000 | 3.00 | 14.80 | | |
| W52210013 | XOLW 130410SR | 13.6 | 13.1 | 4.8 | 1.000 | 3.00 | 14.20 | | |
| W52410013 | XOLT 130410ER | 13.6 | 13.1 | 4.8 | 1.000 | 3.00 | 16.20 | | |
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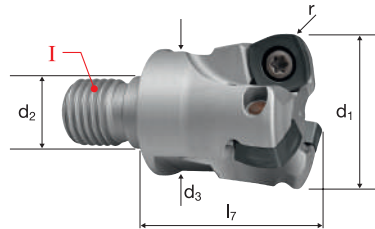
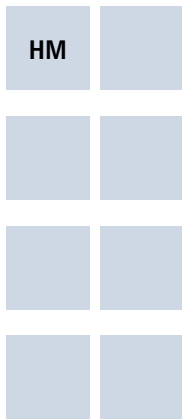
ToolExpert 2.0
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Frese ad alto avanzamento

Inserti 13mm, con canale di aerazione/raffreddamento integrato



| Frese ad alto avanzamento | | Composizione fornitura: Corpo fresa comprese viti per serraggio inserto | | | | | | | |
|---------------------------|----------------|---|----------------|----------------|-------------------|---|---|-----|--------|
| N° Ordine | d ₁ | d ₂ | d ₃ | l ₇ | ap _{max} | z |  | I | EUR |
| W02210353 | 35.00 | 17.00 | 29.00 | 35 | 2.00 | 3 | 24 | M16 | 269.00 |
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| Accessori | | Viti per serraggio inserti, confezione da 10 pezzi |
|-----------|--|--|
| N° Ordine | | EUR / pz. |
| W91110013 | Cacciavite dinamometrico 5.0 Nm con stelo Torx TX 20 | 171.00 |
| W91111013 | Stelo intercambiabile di ricambio per cacciavite dinamometrico TX 20 | 7.80 |
| W91100013 | Cacciavite Torx TX 20 | 14.80 |
| W91500013 | Vite di fissaggio per l'inserto Torx TX 20 / M 4.5 x 10.5 | 3.70 |



Frese con inserti a spianare

Frese per spianatura 45° per inserti 9mm

N° W01400



| | | | | | | |
|-----------|---------------|-------------|---------------------------------|--------------------------------|---------------------|-----|
| NX | λ 12° | d. 40 – 125 | Rm 850-1300 | | | 813 |
| | γ -6° | | | | | |
| SX | λ 12° | d. 40 – 125 | Inox Stainless | Rm <850 | | |
| | γ -6° | | | | | |
| ZX | λ 12° | d. 40 – 125 | Ni-/Mn- Alloys | Inox Stainless | Rm <850 | |
| | γ -6° | | | | | |
| AX | λ 12° | d. 40 – 125 | Al Aluminium Alloy | Al Aluminium Cast | Cu Copper | |
| | γ 15° | | | | | |

Frese per spianatura 45° per inserti 13mm




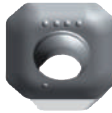
N° W01410



| | | | | | | |
|-----------|---------------|-------------|---------------------------------|--------------------------------|---------------------|-----|
| NX | λ 13° | d. 40 – 125 | Rm 850-1300 | | | 815 |
| | γ -6° | | | | | |
| SX | λ 13° | d. 40 – 125 | Inox Stainless | Rm <850 | | |
| | γ -6° | | | | | |
| ZX | λ 13° | d. 40 – 125 | Ni-/Mn- Alloys | Inox Stainless | Rm <850 | |
| | γ -6° | | | | | |
| AX | λ 13° | d. 40 – 125 | Al Aluminium Alloy | Al Aluminium Cast | Cu Copper | |
| | γ 13° | | | | | |


Inserti

9mm

| NX Acciaio | SX Inox | ZX Materiali difficilmente truciolabili | AX Alluminio |
|---|---|---|--|
|  |  |  |  |
| W51110009 | W51310009 | W51410009 | W51510009 |

| Inserti | | | | | | Composizione fornitura: Confezione minima: 10 pezzi |
|-----------|--------------|-----|-----|-----|-----------|---|
| N° Ordine | ISO-Norm | H | B | D | EUR / pz. | |
| W51110009 | SDLT09T3AESN | 9.5 | 9.5 | 4.0 | 10.70 | |
| W51310009 | SDLT09T3AESN | 9.5 | 9.5 | 4.0 | 11.70 | |
| W51410009 | SDLT09T3AESN | 9.5 | 9.5 | 4.0 | 12.80 | |
| W51510009 | SDLT09T3AEFN | 9.5 | 9.5 | 4.0 | 13.30 | |
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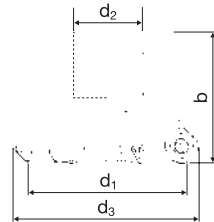
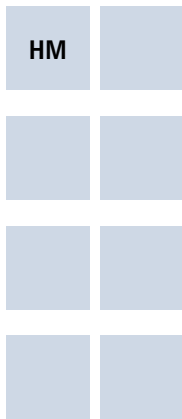
ToolExpert 2.0
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Frese per spianatura 45°

Inserti 9mm, con canale di aerazione/raffreddamento integrato






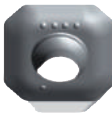
| Frese per spianatura 45° | | | | | | | Composizione fornitura: Corpo fresa comprese viti per serraggio inserto |
|--------------------------|----------------|----------------|----------------|------|--------------------|----|---|
| N° Ordine | d ₁ | d ₂ | d ₃ | b | ap _{max.} | z | EUR |
| W01400406 | 40.00 | 16.00 | 48.40 | 40.0 | 4.00 | 6 | 426.00 |
| W01400507 | 50.00 | 22.00 | 58.40 | 40.0 | 4.00 | 7 | 481.00 |
| W01400638 | 63.00 | 22.00 | 71.40 | 40.0 | 4.00 | 8 | 543.00 |
| W01400809 | 80.00 | 27.00 | 88.40 | 50.0 | 4.00 | 9 | 640.00 |
| W01400100 | 100.00 | 32.00 | 108.40 | 50.0 | 4.00 | 11 | 770.00 |
| W01400125 | 125.00 | 40.00 | 133.40 | 63.0 | 4.00 | 12 | 925.00 |
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VI

| Accessori | | Viti per serraggio inserti, confezione da 10 pezzi |
|-----------|--|--|
| N° Ordine | | EUR / pz. |
| W90110008 | Cacciavite dinamometrico 1.2 Nm con stelo Torx TX 08 | 150.00 |
| W90111008 | Stelo intercambiabile di ricambio per cacciavite dinamometrico TX 08 | 7.80 |
| W90100008 | Cacciavite Torx TX 08 | 14.80 |
| W91500009 | Vite di fissaggio per l'inserto Torx TX 08 / M 3.0 x 7.3 | 3.50 |

Inserti

13mm

| NX Acciaio | SX Inox | ZX Materiali difficilmente truciolabili | AX Alluminio |
|---|---|---|--|
|  |  |  |  |
| W51110013 | W51310013 | W51410013 | W51510013 |

| Inserti | | Composizione fornitura: Confezione minima: 10 pezzi | | | | |
|-----------|--------------|---|------|-----|-----------|--|
| N° Ordine | ISO-Norm | H | B | D | EUR / pz. | |
| W51110013 | SDLT1304AESN | 13.0 | 13.0 | 4.8 | 12.30 | |
| W51310013 | SDLT1304AESN | 13.0 | 13.0 | 4.8 | 13.50 | |
| W51410013 | SDLT1304AESN | 13.0 | 13.0 | 4.8 | 14.70 | |
| W51510013 | SDLT1304AEFN | 12.7 | 12.7 | 4.8 | 15.30 | |
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ToolExpert 2.0

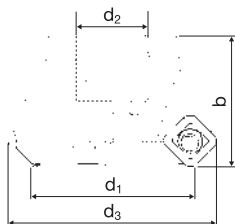
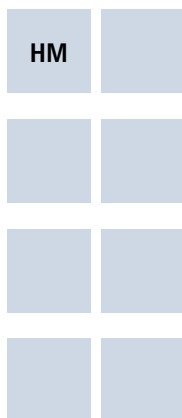
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Frese per spianatura 45°

Inserti 13mm, con canale di aerazione/raffreddamento integrato



| Frese per spianatura 45° | | | | | | | Composizione fornitura: Corpo fresa comprese viti per serraggio inserto |
|--------------------------|----------------|----------------|----------------|------|--------------------|---|---|
| N° Ordine | d ₁ | d ₂ | d ₃ | b | ap _{max.} | z | EUR |
| W01410403 | 40.00 | 16.00 | 54.00 | 40.0 | 6.00 | 3 | 287.00 |
| W01410504 | 50.00 | 22.00 | 63.90 | 40.0 | 6.00 | 4 | 349.00 |
| W01410635 | 63.00 | 22.00 | 76.90 | 40.0 | 6.00 | 5 | 400.00 |
| W01410806 | 80.00 | 27.00 | 93.90 | 50.0 | 6.00 | 6 | 505.00 |
| W01410100 | 100.00 | 32.00 | 113.90 | 50.0 | 6.00 | 7 | 572.00 |
| W01410125 | 125.00 | 40.00 | 138.90 | 63.0 | 6.00 | 8 | 723.00 |
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| Accessori | | Viti per serraggio inserti, confezione da 10 pezzi |
|-----------|--|--|
| N° Ordine | | EUR / pz. |
| W91110013 | Cacciavite dinamometrico 5.0 Nm con stelo Torx TX 20 | 171.00 |
| W91111013 | Stelo intercambiabile di ricambio per cacciavite dinamometrico TX 20 | 7.80 |
| W91100013 | Cacciavite Torx TX 20 | 14.80 |
| W91500013 | Vite di fissaggio per l'inserto Torx TX 20 / M 4.5 x 10.5 | 3.70 |



Frese con inserti ad angolo/per scanalature

Frese ad angolo/Frese per scanalature 90° per inserti 8mm

N° W00100



N° W00140



N° W00180



| | | | | | | |
|-----------|--------------|------------|---------------------------------|--------------------------------|---------------------|-----|
| NX | λ 8° | d. 16 – 32 | Rm 850-1300 | | | 821 |
| | γ 0° | | | | | |
| SX | λ 8° | d. 16 – 32 | Inox Stainless | Rm <850 | | |
| | γ 0° | | | | | |
| HX | λ 8° | d. 16 – 32 | Rm 1300-1500 | HRC 48-60 | | |
| | γ -8° | | | | | |
| ZX | λ 8° | d. 16 – 32 | Ni-/Mn- Alloys | Inox Stainless | Rm <850 | |
| | γ 0° | | | | | |
| AX | λ 8° | d. 16 – 32 | Al Aluminium Alloy | Al Aluminium Cast | Cu Copper | |
| | γ 20° | | | | | |

Frese ad angolo/Frese per scanalature 90° per inserti 13mm

N° W00110



N° W00150



N° W00190



| | | | | | | |
|-----------|---------------|------------|---------------------------------|--------------------------------|---------------------|-----|
| NX | λ 8° | d. 25 – 32 | Rm 850-1300 | | | 823 |
| | γ 6° | | | | | |
| SX | λ 8° | d. 25 – 32 | Inox Stainless | Rm <850 | | |
| | γ 6° | | | | | |
| HX | λ 8° | d. 25 – 32 | Rm 1300-1500 | HRC 48-60 | | |
| | γ -10° | | | | | |
| ZX | λ 8° | d. 25 – 32 | Ni-/Mn- Alloys | Inox Stainless | Rm <850 | |
| | γ 6° | | | | | |
| AX | λ 8° | d. 25 – 32 | Al Aluminium Alloy | Al Aluminium Cast | Cu Copper | |
| | γ 20° | | | | | |

VI



Frese con inserti ad angolo/per scanalature

Frese ad angolo 90° per inserti 8mm

N° W00400



| | | | | | | |
|-----------|--------------|------------|---------------------------------|--------------------------------|---------------------|-----|
| NX | λ 8° | d. 40 – 80 | Rm 850-1300 | | | 825 |
| | γ 0° | | | | | |
| SX | λ 8° | d. 40 – 80 | Inox Stainless | Rm <850 | | |
| | γ 0° | | | | | |
| HX | λ 8° | d. 40 – 80 | Rm 1300-1500 | HRC 48-60 | | |
| | γ -8° | | | | | |
| ZX | λ 8° | d. 40 – 80 | Ni-/Mn- Alloys | Inox Stainless | Rm <850 | |
| | γ 0° | | | | | |
| AX | λ 8° | d. 40 – 80 | Al Aluminium Alloy | Al Aluminium Cast | Cu Copper | |
| | γ 20° | | | | | |

Frese ad angolo 90° per inserti 13mm






N° W00410



| | | | | | | |
|-----------|---------------|------------|---------------------------------|--------------------------------|---------------------|-----|
| NX | λ 8° | d. 40 – 80 | Rm 850-1300 | | | 827 |
| | γ 6° | | | | | |
| SX | λ 8° | d. 40 – 80 | Inox Stainless | Rm <850 | | |
| | γ 6° | | | | | |
| HX | λ 8° | d. 40 – 80 | Rm 1300-1500 | HRC 48-60 | | |
| | γ -10° | | | | | |
| ZX | λ 8° | d. 40 – 80 | Ni-/Mn- Alloys | Inox Stainless | Rm <850 | |
| | γ 6° | | | | | |
| AX | λ 8° | d. 40 – 80 | Al Aluminium Alloy | Al Aluminium Cast | Cu Copper | |
| | γ 20° | | | | | |

Inserti

8mm

| NX Acciaio | SX Inox | HX Acciaio temprato | ZX Materiali difficilmente truciolabili | AX Alluminio |
|---|---|---|---|--|
|  |  |  |  |  |
| W50111008 | W50311008 | W50210008 | W50410008 | W50510008 |

| Inserti | | | | | | | Composizione fornitura: Confezione minima: 10 pezzi |
|------------------|----------------|-----|-----|-----|-------|-----------|---|
| N° Ordine | ISO-Norm | H | B | D | r | EUR / pz. | |
| W50111008 | APKT 0803PD SR | 8.4 | 6.4 | 3.4 | 0.600 | 10.70 | |
| W50311008 | APKT 0803PD SR | 8.4 | 6.4 | 3.4 | 0.600 | 11.70 | |
| W50210008 | APKT 0803PD SR | 8.5 | 6.4 | 3.5 | 0.600 | 11.20 | |
| W50410008 | APKT 0803PD SR | 8.4 | 6.4 | 3.4 | 0.600 | 12.80 | |
| W50510008 | APHT 0803PDR | 8.3 | 6.4 | 3.4 | 0.600 | 13.30 | |
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ToolExpert 2.0

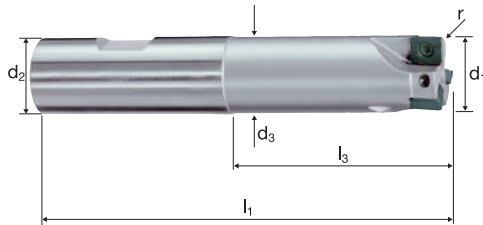
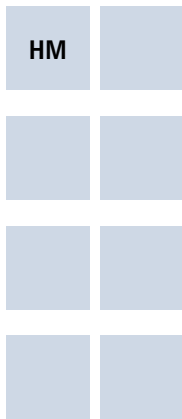
Il nuovo tool online per i dati di taglio che vi permette un impiego ottimale dell'utensile.



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Frese ad angolo/Frese per scanalature 90°

Inserti 8mm, con canale di aerazione/raffreddamento integrato








| Frese ad angolo/Frese per scanalature 90° | | Composizione fornitura: Corpo fresa comprese viti per serraggio inserto | | | | | | | |
|---|----------------|---|----------------|----------------|----------------|--------------------|---|-------|--------|
| N° Ordine | d ₁ | d ₂ h ₆ | d ₃ | l ₁ | l ₃ | ap _{max.} | z | L-Typ | EUR |
| W00100162 | 16.00 | 16.00 | 15.40 | 75 | 25.00 | 7.50 | 2 | K | 244.00 |
| W00100203 | 20.00 | 20.00 | 19.40 | 77 | 25.00 | 7.50 | 3 | K | 303.00 |
| W00100254 | 25.00 | 25.00 | 24.00 | 90 | 32.00 | 7.50 | 4 | K | 372.00 |
| W00100325 | 32.00 | 32.00 | 31.00 | 102 | 40.00 | 7.50 | 5 | K | 436.00 |
| W00140162 | 16.00 | 16.00 | 15.00 | 102 | 51.00 | 7.50 | 2 | M | 244.00 |
| W00140203 | 20.00 | 20.00 | 19.40 | 110 | 57.00 | 7.50 | 3 | M | 303.00 |
| W00140254 | 25.00 | 25.00 | 24.00 | 124 | 65.00 | 7.50 | 4 | M | 376.00 |
| W00140325 | 32.00 | 32.00 | 31.00 | 144 | 81.00 | 7.50 | 5 | M | 454.00 |
| W00180162 | 16.00 | 16.00 | 15.00 | 129 | 78.00 | 7.50 | 2 | L | 254.00 |
| W00180203 | 20.00 | 20.00 | 19.40 | 140 | 87.00 | 7.50 | 3 | L | 319.00 |
| W00180254 | 25.00 | 25.00 | 24.00 | 158 | 99.00 | 7.50 | 4 | L | 398.00 |
| W00180325 | 32.00 | 32.00 | 31.00 | 186 | 123.00 | 7.50 | 5 | L | 491.00 |
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| Accessori | | Viti per serraggio inserti, confezione da 10 pezzi | |
|-----------|--|--|-----------|
| N° Ordine | | | EUR / pz. |
| W90110008 | Cacciavite dinamometrico 1.2 Nm con stelo Torx TX 08 | | 150.00 |
| W90111008 | Stelo intercambiabile di ricambio per cacciavite dinamometrico TX 08 | | 7.80 |
| W90100008 | Cacciavite Torx TX 08 | | 14.80 |
| W90500008 | Vite di fissaggio per l'inserto Torx TX 08 / M 2.5 x 5.0 | | 3.10 |



Inserti

13mm

| NX Acciaio | SX Inox | HX Acciaio temprato | ZX Materiali difficilmente truciolabili | AX Alluminio |
|---|---|---|---|--|
|  |  |  |  |  |
| W50111013 | W50311013 | W50210013 | W50410013 | W50510013 |

| Inserti | | Composizione fornitura: Confezione minima: 10 pezzi | | | | | |
|-----------|----------------|---|-----|-----|-------|-----------|--|
| N° Ordine | ISO-Norm | H | B | D | r | EUR / pz. | |
| W50111013 | APKT 1304PD SR | 14.8 | 8.1 | 4.7 | 0.800 | 12.30 | |
| W50311013 | APKT 1304PD SR | 14.8 | 8.1 | 4.7 | 0.800 | 13.50 | |
| W50210013 | APKT 1304PD SR | 14.7 | 8.1 | 4.7 | 0.800 | 12.90 | |
| W50410013 | APKT 1304PD SR | 14.8 | 8.1 | 4.7 | 0.800 | 14.70 | |
| W50510013 | APHT 1304PDR | 14.7 | 8.0 | 4.5 | 0.800 | 15.30 | |
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ToolExpert 2.0

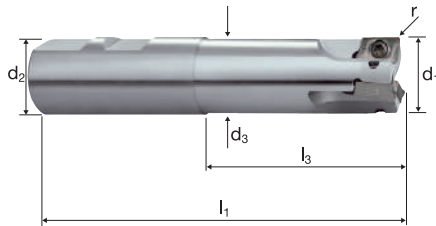
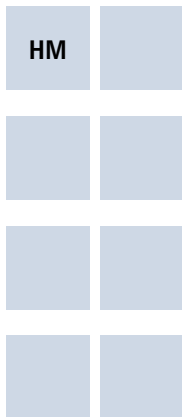
Il nuovo tool online per i dati di taglio che vi permette un impiego ottimale dell'utensile.



Qui si può accedere al nuovo calcolatore dei dati di taglio ToolExpert 2.0 o sul sito FRAISA a <http://www.fraisa.com/it/toolexpert>

Frese ad angolo/Frese per scanalature 90°

Inserti 13mm, con canale di aerazione/raffreddamento integrato








| Frese ad angolo/Frese per scanalature 90° | | Composizione fornitura: Corpo fresa comprese viti per serraggio inserto | | | | | | | EUR |
|---|----------------|---|----------------|----------------|----------------|--------------------|---|-------|--------|
| N° Ordine | d ₁ | d ₂ h ₆ | d ₃ | l ₁ | l ₃ | ap _{max.} | z | L-Typ | EUR |
| W00110253 | 25.00 | 25.00 | 24.00 | 90 | 32.00 | 12.50 | 3 | K | 325.00 |
| W00150253 | 25.00 | 25.00 | 24.00 | 124 | 65.00 | 12.50 | 3 | M | 333.00 |
| W00190253 | 25.00 | 25.00 | 24.00 | 158 | 99.00 | 12.50 | 3 | L | 353.00 |
| W00110324 | 32.00 | 32.00 | 31.00 | 102 | 40.00 | 12.50 | 4 | K | 378.00 |
| W00150324 | 32.00 | 32.00 | 31.00 | 144 | 81.00 | 12.50 | 4 | M | 396.00 |
| W00190324 | 32.00 | 32.00 | 31.00 | 189 | 123.00 | 12.50 | 4 | L | 428.00 |
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| Accessori | | Viti per serraggio inserti, confezione da 10 pezzi | EUR / pz. |
|-----------|--|--|-----------|
| N° Ordine | | | EUR / pz. |
| W90110013 | Cacciavite dinamometrico 3.2 Nm con stelo Torx TX 15 | | 156.00 |
| W90111013 | Stelo intercambiabile di ricambio per cacciavite dinamometrico TX 15 | | 7.80 |
| W90100013 | Cacciavite Torx TX 15 | | 14.80 |
| W90500013 | Vite di fissaggio per l'inserto Torx TX 15 / M 3.5 x 7.2 | | 3.50 |




Inserti

8mm

| NX Acciaio | SX Inox | HX Acciaio temprato | ZX Materiali difficilmente truciolabili | AX Alluminio |
|---|---|---|---|--|
|  |  |  |  |  |
| W50111008 | W50311008 | W50210008 | W50410008 | W50510008 |

| Inserti | | Composizione fornitura: Confezione minima: 10 pezzi | | | | | |
|------------------|----------------|---|-----|-----|-------|-----------|--|
| N° Ordine | ISO-Norm | H | B | D | r | EUR / pz. | |
| W50111008 | APKT 0803PD SR | 8.4 | 6.4 | 3.4 | 0.600 | 10.70 | |
| W50311008 | APKT 0803PD SR | 8.4 | 6.4 | 3.4 | 0.600 | 11.70 | |
| W50210008 | APKT 0803PD SR | 8.5 | 6.4 | 3.5 | 0.600 | 11.20 | |
| W50410008 | APKT 0803PD SR | 8.4 | 6.4 | 3.4 | 0.600 | 12.80 | |
| W50510008 | APHT 0803PDR | 8.3 | 6.4 | 3.4 | 0.600 | 13.30 | |
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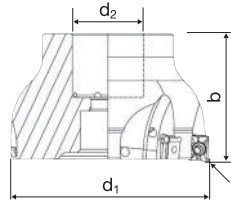
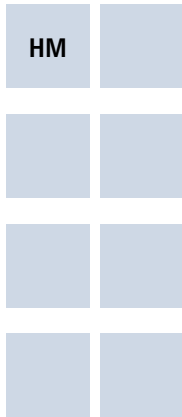
ToolExpert 2.0
 Il nuovo tool online per i dati di taglio che vi permette un impiego ottimale dell'utensile.



Qui si può accedere al nuovo calcolatore dei dati di taglio ToolExpert 2.0 o sul sito FRAISA a <http://www.fraisa.com/it/toolexpert>

Frese ad angolo 90°

Inserti 8mm, con canale di aerazione/raffreddamento integrato






| Frese ad angolo 90° | | Composizione fornitura: Corpo fresa comprese viti per serraggio inserto | | | | | |
|---------------------|----------------|---|------|-------------------|----|--------|--|
| N° Ordine | d ₁ | d ₂ | b | ap _{max} | z | EUR | |
| W00400405 | 40.00 | 16.00 | 40.0 | 7.50 | 5 | 420.00 | |
| W00400506 | 50.00 | 22.00 | 40.0 | 7.50 | 6 | 487.00 | |
| W00400637 | 63.00 | 22.00 | 40.0 | 7.50 | 7 | 586.00 | |
| W00400801 | 80.00 | 27.00 | 50.0 | 7.50 | 10 | 770.00 | |
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| Accessori | | Viti per serraggio inserti, confezione da 10 pezzi | |
|-----------|--|--|-----------|
| N° Ordine | | | EUR / pz. |
| W90110008 | Cacciavite dinamometrico 1.2 Nm con stelo Torx TX 08 | | 150.00 |
| W90111008 | Stelo intercambiabile di ricambio per cacciavite dinamometrico TX 08 | | 7.80 |
| W90100008 | Cacciavite Torx TX 08 | | 14.80 |
| W90500008 | Vite di fissaggio per l'inserto Torx TX 08 / M 2.5 x 5.0 | | 3.10 |

Inserti

13mm

| NX Acciaio | SX Inox | HX Acciaio temprato | ZX Materiali difficilmente truciolabili | AX Alluminio |
|---|---|---|---|--|
|  |  |  |  |  |
| W50111013 | W50311013 | W50210013 | W50410013 | W50510013 |

| Inserti | | Composizione fornitura: Confezione minima: 10 pezzi | | | | | |
|------------------|----------------|---|-----|-----|-------|-----------|--|
| N° Ordine | ISO-Norm | H | B | D | r | EUR / pz. | |
| W50111013 | APKT 1304PD SR | 14.8 | 8.1 | 4.7 | 0.800 | 12.30 | |
| W50311013 | APKT 1304PD SR | 14.8 | 8.1 | 4.7 | 0.800 | 13.50 | |
| W50210013 | APKT 1304PD SR | 14.7 | 8.1 | 4.7 | 0.800 | 12.90 | |
| W50410013 | APKT 1304PD SR | 14.8 | 8.1 | 4.7 | 0.800 | 14.70 | |
| W50510013 | APHT 1304PDR | 14.7 | 8.0 | 4.5 | 0.800 | 15.30 | |
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ToolExpert 2.0

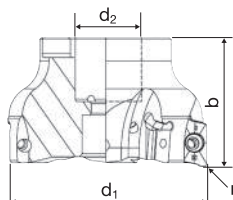
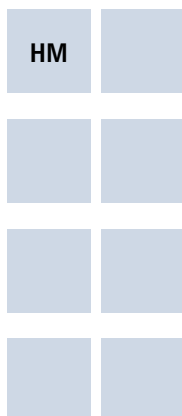
Il nuovo tool online per i dati di taglio che vi permette un impiego ottimale dell'utensile.



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Frese ad angolo 90°

Inserti 13mm, con canale di aerazione/raffreddamento integrato



| Frese ad angolo 90° | | Composizione fornitura: Corpo fresa comprese viti per serraggio inserto | | | | | |
|---------------------|----------------|---|------|--------------------|---|--------|--|
| N° Ordine | d ₁ | d ₂ | b | ap _{max.} | z | EUR | |
| W00410404 | 40.00 | 16.00 | 40.0 | 12.50 | 4 | 384.00 | |
| W00410505 | 50.00 | 22.00 | 40.0 | 12.50 | 5 | 450.00 | |
| W00410636 | 63.00 | 22.00 | 40.0 | 12.50 | 6 | 499.00 | |
| W00410808 | 80.00 | 27.00 | 50.0 | 12.50 | 8 | 671.00 | |
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| Accessori | | Viti per serraggio inserti, confezione da 10 pezzi | |
|-----------|--|--|-----------|
| N° Ordine | | | EUR / pz. |
| W90110013 | Cacciavite dinamometrico 3.2 Nm con stelo Torx TX 15 | | 156.00 |
| W90111013 | Stelo intercambiabile di ricambio per cacciavite dinamometrico TX 15 | | 7.80 |
| W90100013 | Cacciavite Torx TX 15 | | 14.80 |
| W90500013 | Vite di fissaggio per l'inserto Torx TX 15 / M 3.5 x 7.2 | | 3.50 |

Accessori

Cacciavite dinamometrico Torx con stelo

Momento torcente preregolato fisso secondo la tabella



| N° Ordine | Dimensione Torx | Momento di serraggio | EUR |
|-----------|-----------------|----------------------|--------|
| W90110008 | TX 08 | 1.2 Nm | 150.00 |
| W93110010 | TX 10 | 2.0 Nm | 159.00 |
| W90110013 | TX 15 | 3.2 Nm | 156.00 |
| W93110012 | TX 15 | 4.2 Nm | 161.00 |
| W91110013 | TX 20 | 5.0 Nm | 171.00 |

Stelo intercambiabile di ricambio per cacciavite dinamometrico



















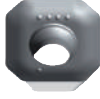

| N° Ordine | Dimensione Torx | EUR |
|-----------|-----------------|------|
| W90111008 | TX 08 | 7.80 |
| W93111010 | TX 10 | 7.80 |
| W90111013 | TX 15 | 7.80 |
| W91111013 | TX 20 | 7.80 |

Cacciavite Torx



| N° Ordine | Dimensione Torx | EUR |
|-----------|-----------------|-------|
| W90100008 | TX 08 | 14.80 |
| W93100010 | TX 10 | 14.80 |
| W90100013 | TX 15 | 14.80 |
| W91100013 | TX 20 | 14.80 |

Marcatura e montaggio degli inserti

| Tipo | Frese ad angolo | Frese per spianatura | Frese ad alto avanzamento | Frese a spianare circolari* |
|--|--|--|--|---|
| NX Acciaio • |  N° Ordine W50111008 W50111013 |  N° Ordine W51110009 W51110013 |  N° Ordine W52110010 W52110013 |  N° Ordine W53110010 W53110012 |
| SX Inox •• |  N° Ordine W50311008 W50311013 |  N° Ordine W51310009 W51310013 |  N° Ordine W52310010 W52310013 |  N° Ordine W53310010 W53310012 |
| HX Acciaio temprato ••• |  N° Ordine W50210008 W50210013 | |  N° Ordine W52210010 W52210013 |  N° Ordine W53210010 W53210012 |
| ZX Materiali difficilmente truciolabili •••• |  N° Ordine W50410008 W50410013 |  N° Ordine W51410009 W51410013 |  N° Ordine W52410010 W52410013 |  N° Ordine W53410010 W53410012 |
| AX Alluminio •••• • |  N° Ordine W50510008 W50510013 |  N° Ordine W51510009 W51510013 | |  N° Ordine W53510010 W53510012 |

- Prima di eseguire il montaggio, pulire accuratamente le sedi degli inserti
- Assicurarsi che le marcature degli inserti abbiano lo stesso orientamento
- Serrare le viti con il cacciavite dinamometrico
- Quando si serrano le viti, badare che gli inserti siano posizionati in modo preciso

* Gli inserti tondi possono essere utilizzati su 8 superfici di posizionamento. Per passare alla superficie successiva non occorre rimuovere completamente la vite. Durante la fase di serraggio, l'inserto tondo deve essere posizionato in modo preciso sulla superficie per non danneggiare la sede dell'inserto.




I suggerimenti della ToolSchool



FRAISA vi offre dei prodotti altamente innovativi. Prodotti che sono sempre all'altezza degli sviluppi tecnologici e spesso ne rappresentano addirittura la massima espressione.

Con «**i suggerimenti della ToolSchool**» vogliamo illustrarvi le tecnologie di volta in volta più aggiornate comprese nel nostro catalogo e naturalmente i loro vantaggi.

«**I suggerimenti della ToolSchool**» vi dimostreranno con chiarezza come passare da prodotti finora impiegati a nuove soluzioni. Nel catalogo, con il logo  contrassegniamo i prodotti selezionati per i quali proporre un upgrade dalle tecnologie già esistenti a quelle più avanzate.

Il passaggio da «già esistente» a «nuovo» vi consentirà di incrementare la produttività e ridurre i costi assicurandovi più vantaggi sul mercato nei confronti della concorrenza.

Grazie a ToolSchool potrete contare sempre sulle più aggiornate tecnologie. Questo vi permetterà di rafforzare la vostra posizione rispetto alla concorrenza.

In FRAISA, ToolSchool è sinonimo di esperienza pluriennale ampiamente collaudata e di grande perizia in fase di applicazione ma ToolSchool significa anche fondato know-how applicativo e vantaggi per il cliente. Su questo potete avere assoluta certezza.

La più aggiornata tecnologia
FRAISA per:

- più efficienza
- meno costi
- migliore competitività sul mercato

A questo catalogo si aggiunge un opuscolo presenta in modo chiaro i suggerimenti di ToolSchool sulla base di una panoramica degli utensili.



FRAISA ReTool® – Rigenerazione utensili industriale

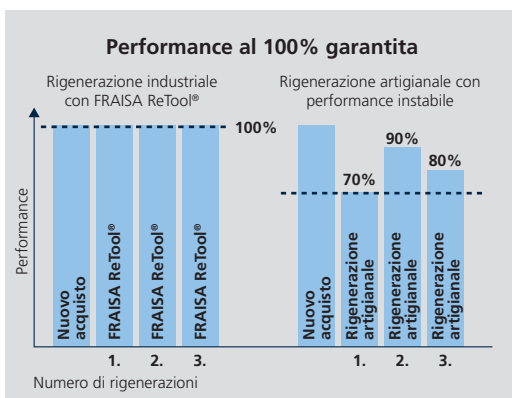


FRAISA ReTool® offre un servizio a 360° che vi permetterà di ripristinare il rendimento originale del vostro "usato" e ottimizzare i processi. Sia gli utensili FRAISA che quelli di terzi vengono rigenerati con risparmio di risorse e ricorrendo alle più moderne tecnologie. Il risultato è utensili come nuovi in grado di fornire lo stesso rendimento della prima volta che li si è impiegati. Con un investimento inferiore a quello per un nuovo acquisto, potrete così incrementare la produttività e risparmiare sui costi.

FRAISA ReTool® – Garanzia di rendimento grazie allo sviluppo integrato di utensile e processo di rigenerazione

Vi garantiamo che il vostro utensile usato, dopo la rigenerazione con **FRAISA ReTool®**, arriverà nuovamente al rendimento originale di quando era nuovo. L'assicurazione di questa garanzia di rendimento viene tenuta in conto dal nostro team di esperti già anticipatamente nella fase di sviluppo del prodotto.

Accanto al test effettivo sul prodotto e alla determinazione dei dati di taglio, lo specifico sviluppo del processo di rigenerazione è perciò parte integrante della fase di sviluppo. In questo contesto vengono applicate regole severe: il processo di **FRAISA ReTool®** è autorizzato solo se la garanzia di rendimento può essere rispettata al 100%.



FRAISA ReToolBlue – Riciclare invece di smaltire

Il prezioso metallo duro di utensili non più rigenerabili, con **FRAISA ReToolBlue**, viene da noi adottato al processo di riutilizzo.

FRAISA ReTool® può convenire anche a voi: dopo la rigenerazione, potrete contare su utensili come nuovi e con un rendimento nuovamente a livello di quello originale, il tutto a costi più convenienti di un nuovo acquisto o di un intervento di rigenerazione artigianale.

Oltre 30 anni di esperienza nella rigenerazione utensili: il nostro centro di competenza in Germania è il più grande centro di assistenza tecnica europeo per utensili fresa in metallo duro.

Video sul servizio da noi offerto: FRAISA ReTool®



Legenda riguardante la pagina dei prodotti

Classi di prestazione



Prodotti ad **alto grado di specializzazione** per applicazioni (eXtra!) che vadano oltre le applicazioni e i requisiti di prestazione generici.



Prodotti ad **ampio campo applicativo** nell'ambito delle applicazioni generiche e **con requisiti di prestazione elevati o molto elevati**.



Prodotti a **campo applicativo molto ampio, con requisiti di prestazione di medio livello** e **rapporto qualità-prezzo favorevole**.



Prodotti in acciaio rapido ad alte prestazioni per **applicazioni semplici** e/o requisiti di prestazione limitati a seconda della macchina.



Fraisa si avvale della sigla **KS** per specificare innovazioni straordinarie. Essa ricorda il leggendario direttore del reparto produzione sviluppo, il signor Konrad Schmid, il quale ha plasmato il marchio Fraisa dal 1969 al 2000.

Prestazione

Sgrossatura



Sgrossatura HPC



Sgrossatura HDC



Finitura



Questo indice descrive il rendimento degli utensili rispetto ad altri prodotti nel relativo capitolo. Più le caselle sono riempite, più l'utensile è appropriato relativo all'operazione.

Resistenza all'usura



Questo indice descrive la resistenza degli utensili all'usura al capitolo CFC. Quanto maggiore è il numero di campi compilati, tanto maggiore è la resistenza dell'utensile all'usura, caratteristica che risulta decisiva per la lavorazione di materiali abrasivi compositi.

Legenda riguardante la pagina dei prodotti

Tecnologie degli utensili



Frese con angolo dell'elica variabile

- Riduzione al minimo di oscillazioni e vibrazioni
- Volumi di truciolatura e durata d'uso maggiori



Fresa con estremità emisferica con angolo dell'elica variabile

- Riduzione al minimo di oscillazioni e vibrazioni
- Volumi di truciolatura e durata d'uso maggiori



Fresa con angolo di spoglia irregolare e variabile

- Smorzamento delle vibrazioni assiali e radiali e taglio dolce e regolare
- Miglioramento delle superfici dei pezzi e minore rumorosità
- Minore sollecitazione del mandrino e consumo di energia inferiore nonostante l'elevato volume di asportazione



Geometria frontale per fresature in penetrazione ad alto rendimento

- Geometria frontale per fresature in penetrazione ad alto rendimento a taglio facile per angoli di penetrazione elevati
- Maggiore rendimento, durata e sicurezza del processo nei lavori di fresatura in penetrazione
- Elevata funzionalità con i dati di taglio ToolExpert-HelixRamp



Fresa con cava a gradini

- Vano di truciolatura maggiore
- Asporto dei trucioli ottimizzata
- Possibilità di avanzamenti assiali e radiali elevati



Fresa con rompitrucciolo

- Lunghezze truciolo ridotte ad accostamenti assiali elevati e quindi migliore rimozione trucioli dal pezzo e dalla macchina
- Migliore automatizzazione e sicurezza di processo
- L'elevata multifunzionalità dell'utente a tagliente liscio viene mantenuta



Fresa con speciale geometria della cava

- Geometria del vano/della cava ottimizzata per uno scarico dei trucioli migliore
- Progettazione ottimizzata dello spazio tra diametro del nucleo e vano per un'elevata stabilità degli utensili



Fresa con rettifica denti

- Rinforzo delle punte del tagliente esposte
- Implementazione di una forza di taglio maggiore



Fresa con speciale smusso di protezione

- Rinforzo del cuneo tagliente principale per evitare distacchi
- Possibilità di avanzamento dei denti elevato per utensili a taglienti lisci
- Possibilità di avanzamenti assiali e radiali elevati per utensili profilati



Fresa con condizionamento del tagliente speciale

- Condizionamento del tagliente principale per una maggiore stabilità del tagliente
- Aumento del carico meccanico e termico sul tagliente
- Incremento generale della durata d'uso

Legenda riguardante la pagina dei prodotti

Tecnologie degli utensili



Fascetta frontale

- Sostegno dell'utensile in direzione radiale e assiale
- Vibrazioni ridotte
- Migliore finitura superficiale del lato frontale e del lato laterale



Preparazione bordo

- Sostegno dell'utensile in direzione radiale e assiale
- Vibrazioni ridotte e maggiore rendimento
- Migliore qualità della superficie grazie alla maggiore tranquillità di funzionamento



Fresa con superficie di spoglia di forma speciale

- Rafforzamento significativo del cuneo tagliente
- Maggiore potenza, meno vibrazioni e miglioramento della qualità del pezzo
- Maggiore durata e affidabilità, dunque maggiori possibilità di automazione



Tecnologia di lappatura

- Superfici libere, superfici di truciolatura e scanalature di scorrimento trucioli, se sottoposte a lappatura riducono la tendenza ad aderire e migliorano la qualità superficiale sul pezzo



Superficie di appoggio parabolica

- Sostegno dell'utensile in direzione radiale e assiale
- Vibrazioni ridotte e maggiore rendimento



G2.5

Utensili equilibrati con precisione

- Utensili equilibrati con precisione, minimo G2,5 a $n=20'000$ giri/min o squilibrio residuo ammesso <1 gmm
- Riduzione o aumento dell'equilibratura per mezzi di bloccaggio equilibrati con precisione
- Migliore qualità della superficie grazie alla maggiore tranquillità di funzionamento e alle minori vibrazioni
- Prolungamento della vita utile del mandrino macchina



Passaggi dolci

- I passaggi gambo-scarico-tagliente sono provvisti di salienti e raggi dolci
- Rigidità dell'utensile migliorata e dunque minore deviazione radiale
- Formazione minima di gradini in caso di approcci progressivi in profondità
- Maggiore carico meccanico e dunque maggiore rendimento



Utensile fresa con diametro del nocciolo crescente

- Miglioramento della rigidità dell'utensile, dunque minore escursione dell'utensile
- Maggiore rendimento nella zona degli accostamenti ap , ae e dell'avanzamento fz
- Migliore precisione del pezzo grazie alla minore escursione dell'utensile



h4

Fresa con gambo di presa in qualità h4

- Elevata precisione di concentricità ed eccentricità
- Ottima per le moderne attrezzature di serraggio di precisione



h5

Fresa con gambo di presa in qualità h5

- Elevata precisione di concentricità ed eccentricità
- Ottima per le moderne attrezzature di serraggio di precisione

Legenda riguardante la pagina dei prodotti

Tecnologie degli utensili



Fresa con estremità emisferica con condizionamento del tagliente speciale per lavori di sgrossatura

- Condizionamento del tagliente principale per una maggiore stabilità del tagliente
- Aumento significativo dei volumi di truciolatura rispetto alle frese con estremità emisferica tradizionali
- Incremento generale della durata d'uso



Fresa con estremità emisferica con condizionamento del tagliente speciale per lavori di finitura

- Condizionamento e lucidatura del tagliente principale
- Precisione dei profili duratura e qualità delle superfici
- Incremento generale della durata d'uso



Fresa torica con condizionatura speciale del bordo per la sgrossatura

- Condizionatura del tagliente principale per una maggiore stabilità del bordo di taglio
- Significativo aumento del volume di truciolo nell'unità tempo rispetto alle comuni frese toriche
- Miglioramento generale in fatto di durata



Fresa torica con condizionatura speciale del bordo per la finitura

- Condizionatura e levigatura del tagliente principale
- Duratura precisione del contorno e qualità della superficie
- Miglioramento generale in fatto di durata



Fresa a testa sferica con diametro ad alta precisione

- Campo di tolleranza di massima precisione su 180° della sfera per un'elevata precisione della forma
- Diametro del tagliente corrispondente al doppio del raggio effettivo della sfera



Fresa con estremità emisferica con tolleranza del raggio ad alta precisione

- Le tolleranze impostate in modo speciale semplificano la programmazione e il completamento sicuro del contorno
- Campo di tolleranza decisamente preciso per un'elevata accuratezza delle forme



Frese toriche con tolleranza del diametro ad alta precisione

- Le tolleranze impostate in modo speciale semplificano la programmazione e il completamento sicuro del contorno
- Campo di tolleranza decisamente preciso per un'elevata accuratezza delle forme



Frese toriche con tolleranza del raggio ad alta precisione

- Le tolleranze impostate in modo speciale semplificano la programmazione e il completamento sicuro del contorno
- Campo di tolleranza decisamente preciso per un'elevata accuratezza delle forme



Frese cilindriche con tolleranza del diametro ad alta precisione

- Le tolleranze impostate in modo speciale semplificano la programmazione e il completamento sicuro del contorno
- Campo di tolleranza decisamente preciso per un'elevata accuratezza delle forme



Precisione geometrica

- Una precisione geometrica con tolleranze di massimo +/- 0.005 mm garantisce grande precisione nella lavorazione del componente

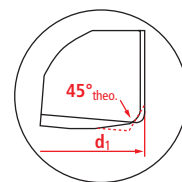
Tecnologie degli utensili



Tagliante per finitura frontale

- Utensile con tagliante specificamente concepito per la finitura frontale
- Possibilità di realizzare superfici piane della migliore qualità

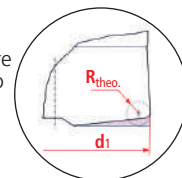
Gli utensili con il tagliante per finitura frontale possono contare su uno smusso teorico di 45° (45°_{theo}). Questo valore è specificato per ogni diametro nella tabella dei dati del catalogo e viene fornito come smusso di utensile per la programmazione CNC/CAM. In fase di lavorazione, però, a causa dei 45°_{theo} di differenza rispetto al contorno effettivo dell'utensile, viene prodotto minimale materiale residuo (tenere presenti le indicazioni tecniche in merito all'applicazione).



Frese ad alto avanzamento (HFC)

- Utensile con una geometria del tagliante speciale per le lavorazioni ad alto avanzamento
- Possibilità di avanzamento elevato grazie alla distribuzione delle sezioni dei trucioli
- Vano maggiore per una rimozione rapida e semplice dei trucioli
- Elevati volumi di asporto con una buona approssimazione dei contorni

La fresa HFC è caratterizzata da un raggio di programmazione teorico (R_{theo}). Questo valore è indicato per ogni diametro nella tabella dei dati della pagina del catalogo ed è specificato per la programmazione CNC/CAM come raggio dell'utensile. Durante la lavorazione si genera comunque del materiale residuo a causa della differenza tra R_{theo} e l'effettivo contorno dell'utensile.



Inserto

- Con rettifica perimetrale, in parte con petti levigati su tutti i lati
- Rendimento migliorato



Nuova geometria di taglio frontale Safe Center

- Contrasta rotture del tagliante durante il processo di penetrazione
- Elevata stabilità dei taglianti e quindi alta resistenza all'usura e alto rendimento

Legenda riguardante la pagina dei prodotti

Materiali per utensili

**HM
XT**

Metallo duro micrograna. Durezza 1900 HV. Contenuto di cobalto 9%. Si distingue particolarmente per l'elevata tenacità (Toughness).

**HM
XA**

Metallo duro micrograna. Durezza 1950 HV. Contenuto di cobalto 8%. Si distingue particolarmente per l'elevata resistenza all'usura (Abrasion).

**HM
MG10**

Metallo duro micrograna. Durezza 1600 HV. Contenuto di cobalto 10%.

**HM
MG6**

Metallo duro micrograna. Durezza 1800 HV. Contenuto di cobalto 6%.

**HM
Plus**

Metallo duro a grana ultrafine. Durezza 1800 HV. Contenuto di cobalto 12%.

HM

Metallo duro micrograno, universale.

CVD

Diamante puro prodotto mediante deposizione chimica nella fase gassosa (CVD). Si caratterizza per l'ottimale tenacità alla rottura presso la tagliente e l'elevata conducibilità termica.

CBN

Nitruro di boro cubico cristallino (CBN). Durezza 4700 HV. Si distingue particolarmente per l'elevata resistenza all'usura (Abrasion).

**HSS
PM/F**

ASR di alta resa per utensili, da metallurgia delle polveri.

**HSS-E
Co8**

ASR di alta resa.

Legenda riguardante la pagina dei prodotti

Forma dello spigolo dei taglienti



L'angolo tra il tagliente frontale e il tagliente periferico è dotato di uno smusso di protezione di 45°. La dimensione dello smusso di protezione è indicata per ogni diametro nella tabella dei dati della pagina del catalogo.



L'utensile è torico. Il valore del raggio è indicato nella tabella-dati in funzione del diametro.



Lo spigolo tra tagliente frontale e tagliente periferico è vivo.



Fresa ad alto avanzamento (HFC). Utensile con una geometria del tagliente speciale per le lavorazioni ad alto avanzamento.



Fresa ad alto avanzamento (HFC) con raggio angolare. Utensile con speciale geometria del tagliente per la lavorazione ad avanzamento rapido.

Legenda riguardante la pagina dei prodotti

Idoneità alla lavorazione



Lo sfondo blu indica l'eccezionale adeguatezza dell'utensile a questo materiale.



Lo sfondo azzurro indica un'adeguatezza da buona a sufficiente dell'utensile a questo materiale.

Capitolo: Acciaio, acciaio inox e titanio / Lavorazione in 3D di acciaio/ Forme speciali

| | | | | | | | | | |
|--------------------|-----------------------|------------------------|------------------------|---------------------|---------------------|--------------------|--------------------------|-----------------------|--|
| Rm < 850 | Rm 850-1100 | Rm 1100-1300 | Rm 1300-1500 | HRC 48-56 | HRC 56-60 | HRC > 60 | Inox Stainless | Ti Titanium | |
|--------------------|-----------------------|------------------------|------------------------|---------------------|---------------------|--------------------|--------------------------|-----------------------|--|

Capitolo: Alluminio e rame

| | | | | | | | | | |
|--------------------|--|--|---------------------------------|---------------------------------|--------------------------------|--|---------------------|------------------------------------|--|
| Rm < 850 | | | Al Aluminium > 99% | Al Aluminium Alloy | Al Aluminium Cast | | Cu Copper | Plastic Thermo- plast | |
|--------------------|--|--|---------------------------------|---------------------------------|--------------------------------|--|---------------------|------------------------------------|--|

Nel campo aggiuntivo sono indicati gli altri materiali che è possibile lavorare

Capitolo: CFC

| | | | | | | | | | |
|--------------------------------|---------------------|----------------------|--|----------------------|--------------------------------------|---------------------------------------|--------------------------|---------------|--|
| Al Aluminium Cast | Cu Copper | CuZn Brass | | C Graphite | CFK GFK I | CFK GFK II | CFK III | CFK/Al | |
|--------------------------------|---------------------|----------------------|--|----------------------|--------------------------------------|---------------------------------------|--------------------------|---------------|--|



Gruppo I: plastiche tecniche fibrorinforzate e materiali plastici composti con percentuale di fibra fino al 30%



Gruppo II: materiali plastici composti fibrorinforzati e abrasivi con percentuale di fibra fino al 60%







Gruppo III: materiali plastici composti ad alte prestazioni, rinforzati con fibra di carbonio e molto abrasivi, con percentuale di fibra superiore al 60%

È possibile assegnare i materiali composti fibrorinforzati ai 3 gruppi di truciolatura in funzione della combinazione dei seguenti fattori di influenza (la descrizione di cui sopra funge da aiuto semplificato):



- Matrice (legante)
- Tipo di fibra (materiale)
- Forma della fibra (corta, lunga, infinita, tessuto)
- Percentuale di fibra
- Struttura della fibra (orientamento)
- Procedimento di produzione

Legenda riguardante la pagina dei prodotti


Forma del gambo / Esecuzioni del gambo

-  Utensili per metallo duro con gambo cilindrico: esecuzione gambo ai sensi della norma DIN 6535 HA
-  Utensili per metallo duro con gambo cilindrico e superficie di serraggio laterale: esecuzione gambo ai sensi della norma DIN 6535 HB
-  Utensili a gambo corto: il gambo corrisponde alla classificazione e alla tolleranza del diametro della norma DIN 6535 HB. La sezione dietro alla superficie di serraggio è ridotta.
-  Utensili HSS con gambo cilindrico e superficie di serraggio laterale: esecuzione gambo ai sensi della norma DIN 1835 B


Inserti - Utensili frese

-  Esecuzione gambo ai sensi della norma DIN 1835 B
-  Attacco femmina con cava trasversale DIN 138

Angolo d'elica e angolo di spoglia interna

-  Angolo d'elica e angolo di spoglia interna sono elementi di speciale importanza delle frese. Per questa ragione angolo d'elica λ e angolo di spoglia interna γ sono indicati per ciascun utensile. I valori precisi possono variare col diametro.

Angolo di collisione α

-  Gli utensili aventi diametro di taglienti inferiore al diametro del gambo esigono speciali cure nell'impiego. Le collisioni sono evitate con sicurezza se le superfici laterali di delimitazione sono inclinate con un angolo minimo (angolo di collisione α) rispetto alla verticale. L'angolo di collisione è indicato per ogni diametro nella tabella dei dati della pagina del catalogo.

Legenda riguardante la pagina dei prodotti

Abbreviazioni

| | |
|--------------------------|--|
| d₁ | Diametro dei taglienti [mm] |
| d₂ | Diametro gambo o foro [mm] |
| d₃ | Diametro di scarico o esterno (fresa per spianatura) [mm] |
| d₄ | Diametro di scarico prima del passaggio scarico-gambo [mm] |
| d₅ | Diametro superficie frontale [mm] |
| l₁ | Lunghezza totale dell'utensile [mm] |
| l₂ | Lunghezza di taglio [mm] |
| l₃ | Distanza della parte frontale dell'utensile dalla fine del scarico [mm] |
| l₄ | Distanza tra la testa dell'utensile e l'inizio del gambo [mm] |
| l₅ | Distanza della parte frontale del gambo dalla fine del scarico [mm] |
| l₆ | Lunghezza gambo [mm] |
| l₇ | Lunghezza testa [mm] |
| l₈ | Lunghezza del fianco [mm] |
| Θ | Angolo di serraggio «Teta» tra d ₃ e d ₄ [° - DEG] |
| 45° | Dimensione dello smusso di protezione tra tagliente frontale e tagliente periferico [mm] |
| r | Torico [mm] |
| α | Angolo di collisione «Alfa» [° - DEG] |
| β | Angolo di registrazione minimo «Beta» [° - DEG] |
| z | Numero dei taglienti |
| R_{theo.} | Raggio di programmazione teorico (R _{theo.}) per utensili HFC [mm] Prestare attenzione alle indicazioni sulla tecnologia degli utensili HFC |
| α/2 | Angolo conico [° - DEG] |
| r₁ | Raggio di taglio [mm] |
| r₂ | Raggio della superficie laterale [mm] |
| r₃ | Raggio di uscita [mm] |

Legenda riguardante la pagina dei prodotti

| | |
|-----------------------------------|--|
| $a_{p_{max}}$ | Massimo avanzamento assiale [mm] |
| $a_{p_{lim}}$ | Approccio assiale limitato dal caso di applicazione o dalla geometria dell'utensile [mm] |
| b | Altezza utensile per frese cilindriche frontali [mm] |
| φ_{max} | Angolo di penetrazione |
| H | Altezza del inserto |
| B | Larghezza del inserto |
| D | Spessore del inserto |
| D₁ | Diametro dell'inserto |
| L_A | Lunghezza totale dal naso mandrino |
| L-Typ | Esecuzione: C = Corta; N = Normale; M = Medio-lunga; L = Lunga; XL = Extralunga |
| I | Interface: parametro interfaccia |

Avvertenze tecniche per l'applicazione

Strategie di lavorazione 2.5D

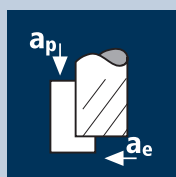
- HPC** High-Performance-Cutting
Caratteristiche della fresatura HPC:
- Elevato volume di lavorazione con forze di taglio elevate
 - Elevato angolo di azione dell'utensile: 66° - 180° (ae), e profondità di taglio ridotte ($a_p < 1.5x_d$)
 - Brevi corse dell'utensile (utensile sempre in azione)

- HDC** High-Dynamic-Cutting
Caratteristiche della fresatura HDC:
- Massimo volume di lavorazione con forze di taglio inferiori
 - Forze di taglio / condizioni di taglio / angolo di azione dell'utensile costanti
 - Angolo di azione dell'utensile ridotto: 25° - 60° (ae) a profondità di taglio elevate ($a_p > 1.5x_d$)

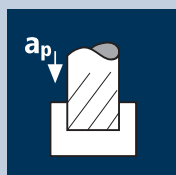
Casistica di applicazione per la lavorazione 2.5D

Cilindrica e torico

Sgrossatura HPC

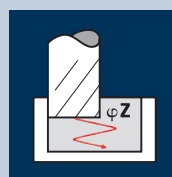


Sgrossatura HPC di lato (taglio parziale)

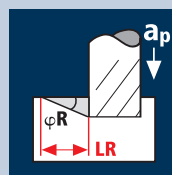


Sgrossatura HPC cava (dal pieno)

Fresatura in penetrazione

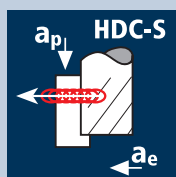


Fresatura in penetrazione mediante Helix

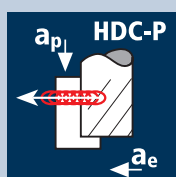


Fresatura in penetrazione in rampa

Sgrossatura HDC

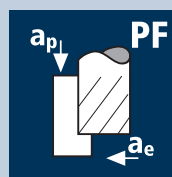


Sgrossatura HDC-S (taglio parziale)

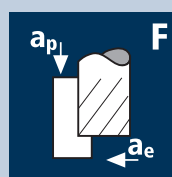


Sgrossatura HDC-P (taglio parziale)

Finitura



Pre finitura (taglio parziale) (Pre-Finishing PF)



Finitura (taglio parziale) (Finishing F)

Avvertenze tecniche per l'applicazione

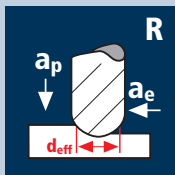
Strategie di lavorazione 3D

- HSC** High-Speed-Cutting
Caratteristiche della fresatura HSC:
- Lavorazione con utensili torici o sferici
 - Possibilità di realizzare ottima qualità delle superfici e precisione geometrica
 - Lavorazione ha luogo con piccoli accostamenti (a_p & a_e)
 - Elevate velocità di taglio (v_c)

- HFC** High-Feed-Cutting
Caratteristiche della fresatura HFC:
- Piccolo accostamento in profondità (a_p)
 - Avanzamenti per dente molto elevati (f_z)
 - Elevato volume di lavorazione con forze di taglio basse
 - Speciale geometria del tagliente degli utensili

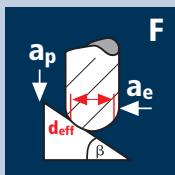
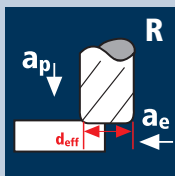
Indicazioni sull'applicazione nel capitolo Lavorazione in 3D

I simboli di applicazione sono mostrati sul lato sinistro dei parametri di taglio.
La lettera in alto a destra indica la strategia per i parametri di taglio indicati.



R sta per «Roughing»: processo di sgrossatura che richiede una macchina e un serraggio con prestazioni e stabilità sufficienti.

Sgrossatura planare: I parametri di taglio indicati in catalogo sono specifici per l'asportazione di strati. In tal caso l'asse macchina assiale ha un avanzamento costante e non si modifica mai. Per tale ragione si sconsiglia l'esecuzione di tagli ad estrusione e a percussione!

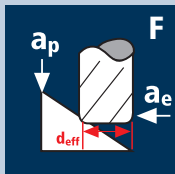


PF sta per «Pre-Finishing»: pre finitura

F sta per «Finishing»: finitura

SF sta per «Super-Finishing»: super finitura

I parametri di taglio indicati in catalogo sono specifici per l'asportazione in piano e parallelamente alla forma del pezzo. È ammessa l'esecuzione di tagli ad estrusione e a percussione, fermo restando che il taglio a percussione crea condizioni operative sfavorevoli riducendo la durata utile dell'utensile.

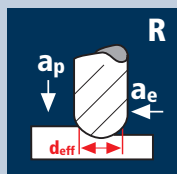


Avvertenze tecniche per l'applicazione

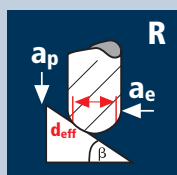
Casistica di applicazione per la lavorazione 3D

Lavorazione HSC

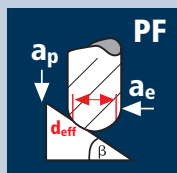
Cstremità emisferica



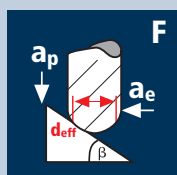
Sgrossatura planare
(Roughing R)



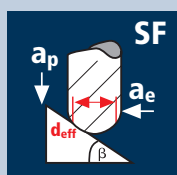
Sgrossatura
parallelamente al
contorno
(Roughing R)



Pre finitura
(Pre-Finishing PF)
Aree verticali

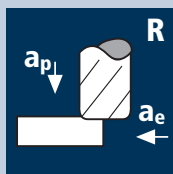


Finitura
(Finishing F)
Aree verticali



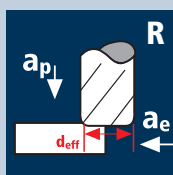
Super finitura
(Super-Finishing SF)
Aree verticali

Torico



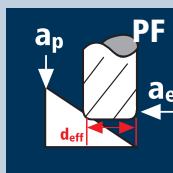
Sgrossatura planare
(Roughing R)

Impiego al di sopra
dell'area torica



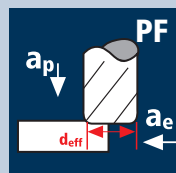
Sgrossatura planare
(Roughing R)

Impiego nell'area
torica



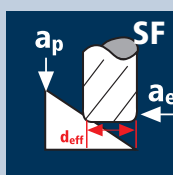
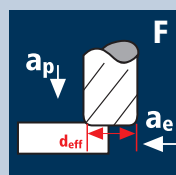
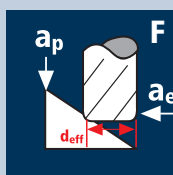
Pre finitura
(Pre-Finishing PF)

Aree verticali /
Aree piatte



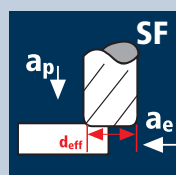
Finitura
(Finishing F)

Aree verticali /
Aree piatte

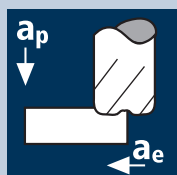


Super finitura
(Super-Finishing SF)

Aree verticali / Aree
piatte



Lavorazione HFC



Sgrossatura planare con frese ad alto avanzamento
(High-Feed-Cutting)

Avvertenze tecniche per l'applicazione

Strategie di lavorazione con utensili fresa ArCut X (fresse ad arco)










Finitura Con l'utensile ArCut-X si può effettuare con grande efficienza la pre-finitura e la finitura di superfici piane e a forma libera.

HSC Le aree radiali possono essere lavorate ricorrendo alla strategia HSC a 5 assi.



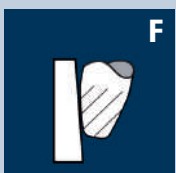
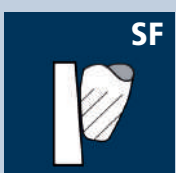
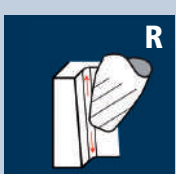
HDC Il materiale residuo nelle aree angolari può essere rimosso affidandosi alla strategia HDC a 5 assi.

Casistica di applicazione per utensili fresa ArCut X (fresse ad arco)

Sferica / Sferica & Torica

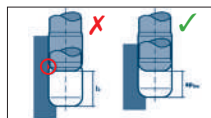
| | | |
|--|--|---|
|  |  | Pre finitura (Pre-Finishing PF) Aree verticali / Aree piatte |
|  |  | Finitura (Finishing F) Aree verticali / Aree piatte |
|  |  | Super finitura (Super-Finishing SF) Aree verticali / Aree piatte |
|  | | Pre finitura HSC (Pre-Finishing PF) Aree radiali |
|  | | Finitura HSC (Finishing F) Aree radiali |
|  | | Super finitura HSC (Super-Finishing SF) Aree radiali |

Torica / Integrale torica

| | |
|---|---|
|  | Sgrossatura di materiale residuo HDC (Roughing HDC) Aree angolari |
|  | Pre finitura (Pre-Finishing PF) Aree verticali |
|  | Finitura (Finishing F) Aree verticali |
|  | Super finitura (Super-Finishing SF) Aree verticali |
|  | Sgrossatura HSC (Roughing R) Aree angolari |

Avvertenze tecniche per l'applicazione

Utensili AX-RV:



Con gli utensili AX-RV è possibile ottenere passaggi puliti durante la rifinitura con approcci gradualmente in profondità. In questo caso di applicazione è tuttavia importante un corretto approccio in profondità. A causa della geometria dell'utensile con raggio frontale, l'approccio assiale limitato (ap_{lim}) è determinato nelle seguenti tabelle:

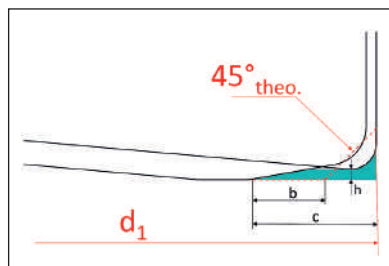
Profondità dell'approccio assiale ap_{lim} per passaggio piano in parete con AX-RV2 e AX-RV3

| d_1 | l_2 | Raggio r | ap_{lim} | Raggio r | ap_{lim} | Raggio r | ap_{lim} | Raggio r | ap_{lim} | Raggio r | ap_{lim} | Raggio r | ap_{lim} |
|-------|-------|----------|------------|----------|------------|----------|------------|----------|------------|----------|------------|----------|------------|
| [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] |
| 3 | 4 | 0.5 | 2.5 | | | | | | | | | | |
| 4 | 5 | 0.5 | 3.5 | | | | | | | | | | |
| 5 | 6 | 0.5 | 4.5 | | | | | | | | | | |
| 6 | 7 | 0.5 | 5.5 | 1.0 | 5.0 | | | | | 2.5 | 3.5 | | |
| 8 | 9 | | | 1.0 | 7.0 | | | | | 2.5 | 5.5 | | |
| 10 | 11 | | | 1.0 | 9.0 | 1.5 | 8.5 | | | 2.5 | 7.5 | 4.0 | 6.0 |
| 12 | 13 | | | 1.0 | 11.0 | 1.5 | 10.5 | | | 2.5 | 9.5 | 4.0 | 8.0 |
| 16 | 18 | | | 1.0 | 16.0 | 1.5 | 15.5 | 2.0 | 15.0 | 2.5 | 14.5 | 4.0 | 13.0 |
| 20 | 22 | | | 1.0 | 20.0 | 1.5 | 19.5 | 2.0 | 19.0 | 2.5 | 18.5 | 4.0 | 17.0 |
| 25 | 27 | | | 1.0 | 25.0 | 1.5 | 24.5 | | | 2.5 | 23.5 | 4.0 | 22.0 |

Utensili con tagliente per finitura frontale:

profondità di accostamento radiale ae_{max} per superfici piane in utensili con tagliente per finitura frontale

| d_1 | h | b | c | ae_{max} |
|-------|------|------|------|------------|
| [mm] | [mm] | [mm] | [mm] | [mm] |
| 3 | 0.02 | 0.1 | 0.20 | 2.6 |
| 4 | 0.02 | 0.1 | 0.20 | 3.6 |
| 5 | 0.02 | 0.1 | 0.20 | 4.6 |
| 6 | 0.03 | 0.2 | 0.20 | 5.3 |
| 8 | 0.03 | 0.2 | 0.35 | 7.3 |
| 10 | 0.04 | 0.3 | 0.35 | 9 |
| 12 | 0.04 | 0.3 | 0.50 | 11 |
| 16 | 0.04 | 0.3 | 0.50 | 15 |



Lavorazione CFC/PRFV:

Lavorazione raccomandata:

Rotazione invertita

- Il calore viene condotto via dall'elemento costruttivo
- Migliore qualità della superficie
- Minore danneggiamento cumulativo (danneggiamento meccanico)
- La polvere viene asportata

Fresatrice cilindrica con rivestimento in DIAMANTE: Lavorazione di sgrossatura e finitura di CFC in una sola passata.



Tagliente retta per l'impiego neutro con qualità di serraggio e spessore della parete medi.



Tagliente a trazione per l'impiego normale con buon serraggio e asportazione di polvere/trucioli.



Tagliente a spinta per l'impiego in materiali sottili, poiché il materiale viene premuto contro la base.

Avvertenze tecniche per l'applicazione

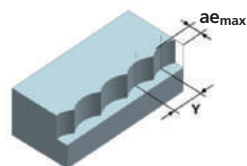
Frese con inserti:

Profondità di accostamento radiale a_e per superfici piane con utensili frese con inserti HFC

| d_1 [mm] | Dimensioni inserto [mm] | a_e [mm] |
|---------------|----------------------------|---------------|
| 25 | 10 | 13.6 |
| 35 | 13 | 18.8 |
| 40 | 10 | 28.6 |
| 50 | 10 | 38.6 |
| 63 | 10 | 51.6 |
| 50 | 13 | 33.8 |
| 63 | 13 | 46.8 |
| 80 | 13 | 63.8 |

Fresatura a tuffo con utensili frese con inserti HFC

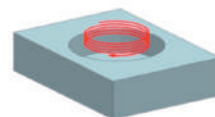
| Dimensioni inserto [mm] | $a_{e_{max}}$ [mm] | f_z [mm] | Y_{max} [mm] |
|----------------------------|-----------------------|---------------|--------------------|
| 10 | 8 | 0.15 | $< 0.7 \times d_1$ |
| 13 | 10.5 | 0.20 | $< 0.7 \times d_1$ |



Fresatura a perforazione/tuffo circolare con utensili frese con inserti HFC e inserti tondi

Diametro di foratura minimo e massimo

| d_1 [mm] | Inserti HFC 10mm | | Inserti HFC 13mm | |
|---------------|-------------------|-------------------|-------------------|-------------------|
| | D_{max} [mm] | D_{min} [mm] | D_{max} [mm] | D_{min} [mm] |
| 25 | 48 | 35 | - | - |
| 35 | - | - | 68 | 50 |
| 40 | 78 | 65 | - | - |
| 50 | 98 | 85 | 98 | 80 |
| 63 | 124 | 111 | 124 | 106 |
| 80 | - | - | 158 | 140 |



| d_1 [mm] | Inserti tondi 10mm | | Inserti tondi 12mm | |
|---------------|--------------------|-------------------|--------------------|-------------------|
| | D_{max} [mm] | D_{min} [mm] | D_{max} [mm] | D_{min} [mm] |
| 20 | 40 | 24 | - | - |
| 25 | 50 | 32 | - | - |
| 32 | 64 | 46 | - | - |
| 35 | 70 | 52 | 70 | 48 |
| 40 | 80 | 62 | 80 | 58 |
| 42 | 84 | 66 | 84 | 62 |
| 50 | 100 | 82 | 100 | 78 |
| 52 | 104 | 86 | 104 | 82 |
| 63 | - | - | 126 | 104 |
| 66 | - | - | 132 | 110 |
| 80 | - | - | 160 | 138 |
| 100 | - | - | 200 | 178 |

Informazioni riguardanti i parametri di taglio

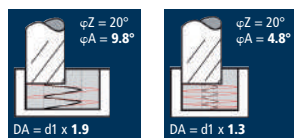
Angolo di penetrazione per frese integrali

| Capitolo: Acciaio, acciaio inox, titanio e nichel | | | | | | | | | | | | |
|---|----------------|-------|-------|----------------|-------|-------|-------------------|-------|-------|----------------|-------|-------|
| Gruppo materiale | Rm 850-1500 | | | HRC 48 - 60 | | | Inox Stainless | | | Ti Titanium | | |
| Versione | N | M | L | N | M | L | N | M | L | N | M | L |
| Avanzamento vf [%] | 100% | | | 100% | | | 80% | | | 80% | | |
| z = 2 | 2.50° | 1.80° | 1.00° | 1.50° | 1.00° | 0.60° | 2.50° | 1.80° | 1.00° | 2.50° | 1.80° | 1.00° |
| z = 3 | 2.00° | 1.20° | 0.80° | 1.00° | 0.65° | 0.40° | 2.00° | 1.20° | 0.80° | 2.00° | 1.20° | 0.80° |
| z = 4 | 1.00° | 0.65° | 0.40° | 0.50° | 0.35° | 0.20° | 1.00° | 0.65° | 0.40° | 1.00° | 0.65° | 0.40° |
| z > 4 | 0.40° | 0.30° | 0.20° | 0.20° | 0.15° | 0.10° | 0.40° | 0.30° | 0.20° | 0.40° | 0.30° | 0.20° |

| Capitolo: Lavorazione in 3D | | | | | | | | | | | | |
|-----------------------------|----------------|-------|-------|----------------|-------|-------|-------------------|-------|-------|----------------|-------|-------|
| Gruppo materiale | Rm 850-1500 | | | HRC 48 - 60 | | | Inox Stainless | | | Ti Titanium | | |
| Versione | N | M | L | N | M | L | N | M | L | N | M | L |
| Avanzamento vf [%] | 100% | | | 100% | | | 80% | | | 80% | | |
| z = 2 | 0.50° | 0.35° | 0.25° | 0.25° | 0.20° | 0.10° | 0.50° | 0.35° | 0.25° | 0.50° | 0.35° | 0.25° |
| z = 4 | 0.30° | 0.25° | 0.15° | 0.20° | 0.15° | 0.10° | 0.30° | 0.25° | 0.15° | 0.30° | 0.25° | 0.15° |
| z > 4 | 0.20° | 0.15° | 0.10° | 0.15° | 0.10° | 0.10° | 0.20° | 0.15° | 0.10° | 0.20° | 0.15° | 0.10° |
| HFC | 0.50° | 0.35° | 0.25° | 0.40° | 0.30° | 0.20° | 0.50° | 0.35° | 0.25° | 0.50° | 0.35° | 0.25° |

| Capitolo: Alluminio e rame | | | | | | | | | | | | |
|----------------------------|--------------------------|-------|-------|-------|-------|-------|--------------|-------|-------|-------|-------|-------|
| Gruppo materiale | Al Aluminium Alloy | | | | | | Cu Copper | | | | | |
| Versione | N | M | 2xd | 3xd | 4xd | 5xd | N | M | 2xd | 3xd | 4xd | 5xd |
| Avanzamento vf [%] | 100% | | | | | | 100% | | | | | |
| z = 2 | 5.00° | 4.00° | 6.00° | 5.00° | 4.00° | 2.50° | 4.00° | 3.00° | 5.00° | 4.00° | 3.00° | 2.00° |
| z = 3 | 4.50° | 3.50° | 5.00° | 4.50° | 3.50° | 2.00° | 3.50° | 2.50° | 4.00° | 3.50° | 2.50° | 1.50° |

Angolo di penetrazione (Helix) per frese con geometria frontale per fresature in penetrazione ad alto rendimento



Programmare correttamente l'angolo di penetrazione ϕ_Z o ϕ_A !

| Tabella di conversione ϕ_Z in ϕ_A , con corrispondente diametro del foro | | | | | | | | | | | | |
|--|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--|
| Angolo di penetrazione ϕ_Z [°] | 20° | 18° | 17.5° | 16° | 15° | 13° | 12° | 10° | 9° | 8° | 7° | |
| Il diametro del foro DA | | | | | | | | | | | | |
| Angolo di penetrazione ϕ_A [°] | | | | | | | | | | | | |
| DA = d1 x 1.3 [mm] | 4.8° | 4.3° | 4.2° | 3.8° | 3.5° | 3.0 | 2.8° | 2.3° | 2.1° | 1.9° | 1.6° | |
| DA = d1 x 1.5 [mm] | 6.9° | 6.2° | 6.0° | 5.5° | 5.1° | 4.4° | 4.1° | 3.4° | 3.0° | 2.7° | 2.3° | |
| DA = d1 x 1.7 [mm] | 8.5° | 7.6° | 7.4° | 6.7° | 6.3° | 5.4° | 5.0° | 4.2° | 3.7° | 3.3° | 2.9° | |
| DA = d1 x 1.9 [mm] | 9.8° | 8.7° | 8.5° | 7.7° | 7.2° | 6.2° | 5.7° | 4.8° | 4.3° | 3.8° | 3.3° | |

Suggerimento FRAISA

www.fraisa.com

Informazioni riguardanti i parametri di taglio

Angolo di penetrazione per frese ad inserti

| Gruppo materiale | | Rm 850-1500 | | | HRC 48 - 60 | | | Inox Stainless | | | Ti Titanium | | | Al Aluminium Alloy | | |
|--|-----------|----------------|-------|-------|----------------|-------|-------|-------------------|-------|-------|----------------|-------|-------|--------------------------|--|--|
| | | K | M | L/XL | K | M | L/XL | K | M | L/XL | K | M | L/XL | | | |
| Versione | | 100% | | | 100% | | | 80% | | | 100% | | | | | |
| Avanzamento vf [%] | | 100% | | | 100% | | | 80% | | | 100% | | | | | |
| d ₁ | | | | | | | | | | | | | | | | |
| Frese ad angolo/Frese per scanalature 8mm | 16 | 1.00° | 0.80° | 0.60° | 0.70° | 0.55° | 0.40° | 1.00° | 0.80° | 0.60° | 1.30° | 1.10° | 0.80° | | | |
| Frese ad angolo/Frese per scanalature 8mm | 20 | 0.75° | 0.60° | 0.45° | 0.55° | 0.40° | 0.30° | 0.75° | 0.60° | 0.45° | 1.00° | 0.80° | 0.60° | | | |
| Frese ad angolo/Frese per scanalature 8mm | 25 | 0.75° | 0.60° | 0.45° | 0.55° | 0.40° | 0.30° | 0.75° | 0.60° | 0.45° | 1.00° | 0.80° | 0.60° | | | |
| Frese ad angolo/Frese per scanalature 8mm | 32 | 0.50° | 0.40° | 0.30° | 0.35° | 0.30° | 0.20° | 0.50° | 0.40° | 0.30° | 0.65° | 0.50° | 0.40° | | | |
| Frese ad angolo/Frese per scanalature 13mm | 25 | 2.00° | 1.60° | 1.20° | 1.40° | 1.10° | 0.85° | 2.00° | 1.60° | 1.20° | 2.50° | 2.00° | 1.50° | | | |
| Frese ad angolo/Frese per scanalature 13mm | 32 | 1.60° | 1.30° | 0.95° | 1.10° | 0.90° | 0.65° | 1.60° | 1.30° | 0.95° | 2.00° | 1.60° | 1.20° | | | |
| Frese ad angolo 8mm | 40 ; 50 | 0.20° | | | 0.20° | | | 0.20° | | | 0.25° | | | | | |
| Frese ad angolo 8mm | 63 ; 80 | 0.10° | | | 0.10° | | | 0.10° | | | 0.15° | | | | | |
| Frese ad angolo 13mm | 40 ; 50 | 0.40° | | | 0.40° | | | 0.40° | | | 0.45° | | | | | |
| Frese ad angolo 13mm | 63 ; 80 | 0.20° | | | 0.20° | | | 0.20° | | | 0.25° | | | | | |
| Frese per spianatura | 40 ; 50 | 0.15° | | | X | | | 0.15° | | | 0.20° | | | | | |
| Frese per spianatura | 63 ; 80 | 0.10° | | | X | | | 0.10° | | | 0.15° | | | | | |
| Frese per spianatura | 100 ; 125 | X | | | X | | | X | | | X | | | | | |
| Frese ad alto avanzamento | 25 ; 35 | 0.60° | 0.40° | 0.20° | 0.50° | 0.30° | 0.15° | 0.60° | 0.40° | 0.20° | X | | | | | |
| Frese ad alto avanzamento | 40 ; 50 | 0.40° | | | 0.30° | | | 0.40° | | | X | | | | | |
| Frese ad alto avanzamento | 63 ; 80 | 0.20° | | | 0.15° | | | 0.20° | | | X | | | | | |
| Frese a spianare circolari | 20 ; 25 | 0.60° | 0.40° | 0.20° | 0.50° | 0.30° | 0.15° | 0.60° | 0.40° | 0.20° | 0.80° | 0.50° | 0.25° | | | |
| Frese a spianare circolari | 32 ; 35 | 0.60° | 0.40° | 0.20° | 0.50° | 0.30° | 0.15° | 0.60° | 0.40° | 0.20° | 0.80° | 0.50° | 0.25° | | | |
| Frese a spianare circolari | 40 ; 42 | 0.50° | | | 0.40° | | | 0.50° | | | 0.60° | | | | | |
| Frese a spianare circolari | 50 ; 52 | 0.40° | | | 0.30° | | | 0.40° | | | 0.50° | | | | | |
| Frese a spianare circolari | 63 ; 66 | 0.25° | | | 0.20° | | | 0.25° | | | 0.35° | | | | | |
| Frese a spianare circolari | 80 ; 100 | 0.10° | | | 0.10° | | | 0.10° | | | 0.20° | | | | | |

Informazioni riguardanti i parametri di taglio

FRAISA ToolExpert® 2.0 – il nuovo tool online per i dati di taglio che vi permette un impiego ottimale dell'utensile

Essendo disponibile online, il ToolExpert non richiede più un laborioso download. Il programma viene inoltre gestito indipendentemente dalla piattaforma semplicemente utilizzando un browser Internet aggiornato, e un design sapientemente rivisto lo rende anche più intuitivo nell'uso.

Questo intuitivo tool online vi fornisce dati di taglio per la vostra produzione, sempre ottimali e specifici all'utensile e al materiale, e con ciò un'ottima base per un impiego preciso dei vostri utensili FRAISA, rapidamente, facilmente e gratuitamente.

Oltre a ciò, le tre applicazioni ToolExpert MFC, ToolExpert HelixRamp e ToolExpert HDC sono adesso integrate in ToolExpert permettendo un utilizzo ancora più flessibile e universale.



FRAISA ToolExpert® E-Cut – Di facile applicazione, altamente efficiente ed estremamente economico

Il calcolatore dei dati di taglio FRAISA FRAISA ToolExpert E-Cut fornisce dati di taglio per la produzione, specifici all'utensile e al materiale, e con ciò la base per un impiego preciso degli utensili E-Cut di FRAISA.

Quest'innovativa soluzione software è di uso molto intuitivo: Per ottenere i dati di taglio specifici basta infatti selezionare materiale, caso applicativo e utensile. Tramite FRAISA ToolExpert E-Cut i dati geometrici dell'utensile potranno essere trasferiti nel sistema CAM.



Informazioni riguardanti i parametri di taglio

FRAISA ToolExpert® MFC – Veloce, semplice, affidabile: Conoscenze sulla tecnologia applicativa = ToolExpert MFC

Per le nuove frese MB-NVDS con canale di raffreddamento/aria centrale è stato sviluppato il software per i dati di taglio ToolExpert MFC che può essere avviato comodamente sul sito web di FRAISA : www.fraisa.com/it/toolexpert-mfc.

Con pochi click del mouse potrete definire applicazione, materiale e utensile ottenendo quindi i parametri da programmare per il sistema di controllo della vostra macchina o il CAM. ToolExpert MFC è veloce, semplice e affidabile da usare.



FRAISA ToolExpert® ArCut X – Dati applicativi online verificati, per una fresatura efficace con ArCut X

Le frese ArCut X sono state sviluppate per processi di finitura finalizzati ad ottenere superfici di alta qualità. Per ognuno dei cinque tipi di utensile ArCut X sono possibili diversi casi applicativi.

Il ToolExpert ArCut X, sviluppato in proprio, aiuta adesso con affidabilità a trovare l'utensile della serie ArCut X esattamente indicato per il materiale da lavorare e il caso applicativo richiesto. Qui si potranno selezionare o visualizzare nell'intuitivo menu il materiale, il caso applicativo, il tipo di utensile ArCut X e l'opzione con o senza rivestimento.

Con l'aiuto del ToolExpert ArCut X si possono però anche trovare i relativi dati di taglio per l'utensile selezionato. Il calcolatore dei dati di taglio appositamente sviluppato permette quindi di sfruttare a pieno le straordinarie possibilità offerte da ArCut X.



FRAISA ToolExpert® AX-FPS – per il calcolo dei più performanti dati di taglio per il vostro ambiente macchina!

Con il nuovo ToolExpert AX-FPS il cliente FRAISA riceve una soluzione innovativa per il calcolo di dati di taglio perfettamente adattata al suo ambiente macchina.

La sgrossatura ad alto rendimento di leghe di alluminio viene infatti limitata non dall'utensile ma dall'ambiente e dal mandino della macchina. In ToolExpert AX-FPS potete descrivere in modo semplice e chiaro il vostro ambiente macchina e calcolare facilmente i dati di taglio con il maggiore rendimento e la maggiore sicurezza di processo per il caso applicativo.

Questa nuova possibilità unica sul mercato si rivela un vero valore aggiunto per i nostri clienti garantendo una riduzione dei tempi di lavorazione e dei costi di produzione. Le funzioni disponibili in ToolExpert AX-FPS sono state sviluppate in più di mille punti di misurazione e garantiscono uno sfruttamento del sistema sicuro e altamente produttivo con un grado di sfruttamento della fresa, del mandrino e dell'ambiente della macchina più vicino possibile al massimo.



I servizi FRAISA in panoramica



ToolCare® 2.1:
sistema di gestione,
acquisto e informazione
per utensili



ConcepTool:
utensili speciali su
misura



ReTool®:
rigenerazione utensili
industriale con garanzia
di rendimento



ToolSchool:
formazione e aggiorna-
mento professionale

Dati CAD

Qui offriamo la possibilità di scaricarsi disegni 2D (DXF), modelli 3D (STEP) e file XML (secondo DIN4000-102) relativi ai nostri prodotti. Per farlo, basterà immettere il numero di articolo dell'utensile e selezionare il file desiderato.

Download il protocollo di misura*

Come cliente, puoi inserire il numero del protocollo di misurazione del utensile FRAISA e scaricare i dati di misurazione come file PDF.

- * I protocolli di misurazione sono disponibili per i seguenti articoli:
- Frese ad alta precisione +/- 0,003 Sphero-XP (X7500)

<https://www.fraisa.com/it/strumenti-online>

Se avete domande sul nostro servizio o la nostra azienda, non vi resta che chiamarci al telefono o inviarci una e-mail. Noi saremo sempre lieti di fornirvi una consulenza individuale.



Qui potete ottenere altre
informazioni sul gruppo
FRAISA.



Utilizzate anche la funzione di
ordinazione del nostro e-shop
e assicuratevi così le nostre
offerte variabili.

Formule di calcolo per i parametri di taglio

Formule

| | |
|------------------------|---|
| d₁ | Diametro dei taglienti [mm] |
| z | Numero dei taglienti |
| a_p | Profondità di avanzamento assiale [mm] |
| a_e | Profondità di avanzamento radiale [mm] |
| v_c | Velocità di taglio [m/min] |
| f_z | Avanzamento per dente e torsione [mm] |
| n | Velocità di rotazione [min ⁻¹] |
| v_f | Velocità di avanzamento [mm/min] |
| f | Avanzamento per giro [mm] |
| Q | Volume di truciolatura [cm ³ /min] |
| d_{eff} | Diametro d'intervento effettivo [mm] |
| β | Angolo di penetrazione «Beta» [° - DEG] |

Velocità di rotazione

$$n = \frac{v_c \cdot 1000}{d_1 \cdot \pi} \left[\frac{1}{\text{min}} \right]$$

Velocità di taglio

$$v_c = \frac{d_1 \cdot n \cdot \pi}{1000} \left[\frac{\text{m}}{\text{min}} \right]$$

Velocità di avanzamento

$$v_f = f_z \cdot z \cdot n \left[\frac{\text{mm}}{\text{min}} \right]$$

Avanzamento per dente

$$f_z = \frac{v_f}{z \cdot n} \text{ [mm]}$$

Avanzamento per giro

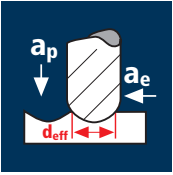
$$f = f_z \cdot z \text{ [mm]}$$

Volume di truciolatura

$$Q = \frac{a_p \cdot a_e \cdot v_f}{1000} \left[\frac{\text{cm}^3}{\text{min}} \right]$$

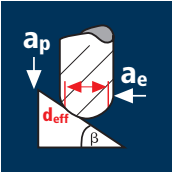
Formule di calcolo per i parametri di taglio

Diametro effettivo per frese con estremità emisferica con angolo di penetrazione $\beta = 0^\circ$



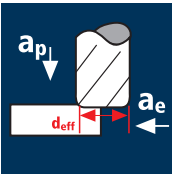
$$d_{\text{eff}} = 2 \cdot \sqrt{d_1 \cdot a_p - a_p^2} \quad [\text{mm}]$$

Diametro effettivo per frese con estremità emisferica con angolo di penetrazione $0 < \beta < 90^\circ$
 Impostazione della calcolatrice tascabile in [° - DEG]; inserimento β in [° - DEG]

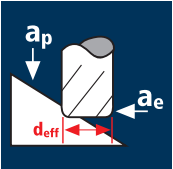


$$d_{\text{eff}} = d_1 \cdot \sin \left[\beta + \cos^{-1} \left(\frac{d_1 - 2 \cdot a_p}{d_1} \right) \right] \quad [\text{mm}]$$

Diametro effettivo per frese toriche con angolo di penetrazione $0 \leq \beta < 90^\circ$
 Impostazione della calcolatrice tascabile in [° - DEG]; inserimento β in [° - DEG]



$$d_{\text{eff}} = d_1 - 2 \cdot r + 2 \cdot r \cdot \sin \left[\beta + \cos^{-1} \left(1 - \frac{a_p}{r} \right) \right] \quad [\text{mm}]$$



Formule di calcolo per i parametri di taglio

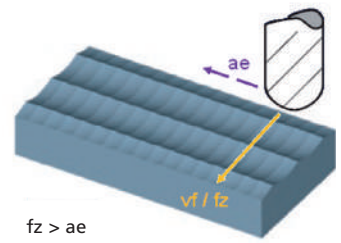
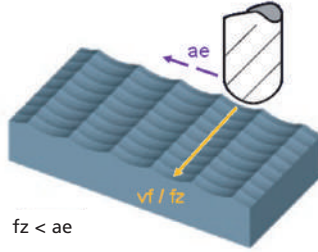
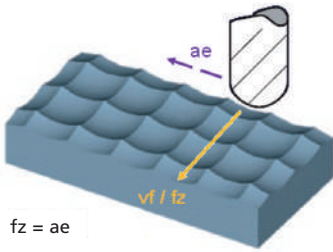
Profondità teorica e qualità superfici

Profondità in direzione
avanzamento v_f

$$R_{th,vf} = \left(\frac{d_1}{2} - \sqrt{\frac{d_1^2 - f_z^2}{4}} \right) \cdot 1000 \text{ } [\mu\text{m}]$$

Profondità in direzione
avanzamento ae

$$R_{th,ae} = \left(\frac{d_1}{2} - \sqrt{\frac{d_1^2 - ae^2}{4}} \right) \cdot 1000 \text{ } [\mu\text{m}]$$



Qualità superficie

| Valori ruvidità massimi Ra in μm ; 1 $\mu\text{m} = 0.001 \text{ mm}$ | | | | | |
|--|-----|-----|-----|-----|-----|
| 3.2 | 1.6 | 0.8 | 0.4 | 0.2 | 0.1 |
| Classi di ruvidità | | | | | |
| N8 | N7 | N6 | N5 | N4 | N3 |
| | | | | | |

Tabella di confronto delle durezza ($R_m \rightarrow HV10 \rightarrow HB \rightarrow HRC$)

| R_m [N/mm ²] | HV 10 | HB | HRC | R_m [N/mm ²] | HV 10 | HB | HRC |
|----------------------------|-------|-----|-----|----------------------------|-------|-----|-----|
| 240 | 75 | 71 | | 920 | 287 | 273 | 28 |
| 255 | 80 | 76 | | 940 | 293 | 278 | 29 |
| 270 | 85 | 81 | | 970 | 302 | 287 | 30 |
| 285 | 90 | 86 | | 995 | 310 | 295 | 31 |
| 305 | 95 | 90 | | 1020 | 317 | 301 | 32 |
| 320 | 100 | 95 | | 1050 | 327 | 311 | 33 |
| 335 | 105 | 100 | | 1080 | 336 | 319 | 34 |
| 350 | 110 | 105 | | 1110 | 345 | 328 | 35 |
| 370 | 115 | 109 | | 1140 | 355 | 337 | 36 |
| 385 | 120 | 114 | | 1170 | 364 | 346 | 37 |
| 400 | 125 | 119 | | 1200 | 373 | 354 | 38 |
| 415 | 130 | 124 | | 1230 | 382 | 363 | 39 |
| 430 | 135 | 128 | | 1260 | 392 | 372 | 40 |
| 450 | 140 | 133 | | 1300 | 403 | 383 | 41 |
| 465 | 145 | 138 | | 1330 | 413 | 393 | 42 |
| 480 | 150 | 143 | | 1360 | 423 | 402 | 43 |
| 495 | 155 | 147 | | 1400 | 434 | 413 | 44 |
| 510 | 160 | 152 | | 1440 | 446 | 424 | 45 |
| 530 | 165 | 157 | | 1480 | 458 | 435 | 46 |
| 545 | 170 | 162 | | 1530 | 473 | 449 | 47 |
| 560 | 175 | 166 | | 1570 | 484 | 460 | 48 |
| 575 | 180 | 171 | | 1620 | 497 | 472 | 49 |
| 595 | 185 | 176 | | 1680 | 514 | 488 | 50 |
| 610 | 190 | 181 | | 1730 | 527 | 501 | 51 |
| 625 | 195 | 185 | | 1790 | 544 | 517 | 52 |
| 640 | 200 | 190 | | 1845 | 560 | 532 | 53 |
| 660 | 205 | 195 | | 1910 | 578 | 549 | 54 |
| 675 | 210 | 199 | | 1980 | 596 | 567 | 55 |
| 690 | 215 | 204 | | 2050 | 615 | 584 | 56 |
| 705 | 220 | 209 | | 2140 | 639 | 607 | 57 |
| 720 | 225 | 214 | | | 655 | 622 | 58 |
| 740 | 230 | 219 | | | 675 | | 59 |
| 755 | 235 | 223 | | | 698 | | 60 |
| 770 | 240 | 228 | | | 720 | | 61 |
| 785 | 245 | 233 | | | 745 | | 62 |
| 800 | 250 | 238 | 22 | | 773 | | 63 |
| 820 | 255 | 242 | 23 | | 800 | | 64 |
| 835 | 260 | 247 | 24 | | 829 | | 65 |
| 860 | 268 | 255 | 25 | | 864 | | 66 |
| 870 | 272 | 258 | 26 | | 900 | | 67 |
| 900 | 280 | 266 | 27 | | 940 | | 68 |

Idoneità strato per frese

Idoneità strato nella lavorazione sull'asciutto e/o sul bagnato



A: Il rivestimento A è eccellente per la lavorazione a umido.

B: Nella lavorazione a umido il rivestimento B da risultati da sufficienti a buoni.

C: Il rivestimento C è eccellente per la lavorazione a secco.

D: Nella lavorazione a secco il rivestimento D offre risultati da sufficienti a buoni.

Idoneità strato per frese nella corrispondente classe di materiale

| 1 = Massimo livello di idoneità 2 = Livello di idoneità da sufficiente a buono | U UNICUT-4X | P POLYCHROM | D DURO-S | V DURO-V | H DURO-Si | X X-AL | M MICRO | C CELERO |
|---|----------------|----------------|-------------|-------------|--------------|-----------|------------|-------------|
| Classi di materiale | | | | | | | | |
| Acciaio < 500 N/mm ² | 1 | 1 | | 2 | 2 | 1 | 1 | 1 |
| Acciaio 500 - 850 N/mm ² | 1 | 1 | | 2 | 2 | 1 | 1 | |
| Acciaio 850 - 1100 N/mm ² | 1 | 1 1 | | 2 1 | | 1 1 1 | | |
| Acciaio 1100 - 1300 N/mm ² | 2 | 2 2 1 | | 2 1 | | 2 1 1 | | |
| Acciaio 1300 - 1500 N/mm ² | 2 | 2 2 1 | 2 | 2 1 | 2 | 2 1 2 1 | | |
| Acciaio da utensile temprato 48-52 HRC | | 2 | 1 | 2 | 1 | 2 | 1 | 1 |
| Acciaio da utensile temprato 52-56 HRC | | | 1 | 1 | 1 | 1 | 1 | |
| Acciaio da utensile temprato 56-60 HRC | | | 1 | 1 | 1 | 1 | 1 | |
| Acciaio da utensile temprato >60 HRC | | | 2 | 1 | 1 | 1 | | |
| Acciaio per lavorazione a freddo (12% Cr) fortemente legati [1.2379] | 2 | 2 2 1 | 1 | 2 1 | 2 | 2 1 | | |
| Acciaio per lavorazione a freddo debolmente legati [1.2067] | 2 | 2 2 1 | 1 | 2 1 | 2 | 2 1 | | |
| Acciaio inossidabili ferritico/martensitico | 1 | 1 | | 2 | 1 | 1 | 1 | |
| Acciaio inossidabile [Cr-Ni/1.4301] | 1 | 1 | | 2 | 1 | 1 | 1 | 2 |
| Acciaio inossidabile [Cr-Ni-Mo-.../1.4571] | 1 | 1 | | 2 | 1 | 1 | 1 | |
| Acciaio resistente al calore [17-4 PH] | 1 | 1 | | 2 | 1 | 2 | 1 | |
| Leg. a base di nichel indurite [Inconel 718] | 1 | 1 | | 2 | 2 | 2 | 1 | |
| Ghisa (grigia / sferoidale) | 2 | 2 2 1 | 1 | 2 1 | | 2 1 2 1 | | |
| Leghe di titanio fino a 300 HB [Ti5Al2.5Sn] | 1 | 1 | 2 | 2 | 2 | 2 | 1 | 2 |
| Leghe di titanio > 300 HB [Ti6Al4V] | 1 | 1 | 1 | 2 | 2 | 2 | 1 | |
| Alluminio non legato | | | | | | | | 1 |
| Alluminio malleabile Si <6% | 2 | 2 | | | | | 1 | 1 |
| Rame non legato | 2 | 2 | | 2 | | 2 | 1 | 1 |
| Rame malleabile Bronzo | 2 | 2 2 1 | 2 | 2 1 | | 2 1 2 1 | | |
| Ottonea truciolo corto [Ms58] | 2 | 2 2 1 | 2 | 2 1 | | 2 1 2 1 | | |
| Thermoplastics | 2 | 2 | | | | | 2 | 2 |
| Acciaio rapido temperato | | | 1 | 1 | 1 | 2 | | |

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(●) Partner della distribuzione.

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| Composizione chimica | | TiAlCrN | TiAlCN | AlTiN | AlTiSiN | TiAlSiN | TiAlN/ AlCrN | TiAlN/ AlCrN | TiAlN | TiB2 | AlTiN + MoS2 | TiAlN/ TiSiN | C | C | C |
| Durezza [HV] | | 3000 | 3200 | 3600 | 3300 | 3200 | 3300 | 3300 | 3000 | 4000 | 3600 | 3800 | 10000 | 10000 | 10000 |
| max. Temp [°C] | | 1000 | 650 | 880 | 1100 | 1100 | 1100 | 1100 | 800 | 700 | 880 | 1100 | 600 | 600 | 600 |
| 0110 | 77 | | ● | | | | | | | | | | | | |
| 0200 | 129 | | ● | | | | | | | | | | | | |
| 0391 | 633 | | | | | | | | | ● | | | | | |
| 0393 | 639 | | | | | | | | | ● | | | | | |
| 0400 | 313 | | ● | | | | | | | | | | | | |
| 0410 | 317 | | ● | | | | | | | | | | | | |
| 0540 | 201 | ● | | | | | | | | | | | | | |
| 0609 | 207 | | ● | | | | | | | | | | | | |
| 0610 | 203 | | ● | | | | | | | | | | | | |
| 0619 | 199 | | ● | | | | | | | | | | | | |
| 0621 | 227 | | ● | | | | | | | | | | | | |
| 0650 | 217 | | ● | | | | | | | | | | | | |
| 0659 | 215 | | ● | | | | | | | | | | | | |
| 0665 | 225 | | ● | | | | | | | | | | | | |
| 0695 | 209 | | ● | | | | | | | | | | | | |
| 0700 | 147 | | ● | | | | | | | | | | | | |
| 0780 | 81 | | ● | | | | | | | | | | | | |
| 0890 | 757 | | ● | | | | | | | | | | | | |
| 0905 | 753 | | ● | | | | | | | | | | | | |
| 0910 | 751 | | ● | | | | | | | | | | | | |
| 0915 | 749 | | ● | | | | | | | | | | | | |
| 0920 | 747 | | ● | | | | | | | | | | | | |
| 3209 | 769 | | ● | | | | | | | | | | | | |
| 3490 | 767 | | ● | | | | | | | | | | | | |
| 5026 | 143 | | | | | | | | | | ● | | | | |
| 5036 | 143 | ● | | | | | | | | | ● | | | | |
| 5200 | 67 | ● | | | | | | | | | | | | | |
| 5213 | 139 | ● | | | | | | | | | | | | | |
| 5214 | 43 | ● | | | | | | | | | | | | | |
| 5215 | 89 | ● | | | | | | | | | | | | | |
| 5218 | 87 | ● | | | | | | | | | | | | | |
| 5219 | 121 | ● | | | | | | | | | | | | | |
| 5225 | 91 | ● | | | | | | | | | | | | | |
| 5229 | 141 | ● | | | | | | | | | | | | | |
| 5234 | 173 | ● | | | | | | | | | | | | | |
| 5236 | 305 | | | | | | | | | | ● | | | | |
| 5236 | 311 | ● | | | | | | | | | | | | | |
| 5237 | 309 | | | | | | | | | | ● | | | | |

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| 5250 | 413 | ● | | | | | | | | | | | | | |
| 5252 | 419 | ● | | | | | | | | | | | | | |
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| 5257 | 189 | ● | | ● | | | | | | | | | | | |
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| 5337 | 309 | ● | | | | | | | | | | ● | | | |
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| 5782 | 679 | | | | | | | | | | | | ● | | |
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| 7554 | 365 | ● | | | | | | | | | | | | | |
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| 7604 | 435 | | | | | | | ● | | | | | | | |
| 7608 | 439 | | | | | | | ● | | | | | | | |
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| 15223 | 95 | ● | | | | | | | | | | | | | |
| 15225 | 123 | ● | | | | | | | | | | | | | |
| 15226 | 169 | ● | | | | | | | | | | | | | |
| 15232 | 301 | ● | | | | | | | | | ● | | | | |
| 15233 | 65 | ● | | | | | | | | | | | | | |
| 15236 | 195 | ● | | | | | | | | | | | | | |
| 15238 | 211 | ● | | | | | | | | | | | | | |
| 15239 | 219 | ● | | | | | | | | | | | | | |
| 15242 | 85 | ● | | | | | | | | | | | | | |
| 15248 | 223 | ● | | | | | | | | | | | | | |
| 15250 | 229 | ● | | | | ● | | | | | | | | | |
| 15251 | 235 | ● | | | | ● | | | | | | | | | |
| 15254 | 241 | ● | | | | ● | | | | | | | | | |
| 15259 | 119 | ● | | | | | | | | | | | | | |
| 15260 | 221 | ● | | | | | | | | | | | | | |
| 15268 | 155 | ● | | | | | | | | | | | | | |
| 15297 | 637 | | | | | | | | ● | | | | | | |
| 15298 | 643 | | | | | | | | ● | | | | | | |
| 15299 | 125 | ● | | | | | | | | | | | | | |
| 15307 | 55 | ● | | | | | | | | | | | | | |
| 15308 | 107 | ● | | | | | | | | | | | | | |
| 15310 | 105 | ● | | | | | | | | | | | | | |
| 15322 | 35 | ● | | | | | | | | | | | | | |
| 15323 | 95 | ● | | | | | | | | | | | | | |
| 15325 | 123 | ● | | | | | | | | | | | | | |
| 15326 | 169 | ● | | | | | | | | | | | | | |
| 15333 | 65 | ● | | | | | | | | | | | | | |
| 15336 | 195 | ● | | | | | | | | | | | | | |
| 15338 | 211 | ● | | | | | | | | | | | | | |
| 15339 | 219 | ● | | | | | | | | | | | | | |
| 15342 | 85 | ● | | | | | | | | | | | | | |
| 15348 | 223 | ● | | | | | | | | | | | | | |
| 15359 | 119 | ● | | | | | | | | | | | | | |
| 15360 | 221 | ● | | | | | | | | | | | | | |
| 15368 | 155 | ● | | | | | | | | | | | | | |
| 15397 | 637 | | | | | | | | ● | | | | | | |
| 15398 | 643 | | | | | | | | ● | | | | | | |
| 15399 | 125 | ● | | | | | | | | | | | | | |
| 15500 | 629 | ● | | | | | | | | | | | | | |
| 15502 | 647 | ● | | | | | | | | | | | | | |
| 15505 | 641 | ● | | | | | | | | | | | | | |
| 15506 | 635 | ● | | | | | | | | | | | | | |
| 15507 | 645 | ● | | | | | | | | | | | | | |
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| 15520 | 587 | ● | | | | | | | ● | | | | | | |
| 15525 | 589 | ● | | | | | | | ● | | | | | | |
| 15530 | 591 | ● | | | | | | | ● | | | | | | |
| 15535 | 593 | ● | | | | | | | ● | | | | | | |
| 15550 | 597 | ● | | | | | | | ● | | | | | | |
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| 15559 | 603 | ● | | | | | | | ● | | | | | | |
| 15560 | 601 | ● | | | | | | | ● | | | | | | |
| 15561 | 605 | ● | | | | | | | ● | | | | | | |
| 15572 | 607 | ● | | | | | | | ● | | | | | | |
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| 15574 | 613 | ● | | | | | | | ● | | | | | | |
| 15575 | 617 | ● | | | | | | | ● | | | | | | |
| 15582 | 619 | ● | | | | | | | ● | | | | | | |
| 15583 | 621 | ● | | | | | | | ● | | | | | | |
| 15584 | 625 | ● | | | | | | | ● | | | | | | |
| 15585 | 627 | ● | | | | | | | ● | | | | | | |
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| 15605 | 641 | ● | | | | | | | | | | | | | | |
| 15606 | 635 | ● | | | | | | | | | | | | | | |
| 15607 | 645 | ● | | | | | | | | | | | | | | |
| 15620 | 587 | ● | | | | | | | | | ● | | | | | |
| 15625 | 589 | ● | | | | | | | | | ● | | | | | |
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