



**crazy about**

**milling**

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CRAZYMILL COOL P&S

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NUOVA: TORICA

**NEW**

## CrazyMill Cool P&S Torica - Z3

**FRESA A TUFFO E PER SCANALATURE CON GEOMETRIA TORICA****Metallo duro micrograna**

Sviluppato per ottenere i migliori requisiti in termini di proprietà meccaniche come durezza e tenacità

**Rivestimento di alta prestazione**

Il rivestimento eXedur SNP resiste all'usura ed al calore e favorisce un'evacuazione ottimale dei trucioli

**Nuova geometria torica**

Fresa con taglienti raggiati di diverse dimensioni

**Gamma di diametri e lunghezze**

$d = 1 - 8 \text{ mm}$ ;  
Tipo A -  $2.5 \times d$  / Tipo C -  $5 \times d$

**Refrigerazione integrata**

Raffreddamento costante e massiccio dei taglienti

**Geometria speciale della testa**

Sviluppata per fresature a tuffo, scanalature, tasche e fresature laterali in spazi minimi



NEW



**CRAZYMILL™**  
by Mikron Tool  
Cool

Mikron Tool espande la famiglia CrazyMill Cool P&S, sviluppata per operazioni di sgrossatura e finitura. La nuova fresa è usata per applicazioni dove è richiesto uno spigolo raggiato. Il nuovo design dei taglienti permette di lavorare molti materiali, in particolare gli acciai inossidabili, il titanio, le leghe di CoCr e le superleghe. Grazie alle sue caratteristiche può lavorare perpendicolarmente al materiale con una fresatura a tuffo oltre che eseguire fresature di scanalature, tasche e contornature in spazi minimi.

### Vantaggi

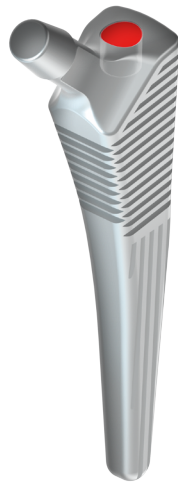
- |                                       |                                                                                      |
|---------------------------------------|--------------------------------------------------------------------------------------|
| ■ TEMPO DI LAVORAZIONE PIÙ BREVE      | Volume di asportazione dei trucioli estremamente alto                                |
| ■ ELEVATA DURATA DI VITA              | Grazie al patentato sistema di refrigerazione                                        |
| ■ ECCELLENTE QUALITÀ DELLA SUPERFICIE | $Ra \leq 0.5 \mu m$                                                                  |
| ■ CONTROLLO DEI TRUCIOLI PREFETTO     | Grazie alla geometria dei taglienti specifica e alla maggior portata di refrigerante |

Scopra di più!



**NEW**

## P&S in applicazioni medicali



### COMPONENTE

Stelo della protesi dell'anca

### MATERIALE

TiAl6V4-ELI / 3.7165 / ASTM F136

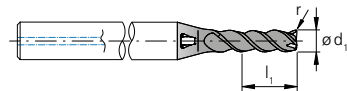
### LAVORAZIONE

Interpolazione elicoidale e contornatura di un foro piatto

- Profondità del foro = 5 mm
- Diametro del foro = 5.2 mm

### UTENSILE

Mikron Tool - CrazyMill Cool P&S Torica - Tipo A



| DATI                                 | MIKRON TOOL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | CONCORRENZA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Tipo d'utensile</b>               | CrazyMill Cool P&S Torica<br>- Metallo duro<br>- Rivestito<br>- Refrigerazione interna                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Fresa torica convenzionale<br>- Metallo duro<br>- Rivestito<br>- Refrigerazione esterna                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Numero articolo</b>               | 2.CMC42.A3Z3.400.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Caratteristiche dell'utensile</b> | $d_1 = 4 \text{ mm}$<br>$l_1 = 2.5 \times d$<br>$r = 0.2 \text{ mm}$<br>$Z = 3$ taglienti                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | $d_1 = 4 \text{ mm}$<br>$l_1 = 3.75 \times d$<br>$r = 0.5 \text{ mm}$<br>$Z = 3$ taglienti                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Dati di taglio</b>                | <p>Interpolazione elicoidale<br/> <math>v_c = 120 \text{ m/min}</math><br/> <math>f_z = 0.013 \text{ mm}</math><br/> <math>a_p = 1.0 \text{ mm}</math><br/> <math>a_e = 2.52 \text{ mm}</math><br/> <math>\alpha = 15^\circ</math><br/> <b><math>Q = 0.94 \text{ cm}^3/\text{min}</math></b><br/> <b><math>\Delta t = 13.2 \text{ s}</math></b></p> <p>Finitura<br/> <math>v_c = 120 \text{ m/min}</math><br/> <math>f_z = 0.022 \text{ mm}</math><br/> <math>a_p = 5 \text{ mm}</math><br/> <math>a_e = 0.08 \text{ mm}</math><br/> <math>Q = 0.29 \text{ cm}^3/\text{min}</math><br/> <b><math>\Delta t = 1.3 \text{ s}</math></b></p> | <p>Interpolazione elicoidale<br/> <math>v_c = 52 \text{ m/min}</math><br/> <math>f_z = 0.026 \text{ mm}</math><br/> <math>a_p = 0.2 \text{ mm}</math><br/> <math>a_e = 2.52 \text{ mm}</math><br/> <math>\alpha = 3.5^\circ</math><br/> <b><math>Q = 0.17 \text{ cm}^3/\text{min}</math></b><br/> <b><math>\Delta t = 1 \text{ min } 10 \text{ s}</math></b></p> <p>Finitura<br/> <math>v_c = 95 \text{ m/min}</math><br/> <math>f_z = 0.060 \text{ mm}</math><br/> <math>a_p = 5 \text{ mm}</math><br/> <math>a_e = 0.08 \text{ mm}</math><br/> <math>Q = 0.54 \text{ cm}^3/\text{min}</math><br/> <b><math>\Delta t = 0.7 \text{ s}</math></b></p> |





■ Risultati:

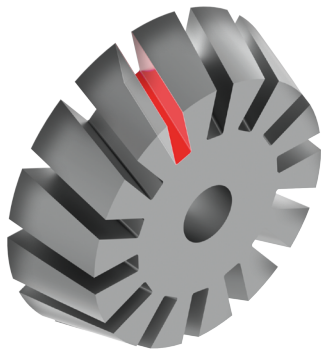
|                                       | CrazyMill Cool P&S Torica                  | Fresa torica convenzionale    |
|---------------------------------------|--------------------------------------------|-------------------------------|
| <b>Volume di truciolo asportato Q</b> | Q = 0.94 cm <sup>3</sup> /min <b>5.5 x</b> | Q = 0.17 cm <sup>3</sup> /min |
| <b>Tempo ciclo totale</b>             | 15 s <b>5 x</b>                            | 1 min 11 s                    |

La combinazione tra la geometria di taglio e il sistema di luborefrigerazione integrato nel gambo (brevettato) permette di ottenere un'elevata velocità di taglio e una maggiore profondità assiale  $a_p$ , così come un elevato angolo di passo  $\alpha$ . Il risultato è un elevato volume di truciolo asportato e una riduzione del tempo ciclo di 5 volte rispetto ad una fresa torica convenzionale.

**Riduzione del tempo ciclo per parte: 56 s**

**NEW**

## P&S in applicazioni aerospaziali



### COMPONENTE

Rotore di turbina

### MATERIALE

X12Cr13 / 1.4006 / AISI 410

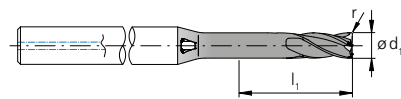
### LAVORAZIONE

Sgrossatura e finitura di 14 scalanature

- Profondità della fessura = 10 mm
- Lunghezza della fessura = 20 mm
- Spessore della fessura = 3.8 mm

### UTENSILE

Mikron Tool - CrazyMill Cool P&S Torica - Tipo C



| DATI                                 | MIKRON TOOL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | CONCORRENZA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Tipo d'utensile</b>               | CrazyMill Cool P&S Torica<br>- Metallo duro<br>- Rivestito<br>- Refrigerazione interna                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Fresa torica convenzionale<br>- Metallo duro<br>- Rivestito<br>- Refrigerazione esterna                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Numero articolo</b>               | 2.CMC42.C3Z3.370.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Caratteristiche dell'utensile</b> | $d_1 = 3.7 \text{ mm}$<br>$l_1 = 2.5 \times d$<br>$r = 0.5 \text{ mm}$<br>$Z = 3 \text{ teeth}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | $d_1 = 3.0 \text{ mm}$<br>$l_1 = 3 \times d$<br>$r = 0.3 \text{ mm}$<br>$Z = 3 \text{ teeth}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Dati di taglio</b>                | <p>Sgrossatura<br/> <math>v_c = 190 \text{ m/min}</math><br/> <math>f_z = 0.028 \text{ mm}</math><br/> <math>a_p = 1.85 \text{ mm}</math><br/> <math>a_e = 3.7 \text{ mm}</math><br/> <b><math>Q = 9.4 \text{ cm}^3/\text{min}</math></b><br/> <b><math>\Delta t = 1 \text{ min } 13 \text{ s}</math></b> </p> <p>Finitura<br/> <math>v_c = 215 \text{ m/min}</math><br/> <math>f_z = 0.023 \text{ mm}</math><br/> <math>a_p = 5</math><br/> <math>a_e = 0.05 \text{ mm}</math><br/> <math>Q = 0.3 \text{ cm}^3/\text{min}</math><br/> <b><math>\Delta t = 52 \text{ s}</math></b> </p> | <p>Sgrossatura<br/> <math>v_c = 44 \text{ m/min}</math><br/> <math>f_z = 0.015 \text{ mm}</math><br/> <math>a_p = 0.77 \text{ mm}</math><br/> <math>a_e = 3 \text{ mm}</math><br/> <b><math>Q = 0.5 \text{ cm}^3/\text{min}</math></b><br/> <b><math>\Delta t = 16 \text{ min } 42 \text{ s}</math></b> </p> <p>Semi-finitura<br/> <math>v_c = 81 \text{ m/min}</math><br/> <math>f_z = 0.032 \text{ mm}</math><br/> <math>a_p = 0.77 \text{ mm}</math><br/> <math>a_e = 0.34 \text{ mm}</math><br/> <math>Q = 0.22 \text{ cm}^3/\text{min}</math><br/> <b><math>\Delta t = 8 \text{ min } 45 \text{ s}</math></b> </p> <p>Finitura<br/> <math>v_c = 105 \text{ m/min}</math><br/> <math>f_z = 0.052 \text{ mm}</math><br/> <math>a_p = 5</math><br/> <math>a_e = 0.06 \text{ mm}</math><br/> <math>Q = 0.5 \text{ cm}^3/\text{min}</math><br/> <b><math>\Delta t = 39 \text{ s}</math></b> </p> |



■ **Risultati:**

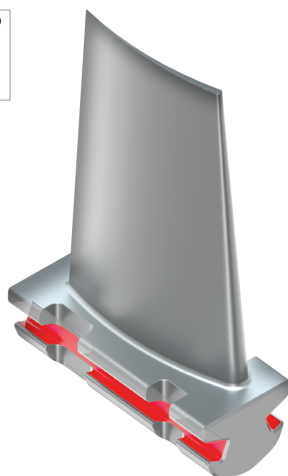
|                                       | CrazyMill Cool P&S Torica                | Fresa torica convenzionale   |
|---------------------------------------|------------------------------------------|------------------------------|
| <b>Volume di truciolo asportato Q</b> | Q = 9.4 cm <sup>3</sup> /min <b>19 x</b> | Q = 0.5 cm <sup>3</sup> /min |
| <b>Tempo ciclo totale</b>             | 2 min 5 s <b>12 x</b>                    | 26 min 6 s                   |

La combinazione tra la geometria di taglio e il sistema di luborefrigerazione integrato nel gambo (brevettato) permette di ottenere un'elevata velocità di taglio e una maggiore profondità assiale  $a_p$ , così come un elevato angolo di passo  $\alpha$ . Il risultato è un elevato volume di truciolo asportato e una riduzione del tempo ciclo di 12 volte rispetto ad una fresa torica convenzionale.

**Riduzione del tempo ciclo per parte: 24 s**

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## P&S in altre applicazioni



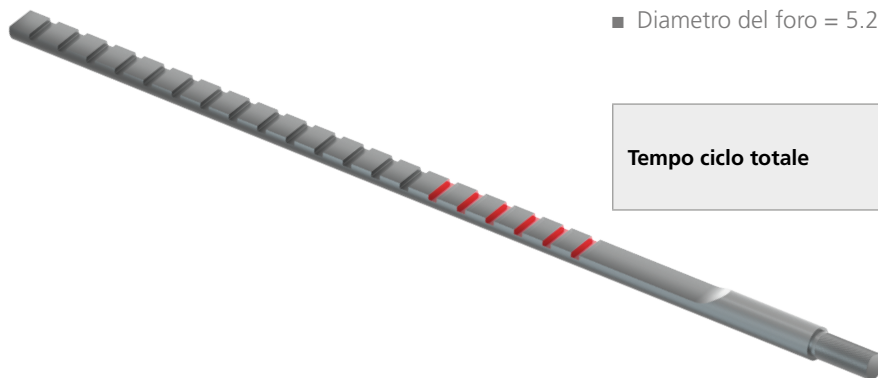
### 3. Paletta di turbina

Materiale: X5NiCrTi26-15 / 1.4943 / Incoloy A-286

Lavorazione: Sgrossatura e finitura in contornatura

- Profondità della scanalatura = 4.6 mm
- Lunghezza della scanalatura = 10 mm
- Spessore della scanalatura = 2.6 mm

|                    | Mikron Tool      | Concorrenza |
|--------------------|------------------|-------------|
| Tempo ciclo totale | 16 s <b>15 x</b> | 4 min 8 s   |



### 4. Sistema di trasmissione

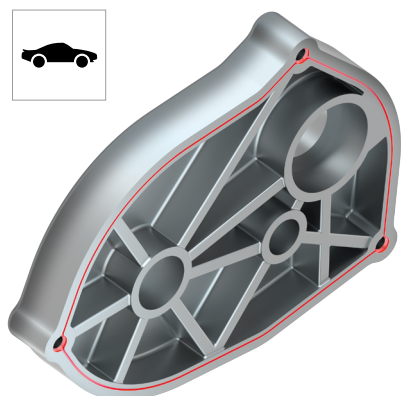
Materiale: X40CrMoV5-1 / 1.2344 / AISI H13

Lavorazione: Sgrossatura di 20 scanalature (lotto 100 pezzi)

- Profondità del foro = 5 mm
- Diametro del foro = 5.2 mm

|                    | Mikron Tool       | Concorrenza |
|--------------------|-------------------|-------------|
| Tempo ciclo totale | 15 min <b>3 x</b> | 45 min 30 s |

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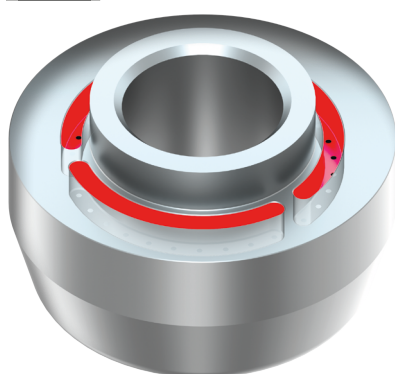
#### 5. Cassa di copertura ingranaggi

Materiale: GGG60 / 0.7060 / ASTM 80-60-03

Lavorazione: Fresatura in rampa lineare e di scanalatura di una sede guarnizione

- Profondità della scanalatura = 2 mm
- Lunghezza della scanalatura = 800 mm
- Spessore della scanalatura = 2 mm

|                    | Mikron Tool           | Concorrenza |
|--------------------|-----------------------|-------------|
| Tempo ciclo totale | 1 min 45 s <b>2 x</b> | 3 min 10 s  |



#### 6. Atomizzatore di vernice

Materiale: TiAl6V4-ELI / 3.7165 / ASTM F136

Lavorazione: Fresatura a tuffo, sgrossatura e finitura in contornatura

- Profondità della scanalatura = 8 mm
- Lunghezza della scanalatura = 210 mm
- Spessore della scanalatura = 5.2 mm

|                    | Mikron Tool           | Concorrenza |
|--------------------|-----------------------|-------------|
| Tempo ciclo totale | 2 min 10 s <b>2 x</b> | 3 min 56 s  |

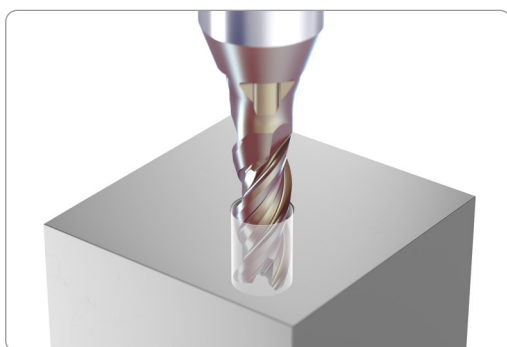


**NEW**

## Un utensile per molte applicazioni

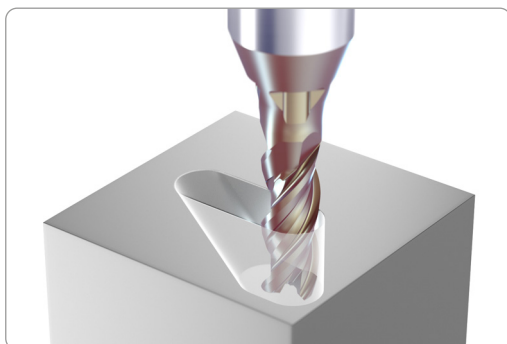
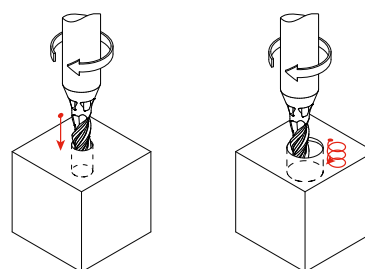
### PROCESSO DI FRESATURA

CrazyMill Cool P&S Torica per:



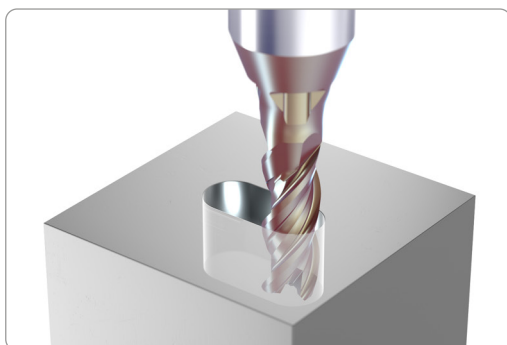
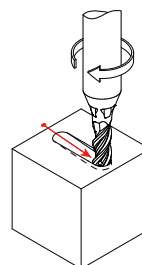
#### 1. Fresatura a tuffo

Diretta o con interpolazione elicoidale



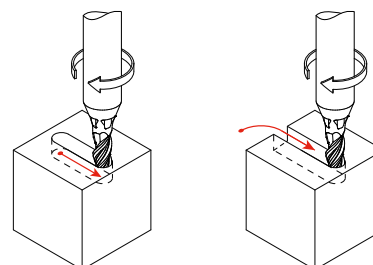
#### 2. Fresatura a rampa lineare

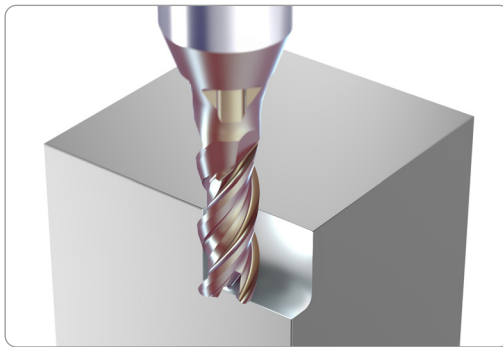
L'angolo dipende dal materiale



#### 3. Fresatura di scanalature

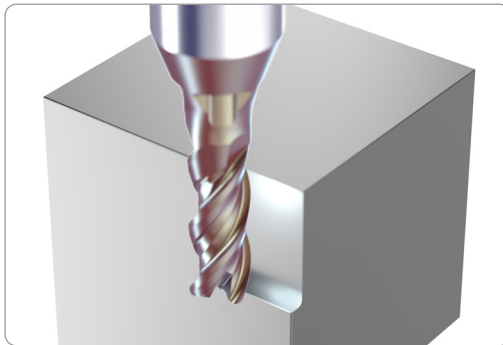
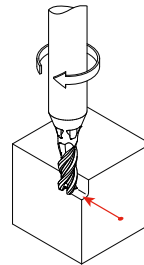
Tasche e scanalature aperte





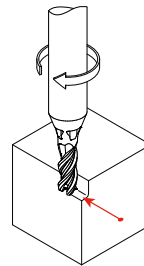
#### 4. Contornatura - Semi-finitura

$$a_p = \max. 1 \times d$$



#### 5. Contornatura - Finitura

$$a_p = 2.5 \times d - \text{Tipo A} / a_p = 2 \times d - \text{Tipo C}$$



**NEW**

## Massime prestazioni in dimensioni ridotte

### FRESA A TUFFO E DI SCANALATURA CON RAFFREDDAMENTO INTEGRATO

Con CrazyMill Cool P&S Torica, Mikron Tool amplia la sua gamma di frese per materiali difficili da lavorare. La nuova fresa viene utilizzata per applicazioni in cui è richiesto un angolo arrotondato. CrazyMill Cool P&S Torica a tre taglienti permette una fresatura a tuffo perpendicolare nel materiale con successiva fresatura di scanalatura. È disponibile con raffreddamento integrato nella gamma di diametri da 1 mm a 8 mm e per una profondità di fresatura massima di 5 x d.

- CrazyMill Cool P&S Torica, tipo A – profondità di fresatura 2.5 x d, lunghezza del tagliente 2.5 x d, lubrificazione nel gambo, Z = 3
- CrazyMill Cool P&S Torica, tipo C – profondità di fresatura 5 x d, lunghezza del tagliente 2 x d, lubrificazione nel gambo, Z = 3

2.5 x d

5 x d

Tipo A

Tipo C

- Rivestito
- Lubrificazione integrata

- Rivestito
- Lubrificazione integrata



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**NEW**

#### 1 | GAMBO

Il robusto gambo in metallo duro garantisce una fresatura stabile e senza vibrazioni. Si ottiene un'elevata precisione ed un'ottima qualità della superficie.

#### 2 | REFRIGERAZIONE INTEGRATA - BREVETTATA

I canali di lubrificazione integrati nel gambo garantiscono un raffreddamento costante e massiccio dei taglienti ed un'ottima evacuazione dei trucioli. Il risultato è un aumento della velocità di taglio e della rispettiva profondità  $a_p$  oltre alla qualità della superficie.

#### 3 | METALLO DURO

Il metallo duro micrograna appositamente sviluppato, consente di ottenere i migliori requisiti in termini di proprietà meccaniche.

#### 4 | RIVESTIMENTO

Il rivestimento di alta prestazione eXedur SNP resiste all'usura ed al calore, previene il tagliente di riporto e favorisce un'evacuazione ottimale dei trucioli. Il risultato è una lunga durata di vita dell'utensile.

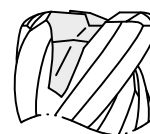
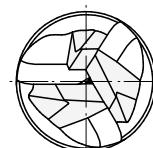
#### 5 | GEOMETRIA DELLA GOLA

Il design speciale delle gole assicura un'alta stabilità del processo di fresatura e garantisce allo stesso tempo un ampio spazio per una perfetta evacuazione dei trucioli.

#### 6 | GEOMETRIA DELLA TESTA

Lo speciale ed allargato "canale per truciolo" nella testa della fresa garantisce una buona evacuazione dei trucioli durante l'entrata a tuffo. Una correzione al tagliente centrale impedisce la rottura, riduce la forza d'entrata e contribuisce a raggiungere un'elevata durata di vita.

Parte frontale della fresa - 3 Taglienti

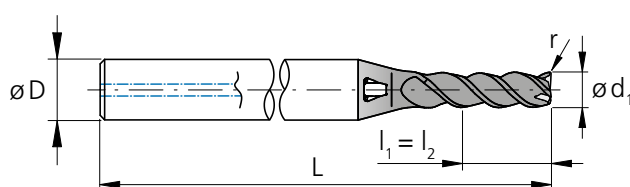
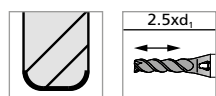


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## Tipo A - 2.5 x d - Torica - Z3

### FRESARE CON RAFFREDDAMENTO INTEGRATO

#### P&S - Torica



$l_1$  = lunghezza utile  
 $l_2$  = lunghezza del tagliente

| $d_1$<br>[mm] | $d_1$<br>[inch] | $l_1$<br>[mm] | $l_2$<br>[mm] | D<br>(h6)<br>[mm] | L<br>[mm] | r<br>[mm] | r<br>[inch] | Numero<br>articolo | Disponibilità |
|---------------|-----------------|---------------|---------------|-------------------|-----------|-----------|-------------|--------------------|---------------|
| 1.0           |                 | 2.50          | 2.50          | 4                 | 40        | 0.10      |             | 2.CMC42.A2Z3.100.1 | ■             |
| 1.0           |                 | 2.50          | 2.50          | 4                 | 40        | 0.20      |             | 2.CMC42.A3Z3.100.1 | ■             |
| 1.1           |                 | 2.75          | 2.75          | 4                 | 40        | 0.10      |             | 2.CMC42.A2Z3.110.1 | ■             |
| 1.1           |                 | 2.75          | 2.75          | 4                 | 40        | 0.20      |             | 2.CMC42.A3Z3.110.1 | ■             |
| 1.2           |                 | 3.00          | 3.00          | 4                 | 40        | 0.10      |             | 2.CMC42.A2Z3.120.1 | ■             |
| 1.2           |                 | 3.00          | 3.00          | 4                 | 40        | 0.20      |             | 2.CMC42.A3Z3.120.1 | ■             |
| 1.3           |                 | 3.25          | 3.25          | 4                 | 40        | 0.10      |             | 2.CMC42.A2Z3.130.1 | ■             |
| 1.3           |                 | 3.25          | 3.25          | 4                 | 40        | 0.20      |             | 2.CMC42.A3Z3.130.1 | ■             |
| 1.4           |                 | 3.50          | 3.50          | 4                 | 40        | 0.10      |             | 2.CMC42.A2Z3.140.1 | ■             |
| 1.4           |                 | 3.50          | 3.50          | 4                 | 40        | 0.20      |             | 2.CMC42.A3Z3.140.1 | ■             |
| 1.5           |                 | 3.75          | 3.75          | 4                 | 40        | 0.10      |             | 2.CMC42.A2Z3.150.1 | ■             |
| 1.5           |                 | 3.75          | 3.75          | 4                 | 40        | 0.30      |             | 2.CMC42.A3Z3.150.1 | ■             |
| 1.587         | <b>1/16</b>     | 3.97          | 3.97          | 4                 | 40        | 0.127     | .005        | 2.CMC.PSRA2Z3.F116 | ■             |
| 1.587         | <b>1/16</b>     | 3.97          | 3.97          | 4                 | 40        | 0.254     | .010        | 2.CMC.PSRA3Z3.F116 | ■             |
| 1.6           |                 | 4.00          | 4.00          | 4                 | 40        | 0.10      |             | 2.CMC42.A2Z3.160.1 | ■             |
| 1.6           |                 | 4.00          | 4.00          | 4                 | 40        | 0.30      |             | 2.CMC42.A3Z3.160.1 | ■             |
| 1.7           |                 | 4.25          | 4.25          | 4                 | 40        | 0.10      |             | 2.CMC42.A2Z3.170.1 | ■             |
| 1.7           |                 | 4.25          | 4.25          | 4                 | 40        | 0.30      |             | 2.CMC42.A3Z3.170.1 | ■             |
| 1.8           |                 | 4.50          | 4.50          | 4                 | 40        | 0.10      |             | 2.CMC42.A2Z3.180.1 | ■             |
| 1.8           |                 | 4.50          | 4.50          | 4                 | 40        | 0.30      |             | 2.CMC42.A3Z3.180.1 | ■             |
| 1.9           |                 | 4.75          | 4.75          | 4                 | 40        | 0.10      |             | 2.CMC42.A2Z3.190.1 | ■             |
| 1.9           |                 | 4.75          | 4.75          | 4                 | 40        | 0.30      |             | 2.CMC42.A3Z3.190.1 | ■             |
| 2.0           |                 | 5.00          | 5.00          | 4                 | 40        | 0.10      |             | 2.CMC42.A2Z3.200.1 | ■             |
| 2.0           |                 | 5.00          | 5.00          | 4                 | 40        | 0.20      |             | 2.CMC42.A3Z3.200.1 | ■             |
| 2.0           |                 | 5.00          | 5.00          | 4                 | 40        | 0.50      |             | 2.CMC42.A4Z3.200.1 | ■             |
| 2.1           |                 | 5.25          | 5.25          | 4                 | 40        | 0.20      |             | 2.CMC42.A2Z3.210.1 | ■             |
| 2.1           |                 | 5.25          | 5.25          | 4                 | 40        | 0.50      |             | 2.CMC42.A3Z3.210.1 | ■             |
| 2.2           |                 | 5.50          | 5.50          | 4                 | 40        | 0.20      |             | 2.CMC42.A2Z3.220.1 | ■             |
| 2.2           |                 | 5.50          | 5.50          | 4                 | 40        | 0.50      |             | 2.CMC42.A3Z3.220.1 | ■             |
| 2.3           |                 | 5.75          | 5.75          | 4                 | 40        | 0.20      |             | 2.CMC42.A2Z3.230.1 | ■             |
| 2.3           |                 | 5.75          | 5.75          | 4                 | 40        | 0.50      |             | 2.CMC42.A3Z3.230.1 | ■             |
| 2.381         | <b>3/32</b>     | 5.95          | 5.95          | 4                 | 40        | 0.127     | .005        | 2.CMC.PSRA2Z3.F332 | ■             |
| 2.381         | <b>3/32</b>     | 5.95          | 5.95          | 4                 | 40        | 0.254     | .010        | 2.CMC.PSRA3Z3.F332 | ■             |
| 2.381         | <b>3/32</b>     | 5.95          | 5.95          | 4                 | 40        | 0.381     | .015        | 2.CMC.PSRA4Z3.F332 | ■             |
| 2.4           |                 | 6.00          | 6.00          | 4                 | 40        | 0.20      |             | 2.CMC42.A2Z3.240.1 | ■             |
| 2.4           |                 | 6.00          | 6.00          | 4                 | 40        | 0.50      |             | 2.CMC42.A3Z3.240.1 | ■             |
| 2.5           |                 | 6.25          | 6.25          | 6                 | 50        | 0.20      |             | 2.CMC42.A2Z3.250.1 | ■             |
| 2.5           |                 | 6.25          | 6.25          | 6                 | 50        | 0.50      |             | 2.CMC42.A3Z3.250.1 | ■             |
| 2.6           |                 | 6.50          | 6.50          | 6                 | 50        | 0.20      |             | 2.CMC42.A2Z3.260.1 | ■             |
| 2.6           |                 | 6.50          | 6.50          | 6                 | 50        | 0.50      |             | 2.CMC42.A3Z3.260.1 | ■             |
| 2.7           |                 | 6.75          | 6.75          | 6                 | 50        | 0.20      |             | 2.CMC42.A2Z3.270.1 | ■             |
| 2.7           |                 | 6.75          | 6.75          | 6                 | 50        | 0.50      |             | 2.CMC42.A3Z3.270.1 | ■             |

■ Articolo a stock

|              |    |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |  |
|--------------|----|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--|
| Metallo duro | Z3 |  |  |  |  |  |  |  |  |  |  |  |  |
|              |    | Ø d <sub>1</sub>                                                                  |                                                                                   | 1.0 - 3.0 mm                                                                      |                                                                                   | 3.1 - 6.0 mm                                                                      |                                                                                     | 6.1 - 10.0 mm                                                                       |                                                                                     | r                                                                                   |                                                                                     | 0.1 - 1.524 mm                                                                      |  |
|              |    | Tolleranza                                                                        |                                                                                   | - 0.014 mm<br>- 0.028 mm                                                          |                                                                                   | - 0.020 mm<br>- 0.038 mm                                                          |                                                                                     | - 0.025 mm<br>- 0.047 mm                                                            |                                                                                     | Tolleranza                                                                          |                                                                                     | ± 0.05 · r mm                                                                       |  |

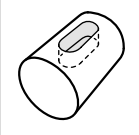
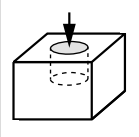
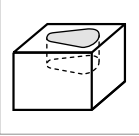
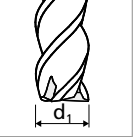
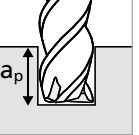
| d <sub>1</sub> | d <sub>1</sub> | l <sub>1</sub> | l <sub>2</sub> | D (h6) | L    | r     | r      | Numero articolo    | Disponibilità |
|----------------|----------------|----------------|----------------|--------|------|-------|--------|--------------------|---------------|
| [mm]           | [inch]         | [mm]           | [mm]           | [mm]   | [mm] | [mm]  | [inch] |                    |               |
| 2.8            |                | 7.00           | 7.00           | 6      | 50   | 0.20  |        | 2.CMC42.A2Z3.280.1 | ■             |
| 2.8            |                | 7.00           | 7.00           | 6      | 50   | 0.50  |        | 2.CMC42.A3Z3.280.1 | ■             |
| 2.9            |                | 7.25           | 7.25           | 6      | 50   | 0.20  |        | 2.CMC42.A2Z3.290.1 | ■             |
| 2.9            |                | 7.25           | 7.25           | 6      | 50   | 0.50  |        | 2.CMC42.A3Z3.290.1 | ■             |
| 3.0            |                | 7.50           | 7.50           | 6      | 50   | 0.20  |        | 2.CMC42.A2Z3.300.1 | ■             |
| 3.0            |                | 7.50           | 7.50           | 6      | 50   | 0.50  |        | 2.CMC42.A3Z3.300.1 | ■             |
| 3.1            |                | 7.75           | 7.75           | 6      | 50   | 0.20  |        | 2.CMC42.A2Z3.310.1 | ■             |
| 3.1            |                | 7.75           | 7.75           | 6      | 50   | 0.50  |        | 2.CMC42.A3Z3.310.1 | ■             |
| 3.175          | 1/8            | 7.94           | 7.94           | 6      | 50   | 0.254 | .010   | 2.CMC.PSRA2Z3.F18  | ■             |
| 3.175          | 1/8            | 7.94           | 7.94           | 6      | 50   | 0.381 | .015   | 2.CMC.PSRA3Z3.F18  | ■             |
| 3.3            |                | 8.25           | 8.25           | 6      | 50   | 0.20  |        | 2.CMC42.A2Z3.330.1 | ■             |
| 3.3            |                | 8.25           | 8.25           | 6      | 50   | 0.50  |        | 2.CMC42.A3Z3.330.1 | ■             |
| 3.7            |                | 9.25           | 9.25           | 6      | 50   | 0.20  |        | 2.CMC42.A2Z3.370.1 | ■             |
| 3.7            |                | 9.25           | 9.25           | 6      | 50   | 0.50  |        | 2.CMC42.A3Z3.370.1 | ■             |
| 3.968          | 5/32           | 9.92           | 9.92           | 6      | 50   | 0.254 | .010   | 2.CMC.PSRA2Z3.F532 | ■             |
| 3.968          | 5/32           | 9.92           | 9.92           | 6      | 50   | 0.381 | .015   | 2.CMC.PSRA3Z3.F532 | ■             |
| 4.0            |                | 10.00          | 10.00          | 6      | 50   | 0.20  |        | 2.CMC42.A2Z3.400.1 | ■             |
| 4.0            |                | 10.00          | 10.00          | 6      | 50   | 0.50  |        | 2.CMC42.A3Z3.400.1 | ■             |
| 4.3            |                | 10.75          | 10.75          | 8      | 60   | 0.20  |        | 2.CMC42.A2Z3.430.1 | ■             |
| 4.3            |                | 10.75          | 10.75          | 8      | 60   | 0.50  |        | 2.CMC42.A3Z3.430.1 | ■             |
| 4.7            |                | 11.75          | 11.75          | 8      | 60   | 0.20  |        | 2.CMC42.A2Z3.470.1 | ■             |
| 4.7            |                | 11.75          | 11.75          | 8      | 60   | 0.50  |        | 2.CMC42.A3Z3.470.1 | ■             |
| 4.762          | 3/16           | 11.91          | 11.91          | 8      | 60   | 0.254 | .010   | 2.CMC.PSRA2Z3.F316 | ■             |
| 4.762          | 3/16           | 11.91          | 11.91          | 8      | 60   | 0.381 | .015   | 2.CMC.PSRA3Z3.F316 | ■             |
| 4.8            |                | 12.00          | 12.00          | 8      | 60   | 0.20  |        | 2.CMC42.A2Z3.480.1 | ■             |
| 4.8            |                | 12.00          | 12.00          | 8      | 60   | 0.50  |        | 2.CMC42.A3Z3.480.1 | ■             |
| 5.0            |                | 12.50          | 12.50          | 8      | 60   | 0.20  |        | 2.CMC42.A2Z3.500.1 | ■             |
| 5.0            |                | 12.50          | 12.50          | 8      | 60   | 0.50  |        | 2.CMC42.A3Z3.500.1 | ■             |
| 5.3            |                | 13.25          | 13.25          | 10     | 65   | 0.20  |        | 2.CMC42.A2Z3.530.1 | ■             |
| 5.3            |                | 13.25          | 13.25          | 10     | 65   | 0.50  |        | 2.CMC42.A3Z3.530.1 | ■             |
| 5.560          | 7/32           | 13.90          | 13.90          | 10     | 65   | 0.381 | .015   | 2.CMC.PSRA2Z3.F732 | ■             |
| 5.560          | 7/32           | 13.90          | 13.90          | 10     | 65   | 0.762 | .030   | 2.CMC.PSRA3Z3.F732 | ■             |
| 5.7            |                | 14.25          | 14.25          | 10     | 65   | 0.20  |        | 2.CMC42.A2Z3.570.1 | ■             |
| 5.7            |                | 14.25          | 14.25          | 10     | 65   | 0.50  |        | 2.CMC42.A3Z3.570.1 | ■             |
| 6.0            |                | 15.00          | 15.00          | 10     | 65   | 0.20  |        | 2.CMC42.A2Z3.600.1 | ■             |
| 6.0            |                | 15.00          | 15.00          | 10     | 65   | 0.50  |        | 2.CMC42.A3Z3.600.1 | ■             |
| 6.0            |                | 15.00          | 15.00          | 10     | 65   | 1.00  |        | 2.CMC42.A4Z3.600.1 | ■             |
| 6.350          | 1/4            | 15.88          | 15.88          | 10     | 65   | 0.381 | .015   | 2.CMC.PSRA2Z3.F14  | ■             |
| 6.350          | 1/4            | 15.88          | 15.88          | 10     | 65   | 0.762 | .030   | 2.CMC.PSRA3Z3.F14  | ■             |
| 6.350          | 1/4            | 15.88          | 15.88          | 10     | 65   | 1.524 | .060   | 2.CMC.PSRA4Z3.F14  | ■             |
| 8.0            |                | 20.00          | 20.00          | 12     | 70   | 0.20  |        | 2.CMC42.A2Z3.800.1 | ■             |
| 8.0            |                | 20.00          | 20.00          | 12     | 70   | 0.50  |        | 2.CMC42.A3Z3.800.1 | ■             |
| 8.0            |                | 20.00          | 20.00          | 12     | 70   | 1.50  |        | 2.CMC42.A4Z3.800.1 | ■             |

■ Articolo a stock

**NEW**

## Tipo A - Sedi chiavette - Fresatura a tuffo - Cave

### FRESARE CON RAFFREDDAMENTO INTEGRATO | VISTA D'INSIEME DEI DATI DI TAGLIO

|                                                                                                                                                                                                    | Gruppo materiali                             | Materiale                                                           | Mat. no. | DIN                | AISI/ASTM/UNS           | 1.0 mm |           |           |         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------|----------|--------------------|-------------------------|--------|-----------|-----------|---------|
|                                                                                                                                                                                                    |                                              |                                                                     |          |                    |                         | $v_c$  | $f_{z,p}$ | $f_{z,s}$ | $a_p$   |
| <b>Fresatura di sedi chiavette</b><br><br>■ $f_{z,p}$ : per fresatura a tuffo<br>■ $f_{z,s}$ : per fresatura cave | <b>P</b>                                     | Acciai non legati<br>$R_m < 800 \text{ N/mm}^2$                     | 1.0301   | C10                | AISI 1010               | 100    | 0.0013    | 0.0046    | 1xd1    |
|                                                                                                                                                                                                    |                                              |                                                                     | 1.0401   | C15                | AISI 1015               |        |           |           |         |
|                                                                                                                                                                                                    |                                              |                                                                     | 1.1191   | C45E/CK45          | AISI 1045               |        |           |           |         |
|                                                                                                                                                                                                    |                                              |                                                                     | 1.0044   | S275JR             | AISI 1020               |        |           |           |         |
|                                                                                                                                                                                                    |                                              |                                                                     | 1.0715   | 11SMn30            | AISI 1215               |        |           |           |         |
|                                                                                                                                                                                                    |                                              | Acciai debolmente legati<br>$R_m > 900 \text{ N/mm}^2$              | 1.5752   | 15NiCr13           | ASTM 3415 / AISI 3310   | 100    | 0.0014    | 0.0049    | 1xd1    |
|                                                                                                                                                                                                    |                                              |                                                                     | 1.7131   | 16MnCr5            | AISI 5115               |        |           |           |         |
|                                                                                                                                                                                                    |                                              |                                                                     | 1.3505   | 100Cr6             | AISI 52100              |        |           |           |         |
|                                                                                                                                                                                                    |                                              |                                                                     | 1.7225   | 42CrMo4            | AISI 4140               |        |           |           |         |
|                                                                                                                                                                                                    |                                              |                                                                     | 1.2842   | 90MnCrV8           | AISI O2                 |        |           |           |         |
|                                                                                                                                                                                                    |                                              | Acciai da utensili fortemente legati<br>$R_m < 1200 \text{ N/mm}^2$ | 1.2379   | X153CrMoV12        | AISI D2                 | 100    | 0.0012    | 0.0042    | 0.5xd1  |
|                                                                                                                                                                                                    |                                              |                                                                     | 1.2436   | X210CrW12          | AISI D4/D6              |        |           |           |         |
|                                                                                                                                                                                                    |                                              |                                                                     | 1.3343   | HS6-5-2C           | AISI M2 / UNS T11302    |        |           |           |         |
|                                                                                                                                                                                                    |                                              |                                                                     | 1.3355   | HS18-0-1           | AISI T1 / UNS T12001    |        |           |           |         |
| <b>Fresatura a tuffo</b><br><br>■ $f_{z,p}$ : per fresatura a tuffo                                             | <b>M</b>                                     | Acciai inossidabili ferritici                                       | 1.4016   | X6Cr17             | AISI 430 / UNS S43000   | 100    | 0.0010    | 0.0035    | 1xd1    |
|                                                                                                                                                                                                    |                                              |                                                                     | 1.4105   | X6CrMoS17          | AISI 430F               |        |           |           |         |
|                                                                                                                                                                                                    |                                              |                                                                     | 1.4034   | X46Cr13            | AISI 420C               | 100    | 0.0010    | 0.0035    | 0.5xd1  |
|                                                                                                                                                                                                    |                                              | Acciai inossidabili martensitici                                    | 1.4112   | X90CrMoV18         | AISI 440B               |        |           |           |         |
|                                                                                                                                                                                                    |                                              |                                                                     | 1.4542   | X5CrNiCuNb16-4     | AISI 630 / ASTM 17-4 PH | 100    | 0.0010    | 0.0035    | 0.5xd1  |
|                                                                                                                                                                                                    |                                              |                                                                     | 1.4545   | X5CrNiCuNb15-5     | ASTM 15-5 PH            |        |           |           |         |
|                                                                                                                                                                                                    |                                              | Acciai inossidabili austenitici                                     | 1.4301   | X5CrNi18-10        | AISI 304                | 100    | 0.0010    | 0.0035    | 1xd1    |
|                                                                                                                                                                                                    |                                              |                                                                     | 1.4435   | X2CrNiMo18-14-3    | AISI 316L               |        |           |           |         |
|                                                                                                                                                                                                    |                                              |                                                                     | 1.4441   | X2CrNiMo18-15-3    | AISI 316LM              |        |           |           |         |
|                                                                                                                                                                                                    |                                              |                                                                     | 1.4539   | X1NiCrMoCu25-20-5  | AISI 904L               |        |           |           |         |
| <b>Fresatura di cave</b><br><br>■ $f_{z,p}$ : per fresatura a tuffo<br>■ $f_{z,s}$ : per fresatura cave         | <b>K</b>                                     | Ghise                                                               | 0.6020   | GG20               | ASTM 30                 | 100    | 0.0013    | 0.0042    | 1xd1    |
|                                                                                                                                                                                                    |                                              |                                                                     | 0.6030   | GG30               | ASTM 40B                |        |           |           |         |
|                                                                                                                                                                                                    |                                              |                                                                     | 0.7040   | GGG40              | ASTM 60-40-18           |        |           |           |         |
|                                                                                                                                                                                                    |                                              |                                                                     | 0.7060   | GGG60              | ASTM 80-60-03           |        |           |           |         |
|                                                                                                                                                                                                    |                                              |                                                                     |          |                    |                         |        |           |           |         |
| <br>■ $f_{z,p}$ : per fresatura a tuffo<br>■ $f_{z,s}$ : per fresatura cave                                     | <b>N</b>                                     | Leghe d'alluminio battute                                           | 3.2315   | AlMgSi1            | ASTM 6351               | 100    | 0.0012    | 0.0100    | 1xd1    |
|                                                                                                                                                                                                    |                                              |                                                                     | 3.4365   | AlZnMgCu1.5        | ASTM 7075               |        |           |           |         |
|                                                                                                                                                                                                    |                                              | Leghe d'alluminio pressofuse                                        | 3.2163   | GD-AlSi9Cu3        | ASTM A380               | 100    | 0.0012    | 0.0100    | 1xd1    |
|                                                                                                                                                                                                    |                                              |                                                                     | 3.2381   | GD-AlSi10Mg        | UNS A03590              |        |           |           |         |
|                                                                                                                                                                                                    |                                              | Rame                                                                | 2.0040   | Cu-OF / CW008A     | UNS C10100              | 100    | 0.0012    | 0.0100    | 1xd1    |
|                                                                                                                                                                                                    |                                              |                                                                     | 2.0065   | Cu-ETP / CW004A    | UNS C11000              |        |           |           |         |
|                                                                                                                                                                                                    |                                              | Ottoni senza piombo                                                 | 2.0321   | CuZn37 CW508L      | UNS C27400              | 100    | 0.0012    | 0.0100    | 1xd1    |
|                                                                                                                                                                                                    |                                              |                                                                     | 2.0360   | CuZn40 CW509L      | UNS C28000              |        |           |           |         |
|                                                                                                                                                                                                    |                                              | Ottoni, Bronzi<br>$R_m < 400 \text{ N/mm}^2$                        | 2.0401   | CuZn39Pb3 / CW614N | UNS C38500              | 100    | 0.0012    | 0.0100    | 1xd1    |
|                                                                                                                                                                                                    |                                              |                                                                     | 2.1020   | CuSn6              | UNS C51900              |        |           |           |         |
|                                                                                                                                                                                                    |                                              | Bronzi<br>$R_m < 600 \text{ N/mm}^2$                                | 2.0966   | CuAl10Ni5Fe4       | UNS C63000              | 100    | 0.0012    | 0.0100    | 1xd1    |
|                                                                                                                                                                                                    |                                              |                                                                     | 2.0960   | CuAl9Mn2           | UNS C63200              |        |           |           |         |
| <br>                         | <b>S<sub>1</sub></b>                         | Superleghe                                                          | 2.4856   |                    | Inconel 625             | 40     | 0.0010    | 0.0035    | 0.25xd1 |
|                                                                                                                                                                                                    |                                              |                                                                     | 2.4668   |                    | Inconel 718             |        |           |           |         |
|                                                                                                                                                                                                    |                                              |                                                                     | 2.4617   | NiMo28             | Hastelloy B-2           |        |           |           |         |
|                                                                                                                                                                                                    |                                              |                                                                     | 2.4665   | NiCr22Fe18Mo       | Hastelloy X             |        |           |           |         |
|                                                                                                                                                                                                    | <b>S<sub>2</sub></b>                         | Titanio puro                                                        | 3.7035   | Gr.2               | ASTM B348 / F67         | 80     | 0.0010    | 0.0032    | 0.25xd1 |
|                                                                                                                                                                                                    |                                              |                                                                     | 3.7065   | Gr.4               | ASTM B348 / F68         |        |           |           |         |
|                                                                                                                                                                                                    | <b>S<sub>3</sub></b>                         | Leghe di titanio                                                    | 3.7165   | TiAl6V4            | ASTM B348 / F136        | 80     | 0.0010    | 0.0032    | 0.25xd1 |
|                                                                                                                                                                                                    |                                              |                                                                     | 9.9367   | TiAl6Nb7           | ASTM F1295              |        |           |           |         |
|                                                                                                                                                                                                    | <b>H<sub>1</sub></b><br><b>H<sub>2</sub></b> | Acciai temprati<br>$< 55 \text{ HRC}$                               | 2.4964   | CoCr20W15Ni        | Haynes 25               | 60     | 0.0010    | 0.0035    | 0.5xd1  |
|                                                                                                                                                                                                    |                                              |                                                                     |          | CrCoMo28           | ASTM F1537              |        |           |           |         |
|                                                                                                                                                                                                    | <b>H<sub>1</sub></b><br><b>H<sub>2</sub></b> | Acciai temprati<br>$\geq 55 \text{ HRC}$                            | 1.2510   | 100MnCrMoW4        | AISI O1                 |        |           |           |         |
|                                                                                                                                                                                                    |                                              |                                                                     | 1.2379   | X153CrMoV12        | AISI D2                 |        |           |           |         |

**v<sub>c</sub>** [m/min]   **a<sub>p</sub>** [mm]  
**f<sub>z,p</sub>** [mm]   **f<sub>z,s</sub>** [mm]

RACCOMANDAZIONI PER L'USO

● Perfettamente consigliato | ● Consigliato | ○ Parzialmente consigliato | ☒ Non consigliato

|   |                |                |
|---|----------------|----------------|
| P | N              | S <sub>3</sub> |
| M | S <sub>1</sub> | H <sub>1</sub> |
| K | S <sub>2</sub> | H <sub>2</sub> |

| Ød <sub>i</sub> |                |                  |                  |                 |                |                  |                  |                |                |                  |                  |                 |                |                  |                  |                         |                |                  |                  |                         |                |                  |                  |                |
|-----------------|----------------|------------------|------------------|-----------------|----------------|------------------|------------------|----------------|----------------|------------------|------------------|-----------------|----------------|------------------|------------------|-------------------------|----------------|------------------|------------------|-------------------------|----------------|------------------|------------------|----------------|
| 1.5 mm<br>1/16" |                |                  |                  | 2.0 mm<br>3/32" |                |                  |                  | 3.0 mm<br>1/8" |                |                  |                  | 4.0 mm<br>5/32" |                |                  |                  | 5.0 mm<br>3/16" - 7/32" |                |                  |                  | 6.0 mm - 8.0 mm<br>1/4" |                |                  |                  |                |
|                 | v <sub>c</sub> | f <sub>z,p</sub> | f <sub>z,s</sub> | a <sub>p</sub>  | v <sub>c</sub> | f <sub>z,p</sub> | f <sub>z,s</sub> | a <sub>p</sub> | v <sub>c</sub> | f <sub>z,p</sub> | f <sub>z,s</sub> | a <sub>p</sub>  | v <sub>c</sub> | f <sub>z,p</sub> | f <sub>z,s</sub> | a <sub>p</sub>          | v <sub>c</sub> | f <sub>z,p</sub> | f <sub>z,s</sub> | a <sub>p</sub>          | v <sub>c</sub> | f <sub>z,p</sub> | f <sub>z,s</sub> | a <sub>p</sub> |
|                 | 120            | 0.0020           | 0.0065           | 1xd1            | 120            | 0.0026           | 0.0091           | 1xd1           | 140            | 0.004            | 0.013            | 1xd1            | 140            | 0.005            | 0.020            | 1xd1                    | 150            | 0.005            | 0.026            | 1xd1                    | 160            | 0.006            | 0.033            | 1xd1           |
|                 | 120            | 0.0021           | 0.0070           | 1xd1            | 120            | 0.0028           | 0.0098           | 1xd1           | 140            | 0.004            | 0.014            | 1xd1            | 140            | 0.005            | 0.021            | 1xd1                    | 150            | 0.006            | 0.027            | 1xd1                    | 160            | 0.006            | 0.034            | 1xd1           |
|                 | 120            | 0.0018           | 0.0060           | 0.5xd1          | 120            | 0.0024           | 0.0084           | 0.5xd1         | 140            | 0.003            | 0.012            | 0.5xd1          | 140            | 0.004            | 0.017            | 0.5xd1                  | 150            | 0.004            | 0.022            | 0.5xd1                  | 160            | 0.005            | 0.028            | 0.5xd1         |
|                 | 120            | 0.0015           | 0.0050           | 1xd1            | 120            | 0.0020           | 0.0070           | 1xd1           | 140            | 0.003            | 0.010            | 1xd1            | 140            | 0.004            | 0.015            | 1xd1                    | 150            | 0.004            | 0.020            | 1xd1                    | 160            | 0.005            | 0.025            | 1xd1           |
|                 | 120            | 0.0015           | 0.0050           | 0.5xd1          | 120            | 0.0020           | 0.0070           | 0.5xd1         | 140            | 0.003            | 0.010            | 0.5xd1          | 140            | 0.004            | 0.015            | 0.5xd1                  | 150            | 0.004            | 0.020            | 0.5xd1                  | 160            | 0.005            | 0.025            | 0.5xd1         |
|                 | 120            | 0.0015           | 0.0050           | 0.5xd1          | 120            | 0.0020           | 0.0070           | 0.5xd1         | 140            | 0.003            | 0.010            | 0.5xd1          | 140            | 0.004            | 0.015            | 0.5xd1                  | 150            | 0.004            | 0.020            | 0.5xd1                  | 160            | 0.005            | 0.025            | 0.5xd1         |
|                 | 120            | 0.0015           | 0.0050           | 1xd1            | 120            | 0.0020           | 0.0070           | 1xd1           | 140            | 0.003            | 0.010            | 1xd1            | 140            | 0.004            | 0.015            | 1xd1                    | 150            | 0.004            | 0.020            | 1xd1                    | 160            | 0.005            | 0.025            | 1xd1           |
|                 | 120            | 0.0019           | 0.0060           | 1xd1            | 120            | 0.0024           | 0.0084           | 1xd1           | 140            | 0.004            | 0.012            | 1xd1            | 140            | 0.004            | 0.017            | 1xd1                    | 150            | 0.005            | 0.022            | 1xd1                    | 160            | 0.005            | 0.028            | 1xd1           |
|                 | 120            | 0.0018           | 0.0160           | 1xd1            | 120            | 0.0024           | 0.0210           | 1xd1           | 150            | 0.004            | 0.034            | 1xd1            | 160            | 0.004            | 0.035            | 1xd1                    | 170            | 0.005            | 0.036            | 1xd1                    | 180            | 0.005            | 0.037            | 1xd1           |
|                 | 120            | 0.0018           | 0.0160           | 1xd1            | 120            | 0.0024           | 0.0210           | 1xd1           | 150            | 0.004            | 0.034            | 1xd1            | 160            | 0.004            | 0.035            | 1xd1                    | 170            | 0.005            | 0.036            | 1xd1                    | 180            | 0.005            | 0.037            | 1xd1           |
|                 | 120            | 0.0018           | 0.0160           | 1xd1            | 120            | 0.0024           | 0.0210           | 1xd1           | 150            | 0.004            | 0.034            | 1xd1            | 160            | 0.004            | 0.035            | 1xd1                    | 170            | 0.005            | 0.036            | 1xd1                    | 180            | 0.005            | 0.037            | 1xd1           |
|                 | 120            | 0.0018           | 0.0160           | 1xd1            | 120            | 0.0024           | 0.0210           | 1xd1           | 150            | 0.004            | 0.034            | 1xd1            | 160            | 0.004            | 0.035            | 1xd1                    | 170            | 0.005            | 0.036            | 1xd1                    | 180            | 0.005            | 0.037            | 1xd1           |
|                 | 120            | 0.0018           | 0.0160           | 1xd1            | 120            | 0.0024           | 0.0210           | 1xd1           | 150            | 0.004            | 0.034            | 1xd1            | 160            | 0.004            | 0.035            | 1xd1                    | 170            | 0.005            | 0.036            | 1xd1                    | 180            | 0.005            | 0.037            | 1xd1           |
|                 | 120            | 0.0018           | 0.0160           | 1xd1            | 120            | 0.0024           | 0.0210           | 1xd1           | 150            | 0.004            | 0.034            | 1xd1            | 160            | 0.004            | 0.035            | 1xd1                    | 170            | 0.005            | 0.036            | 1xd1                    | 180            | 0.005            | 0.037            | 1xd1           |
|                 | 40             | 0.0015           | 0.0050           | 0.25xd1         | 50             | 0.0020           | 0.0070           | 0.25xd1        | 50             | 0.003            | 0.010            | 0.25xd1         | 60             | 0.004            | 0.014            | 0.25xd1                 | 80             | 0.004            | 0.018            | 0.25xd1                 | 80             | 0.005            | 0.021            | 0.25xd1        |
|                 | 90             | 0.0014           | 0.0045           | 0.25xd1         | 100            | 0.0018           | 0.0063           | 0.25xd1        | 110            | 0.003            | 0.010            | 0.25xd1         | 120            | 0.004            | 0.013            | 0.25xd1                 | 120            | 0.004            | 0.016            | 0.25xd1                 | 120            | 0.005            | 0.019            | 0.25xd1        |
|                 | 90             | 0.0014           | 0.0045           | 0.25xd1         | 100            | 0.0018           | 0.0063           | 0.25xd1        | 110            | 0.003            | 0.010            | 0.25xd1         | 120            | 0.004            | 0.013            | 0.25xd1                 | 120            | 0.004            | 0.016            | 0.25xd1                 | 120            | 0.005            | 0.019            | 0.25xd1        |
|                 | 60             | 0.0015           | 0.0050           | 0.5xd1          | 80             | 0.0020           | 0.0070           | 0.5xd1         | 80             | 0.003            | 0.010            | 0.5xd1          | 100            | 0.004            | 0.014            | 0.5xd1                  | 100            | 0.004            | 0.018            | 0.5xd1                  | 120            | 0.005            | 0.021            | 0.5xd1         |
|                 |                |                  |                  |                 |                |                  |                  |                |                |                  |                  |                 |                |                  |                  |                         |                |                  |                  |                         |                |                  |                  |                |
|                 |                |                  |                  |                 |                |                  |                  |                |                |                  |                  |                 |                |                  |                  |                         |                |                  |                  |                         |                |                  |                  |                |

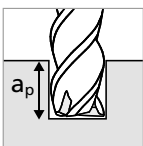
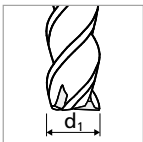
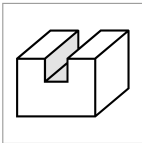


**NEW**

## Tipo A - Fresatura di scanalature

### FRESARE CON RAFFREDDAMENTO INTEGRATO | VISTA D'INSIEME DEI DATI DI TAGLIO

Fresatura di  
scanalature



| Gruppo materiali         | Materiale                                                    | Mat. no.          | DIN                  | AISI/ASTM/UNS           | 1.0 mm         |                |                |
|--------------------------|--------------------------------------------------------------|-------------------|----------------------|-------------------------|----------------|----------------|----------------|
|                          |                                                              |                   |                      |                         | v <sub>c</sub> | f <sub>z</sub> | a <sub>p</sub> |
| P                        | Acciai non legati<br>Rm < 800 N/mm²                          | 1.0301            | C10                  | AISI 1010               | 140            | 0.009          | 1xd1           |
|                          |                                                              | 1.0401            | C15                  | AISI 1015               |                |                |                |
|                          |                                                              | 1.1191            | C45E/CK45            | AISI 1045               |                |                |                |
|                          |                                                              | 1.0044            | S275JR               | AISI 1020               |                |                |                |
|                          |                                                              | 1.0715            | 11SMn30              | AISI 1215               |                |                |                |
|                          | Acciai debolmente legati<br>Rm > 900 N/mm²                   | 1.5752            | 15NiCr13             | ASTM 3415 / AISI 3310   | 140            | 0.008          | 1xd1           |
|                          |                                                              | 1.7131            | 16MnCr5              | AISI 5115               |                |                |                |
|                          |                                                              | 1.3505            | 100Cr6               | AISI 52100              |                |                |                |
|                          |                                                              | 1.7225            | 42CrMo4              | AISI 4140               |                |                |                |
|                          |                                                              | 1.2842            | 90MnCrV8             | AISI O2                 |                |                |                |
|                          | Acciai da utensili forte-<br>mente legati<br>Rm < 1200 N/mm² | 1.2379            | X153CrMoV12          | AISI D2                 | 140            | 0.006          | 0.5xd1         |
|                          |                                                              | 1.2436            | X210CrW12            | AISI D4/D6              |                |                |                |
|                          |                                                              | 1.3343            | H56-5-2C             | AISI M2 / UNS T11302    |                |                |                |
| 1.3355                   |                                                              | H518-0-1          | AISI T1 / UNS T12001 |                         |                |                |                |
| M                        | Acciai inossidabili ferritici                                | 1.4016            | X6Cr17               | AISI 430 / UNS S43000   | 140            | 0.009          | 1xd1           |
|                          |                                                              | 1.4105            | X6CrMoS17            | AISI 430F               |                |                |                |
|                          | Acciai inossidabili martensitici                             | 1.4034            | X46Cr13              | AISI 420C               | 140            | 0.009          | 1xd1           |
|                          |                                                              | 1.4112            | X90CrMoV18           | AISI 440B               |                |                |                |
|                          | Acciai inossidabili mar-<br>tensitici - PH                   | 1.4542            | X5CrNiCuNb16-4       | AISI 630 / ASTM 17-4 PH | 140            | 0.009          | 1xd1           |
|                          |                                                              | 1.4545            | X5CrNiCuNb15-5       | ASTM 15-5 PH            |                |                |                |
|                          | Acciai inossidabili austenitici                              | 1.4301            | X5CrNi18-10          | AISI 304                | 140            | 0.007          | 1xd1           |
|                          |                                                              | 1.4435            | X2CrNiMo18-14-3      | AISI 316L               |                |                |                |
|                          |                                                              | 1.4441            | X2CrNiMo18-15-3      | AISI 316LM              |                |                |                |
| 1.4539                   |                                                              | X1NiCrMoCu25-20-5 | AISI 904L            |                         |                |                |                |
| K                        | Ghise                                                        | 0.6020            | GG20                 | ASTM 30                 | 120            | 0.007          | 1xd1           |
|                          |                                                              | 0.6030            | GG30                 | ASTM 40B                |                |                |                |
|                          |                                                              | 0.7040            | GGG40                | ASTM 60-40-18           |                |                |                |
|                          |                                                              | 0.7060            | GGG60                | ASTM 80-60-03           |                |                |                |
| N                        | Leghe d'alluminio battute                                    | 3.2315            | AlMgSi1              | ASTM 6351               | 140            | 0.010          | 1xd1           |
|                          |                                                              | 3.4365            | AlZnMgCu1.5          | ASTM 7075               |                |                |                |
|                          | Leghe d'alluminio pressofuse                                 | 3.2163            | GD-AlSi9Cu3          | ASTM A380               | 140            | 0.010          | 1xd1           |
|                          |                                                              | 3.2381            | GD-AlSi10Mg          | UNS A03590              |                |                |                |
|                          | Rame                                                         | 2.0040            | Cu-OF / CW008A       | UNS C10100              | 140            | 0.012          | 1xd1           |
|                          |                                                              | 2.0065            | Cu-ETP / CW004A      | UNS C11000              |                |                |                |
|                          | Ottoni senza piombo                                          | 2.0321            | CuZn37 CW508L        | UNS C27400              | 140            | 0.012          | 1xd1           |
|                          |                                                              | 2.0360            | CuZn40 CW509L        | UNS C28000              |                |                |                |
|                          | Ottoni, Bronzi<br>Rm < 400 N/mm²                             | 2.0401            | CuZn39Pb3 / CW614N   | UNS C38500              | 140            | 0.012          | 1xd1           |
|                          |                                                              | 2.1020            | CuSn6                | UNS C51900              |                |                |                |
| Bronzi<br>Rm < 600 N/mm² |                                                              | 2.0966            | CuAl10Ni5Fe4         | UNS C63000              |                |                |                |
|                          | 2.0960                                                       | CuAl9Mn2          | UNS C63200           |                         |                |                |                |
| S <sub>1</sub>           | Superleghe                                                   | 2.4856            |                      | Inconel 625             | 80             | 0.005          | 0.5xd1         |
|                          |                                                              | 2.4668            |                      | Inconel 718             |                |                |                |
|                          |                                                              | 2.4617            | NiMo28               | Hastelloy B-2           |                |                |                |
|                          |                                                              | 2.4665            | NiCr22Fe18Mo         | Hastelloy X             |                |                |                |
| S <sub>2</sub>           | Titanio puro                                                 | 3.7035            | Gr.2                 | ASTM B348 / F67         | 100            | 0.009          | 0.5xd1         |
|                          |                                                              | 3.7065            | Gr.4                 | ASTM B348 / F68         |                |                |                |
|                          | Leghe di titanio                                             | 3.7165            | TiAl6V4              | ASTM B348 / F136        | 100            | 0.009          | 0.5xd1         |
|                          | 9.9367                                                       | TiAl6Nb7          | ASTM F1295           |                         |                |                |                |
| S <sub>3</sub>           | Leghe CrCo                                                   | 2.4964            | CoCr20W15Ni          | Haynes 25               | 80             | 0.005          | 0.5xd1         |
|                          |                                                              |                   | CrCoMo28             | ASTM F1537              |                |                |                |
| H <sub>1</sub>           | Acciai temprati<br>< 55 HRC                                  | 1.2510            | 100MnCrMoW4          | AISI O1                 |                |                |                |
| H <sub>2</sub>           | Acciai temprati<br>≥ 55 HRC                                  | 1.2379            | X153CrMoV12          | AISI D2                 |                |                |                |

$v_c$  [m/min]  
 $f_z$  [mm]  
 $a_p$  [mm]

RACCOMANDAZIONI PER L'USO

● Perfettamente consigliato | ● Consigliato | ○ Parzialmente consigliato | ☒ Non consigliato

|   |                |                |
|---|----------------|----------------|
| P | N              | S <sub>3</sub> |
| M | S <sub>1</sub> | H <sub>1</sub> |
| K | S <sub>2</sub> | H <sub>2</sub> |

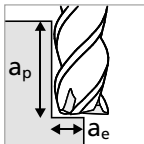
|  | 1.5 mm<br>1/16" |       |        | 2.0 mm<br>3/32" |       |        | 3.0 mm<br>1/8" |       |        | 4.0 mm<br>5/32" |       |        | 5.0 mm<br>3/16" - 7/32" |       |        | 6.0 mm - 8.0 mm<br>1/4" |       |        |
|--|-----------------|-------|--------|-----------------|-------|--------|----------------|-------|--------|-----------------|-------|--------|-------------------------|-------|--------|-------------------------|-------|--------|
|  | $v_c$           | $f_z$ | $a_p$  | $v_c$           | $f_z$ | $a_p$  | $v_c$          | $f_z$ | $a_p$  | $v_c$           | $f_z$ | $a_p$  | $v_c$                   | $f_z$ | $a_p$  | $v_c$                   | $f_z$ | $a_p$  |
|  | 180             | 0.015 | 1xd1   | 200             | 0.020 | 1xd1   | 220            | 0.029 | 1xd1   | 230             | 0.031 | 1xd1   | 240                     | 0.031 | 1xd1   | 260                     | 0.032 | 1xd1   |
|  | 180             | 0.013 | 1xd1   | 200             | 0.019 | 1xd1   | 220            | 0.028 | 1xd1   | 230             | 0.029 | 1xd1   | 240                     | 0.030 | 1xd1   | 260                     | 0.031 | 1xd1   |
|  | 180             | 0.012 | 0.5xd1 | 200             | 0.017 | 0.5xd1 | 220            | 0.025 | 0.5xd1 | 230             | 0.026 | 0.5xd1 | 240                     | 0.026 | 0.5xd1 | 260                     | 0.027 | 0.5xd1 |
|  | 180             | 0.015 | 1xd1   | 200             | 0.020 | 1xd1   | 220            | 0.028 | 1xd1   | 230             | 0.029 | 1xd1   | 240                     | 0.030 | 1xd1   | 260                     | 0.031 | 1xd1   |
|  | 180             | 0.013 | 1xd1   | 200             | 0.019 | 1xd1   | 220            | 0.027 | 1xd1   | 230             | 0.028 | 1xd1   | 240                     | 0.029 | 1xd1   | 260                     | 0.029 | 1xd1   |
|  | 180             | 0.013 | 1xd1   | 200             | 0.019 | 1xd1   | 220            | 0.027 | 1xd1   | 230             | 0.028 | 1xd1   | 240                     | 0.029 | 1xd1   | 260                     | 0.029 | 1xd1   |
|  | 180             | 0.011 | 1xd1   | 200             | 0.017 | 1xd1   | 220            | 0.025 | 1xd1   | 230             | 0.027 | 1xd1   | 240                     | 0.027 | 1xd1   | 260                     | 0.028 | 1xd1   |
|  | 140             | 0.015 | 1xd1   | 160             | 0.017 | 1xd1   | 180            | 0.025 | 1xd1   | 200             | 0.031 | 1xd1   | 200                     | 0.031 | 1xd1   | 200                     | 0.032 | 1xd1   |
|  | 180             | 0.016 | 1xd1   | 200             | 0.021 | 1xd1   | 220            | 0.034 | 1xd1   | 260             | 0.035 | 1xd1   | 300                     | 0.036 | 1xd1   | 340                     | 0.037 | 1xd1   |
|  | 180             | 0.016 | 1xd1   | 200             | 0.021 | 1xd1   | 220            | 0.032 | 1xd1   | 260             | 0.034 | 1xd1   | 300                     | 0.034 | 1xd1   | 340                     | 0.036 | 1xd1   |
|  | 180             | 0.016 | 1xd1   | 200             | 0.021 | 1xd1   | 220            | 0.034 | 1xd1   | 260             | 0.035 | 1xd1   | 300                     | 0.036 | 1xd1   | 340                     | 0.037 | 1xd1   |
|  | 180             | 0.016 | 1xd1   | 200             | 0.021 | 1xd1   | 220            | 0.034 | 1xd1   | 260             | 0.035 | 1xd1   | 300                     | 0.036 | 1xd1   | 340                     | 0.037 | 1xd1   |
|  | 180             | 0.016 | 1xd1   | 200             | 0.021 | 1xd1   | 220            | 0.034 | 1xd1   | 260             | 0.035 | 1xd1   | 300                     | 0.036 | 1xd1   | 340                     | 0.037 | 1xd1   |
|  | 180             | 0.016 | 1xd1   | 200             | 0.021 | 1xd1   | 220            | 0.034 | 1xd1   | 260             | 0.035 | 1xd1   | 300                     | 0.036 | 1xd1   | 340                     | 0.037 | 1xd1   |
|  | 80              | 0.006 | 0.5xd1 | 100             | 0.007 | 0.5xd1 | 100            | 0.010 | 0.5xd1 | 120             | 0.013 | 0.5xd1 | 120                     | 0.013 | 0.5xd1 | 120                     | 0.013 | 0.5xd1 |
|  | 100             | 0.012 | 0.5xd1 | 120             | 0.017 | 0.5xd1 | 120            | 0.027 | 0.5xd1 | 140             | 0.027 | 0.5xd1 | 140                     | 0.027 | 0.5xd1 | 140                     | 0.028 | 0.5xd1 |
|  | 100             | 0.012 | 0.5xd1 | 120             | 0.017 | 0.5xd1 | 120            | 0.027 | 0.5xd1 | 140             | 0.027 | 0.5xd1 | 140                     | 0.027 | 0.5xd1 | 140                     | 0.028 | 0.5xd1 |
|  | 80              | 0.006 | 0.5xd1 | 100             | 0.007 | 0.5xd1 | 100            | 0.010 | 0.5xd1 | 120             | 0.013 | 0.5xd1 | 120                     | 0.013 | 0.5xd1 | 120                     | 0.013 | 0.5xd1 |
|  |                 |       |        |                 |       |        |                |       |        |                 |       |        |                         |       |        |                         |       |        |
|  |                 |       |        |                 |       |        |                |       |        |                 |       |        |                         |       |        |                         |       |        |

**NEW**

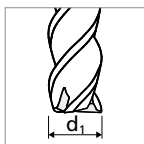
## Tipo A - Contornatura - Semi-finitura

### FRESARE CON RAFFREDDAMENTO INTEGRATO | VISTA D'INSIEME DEI DATI DI TAGLIO

#### Semi-finitura



■  $a_p = 1 \times d_1 - 2 \times d_1$   
■  $a_e = 0.2 \times d_1$



| Gruppo materiali                                                     | Materiale                                                           | Mat. no. | DIN                | AISI/ASTM/UNS           | 1.0 mm |       |
|----------------------------------------------------------------------|---------------------------------------------------------------------|----------|--------------------|-------------------------|--------|-------|
|                                                                      |                                                                     |          |                    |                         | $v_c$  | $f_z$ |
| <b>P</b>                                                             | Acciai non legati<br>$R_m < 800 \text{ N/mm}^2$                     | 1.0301   | C10                | AISI 1010               | 140    | 0.013 |
|                                                                      |                                                                     | 1.0401   | C15                | AISI 1015               |        |       |
|                                                                      |                                                                     | 1.1191   | C45E/CK45          | AISI 1045               |        |       |
|                                                                      |                                                                     | 1.0044   | S275JR             | AISI 1020               |        |       |
|                                                                      |                                                                     | 1.0715   | 11SMn30            | AISI 1215               |        |       |
|                                                                      | Acciai debolmente legati<br>$R_m > 900 \text{ N/mm}^2$              | 1.5752   | 15NiCr13           | ASTM 3415 / AISI 3310   | 140    | 0.012 |
|                                                                      |                                                                     | 1.7131   | 16MnCr5            | AISI 5115               |        |       |
|                                                                      |                                                                     | 1.3505   | 100Cr6             | AISI 52100              |        |       |
|                                                                      |                                                                     | 1.7225   | 42CrMo4            | AISI 4140               |        |       |
|                                                                      |                                                                     | 1.2842   | 90MnCrV8           | AISI O2                 |        |       |
|                                                                      | Acciai da utensili fortemente legati<br>$R_m < 1200 \text{ N/mm}^2$ | 1.2379   | X153CrMoV12        | AISI D2                 | 140    | 0.009 |
|                                                                      |                                                                     | 1.2436   | X210CrW12          | AISI D4/D6              |        |       |
|                                                                      |                                                                     | 1.3343   | HS6-5-2C           | AISI M2 / UNS T11302    |        |       |
|                                                                      |                                                                     | 1.3355   | HS18-0-1           | AISI T1 / UNS T12001    |        |       |
| <b>M</b>                                                             | Acciai inossidabili ferritici                                       | 1.4016   | X6Cr17             | AISI 430 / UNS S43000   | 140    | 0.014 |
|                                                                      |                                                                     | 1.4105   | X6CrMoS17          | AISI 430F               |        |       |
|                                                                      | Acciai inossidabili martensitici                                    | 1.4034   | X46Cr13            | AISI 420C               | 140    | 0.013 |
|                                                                      |                                                                     | 1.4112   | X90CrMoV18         | AISI 440B               |        |       |
|                                                                      | Acciai inossidabili martensitici - PH                               | 1.4542   | X5CrNiCuNb16-4     | AISI 630 / ASTM 17-4 PH | 140    | 0.013 |
|                                                                      |                                                                     | 1.4545   | X5CrNiCuNb15-5     | ASTM 15-5 PH            |        |       |
|                                                                      | Acciai inossidabili austenitici                                     | 1.4301   | X5CrNi18-10        | AISI 304                | 140    | 0.010 |
|                                                                      |                                                                     | 1.4435   | X2CrNiMo18-14-3    | AISI 316L               |        |       |
|                                                                      |                                                                     | 1.4441   | X2CrNiMo18-15-3    | AISI 316LM              |        |       |
| <b>K</b>                                                             | Ghise                                                               | 0.6020   | GG20               | ASTM 30                 | 120    | 0.009 |
|                                                                      |                                                                     | 0.6030   | GG30               | ASTM 40B                |        |       |
|                                                                      |                                                                     | 0.7040   | GGG40              | ASTM 60-40-18           |        |       |
|                                                                      |                                                                     | 0.7060   | GGG60              | ASTM 80-60-03           |        |       |
| <b>N</b>                                                             | Leghe d'alluminio battute                                           | 3.2315   | AlMgSi1            | ASTM 6351               | 140    | 0.015 |
|                                                                      |                                                                     | 3.4365   | AlZnMgCu1.5        | ASTM 7075               |        |       |
|                                                                      | Leghe d'alluminio pressofuse                                        | 3.2163   | GD-AlSi9Cu3        | ASTM A380               | 140    | 0.015 |
|                                                                      |                                                                     | 3.2381   | GD-AlSi10Mg        | UNS A03590              |        |       |
|                                                                      | Rame                                                                | 2.0040   | Cu-OF / CW008A     | UNS C10100              | 140    | 0.017 |
|                                                                      |                                                                     | 2.0065   | Cu-ETP / CW004A    | UNS C11000              |        |       |
|                                                                      | Ottoni senza piombo                                                 | 2.0321   | CuZn37 CW508L      | UNS C27400              | 140    | 0.017 |
|                                                                      |                                                                     | 2.0360   | CuZn40 CW509L      | UNS C28000              |        |       |
|                                                                      | Ottoni, Bronzi<br>$R_m < 400 \text{ N/mm}^2$                        | 2.0401   | CuZn39Pb3 / CW614N | UNS C38500              | 140    | 0.017 |
|                                                                      |                                                                     | 2.1020   | CuSn6              | UNS C51900              |        |       |
| <b>S<sub>1</sub></b><br><b>S<sub>2</sub></b><br><b>S<sub>3</sub></b> | Superleghe                                                          | 2.4856   |                    | Inconel 625             | 80     | 0.006 |
|                                                                      |                                                                     | 2.4668   |                    | Inconel 718             |        |       |
|                                                                      |                                                                     | 2.4617   | NiMo28             | Hastelloy B-2           |        |       |
|                                                                      |                                                                     | 2.4665   | NiCr22Fe18Mo       | Hastelloy X             |        |       |
|                                                                      | Titanio puro                                                        | 3.7035   | Gr.2               | ASTM B348 / F67         | 120    | 0.014 |
|                                                                      |                                                                     | 3.7065   | Gr.4               | ASTM B348 / F68         |        |       |
|                                                                      | Leghe di titanio                                                    | 3.7165   | TiAl6V4            | ASTM B348 / F136        | 120    | 0.014 |
|                                                                      |                                                                     | 9.9367   | TiAl6Nb7           | ASTM F1295              |        |       |
|                                                                      | Leghe CrCo                                                          | 2.4964   | CoCr20W15Ni        | Haynes 25               | 80     | 0.006 |
|                                                                      |                                                                     |          | CrCoMo28           | ASTM F1537              |        |       |
| <b>H<sub>1</sub></b>                                                 | Acciai temprati<br>$< 55 \text{ HRC}$                               | 1.2510   | 100MnCrMoW4        | AISI O1                 |        |       |
| <b>H<sub>2</sub></b>                                                 | Acciai temprati<br>$\geq 55 \text{ HRC}$                            | 1.2379   | X153CrMoV12        | AISI D2                 |        |       |

$v_c$  [m/min]  
 $f_z$  [mm]

RACCOMANDAZIONI PER L'USO

● Perfettamente consigliato | ● Consigliato | ○ Parzialmente consigliato | ☒ Non consigliato

|   |                |                |
|---|----------------|----------------|
| P | N              | S <sub>3</sub> |
| M | S <sub>1</sub> | H <sub>1</sub> |
| K | S <sub>2</sub> | H <sub>2</sub> |

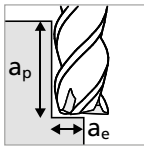
|  | 1.5 mm<br>1/16" |       | 2.0 mm<br>3/32" |       | 3.0 mm<br>1/8" |       | Ød <sub>1</sub><br>4.0 mm<br>5/32" |       | 5.0 mm<br>3/16" - 7/32" |       | 6.0 mm<br>1/4" |       | 8.0 mm |       |
|--|-----------------|-------|-----------------|-------|----------------|-------|------------------------------------|-------|-------------------------|-------|----------------|-------|--------|-------|
|  | $v_c$           | $f_z$ | $v_c$           | $f_z$ | $v_c$          | $f_z$ | $v_c$                              | $f_z$ | $v_c$                   | $f_z$ | $v_c$          | $f_z$ | $v_c$  | $f_z$ |
|  | 200             | 0.020 | 220             | 0.029 | 240            | 0.037 | 260                                | 0.040 | 260                     | 0.040 | 260            | 0.043 | 260    | 0.051 |
|  | 200             | 0.019 | 220             | 0.027 | 240            | 0.035 | 260                                | 0.038 | 260                     | 0.038 | 260            | 0.041 | 260    | 0.049 |
|  | 200             | 0.017 | 220             | 0.026 | 240            | 0.032 | 260                                | 0.034 | 260                     | 0.034 | 260            | 0.036 | 260    | 0.043 |
|  | 200             | 0.020 | 220             | 0.029 | 240            | 0.035 | 260                                | 0.038 | 260                     | 0.038 | 260            | 0.041 | 260    | 0.046 |
|  | 200             | 0.019 | 220             | 0.027 | 240            | 0.035 | 260                                | 0.037 | 260                     | 0.037 | 260            | 0.039 | 260    | 0.045 |
|  | 200             | 0.019 | 220             | 0.027 | 240            | 0.035 | 260                                | 0.037 | 260                     | 0.037 | 260            | 0.039 | 260    | 0.045 |
|  | 200             | 0.014 | 220             | 0.026 | 240            | 0.032 | 260                                | 0.035 | 260                     | 0.035 | 260            | 0.037 | 260    | 0.043 |
|  | 140             | 0.020 | 160             | 0.024 | 180            | 0.034 | 200                                | 0.040 | 200                     | 0.042 | 200            | 0.044 | 200    | 0.052 |
|  | 200             | 0.022 | 220             | 0.031 | 240            | 0.046 | 260                                | 0.048 | 260                     | 0.048 | 260            | 0.051 | 260    | 0.063 |
|  | 200             | 0.022 | 220             | 0.031 | 240            | 0.046 | 260                                | 0.048 | 260                     | 0.048 | 260            | 0.051 | 260    | 0.063 |
|  | 200             | 0.022 | 220             | 0.031 | 240            | 0.046 | 260                                | 0.048 | 260                     | 0.048 | 260            | 0.051 | 260    | 0.063 |
|  | 200             | 0.022 | 220             | 0.031 | 240            | 0.046 | 260                                | 0.048 | 260                     | 0.048 | 260            | 0.051 | 260    | 0.063 |
|  | 200             | 0.022 | 220             | 0.031 | 240            | 0.046 | 260                                | 0.048 | 260                     | 0.048 | 260            | 0.051 | 260    | 0.063 |
|  | 100             | 0.008 | 100             | 0.009 | 100            | 0.012 | 120                                | 0.016 | 120                     | 0.016 | 120            | 0.017 | 120    | 0.018 |
|  | 120             | 0.017 | 130             | 0.024 | 130            | 0.032 | 150                                | 0.035 | 150                     | 0.035 | 150            | 0.037 | 150    | 0.040 |
|  | 120             | 0.017 | 130             | 0.024 | 130            | 0.032 | 150                                | 0.035 | 150                     | 0.035 | 150            | 0.037 | 150    | 0.040 |
|  | 100             | 0.008 | 100             | 0.009 | 100            | 0.012 | 120                                | 0.016 | 120                     | 0.016 | 120            | 0.017 | 120    | 0.018 |
|  |                 |       |                 |       |                |       |                                    |       |                         |       |                |       |        |       |
|  |                 |       |                 |       |                |       |                                    |       |                         |       |                |       |        |       |

**NEW**

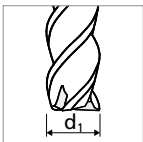
## Tipo A - Contornatura - Finitura

### FRESARE CON RAFFREDDAMENTO INTEGRATO | VISTA D'INSIEME DEI DATI DI TAGLIO

#### Finitura



- $a_p = 2.5 \times d_1$
- $a_e = 0.05 \times d_1$



| Gruppo materiali     | Materiale                                                           | Mat. no. | DIN                | AISI/ASTM/UNS           | 1.0 mm |       |
|----------------------|---------------------------------------------------------------------|----------|--------------------|-------------------------|--------|-------|
|                      |                                                                     |          |                    |                         | $v_c$  | $f_z$ |
| <b>P</b>             | Acciai non legati<br>$R_m < 800 \text{ N/mm}^2$                     | 1.0301   | C10                | AISI 1010               | 130    | 0.008 |
|                      |                                                                     | 1.0401   | C15                | AISI 1015               |        |       |
|                      |                                                                     | 1.1191   | C45E/CK45          | AISI 1045               |        |       |
|                      |                                                                     | 1.0044   | S275JR             | AISI 1020               |        |       |
|                      |                                                                     | 1.0715   | 11SMn30            | AISI 1215               |        |       |
|                      | Acciai debolmente legati<br>$R_m > 900 \text{ N/mm}^2$              | 1.5752   | 15NiCr13           | ASTM 3415 / AISI 3310   | 130    | 0.007 |
|                      |                                                                     | 1.7131   | 16MnCr5            | AISI 5115               |        |       |
|                      |                                                                     | 1.3505   | 100Cr6             | AISI 52100              |        |       |
|                      |                                                                     | 1.7225   | 42CrMo4            | AISI 4140               |        |       |
|                      |                                                                     | 1.2842   | 90MnCrV8           | AISI O2                 |        |       |
|                      | Acciai da utensili fortemente legati<br>$R_m < 1200 \text{ N/mm}^2$ | 1.2379   | X153CrMoV12        | AISI D2                 | 130    | 0.006 |
|                      |                                                                     | 1.2436   | X210CrW12          | AISI D4/D6              |        |       |
|                      |                                                                     | 1.3343   | HS6-5-2C           | AISI M2 / UNS T11302    |        |       |
|                      |                                                                     | 1.3355   | HS18-0-1           | AISI T1 / UNS T12001    |        |       |
|                      |                                                                     |          |                    |                         |        |       |
| <b>M</b>             | Acciai inossidabili ferritici                                       | 1.4016   | X6Cr17             | AISI 430 / UNS S43000   | 130    | 0.008 |
|                      |                                                                     | 1.4105   | X6CrMoS17          | AISI 430F               |        |       |
|                      |                                                                     | 1.4034   | X46Cr13            | AISI 420C               | 130    | 0.008 |
|                      | Acciai inossidabili martensitici                                    | 1.4112   | X90CrMoV18         | AISI 440B               |        |       |
|                      |                                                                     | 1.4542   | X5CrNiCuNb16-4     | AISI 630 / ASTM 17-4 PH | 130    | 0.008 |
|                      |                                                                     | 1.4545   | X5CrNiCuNb15-5     | ASTM 15-5 PH            |        |       |
|                      | Acciai inossidabili austenitici                                     | 1.4301   | X5CrNi18-10        | AISI 304                | 130    | 0.006 |
|                      |                                                                     | 1.4435   | X2CrNiMo18-14-3    | AISI 316L               |        |       |
|                      |                                                                     | 1.4441   | X2CrNiMo18-15-3    | AISI 316LM              |        |       |
| <b>K</b>             | Ghise                                                               | 0.6020   | GG20               | ASTM 30                 | 110    | 0.006 |
|                      |                                                                     | 0.6030   | GG30               | ASTM 40B                |        |       |
|                      |                                                                     | 0.7040   | GGG40              | ASTM 60-40-18           |        |       |
|                      |                                                                     | 0.7060   | GGG60              | ASTM 80-60-03           |        |       |
|                      |                                                                     |          |                    |                         |        |       |
| <b>N</b>             | Leghe d'alluminio battute                                           | 3.2315   | AlMgSi1            | ASTM 6351               | 130    | 0.009 |
|                      |                                                                     | 3.4365   | AlZnMgCu1.5        | ASTM 7075               |        |       |
|                      | Leghe d'alluminio pressofuse                                        | 3.2163   | GD-AlSi9Cu3        | ASTM A380               | 130    | 0.009 |
|                      |                                                                     | 3.2381   | GD-AlSi10Mg        | UNS A03590              |        |       |
|                      | Rame                                                                | 2.0040   | Cu-OF / CW008A     | UNS C10100              | 130    | 0.010 |
|                      |                                                                     | 2.0065   | Cu-ETP / CW004A    | UNS C11000              |        |       |
|                      | Ottoni senza piombo                                                 | 2.0321   | CuZn37 CW508L      | UNS C27400              | 130    | 0.010 |
|                      |                                                                     | 2.0360   | CuZn40 CW509L      | UNS C28000              |        |       |
|                      | Ottoni, Bronzi<br>$R_m < 400 \text{ N/mm}^2$                        | 2.0401   | CuZn39Pb3 / CW614N | UNS C38500              | 130    | 0.010 |
|                      |                                                                     | 2.1020   | CuSn6              | UNS C51900              |        |       |
|                      | Bronzi<br>$R_m < 600 \text{ N/mm}^2$                                | 2.0966   | CuAl10Ni5Fe4       | UNS C63000              | 130    | 0.009 |
|                      |                                                                     | 2.0960   | CuAl9Mn2           | UNS C63200              |        |       |
| <b>S<sub>1</sub></b> | Superleghe                                                          | 2.4856   |                    | Inconel 625             | 110    | 0.004 |
|                      |                                                                     | 2.4668   |                    | Inconel 718             |        |       |
|                      |                                                                     | 2.4617   | NiMo28             | Hastelloy B-2           |        |       |
|                      |                                                                     | 2.4665   | NiCr22Fe18Mo       | Hastelloy X             |        |       |
| <b>S<sub>2</sub></b> | Titanio puro                                                        | 3.7035   | Gr.2               | ASTM B348 / F67         | 110    | 0.008 |
|                      |                                                                     | 3.7065   | Gr.4               | ASTM B348 / F68         |        |       |
|                      | Leghe di titanio                                                    | 3.7165   | TiAl6V4            | ASTM B348 / F136        | 110    | 0.008 |
|                      |                                                                     | 9.9367   | TiAl6Nb7           | ASTM F1295              |        |       |
| <b>S<sub>3</sub></b> | Leghe CrCo                                                          | 2.4964   | CoCr20W15Ni        | Haynes 25               | 110    | 0.004 |
|                      |                                                                     |          | CrCoMo28           | ASTM F1537              |        |       |
| <b>H<sub>1</sub></b> | Acciai temprati<br>$< 55 \text{ HRC}$                               | 1.2510   | 100MnCrMoW4        | AISI O1                 |        |       |
| <b>H<sub>2</sub></b> | Acciai temprati<br>$\geq 55 \text{ HRC}$                            | 1.2379   | X153CrMoV12        | AISI D2                 |        |       |

$v_c$  [m/min]  
 $f_z$  [mm]

RACCOMANDAZIONI PER L'USO

● Perfettamente consigliato | ● Consigliato | ○ Parzialmente consigliato | ☒ Non consigliato

|   |                |                |
|---|----------------|----------------|
| P | N              | S <sub>3</sub> |
| M | S <sub>1</sub> | H <sub>1</sub> |
| K | S <sub>2</sub> | H <sub>2</sub> |

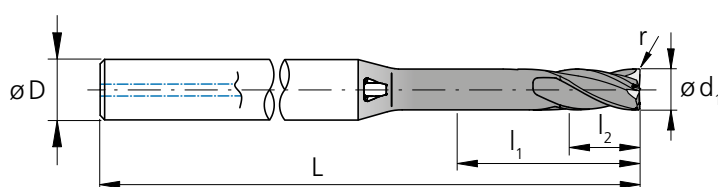
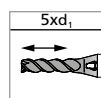
|  | 1.5 mm<br>1/16" |       | 2.0 mm<br>3/32" |       | 3.0 mm<br>1/8" |       | Ød <sub>1</sub><br>4.0 mm<br>5/32" |       | 5.0 mm<br>3/16" - 7/32" |       | 6.0 mm<br>1/4" |       | 8.0 mm |       |
|--|-----------------|-------|-----------------|-------|----------------|-------|------------------------------------|-------|-------------------------|-------|----------------|-------|--------|-------|
|  | $v_c$           | $f_z$ | $v_c$           | $f_z$ | $v_c$          | $f_z$ | $v_c$                              | $f_z$ | $v_c$                   | $f_z$ | $v_c$          | $f_z$ | $v_c$  | $f_z$ |
|  | 180             | 0.012 | 200             | 0.017 | 210            | 0.023 | 220                                | 0.025 | 220                     | 0.028 | 220            | 0.033 | 220    | 0.042 |
|  | 180             | 0.011 | 200             | 0.016 | 210            | 0.022 | 220                                | 0.024 | 220                     | 0.026 | 220            | 0.029 | 220    | 0.038 |
|  | 180             | 0.010 | 200             | 0.015 | 210            | 0.020 | 220                                | 0.021 | 220                     | 0.023 | 220            | 0.025 | 220    | 0.034 |
|  | 180             | 0.012 | 200             | 0.017 | 210            | 0.022 | 220                                | 0.024 | 220                     | 0.026 | 220            | 0.029 | 220    | 0.036 |
|  | 180             | 0.011 | 200             | 0.016 | 210            | 0.022 | 220                                | 0.023 | 220                     | 0.025 | 220            | 0.028 | 220    | 0.037 |
|  | 180             | 0.011 | 200             | 0.016 | 210            | 0.022 | 220                                | 0.023 | 220                     | 0.025 | 220            | 0.028 | 220    | 0.037 |
|  | 180             | 0.008 | 200             | 0.015 | 210            | 0.020 | 220                                | 0.022 | 220                     | 0.024 | 220            | 0.026 | 220    | 0.035 |
|  | 130             | 0.012 | 150             | 0.014 | 160            | 0.022 | 170                                | 0.025 | 170                     | 0.029 | 170            | 0.031 | 200    | 0.040 |
|  | 180             | 0.013 | 200             | 0.018 | 210            | 0.029 | 220                                | 0.030 | 220                     | 0.033 | 220            | 0.036 | 270    | 0.045 |
|  | 180             | 0.013 | 200             | 0.018 | 210            | 0.029 | 220                                | 0.030 | 220                     | 0.033 | 220            | 0.036 | 270    | 0.045 |
|  | 180             | 0.013 | 200             | 0.018 | 210            | 0.029 | 220                                | 0.030 | 220                     | 0.033 | 220            | 0.036 | 270    | 0.045 |
|  | 180             | 0.013 | 200             | 0.018 | 210            | 0.029 | 220                                | 0.030 | 220                     | 0.033 | 220            | 0.036 | 270    | 0.045 |
|  | 180             | 0.013 | 200             | 0.018 | 210            | 0.029 | 220                                | 0.030 | 220                     | 0.033 | 220            | 0.036 | 270    | 0.045 |
|  | 180             | 0.013 | 200             | 0.018 | 210            | 0.029 | 220                                | 0.030 | 220                     | 0.033 | 220            | 0.036 | 270    | 0.045 |
|  | 120             | 0.005 | 130             | 0.005 | 130            | 0.008 | 140                                | 0.010 | 140                     | 0.011 | 150            | 0.012 | 160    | 0.021 |
|  | 120             | 0.010 | 130             | 0.014 | 130            | 0.020 | 140                                | 0.022 | 140                     | 0.024 | 150            | 0.026 | 160    | 0.035 |
|  | 120             | 0.010 | 130             | 0.014 | 130            | 0.020 | 140                                | 0.022 | 140                     | 0.024 | 150            | 0.026 | 160    | 0.035 |
|  | 120             | 0.005 | 130             | 0.005 | 130            | 0.008 | 140                                | 0.010 | 140                     | 0.011 | 150            | 0.012 | 160    | 0.021 |
|  |                 |       |                 |       |                |       |                                    |       |                         |       |                |       |        |       |
|  |                 |       |                 |       |                |       |                                    |       |                         |       |                |       |        |       |

**NEW**

## Tipo C - 5 x d - Torica - Z3

### FRESARE CON RAFFREDDAMENTO INTEGRATO

P&S - Torica



$l_1$  = lunghezza utile  
 $l_2$  = lunghezza del tagliente

| $d_1$<br>[mm] | $d_1$<br>[inch] | $l_1$<br>[mm] | $l_2$<br>[mm] | D<br>(h6)<br>[mm] | L<br>[mm] | r<br>[mm] | r<br>[inch] | Numero<br>articolo | Disponibilità |
|---------------|-----------------|---------------|---------------|-------------------|-----------|-----------|-------------|--------------------|---------------|
| 1.0           |                 | 5.00          | 2.00          | 4                 | 40        | 0.10      |             | 2.CMC42.C2Z3.100.1 | ■             |
| 1.0           |                 | 5.00          | 2.00          | 4                 | 40        | 0.20      |             | 2.CMC42.C3Z3.100.1 | ■             |
| 1.1           |                 | 5.50          | 2.20          | 4                 | 40        | 0.10      |             | 2.CMC42.C2Z3.110.1 | ■             |
| 1.1           |                 | 5.50          | 2.20          | 4                 | 40        | 0.20      |             | 2.CMC42.C3Z3.110.1 | ■             |
| 1.2           |                 | 6.00          | 2.40          | 4                 | 40        | 0.10      |             | 2.CMC42.C2Z3.120.1 | ■             |
| 1.2           |                 | 6.00          | 2.40          | 4                 | 40        | 0.20      |             | 2.CMC42.C3Z3.120.1 | ■             |
| 1.3           |                 | 6.50          | 2.60          | 4                 | 40        | 0.10      |             | 2.CMC42.C2Z3.130.1 | ■             |
| 1.3           |                 | 6.50          | 2.60          | 4                 | 40        | 0.20      |             | 2.CMC42.C3Z3.130.1 | ■             |
| 1.4           |                 | 7.00          | 2.80          | 4                 | 40        | 0.10      |             | 2.CMC42.C2Z3.140.1 | ■             |
| 1.4           |                 | 7.00          | 2.80          | 4                 | 40        | 0.20      |             | 2.CMC42.C3Z3.140.1 | ■             |
| 1.5           |                 | 7.50          | 3.00          | 4                 | 40        | 0.10      |             | 2.CMC42.C2Z3.150.1 | ■             |
| 1.5           |                 | 7.50          | 3.00          | 4                 | 40        | 0.30      |             | 2.CMC42.C3Z3.150.1 | ■             |
| 1.587         | <b>1/16</b>     | 7.94          | 3.17          | 4                 | 45        | 0.127     | .005        | 2.CMC.PSRC2Z3.F116 | ■             |
| 1.587         | <b>1/16</b>     | 7.94          | 3.17          | 4                 | 45        | 0.254     | .010        | 2.CMC.PSRC3Z3.F116 | ■             |
| 1.6           |                 | 8.00          | 3.20          | 4                 | 45        | 0.10      |             | 2.CMC42.C2Z3.160.1 | ■             |
| 1.6           |                 | 8.00          | 3.20          | 4                 | 45        | 0.30      |             | 2.CMC42.C3Z3.160.1 | ■             |
| 1.7           |                 | 8.50          | 3.40          | 4                 | 45        | 0.10      |             | 2.CMC42.C2Z3.170.1 | ■             |
| 1.7           |                 | 8.50          | 3.40          | 4                 | 45        | 0.30      |             | 2.CMC42.C3Z3.170.1 | ■             |
| 1.8           |                 | 9.00          | 3.60          | 4                 | 45        | 0.10      |             | 2.CMC42.C2Z3.180.1 | ■             |
| 1.8           |                 | 9.00          | 3.60          | 4                 | 45        | 0.30      |             | 2.CMC42.C3Z3.180.1 | ■             |
| 1.9           |                 | 9.50          | 3.80          | 4                 | 44        | 0.10      |             | 2.CMC42.C2Z3.190.1 | ■             |
| 1.9           |                 | 9.50          | 3.80          | 4                 | 44        | 0.30      |             | 2.CMC42.C3Z3.190.1 | ■             |
| 2.0           |                 | 10.00         | 4.00          | 4                 | 44        | 0.10      |             | 2.CMC42.C2Z3.200.1 | ■             |
| 2.0           |                 | 10.00         | 4.00          | 4                 | 44        | 0.20      |             | 2.CMC42.C3Z3.200.1 | ■             |
| 2.0           |                 | 10.00         | 4.00          | 4                 | 44        | 0.50      |             | 2.CMC42.C4Z3.200.1 | ■             |
| 2.1           |                 | 10.50         | 4.20          | 4                 | 44        | 0.20      |             | 2.CMC42.C2Z3.210.1 | ■             |
| 2.1           |                 | 10.50         | 4.20          | 4                 | 44        | 0.50      |             | 2.CMC42.C3Z3.210.1 | ■             |
| 2.2           |                 | 11.00         | 4.40          | 4                 | 44        | 0.20      |             | 2.CMC42.C2Z3.220.1 | ■             |
| 2.2           |                 | 11.00         | 4.40          | 4                 | 44        | 0.50      |             | 2.CMC42.C3Z3.220.1 | ■             |
| 2.3           |                 | 11.50         | 4.60          | 4                 | 44        | 0.20      |             | 2.CMC42.C2Z3.230.1 | ■             |
| 2.3           |                 | 11.50         | 4.60          | 4                 | 44        | 0.50      |             | 2.CMC42.C3Z3.230.1 | ■             |
| 2.381         | <b>3/32</b>     | 11.91         | 4.76          | 4                 | 44        | 0.127     | .005        | 2.CMC.PSRC2Z3.F332 | ■             |
| 2.381         | <b>3/32</b>     | 11.91         | 4.76          | 4                 | 44        | 0.254     | .010        | 2.CMC.PSRC3Z3.F332 | ■             |
| 2.381         | <b>3/32</b>     | 11.91         | 4.76          | 4                 | 44        | 0.381     | .015        | 2.CMC.PSRC4Z3.F332 | ■             |
| 2.4           |                 | 12.00         | 4.80          | 4                 | 44        | 0.20      |             | 2.CMC42.C2Z3.240.1 | ■             |
| 2.4           |                 | 12.00         | 4.80          | 4                 | 44        | 0.50      |             | 2.CMC42.C3Z3.240.1 | ■             |
| 2.5           |                 | 12.50         | 5.00          | 6                 | 55        | 0.20      |             | 2.CMC42.C2Z3.250.1 | ■             |
| 2.5           |                 | 12.50         | 5.00          | 6                 | 55        | 0.50      |             | 2.CMC42.C3Z3.250.1 | ■             |
| 2.6           |                 | 13.00         | 5.20          | 6                 | 55        | 0.20      |             | 2.CMC42.C2Z3.260.1 | ■             |
| 2.6           |                 | 13.00         | 5.20          | 6                 | 55        | 0.50      |             | 2.CMC42.C3Z3.260.1 | ■             |
| 2.7           |                 | 13.50         | 5.40          | 6                 | 55        | 0.20      |             | 2.CMC42.C2Z3.270.1 | ■             |
| 2.7           |                 | 13.50         | 5.40          | 6                 | 55        | 0.50      |             | 2.CMC42.C3Z3.270.1 | ■             |

■ Articolo a stock

|              |    |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                |  |
|--------------|----|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------|--|
| Metallo duro | Z3 |  |  |  |  |  |  |  |  |  |  |                |  |
|              |    | Ø d <sub>i</sub>                                                                  |                                                                                   | 1.0 - 3.0 mm                                                                      |                                                                                   | 3.1 - 6.0 mm                                                                       |                                                                                     | 6.1 - 10.0 mm                                                                       |                                                                                     | r                                                                                   |                                                                                     | 0.1 - 1.524 mm |  |
|              |    | Tolerance                                                                         |                                                                                   | - 0.014 mm<br>- 0.028 mm                                                          |                                                                                   | - 0.020 mm<br>- 0.038 mm                                                           |                                                                                     | - 0.025 mm<br>- 0.047 mm                                                            |                                                                                     | Tolerance                                                                           |                                                                                     | ± 0.05 · r mm  |  |

| d <sub>1</sub> | d <sub>1</sub> | l <sub>1</sub> | l <sub>2</sub> | D (h6) | L    | r     | r      | Numero articolo    | Disponibilità |
|----------------|----------------|----------------|----------------|--------|------|-------|--------|--------------------|---------------|
| [mm]           | [inch]         | [mm]           | [mm]           | [mm]   | [mm] | [mm]  | [inch] |                    |               |
| 2.8            |                | 14.00          | 5.60           | 6      | 55   | 0.20  |        | 2.CMC42.C2Z3.280.1 | ■             |
| 2.8            |                | 14.00          | 5.60           | 6      | 55   | 0.50  |        | 2.CMC42.C3Z3.280.1 | ■             |
| 2.9            |                | 14.50          | 5.80           | 6      | 55   | 0.20  |        | 2.CMC42.C2Z3.290.1 | ■             |
| 2.9            |                | 14.50          | 5.80           | 6      | 55   | 0.50  |        | 2.CMC42.C3Z3.290.1 | ■             |
| 3.0            |                | 15.00          | 6.00           | 6      | 55   | 0.20  |        | 2.CMC42.C2Z3.300.1 | ■             |
| 3.0            |                | 15.00          | 6.00           | 6      | 55   | 0.50  |        | 2.CMC42.C3Z3.300.1 | ■             |
| 3.1            |                | 15.50          | 6.20           | 6      | 60   | 0.20  |        | 2.CMC42.C2Z3.310.1 | ■             |
| 3.1            |                | 15.50          | 6.20           | 6      | 60   | 0.50  |        | 2.CMC42.C3Z3.310.1 | ■             |
| 3.175          | 1/8            | 15.88          | 6.35           | 6      | 60   | 0.254 | .010   | 2.CMC.PSRC2Z3.F18  | ■             |
| 3.175          | 1/8            | 15.88          | 6.35           | 6      | 60   | 0.381 | .015   | 2.CMC.PSRC3Z3.F18  | ■             |
| 3.3            |                | 16.50          | 6.60           | 6      | 60   | 0.20  |        | 2.CMC42.C2Z3.330.1 | ■             |
| 3.3            |                | 16.50          | 6.60           | 6      | 60   | 0.50  |        | 2.CMC42.C3Z3.330.1 | ■             |
| 3.7            |                | 18.50          | 7.40           | 6      | 60   | 0.20  |        | 2.CMC42.C2Z3.370.1 | ■             |
| 3.7            |                | 18.50          | 7.40           | 6      | 60   | 0.50  |        | 2.CMC42.C3Z3.370.1 | ■             |
| 3.968          | 5/32           | 19.84          | 7.94           | 6      | 60   | 0.254 | .010   | 2.CMC.PSRC2Z3.F532 | ■             |
| 3.968          | 5/32           | 19.84          | 7.94           | 6      | 60   | 0.381 | .015   | 2.CMC.PSRC3Z3.F532 | ■             |
| 4.0            |                | 20.00          | 8.00           | 6      | 60   | 0.20  |        | 2.CMC42.C2Z3.400.1 | ■             |
| 4.0            |                | 20.00          | 8.00           | 6      | 60   | 0.50  |        | 2.CMC42.C3Z3.400.1 | ■             |
| 4.3            |                | 21.50          | 8.60           | 8      | 70   | 0.20  |        | 2.CMC42.C2Z3.430.1 | ■             |
| 4.3            |                | 21.50          | 8.60           | 8      | 70   | 0.50  |        | 2.CMC42.C3Z3.430.1 | ■             |
| 4.7            |                | 23.50          | 9.40           | 8      | 70   | 0.20  |        | 2.CMC42.C2Z3.470.1 | ■             |
| 4.7            |                | 23.50          | 9.40           | 8      | 70   | 0.50  |        | 2.CMC42.C3Z3.470.1 | ■             |
| 4.762          | 3/16           | 23.81          | 9.52           | 8      | 70   | 0.254 | .010   | 2.CMC.PSRC2Z3.F316 | ■             |
| 4.762          | 3/16           | 23.81          | 9.52           | 8      | 70   | 0.381 | .015   | 2.CMC.PSRC3Z3.F316 | ■             |
| 4.8            |                | 24.00          | 9.60           | 8      | 70   | 0.20  |        | 2.CMC42.C2Z3.480.1 | ■             |
| 4.8            |                | 24.00          | 9.60           | 8      | 70   | 0.50  |        | 2.CMC42.C3Z3.480.1 | ■             |
| 5.0            |                | 25.00          | 10.00          | 8      | 70   | 0.20  |        | 2.CMC42.C2Z3.500.1 | ■             |
| 5.0            |                | 25.00          | 10.00          | 8      | 70   | 0.50  |        | 2.CMC42.C3Z3.500.1 | ■             |
| 5.3            |                | 26.50          | 10.60          | 10     | 70   | 0.20  |        | 2.CMC42.C2Z3.530.1 | ■             |
| 5.3            |                | 26.50          | 10.60          | 10     | 70   | 0.50  |        | 2.CMC42.C3Z3.530.1 | ■             |
| 5.560          | 7/32           | 27.80          | 11.12          | 10     | 70   | 0.381 | .015   | 2.CMC.PSRC2Z3.F732 | ■             |
| 5.560          | 7/32           | 27.80          | 11.12          | 10     | 70   | 0.762 | .030   | 2.CMC.PSRC3Z3.F732 | ■             |
| 5.7            |                | 28.50          | 11.40          | 10     | 70   | 0.20  |        | 2.CMC42.C2Z3.570.1 | ■             |
| 5.7            |                | 28.50          | 11.40          | 10     | 70   | 0.50  |        | 2.CMC42.C3Z3.570.1 | ■             |
| 6.0            |                | 30.00          | 12.00          | 10     | 70   | 0.20  |        | 2.CMC42.C2Z3.600.1 | ■             |
| 6.0            |                | 30.00          | 12.00          | 10     | 70   | 0.50  |        | 2.CMC42.C3Z3.600.1 | ■             |
| 6.0            |                | 30.00          | 12.00          | 10     | 70   | 1.00  |        | 2.CMC42.C4Z3.600.1 | ■             |
| 6.350          | 1/4            | 31.75          | 12.70          | 10     | 70   | 0.381 | .015   | 2.CMC.PSRC2Z3.F14  | ■             |
| 6.350          | 1/4            | 31.75          | 12.70          | 10     | 70   | 0.762 | .030   | 2.CMC.PSRC3Z3.F14  | ■             |
| 6.350          | 1/4            | 31.75          | 12.70          | 10     | 70   | 1.524 | .060   | 2.CMC.PSRC4Z3.F14  | ■             |
| 8.0            |                | 40.00          | 16.00          | 12     | 90   | 0.20  |        | 2.CMC42.C2Z3.800.1 | ■             |
| 8.0            |                | 40.00          | 16.00          | 12     | 90   | 0.50  |        | 2.CMC42.C3Z3.800.1 | ■             |
| 8.0            |                | 40.00          | 16.00          | 12     | 90   | 1.50  |        | 2.CMC42.C4Z3.800.1 | ■             |

■ Articolo a stock

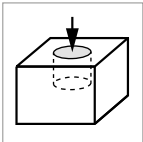


**NEW**

## Tipo C - Fresatura a tuffo - Cave

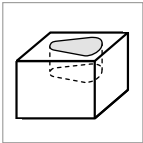
### FRESARE CON RAFFREDDAMENTO INTEGRATO | VISTA D'INSIEME DEI DATI DI TAGLIO

#### Fresatura a tuffo



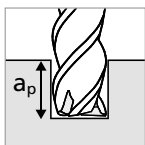
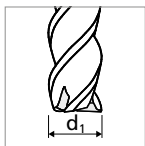
■  $f_{z,p}$ : per fresatura a tuffo

#### Fresatura di cave



■  $f_{z,p}$ : per fresatura a tuffo

■  $f_{z,s}$ : per fresatura cave



| Gruppo materiali     | Materiale                                                           | Mat. no. | DIN                | AISI/ASTM/UNS           | 1.0 mm |           |           |         |
|----------------------|---------------------------------------------------------------------|----------|--------------------|-------------------------|--------|-----------|-----------|---------|
|                      |                                                                     |          |                    |                         | $v_c$  | $f_{z,p}$ | $f_{z,s}$ | $a_p$   |
| <b>P</b>             | Acciai non legati<br>$R_m < 800 \text{ N/mm}^2$                     | 1.0301   | C10                | AISI 1010               | 100    | 0.0013    | 0.0046    | 0.5xd1  |
|                      |                                                                     | 1.0401   | C15                | AISI 1015               |        |           |           |         |
|                      |                                                                     | 1.1191   | C45E/CK45          | AISI 1045               |        |           |           |         |
|                      |                                                                     | 1.0044   | S275JR             | AISI 1020               |        |           |           |         |
|                      |                                                                     | 1.0715   | 11SMn30            | AISI 1215               |        |           |           |         |
|                      | Acciai debolmente legati<br>$R_m > 900 \text{ N/mm}^2$              | 1.5752   | 15NiCr13           | ASTM 3415 / AISI 3310   | 100    | 0.0014    | 0.0049    | 0.5xd1  |
|                      |                                                                     | 1.7131   | 16MnCr5            | AISI 5115               |        |           |           |         |
|                      |                                                                     | 1.3505   | 100Cr6             | AISI 52100              |        |           |           |         |
|                      |                                                                     | 1.7225   | 42CrMo4            | AISI 4140               |        |           |           |         |
|                      |                                                                     | 1.2842   | 90MnCrV8           | AISI O2                 |        |           |           |         |
|                      | Acciai da utensili fortemente legati<br>$R_m < 1200 \text{ N/mm}^2$ | 1.2379   | X153CrMoV12        | AISI D2                 | 100    | 0.0012    | 0.0042    | 0.25xd1 |
|                      |                                                                     | 1.2436   | X210CrW12          | AISI D4/D6              |        |           |           |         |
|                      |                                                                     | 1.3343   | HS6-5-2C           | AISI M2 / UNS T11302    |        |           |           |         |
|                      |                                                                     | 1.3355   | HS18-0-1           | AISI T1 / UNS T12001    |        |           |           |         |
| <b>M</b>             | Acciai inossidabili ferritici                                       | 1.4016   | X6Cr17             | AISI 430 / UNS S43000   | 100    | 0.0010    | 0.0035    | 0.5xd1  |
|                      |                                                                     | 1.4105   | X6CrMoS17          | AISI 430F               |        |           |           |         |
|                      | Acciai inossidabili martensitici                                    | 1.4034   | X46Cr13            | AISI 420C               | 100    | 0.0010    | 0.0035    | 0.25xd1 |
|                      |                                                                     | 1.4112   | X90CrMoV18         | AISI 440B               |        |           |           |         |
|                      | Acciai inossidabili martensitici - PH                               | 1.4542   | X5CrNiCuNb16-4     | AISI 630 / ASTM 17-4 PH | 100    | 0.0010    | 0.0035    | 0.25xd1 |
|                      |                                                                     | 1.4545   | X5CrNiCuNb15-5     | ASTM 15-5 PH            |        |           |           |         |
|                      | Acciai inossidabili austenitici                                     | 1.4301   | X5CrNi18-10        | AISI 304                | 100    | 0.0010    | 0.0035    | 0.5xd1  |
|                      |                                                                     | 1.4435   | X2CrNiMo18-14-3    | AISI 316L               |        |           |           |         |
|                      |                                                                     | 1.4441   | X2CrNiMo18-15-3    | AISI 316LM              |        |           |           |         |
| <b>K</b>             | Ghise                                                               | 1.4539   | X1NiCrMoCu25-20-5  | AISI 904L               |        |           |           |         |
|                      |                                                                     | 0.6020   | GG20               | ASTM 30                 | 100    | 0.0013    | 0.0042    | 0.5xd1  |
|                      |                                                                     | 0.6030   | GG30               | ASTM 40B                |        |           |           |         |
|                      |                                                                     | 0.7040   | GGG40              | ASTM 60-40-18           |        |           |           |         |
| <b>N</b>             | Leghe d'alluminio battute                                           | 0.7060   | GGG60              | ASTM 80-60-03           |        |           |           |         |
|                      |                                                                     | 3.2315   | AlMgSi1            | ASTM 6351               | 100    | 0.0012    | 0.0100    | 0.5xd1  |
|                      |                                                                     | 3.4365   | AlZnMgCu1.5        | ASTM 7075               |        |           |           |         |
|                      | Leghe d'alluminio pressofuse                                        | 3.2163   | GD-AlSi9Cu3        | ASTM A380               | 100    | 0.0012    | 0.0100    | 0.5xd1  |
|                      |                                                                     | 3.2381   | GD-AlSi10Mg        | UNS A03590              |        |           |           |         |
|                      | Rame                                                                | 2.0040   | Cu-OF / CW008A     | UNS C10100              | 100    | 0.0012    | 0.0100    | 0.5xd1  |
|                      |                                                                     | 2.0065   | Cu-ETP / CW004A    | UNS C11000              |        |           |           |         |
|                      | Ottoni senza piombo                                                 | 2.0321   | CuZn37 CW508L      | UNS C27400              | 100    | 0.0012    | 0.0100    | 0.5xd1  |
|                      |                                                                     | 2.0360   | CuZn40 CW509L      | UNS C28000              |        |           |           |         |
|                      | Ottoni, Bronzi<br>$R_m < 400 \text{ N/mm}^2$                        | 2.0401   | CuZn39Pb3 / CW614N | UNS C38500              | 100    | 0.0012    | 0.0100    | 0.5xd1  |
|                      |                                                                     | 2.1020   | CuSn6              | UNS C51900              |        |           |           |         |
|                      | Bronzi<br>$R_m < 600 \text{ N/mm}^2$                                | 2.0966   | CuAl10Ni5Fe4       | UNS C63000              | 100    | 0.0012    | 0.0100    | 0.5xd1  |
|                      |                                                                     | 2.0960   | CuAl9Mn2           | UNS C63200              |        |           |           |         |
| <b>S<sub>1</sub></b> | Superleghe                                                          | 2.4856   |                    | Inconel 625             | 40     | 0.0010    | 0.0035    | 0.25xd1 |
|                      |                                                                     | 2.4668   |                    | Inconel 718             |        |           |           |         |
|                      |                                                                     | 2.4617   | NiMo28             | Hastelloy B-2           |        |           |           |         |
|                      |                                                                     | 2.4665   | NiCr22Fe18Mo       | Hastelloy X             |        |           |           |         |
| <b>S<sub>2</sub></b> | Titanio puro                                                        | 3.7035   | Gr.2               | ASTM B348 / F67         | 80     | 0.0010    | 0.0032    | 0.25xd1 |
|                      |                                                                     | 3.7065   | Gr.4               | ASTM B348 / F68         |        |           |           |         |
| <b>S<sub>3</sub></b> | Leghe di titanio                                                    | 3.7165   | TiAl6V4            | ASTM B348 / F136        | 80     | 0.0010    | 0.0032    | 0.25xd1 |
|                      |                                                                     | 9.9367   | TiAl6Nb7           | ASTM F1295              |        |           |           |         |
| <b>H<sub>1</sub></b> | Leghe CrCo                                                          | 2.4964   | CoCr20W15Ni        | Haynes 25               | 60     | 0.0010    | 0.0035    | 0.25xd1 |
|                      |                                                                     |          | CrCoMo28           | ASTM F1537              |        |           |           |         |
| <b>H<sub>2</sub></b> | Acciai temprati<br>$< 55 \text{ HRC}$                               | 1.2510   | 100MnCrMoW4        | AISI O1                 |        |           |           |         |
|                      | Acciai temprati<br>$\geq 55 \text{ HRC}$                            | 1.2379   | X153CrMoV12        | AISI D2                 |        |           |           |         |

**v<sub>c</sub>** [m/min]   **a<sub>p</sub>** [mm]  
**f<sub>z,p</sub>** [mm]   **f<sub>z,s</sub>** [mm]

RACCOMANDAZIONI PER L'USO

● Perfettamente consigliato | ● Consigliato | ○ Parzialmente consigliato | ☒ Non consigliato

|   |                |                |
|---|----------------|----------------|
| P | N              | S <sub>3</sub> |
| M | S <sub>1</sub> | H <sub>1</sub> |
| K | S <sub>2</sub> | H <sub>2</sub> |

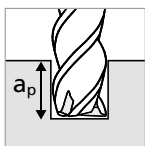
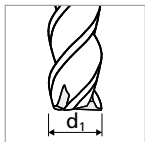
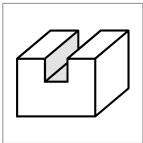
| Ød <sub>1</sub> |                  |                  |                |                 |                  |                  |                |                |                  |                  |                |                 |                  |                  |                |                         |                  |                  |                |                         |                  |                  |                |
|-----------------|------------------|------------------|----------------|-----------------|------------------|------------------|----------------|----------------|------------------|------------------|----------------|-----------------|------------------|------------------|----------------|-------------------------|------------------|------------------|----------------|-------------------------|------------------|------------------|----------------|
| 1.5 mm<br>1/16" |                  |                  |                | 2.0 mm<br>3/32" |                  |                  |                | 3.0 mm<br>1/8" |                  |                  |                | 4.0 mm<br>5/32" |                  |                  |                | 5.0 mm<br>3/16" - 7/32" |                  |                  |                | 6.0 mm - 8.0 mm<br>1/4" |                  |                  |                |
| v <sub>c</sub>  | f <sub>z,p</sub> | f <sub>z,s</sub> | a <sub>p</sub> | v <sub>c</sub>  | f <sub>z,p</sub> | f <sub>z,s</sub> | a <sub>p</sub> | v <sub>c</sub> | f <sub>z,p</sub> | f <sub>z,s</sub> | a <sub>p</sub> | v <sub>c</sub>  | f <sub>z,p</sub> | f <sub>z,s</sub> | a <sub>p</sub> | v <sub>c</sub>          | f <sub>z,p</sub> | f <sub>z,s</sub> | a <sub>p</sub> | v <sub>c</sub>          | f <sub>z,p</sub> | f <sub>z,s</sub> | a <sub>p</sub> |
| 120             | 0.0020           | 0.0065           | 0.5xd1         | 120             | 0.0026           | 0.0091           | 0.5xd1         | 140            | 0.004            | 0.013            | 0.5xd1         | 140             | 0.005            | 0.020            | 0.5xd1         | 150                     | 0.005            | 0.026            | 0.5xd1         | 160                     | 0.006            | 0.033            | 0.5xd1         |
| 120             | 0.0021           | 0.0070           | 0.5xd1         | 120             | 0.0028           | 0.0098           | 0.5xd1         | 140            | 0.004            | 0.014            | 0.5xd1         | 140             | 0.005            | 0.021            | 0.5xd1         | 150                     | 0.006            | 0.027            | 0.5xd1         | 160                     | 0.006            | 0.034            | 0.5xd1         |
| 120             | 0.0018           | 0.0060           | 0.25xd1        | 120             | 0.0024           | 0.0084           | 0.25xd1        | 140            | 0.003            | 0.012            | 0.25xd1        | 140             | 0.004            | 0.017            | 0.25xd1        | 150                     | 0.004            | 0.022            | 0.25xd1        | 160                     | 0.005            | 0.028            | 0.25xd1        |
| 120             | 0.0015           | 0.0050           | 0.5xd1         | 120             | 0.0020           | 0.0070           | 0.5xd1         | 140            | 0.003            | 0.010            | 0.5xd1         | 140             | 0.004            | 0.015            | 0.5xd1         | 150                     | 0.004            | 0.020            | 0.5xd1         | 160                     | 0.005            | 0.025            | 0.5xd1         |
| 120             | 0.0015           | 0.0050           | 0.25xd1        | 120             | 0.0020           | 0.0070           | 0.25xd1        | 140            | 0.003            | 0.010            | 0.25xd1        | 140             | 0.004            | 0.015            | 0.25xd1        | 150                     | 0.004            | 0.020            | 0.25xd1        | 160                     | 0.005            | 0.025            | 0.25xd1        |
| 120             | 0.0015           | 0.0050           | 0.25xd1        | 120             | 0.0020           | 0.0070           | 0.25xd1        | 140            | 0.003            | 0.010            | 0.25xd1        | 140             | 0.004            | 0.015            | 0.25xd1        | 150                     | 0.004            | 0.020            | 0.25xd1        | 160                     | 0.005            | 0.025            | 0.25xd1        |
| 120             | 0.0015           | 0.0050           | 0.5xd1         | 120             | 0.0020           | 0.0070           | 0.5xd1         | 140            | 0.003            | 0.010            | 0.5xd1         | 140             | 0.004            | 0.015            | 0.5xd1         | 150                     | 0.004            | 0.020            | 0.5xd1         | 160                     | 0.005            | 0.020            | 0.5xd1         |
| 120             | 0.0019           | 0.0060           | 0.5xd1         | 120             | 0.0024           | 0.0084           | 0.5xd1         | 140            | 0.004            | 0.012            | 0.5xd1         | 140             | 0.004            | 0.017            | 0.5xd1         | 150                     | 0.005            | 0.022            | 0.5xd1         | 160                     | 0.005            | 0.028            | 0.5xd1         |
| 120             | 0.0018           | 0.0160           | 0.5xd1         | 120             | 0.0024           | 0.0210           | 0.5xd1         | 150            | 0.004            | 0.034            | 0.5xd1         | 160             | 0.004            | 0.035            | 0.5xd1         | 170                     | 0.005            | 0.036            | 0.5xd1         | 180                     | 0.005            | 0.037            | 0.5xd1         |
| 120             | 0.0018           | 0.0160           | 0.5xd1         | 120             | 0.0024           | 0.0210           | 0.5xd1         | 150            | 0.004            | 0.034            | 0.5xd1         | 160             | 0.004            | 0.035            | 0.5xd1         | 170                     | 0.005            | 0.036            | 0.5xd1         | 180                     | 0.005            | 0.037            | 0.5xd1         |
| 120             | 0.0018           | 0.0160           | 0.5xd1         | 120             | 0.0024           | 0.0210           | 0.5xd1         | 150            | 0.004            | 0.034            | 0.5xd1         | 160             | 0.004            | 0.035            | 0.5xd1         | 170                     | 0.005            | 0.036            | 0.5xd1         | 180                     | 0.005            | 0.037            | 0.5xd1         |
| 120             | 0.0018           | 0.0160           | 0.5xd1         | 120             | 0.0024           | 0.0210           | 0.5xd1         | 150            | 0.004            | 0.034            | 0.5xd1         | 160             | 0.004            | 0.035            | 0.5xd1         | 170                     | 0.005            | 0.036            | 0.5xd1         | 180                     | 0.005            | 0.037            | 0.5xd1         |
| 120             | 0.0018           | 0.0160           | 0.5xd1         | 120             | 0.0024           | 0.0210           | 0.5xd1         | 150            | 0.004            | 0.034            | 0.5xd1         | 160             | 0.004            | 0.035            | 0.5xd1         | 170                     | 0.005            | 0.036            | 0.5xd1         | 180                     | 0.005            | 0.037            | 0.5xd1         |
| 40              | 0.0015           | 0.0050           | 0.25xd1        | 50              | 0.0020           | 0.0070           | 0.25xd1        | 50             | 0.003            | 0.010            | 0.25xd1        | 60              | 0.004            | 0.014            | 0.25xd1        | 80                      | 0.004            | 0.018            | 0.25xd1        | 80                      | 0.005            | 0.021            | 0.25xd1        |
| 90              | 0.0014           | 0.0045           | 0.25xd1        | 100             | 0.0018           | 0.0063           | 0.25xd1        | 110            | 0.003            | 0.010            | 0.25xd1        | 120             | 0.004            | 0.013            | 0.25xd1        | 120                     | 0.004            | 0.016            | 0.25xd1        | 120                     | 0.005            | 0.019            | 0.25xd1        |
| 90              | 0.0014           | 0.0045           | 0.25xd1        | 100             | 0.0018           | 0.0063           | 0.25xd1        | 110            | 0.003            | 0.010            | 0.25xd1        | 120             | 0.004            | 0.013            | 0.25xd1        | 120                     | 0.004            | 0.016            | 0.25xd1        | 120                     | 0.005            | 0.019            | 0.25xd1        |
| 60              | 0.0015           | 0.0050           | 0.25xd1        | 80              | 0.0020           | 0.0070           | 0.25xd1        | 80             | 0.003            | 0.010            | 0.25xd1        | 100             | 0.004            | 0.014            | 0.25xd1        | 100                     | 0.004            | 0.018            | 0.25xd1        | 120                     | 0.005            | 0.021            | 0.25xd1        |
|                 |                  |                  |                |                 |                  |                  |                |                |                  |                  |                |                 |                  |                  |                |                         |                  |                  |                |                         |                  |                  |                |
|                 |                  |                  |                |                 |                  |                  |                |                |                  |                  |                |                 |                  |                  |                |                         |                  |                  |                |                         |                  |                  |                |

**NEW**

## Tipo C - Fresatura di scanalature

### FRESARE CON RAFFREDDAMENTO INTEGRATO | VISTA D'INSIEME DEI DATI DI TAGLIO

Fresatura di  
scanalature



| Gruppo materiali     | Materiale                                                                | Mat. no. | DIN                | AISI/ASTM/UNS           | 1.0 mm |       |         |
|----------------------|--------------------------------------------------------------------------|----------|--------------------|-------------------------|--------|-------|---------|
|                      |                                                                          |          |                    |                         | $v_c$  | $f_z$ | $a_p$   |
| <b>P</b>             | Acciai non legati<br>$R_m < 800 \text{ N/mm}^2$                          | 1.0301   | C10                | AISI 1010               | 120    | 0.009 | 0.5xd1  |
|                      |                                                                          | 1.0401   | C15                | AISI 1015               |        |       |         |
|                      |                                                                          | 1.1191   | C45E/CK45          | AISI 1045               |        |       |         |
|                      |                                                                          | 1.0044   | S275JR             | AISI 1020               |        |       |         |
|                      |                                                                          | 1.0715   | 11SMn30            | AISI 1215               |        |       |         |
|                      | Acciai debolmente<br>legati<br>$R_m > 900 \text{ N/mm}^2$                | 1.5752   | 15NiCr13           | ASTM 3415 / AISI 3310   | 120    | 0.008 | 0.5xd1  |
|                      |                                                                          | 1.7131   | 16MnCr5            | AISI 5115               |        |       |         |
|                      |                                                                          | 1.3505   | 100Cr6             | AISI 52100              |        |       |         |
|                      |                                                                          | 1.7225   | 42CrMo4            | AISI 4140               |        |       |         |
|                      |                                                                          | 1.2842   | 90MnCrV8           | AISI O2                 |        |       |         |
|                      | Acciai da utensili forte-<br>mente legati<br>$R_m < 1200 \text{ N/mm}^2$ | 1.2379   | X153CrMoV12        | AISI D2                 | 120    | 0.006 | 0.25xd1 |
|                      |                                                                          | 1.2436   | X210CrW12          | AISI D4/D6              |        |       |         |
|                      |                                                                          | 1.3343   | HS6-5-2C           | AISI M2 / UNS T11302    |        |       |         |
|                      |                                                                          | 1.3355   | HS18-0-1           | AISI T1 / UNS T12001    |        |       |         |
| <b>M</b>             | Acciai inossidabili<br>ferritici                                         | 1.4016   | X6Cr17             | AISI 430 / UNS S43000   | 120    | 0.009 | 0.5xd1  |
|                      |                                                                          | 1.4105   | X6CrMoS17          | AISI 430F               |        |       |         |
|                      |                                                                          | 1.4034   | X46Cr13            | AISI 420C               | 120    | 0.009 | 0.5xd1  |
|                      | Acciai inossidabili<br>martensitici                                      | 1.4112   | X90CrMoV18         | AISI 440B               |        |       |         |
|                      |                                                                          | 1.4542   | X5CrNiCuNb16-4     | AISI 630 / ASTM 17-4 PH | 120    | 0.009 | 0.5xd1  |
|                      | Acciai inossidabili mar-<br>tensitici - PH                               | 1.4545   | X5CrNiCuNb15-5     | ASTM 15-5 PH            |        |       |         |
|                      |                                                                          | 1.4301   | X5CrNi18-10        | AISI 304                |        |       |         |
|                      |                                                                          | 1.4435   | X2CrNiMo18-14-3    | AISI 316L               | 120    | 0.007 | 0.5xd1  |
| <b>K</b>             | Ghise                                                                    | 1.4441   | X2CrNiMo18-15-3    | AISI 316LM              |        |       |         |
|                      |                                                                          | 1.4539   | X1NiCrMoCu25-20-5  | AISI 904L               |        |       |         |
|                      |                                                                          | 0.6020   | GG20               | ASTM 30                 | 100    | 0.007 | 0.5xd1  |
|                      |                                                                          | 0.6030   | GG30               | ASTM 40B                |        |       |         |
|                      |                                                                          | 0.7040   | GGG40              | ASTM 60-40-18           |        |       |         |
| <b>N</b>             | Leghe d'alluminio<br>battute                                             | 0.7060   | GGG60              | ASTM 80-60-03           |        |       |         |
|                      |                                                                          | 3.2315   | AlMgSi1            | ASTM 6351               | 170    | 0.010 | 0.5xd1  |
|                      |                                                                          | 3.4365   | AlZnMgCu1.5        | ASTM 7075               |        |       |         |
|                      | Leghe d'alluminio<br>pressofuse                                          | 3.2163   | GD-AlSi9Cu3        | ASTM A380               | 170    | 0.010 | 0.5xd1  |
|                      |                                                                          | 3.2381   | GD-AlSi10Mg        | UNS A03590              |        |       |         |
|                      | Rame                                                                     | 2.0040   | Cu-OF / CW008A     | UNS C10100              | 170    | 0.012 | 0.5xd1  |
|                      |                                                                          | 2.0065   | Cu-ETP / CW004A    | UNS C11000              |        |       |         |
|                      | Ottoni senza piombo                                                      | 2.0321   | CuZn37 CW508L      | UNS C27400              | 170    | 0.012 | 0.5xd1  |
|                      |                                                                          | 2.0360   | CuZn40 CW509L      | UNS C28000              |        |       |         |
|                      | Ottoni, Bronzi<br>$R_m < 400 \text{ N/mm}^2$                             | 2.0401   | CuZn39Pb3 / CW614N | UNS C38500              | 170    | 0.012 | 0.5xd1  |
|                      |                                                                          | 2.1020   | CuSn6              | UNS C51900              |        |       |         |
|                      | Bronzi<br>$R_m < 600 \text{ N/mm}^2$                                     | 2.0966   | CuAl10Ni5Fe4       | UNS C63000              | 170    | 0.011 | 0.5xd1  |
|                      |                                                                          | 2.0960   | CuAl9Mn2           | UNS C63200              |        |       |         |
| <b>S<sub>1</sub></b> | Superleghe                                                               | 2.4856   |                    | Inconel 625             | 80     | 0.005 | 0.25xd1 |
|                      |                                                                          | 2.4668   |                    | Inconel 718             |        |       |         |
|                      |                                                                          | 2.4617   | NiMo28             | Hastelloy B-2           |        |       |         |
|                      |                                                                          | 2.4665   | NiCr22Fe18Mo       | Hastelloy X             |        |       |         |
| <b>S<sub>2</sub></b> | Titanio puro                                                             | 3.7035   | Gr.2               | ASTM B348 / F67         | 80     | 0.009 | 0.25xd1 |
|                      |                                                                          | 3.7065   | Gr.4               | ASTM B348 / F68         |        |       |         |
|                      | Leghe di titanio                                                         | 3.7165   | TiAl6V4            | ASTM B348 / F136        | 80     | 0.009 | 0.25xd1 |
|                      |                                                                          | 9.9367   | TiAl6Nb7           | ASTM F1295              |        |       |         |
| <b>S<sub>3</sub></b> | Leghe CrCo                                                               | 2.4964   | CoCr20W15Ni        | Haynes 25               | 80     | 0.005 | 0.25xd1 |
|                      |                                                                          |          | CrCoMo28           | ASTM F1537              |        |       |         |
| <b>H<sub>1</sub></b> | Acciai temprati<br>$< 55 \text{ HRC}$                                    | 1.2510   | 100MnCrMoW4        | AISI O1                 |        |       |         |
| <b>H<sub>2</sub></b> | Acciai temprati<br>$\geq 55 \text{ HRC}$                                 | 1.2379   | X153CrMoV12        | AISI D2                 |        |       |         |

**v<sub>c</sub>** [m/min]  
**f<sub>z</sub>** [mm]  
**a<sub>p</sub>** [mm]

● Perfettamente consigliato | ● Consigliato | ○ Parzialmente consigliato | ☒ Non consigliato

RACCOMANDAZIONI PER L'USO

|   |                |                |   |
|---|----------------|----------------|---|
| P | N              | S <sub>3</sub> |   |
| M | S <sub>1</sub> | H <sub>1</sub> | ☒ |
| K | S <sub>2</sub> | H <sub>2</sub> | ☒ |

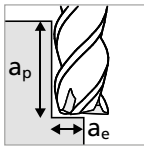
|  | 1.5 mm<br>1/16" |                |                | 2.0 mm<br>3/32" |                |                | 3.0 mm<br>1/8" |                |                | 4.0 mm<br>5/32" |                |                | 5.0 mm<br>3/16" - 7/32" |                |                | 6.0 mm - 8.0 mm<br>1/4" |                |                |
|--|-----------------|----------------|----------------|-----------------|----------------|----------------|----------------|----------------|----------------|-----------------|----------------|----------------|-------------------------|----------------|----------------|-------------------------|----------------|----------------|
|  | v <sub>c</sub>  | f <sub>z</sub> | a <sub>p</sub> | v <sub>c</sub>  | f <sub>z</sub> | a <sub>p</sub> | v <sub>c</sub> | f <sub>z</sub> | a <sub>p</sub> | v <sub>c</sub>  | f <sub>z</sub> | a <sub>p</sub> | v <sub>c</sub>          | f <sub>z</sub> | a <sub>p</sub> | v <sub>c</sub>          | f <sub>z</sub> | a <sub>p</sub> |
|  | 140             | 0.015          | 0.5xd1         | 160             | 0.020          | 0.5xd1         | 180            | 0.029          | 0.5xd1         | 200             | 0.031          | 0.5xd1         | 200                     | 0.031          | 0.5xd1         | 220                     | 0.032          | 0.5xd1         |
|  | 140             | 0.013          | 0.5xd1         | 160             | 0.019          | 0.5xd1         | 180            | 0.028          | 0.5xd1         | 200             | 0.029          | 0.5xd1         | 200                     | 0.030          | 0.5xd1         | 220                     | 0.031          | 0.5xd1         |
|  | 140             | 0.012          | 0.25xd1        | 160             | 0.017          | 0.25xd1        | 180            | 0.025          | 0.25xd1        | 200             | 0.026          | 0.25xd1        | 200                     | 0.026          | 0.25xd1        | 220                     | 0.027          | 0.25xd1        |
|  | 140             | 0.015          | 0.5xd1         | 160             | 0.020          | 0.5xd1         | 180            | 0.028          | 0.5xd1         | 200             | 0.029          | 0.5xd1         | 200                     | 0.030          | 0.5xd1         | 220                     | 0.031          | 0.5xd1         |
|  | 140             | 0.013          | 0.5xd1         | 160             | 0.019          | 0.5xd1         | 180            | 0.027          | 0.5xd1         | 200             | 0.028          | 0.5xd1         | 200                     | 0.029          | 0.5xd1         | 220                     | 0.029          | 0.5xd1         |
|  | 140             | 0.013          | 0.5xd1         | 160             | 0.019          | 0.5xd1         | 180            | 0.027          | 0.5xd1         | 200             | 0.028          | 0.5xd1         | 200                     | 0.029          | 0.5xd1         | 220                     | 0.029          | 0.5xd1         |
|  | 140             | 0.011          | 0.5xd1         | 160             | 0.017          | 0.5xd1         | 180            | 0.025          | 0.5xd1         | 200             | 0.027          | 0.5xd1         | 200                     | 0.027          | 0.5xd1         | 220                     | 0.028          | 0.5xd1         |
|  | 120             | 0.015          | 0.5xd1         | 140             | 0.017          | 0.5xd1         | 160            | 0.025          | 0.5xd1         | 180             | 0.031          | 0.5xd1         | 200                     | 0.031          | 0.5xd1         | 200                     | 0.032          | 0.5xd1         |
|  | 190             | 0.016          | 0.5xd1         | 210             | 0.021          | 0.5xd1         | 230            | 0.034          | 0.5xd1         | 250             | 0.035          | 0.5xd1         | 250                     | 0.036          | 0.5xd1         | 270                     | 0.037          | 0.5xd1         |
|  | 190             | 0.016          | 0.5xd1         | 210             | 0.021          | 0.5xd1         | 230            | 0.032          | 0.5xd1         | 250             | 0.034          | 0.5xd1         | 250                     | 0.034          | 0.5xd1         | 270                     | 0.036          | 0.5xd1         |
|  | 190             | 0.016          | 0.5xd1         | 210             | 0.021          | 0.5xd1         | 230            | 0.034          | 0.5xd1         | 250             | 0.035          | 0.5xd1         | 250                     | 0.036          | 0.5xd1         | 270                     | 0.037          | 0.5xd1         |
|  | 190             | 0.016          | 0.5xd1         | 210             | 0.021          | 0.5xd1         | 230            | 0.034          | 0.5xd1         | 250             | 0.035          | 0.5xd1         | 250                     | 0.036          | 0.5xd1         | 270                     | 0.037          | 0.5xd1         |
|  | 190             | 0.016          | 0.5xd1         | 210             | 0.021          | 0.5xd1         | 230            | 0.034          | 0.5xd1         | 250             | 0.035          | 0.5xd1         | 250                     | 0.036          | 0.5xd1         | 270                     | 0.037          | 0.5xd1         |
|  | 190             | 0.016          | 0.5xd1         | 210             | 0.021          | 0.5xd1         | 230            | 0.034          | 0.5xd1         | 250             | 0.035          | 0.5xd1         | 250                     | 0.036          | 0.5xd1         | 270                     | 0.037          | 0.5xd1         |
|  | 80              | 0.006          | 0.25xd1        | 100             | 0.007          | 0.25xd1        | 100            | 0.010          | 0.25xd1        | 120             | 0.013          | 0.25xd1        | 120                     | 0.013          | 0.25xd1        | 120                     | 0.013          | 0.25xd1        |
|  | 80              | 0.012          | 0.25xd1        | 100             | 0.017          | 0.25xd1        | 100            | 0.027          | 0.25xd1        | 120             | 0.027          | 0.25xd1        | 120                     | 0.027          | 0.25xd1        | 140                     | 0.028          | 0.25xd1        |
|  | 80              | 0.012          | 0.25xd1        | 100             | 0.017          | 0.25xd1        | 100            | 0.027          | 0.25xd1        | 120             | 0.027          | 0.25xd1        | 120                     | 0.027          | 0.25xd1        | 140                     | 0.028          | 0.25xd1        |
|  | 80              | 0.006          | 0.25xd1        | 100             | 0.007          | 0.25xd1        | 100            | 0.010          | 0.25xd1        | 120             | 0.013          | 0.25xd1        | 120                     | 0.013          | 0.25xd1        | 120                     | 0.013          | 0.25xd1        |
|  |                 |                |                |                 |                |                |                |                |                |                 |                |                |                         |                |                |                         |                |                |
|  |                 |                |                |                 |                |                |                |                |                |                 |                |                |                         |                |                |                         |                |                |

**NEW**

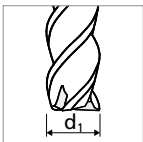
## Tipo C - Contornatura - Semi-finitura

### FRESARE CON RAFFREDDAMENTO INTEGRATO | VISTA D'INSIEME DEI DATI DI TAGLIO

#### Semi-finitura



■  $a_p = 1 \times d_1 - 2 \times d_1$   
■  $a_e = 0.1 \times d_1$



| Gruppo materiali                                                     | Materiale                                                           | Mat. no. | DIN                | AISI/ASTM/UNS           | 1.0 mm |       |
|----------------------------------------------------------------------|---------------------------------------------------------------------|----------|--------------------|-------------------------|--------|-------|
|                                                                      |                                                                     |          |                    |                         | $v_c$  | $f_z$ |
| <b>P</b>                                                             | Acciai non legati<br>$R_m < 800 \text{ N/mm}^2$                     | 1.0301   | C10                | AISI 1010               | 120    | 0.017 |
|                                                                      |                                                                     | 1.0401   | C15                | AISI 1015               |        |       |
|                                                                      |                                                                     | 1.1191   | C45E/CK45          | AISI 1045               |        |       |
|                                                                      |                                                                     | 1.0044   | S275JR             | AISI 1020               |        |       |
|                                                                      |                                                                     | 1.0715   | 11SMn30            | AISI 1215               |        |       |
|                                                                      | Acciai debolmente legati<br>$R_m > 900 \text{ N/mm}^2$              | 1.5752   | 15NiCr13           | ASTM 3415 / AISI 3310   | 120    | 0.016 |
|                                                                      |                                                                     | 1.7131   | 16MnCr5            | AISI 5115               |        |       |
|                                                                      |                                                                     | 1.3505   | 100Cr6             | AISI 52100              |        |       |
|                                                                      |                                                                     | 1.7225   | 42CrMo4            | AISI 4140               |        |       |
|                                                                      |                                                                     | 1.2842   | 90MnCrV8           | AISI O2                 |        |       |
|                                                                      | Acciai da utensili fortemente legati<br>$R_m < 1200 \text{ N/mm}^2$ | 1.2379   | X153CrMoV12        | AISI D2                 | 120    | 0.012 |
|                                                                      |                                                                     | 1.2436   | X210CrW12          | AISI D4/D6              |        |       |
|                                                                      |                                                                     | 1.3343   | HS6-5-2C           | AISI M2 / UNS T11302    |        |       |
|                                                                      |                                                                     | 1.3355   | HS18-0-1           | AISI T1 / UNS T12001    |        |       |
|                                                                      |                                                                     |          |                    |                         |        |       |
| <b>M</b>                                                             | Acciai inossidabili ferritici                                       | 1.4016   | X6Cr17             | AISI 430 / UNS S43000   | 120    | 0.018 |
|                                                                      |                                                                     | 1.4105   | X6CrMoS17          | AISI 430F               |        |       |
|                                                                      |                                                                     | 1.4034   | X46Cr13            | AISI 420C               | 120    | 0.017 |
|                                                                      | Acciai inossidabili martensitici                                    | 1.4112   | X90CrMoV18         | AISI 440B               |        |       |
|                                                                      |                                                                     | 1.4542   | X5CrNiCuNb16-4     | AISI 630 / ASTM 17-4 PH | 120    | 0.017 |
|                                                                      |                                                                     | 1.4545   | X5CrNiCuNb15-5     | ASTM 15-5 PH            |        |       |
|                                                                      | Acciai inossidabili austenitici                                     | 1.4301   | X5CrNi18-10        | AISI 304                | 120    | 0.013 |
|                                                                      |                                                                     | 1.4435   | X2CrNiMo18-14-3    | AISI 316L               |        |       |
|                                                                      |                                                                     | 1.4441   | X2CrNiMo18-15-3    | AISI 316LM              |        |       |
| <b>K</b>                                                             | Ghise                                                               | 0.6020   | GG20               | ASTM 30                 | 100    | 0.012 |
|                                                                      |                                                                     | 0.6030   | GG30               | ASTM 40B                |        |       |
|                                                                      |                                                                     | 0.7040   | GGG40              | ASTM 60-40-18           |        |       |
|                                                                      |                                                                     | 0.7060   | GGG60              | ASTM 80-60-03           |        |       |
|                                                                      |                                                                     |          |                    |                         |        |       |
| <b>N</b>                                                             | Leghe d'alluminio battute                                           | 3.2315   | AlMgSi1            | ASTM 6351               | 170    | 0.020 |
|                                                                      |                                                                     | 3.4365   | AlZnMgCu1.5        | ASTM 7075               |        |       |
|                                                                      | Leghe d'alluminio pressofuse                                        | 3.2163   | GD-AlSi9Cu3        | ASTM A380               | 170    | 0.020 |
|                                                                      |                                                                     | 3.2381   | GD-AlSi10Mg        | UNS A03590              |        |       |
|                                                                      | Rame                                                                | 2.0040   | Cu-OF / CW008A     | UNS C10100              | 170    | 0.022 |
|                                                                      |                                                                     | 2.0065   | Cu-ETP / CW004A    | UNS C11000              |        |       |
|                                                                      | Ottoni senza piombo                                                 | 2.0321   | CuZn37 CW508L      | UNS C27400              | 170    | 0.022 |
|                                                                      |                                                                     | 2.0360   | CuZn40 CW509L      | UNS C28000              |        |       |
|                                                                      | Ottoni, Bronzi<br>$R_m < 400 \text{ N/mm}^2$                        | 2.0401   | CuZn39Pb3 / CW614N | UNS C38500              | 170    | 0.022 |
|                                                                      |                                                                     | 2.1020   | CuSn6              | UNS C51900              |        |       |
|                                                                      | Bronzi<br>$R_m < 600 \text{ N/mm}^2$                                | 2.0966   | CuAl10Ni5Fe4       | UNS C63000              | 170    | 0.020 |
|                                                                      |                                                                     | 2.0960   | CuAl9Mn2           | UNS C63200              |        |       |
| <b>S<sub>1</sub></b><br><b>S<sub>2</sub></b><br><b>S<sub>3</sub></b> | Superleghe                                                          | 2.4856   |                    | Inconel 625             | 100    | 0.008 |
|                                                                      |                                                                     | 2.4668   |                    | Inconel 718             |        |       |
|                                                                      |                                                                     | 2.4617   | NiMo28             | Hastelloy B-2           |        |       |
|                                                                      |                                                                     | 2.4665   | NiCr22Fe18Mo       | Hastelloy X             |        |       |
|                                                                      | Titanio puro                                                        | 3.7035   | Gr.2               | ASTM B348 / F67         | 100    | 0.018 |
|                                                                      |                                                                     | 3.7065   | Gr.4               | ASTM B348 / F68         |        |       |
|                                                                      | Leghe di titanio                                                    | 3.7165   | TiAl6V4            | ASTM B348 / F136        | 100    | 0.018 |
|                                                                      |                                                                     | 9.9367   | TiAl6Nb7           | ASTM F1295              |        |       |
|                                                                      | Leghe CrCo                                                          | 2.4964   | CoCr20W15Ni        | Haynes 25               | 100    | 0.008 |
|                                                                      |                                                                     |          | CrCoMo28           | ASTM F1537              |        |       |
| <b>H<sub>1</sub></b>                                                 | Acciai temprati<br>$< 55 \text{ HRC}$                               | 1.2510   | 100MnCrMoW4        | AISI O1                 |        |       |
| <b>H<sub>2</sub></b>                                                 | Acciai temprati<br>$\geq 55 \text{ HRC}$                            | 1.2379   | X153CrMoV12        | AISI D2                 |        |       |

$v_c$  [m/min]  
 $f_z$  [mm]

RACCOMANDAZIONI PER L'USO

● Perfettamente consigliato | ● Consigliato | ○ Parzialmente consigliato | ☒ Non consigliato

|   |                |                |
|---|----------------|----------------|
| P | N              | S <sub>3</sub> |
| M | S <sub>1</sub> | H <sub>1</sub> |
| K | S <sub>2</sub> | H <sub>2</sub> |

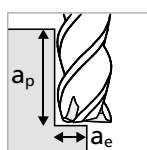
|  | 1.5 mm<br>1/16" |       | 2.0 mm<br>3/32" |       | 3.0 mm<br>1/8" |       | Ød <sub>1</sub><br>4.0 mm<br>5/32" |       | 5.0 mm<br>3/16" - 7/32" |       | 6.0 mm<br>1/4" |       | 8.0 mm |       |
|--|-----------------|-------|-----------------|-------|----------------|-------|------------------------------------|-------|-------------------------|-------|----------------|-------|--------|-------|
|  | $v_c$           | $f_z$ | $v_c$           | $f_z$ | $v_c$          | $f_z$ | $v_c$                              | $f_z$ | $v_c$                   | $f_z$ | $v_c$          | $f_z$ | $v_c$  | $f_z$ |
|  | 140             | 0.026 | 160             | 0.038 | 180            | 0.048 | 200                                | 0.050 | 200                     | 0.052 | 220            | 0.056 | 220    | 0.068 |
|  | 140             | 0.025 | 160             | 0.036 | 180            | 0.044 | 200                                | 0.048 | 200                     | 0.050 | 220            | 0.054 | 220    | 0.066 |
|  | 140             | 0.022 | 160             | 0.035 | 180            | 0.042 | 200                                | 0.043 | 200                     | 0.045 | 220            | 0.048 | 220    | 0.058 |
|  | 140             | 0.026 | 160             | 0.038 | 180            | 0.046 | 200                                | 0.048 | 200                     | 0.050 | 220            | 0.055 | 220    | 0.062 |
|  | 140             | 0.025 | 160             | 0.036 | 180            | 0.044 | 200                                | 0.046 | 200                     | 0.048 | 220            | 0.052 | 220    | 0.060 |
|  | 140             | 0.025 | 160             | 0.036 | 180            | 0.044 | 200                                | 0.046 | 200                     | 0.048 | 220            | 0.052 | 220    | 0.060 |
|  | 140             | 0.016 | 160             | 0.034 | 180            | 0.042 | 200                                | 0.044 | 200                     | 0.046 | 220            | 0.049 | 220    | 0.058 |
|  | 120             | 0.026 | 140             | 0.032 | 160            | 0.043 | 180                                | 0.054 | 180                     | 0.056 | 200            | 0.058 | 200    | 0.070 |
|  | 190             | 0.029 | 210             | 0.040 | 230            | 0.060 | 250                                | 0.062 | 250                     | 0.064 | 270            | 0.068 | 270    | 0.084 |
|  | 190             | 0.029 | 210             | 0.040 | 230            | 0.060 | 250                                | 0.062 | 250                     | 0.064 | 270            | 0.068 | 270    | 0.084 |
|  | 190             | 0.029 | 210             | 0.040 | 230            | 0.060 | 250                                | 0.062 | 250                     | 0.064 | 270            | 0.068 | 270    | 0.084 |
|  | 190             | 0.029 | 210             | 0.040 | 230            | 0.060 | 250                                | 0.062 | 250                     | 0.064 | 270            | 0.068 | 270    | 0.084 |
|  | 190             | 0.029 | 210             | 0.040 | 230            | 0.060 | 250                                | 0.062 | 250                     | 0.064 | 270            | 0.068 | 270    | 0.084 |
|  | 190             | 0.029 | 210             | 0.040 | 230            | 0.060 | 250                                | 0.062 | 250                     | 0.064 | 270            | 0.068 | 270    | 0.084 |
|  | 100             | 0.010 | 120             | 0.012 | 120            | 0.016 | 140                                | 0.018 | 140                     | 0.020 | 160            | 0.022 | 160    | 0.024 |
|  | 100             | 0.022 | 120             | 0.032 | 120            | 0.042 | 140                                | 0.044 | 140                     | 0.046 | 160            | 0.048 | 160    | 0.054 |
|  | 100             | 0.022 | 120             | 0.032 | 120            | 0.042 | 140                                | 0.044 | 140                     | 0.046 | 160            | 0.048 | 160    | 0.054 |
|  | 100             | 0.010 | 120             | 0.012 | 120            | 0.016 | 140                                | 0.018 | 140                     | 0.020 | 160            | 0.022 | 160    | 0.024 |
|  |                 |       |                 |       |                |       |                                    |       |                         |       |                |       |        |       |
|  |                 |       |                 |       |                |       |                                    |       |                         |       |                |       |        |       |

**NEW**

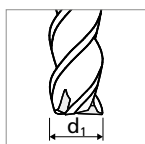
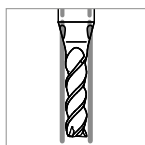
## Tipo C - Contornatura - Finitura

### FRESARE CON RAFFREDDAMENTO INTEGRATO | VISTA D'INSIEME DEI DATI DI TAGLIO

#### Finitura



- $a_p = 2 \times d_1$
- $a_e = 0.02 \times d_1$



| Gruppo materiali     | Materiale                                                           | Mat. no. | DIN                | AISI/ASTM/UNS           | 1.0 mm |       |
|----------------------|---------------------------------------------------------------------|----------|--------------------|-------------------------|--------|-------|
|                      |                                                                     |          |                    |                         | $v_c$  | $f_z$ |
| <b>P</b>             | Acciai non legati<br>$R_m < 800 \text{ N/mm}^2$                     | 1.0301   | C10                | AISI 1010               | 130    | 0.008 |
|                      |                                                                     | 1.0401   | C15                | AISI 1015               |        |       |
|                      |                                                                     | 1.1191   | C45E/CK45          | AISI 1045               |        |       |
|                      |                                                                     | 1.0044   | S275JR             | AISI 1020               |        |       |
|                      |                                                                     | 1.0715   | 11SMn30            | AISI 1215               |        |       |
|                      | Acciai debolmente legati<br>$R_m > 900 \text{ N/mm}^2$              | 1.5752   | 15NiCr13           | ASTM 3415 / AISI 3310   | 130    | 0.007 |
|                      |                                                                     | 1.7131   | 16MnCr5            | AISI 5115               |        |       |
|                      |                                                                     | 1.3505   | 100Cr6             | AISI 52100              |        |       |
|                      |                                                                     | 1.7225   | 42CrMo4            | AISI 4140               |        |       |
|                      |                                                                     | 1.2842   | 90MnCrV8           | AISI O2                 |        |       |
|                      | Acciai da utensili fortemente legati<br>$R_m < 1200 \text{ N/mm}^2$ | 1.2379   | X153CrMoV12        | AISI D2                 | 130    | 0.006 |
|                      |                                                                     | 1.2436   | X210CrW12          | AISI D4/D6              |        |       |
|                      |                                                                     | 1.3343   | HS6-5-2C           | AISI M2 / UNS T11302    |        |       |
|                      |                                                                     | 1.3355   | HS18-0-1           | AISI T1 / UNS T12001    |        |       |
|                      |                                                                     |          |                    |                         |        |       |
| <b>M</b>             | Acciai inossidabili ferritici                                       | 1.4016   | X6Cr17             | AISI 430 / UNS S43000   | 130    | 0.008 |
|                      |                                                                     | 1.4105   | X6CrMoS17          | AISI 430F               |        |       |
|                      |                                                                     | 1.4034   | X46Cr13            | AISI 420C               | 130    | 0.008 |
|                      | Acciai inossidabili martensitici                                    | 1.4112   | X90CrMoV18         | AISI 440B               |        |       |
|                      |                                                                     | 1.4542   | X5CrNiCuNb16-4     | AISI 630 / ASTM 17-4 PH | 130    | 0.008 |
|                      |                                                                     | 1.4545   | X5CrNiCuNb15-5     | ASTM 15-5 PH            |        |       |
|                      | Acciai inossidabili austenitici                                     | 1.4301   | X5CrNi18-10        | AISI 304                | 130    | 0.006 |
|                      |                                                                     | 1.4435   | X2CrNiMo18-14-3    | AISI 316L               |        |       |
|                      |                                                                     | 1.4441   | X2CrNiMo18-15-3    | AISI 316LM              |        |       |
| <b>K</b>             | Ghise                                                               | 0.6020   | GG20               | ASTM 30                 | 110    | 0.006 |
|                      |                                                                     | 0.6030   | GG30               | ASTM 40B                |        |       |
|                      |                                                                     | 0.7040   | GGG40              | ASTM 60-40-18           |        |       |
|                      |                                                                     | 0.7060   | GGG60              | ASTM 80-60-03           |        |       |
|                      |                                                                     |          |                    |                         |        |       |
| <b>N</b>             | Leghe d'alluminio battute                                           | 3.2315   | AlMgSi1            | ASTM 6351               | 130    | 0.009 |
|                      |                                                                     | 3.4365   | AlZnMgCu1.5        | ASTM 7075               |        |       |
|                      | Leghe d'alluminio pressofuse                                        | 3.2163   | GD-AlSi9Cu3        | ASTM A380               | 130    | 0.009 |
|                      |                                                                     | 3.2381   | GD-AlSi10Mg        | UNS A03590              |        |       |
|                      | Rame                                                                | 2.0040   | Cu-OF / CW008A     | UNS C10100              | 130    | 0.010 |
|                      |                                                                     | 2.0065   | Cu-ETP / CW004A    | UNS C11000              |        |       |
|                      | Ottoni senza piombo                                                 | 2.0321   | CuZn37 CW508L      | UNS C27400              | 130    | 0.010 |
|                      |                                                                     | 2.0360   | CuZn40 CW509L      | UNS C28000              |        |       |
|                      | Ottoni, Bronzi<br>$R_m < 400 \text{ N/mm}^2$                        | 2.0401   | CuZn39Pb3 / CW614N | UNS C38500              | 130    | 0.010 |
|                      |                                                                     | 2.1020   | CuSn6              | UNS C51900              |        |       |
|                      | Bronzi<br>$R_m < 600 \text{ N/mm}^2$                                | 2.0966   | CuAl10Ni5Fe4       | UNS C63000              | 130    | 0.009 |
|                      |                                                                     | 2.0960   | CuAl9Mn2           | UNS C63200              |        |       |
| <b>S<sub>1</sub></b> | Superleghe                                                          | 2.4856   |                    | Inconel 625             | 110    | 0.004 |
|                      |                                                                     | 2.4668   |                    | Inconel 718             |        |       |
|                      |                                                                     | 2.4617   | NiMo28             | Hastelloy B-2           |        |       |
|                      |                                                                     | 2.4665   | NiCr22Fe18Mo       | Hastelloy X             |        |       |
| <b>S<sub>2</sub></b> | Titanio puro                                                        | 3.7035   | Gr.2               | ASTM B348 / F67         | 110    | 0.008 |
|                      |                                                                     | 3.7065   | Gr.4               | ASTM B348 / F68         |        |       |
|                      | Leghe di titanio                                                    | 3.7165   | TiAl6V4            | ASTM B348 / F136        | 110    | 0.008 |
|                      |                                                                     | 9.9367   | TiAl6Nb7           | ASTM F1295              |        |       |
| <b>S<sub>3</sub></b> | Leghe CrCo                                                          | 2.4964   | CoCr20W15Ni        | Haynes 25               | 110    | 0.004 |
|                      |                                                                     |          | CrCoMo28           | ASTM F1537              |        |       |
| <b>H<sub>1</sub></b> | Acciai temprati<br>$< 55 \text{ HRC}$                               | 1.2510   | 100MnCrMoW4        | AISI O1                 |        |       |
| <b>H<sub>2</sub></b> | Acciai temprati<br>$\geq 55 \text{ HRC}$                            | 1.2379   | X153CrMoV12        | AISI D2                 |        |       |

$v_c$  [m/min]  
 $f_z$  [mm]

RACCOMANDAZIONI PER L'USO

● Perfettamente consigliato | ● Consigliato | ○ Parzialmente consigliato | ☒ Non consigliato

|   |                |                |   |
|---|----------------|----------------|---|
| P | N              | S <sub>3</sub> |   |
| M | S <sub>1</sub> | H <sub>1</sub> | ☒ |
| K | S <sub>2</sub> | H <sub>2</sub> | ☒ |

|  | 1.5 mm<br>1/16" |       | 2.0 mm<br>3/32" |       | 3.0 mm<br>1/8" |       | Ød <sub>1</sub><br>4.0 mm<br>5/32" |       | 5.0 mm<br>3/16" - 7/32" |       | 6.0 mm<br>1/4" |       | 8.0 mm |       |
|--|-----------------|-------|-----------------|-------|----------------|-------|------------------------------------|-------|-------------------------|-------|----------------|-------|--------|-------|
|  | $v_c$           | $f_z$ | $v_c$           | $f_z$ | $v_c$          | $f_z$ | $v_c$                              | $f_z$ | $v_c$                   | $f_z$ | $v_c$          | $f_z$ | $v_c$  | $f_z$ |
|  | 180             | 0.012 | 200             | 0.017 | 210            | 0.023 | 220                                | 0.025 | 220                     | 0.028 | 220            | 0.033 | 220    | 0.042 |
|  | 180             | 0.011 | 200             | 0.016 | 210            | 0.022 | 220                                | 0.024 | 220                     | 0.026 | 220            | 0.029 | 220    | 0.038 |
|  | 180             | 0.010 | 200             | 0.015 | 210            | 0.020 | 220                                | 0.021 | 220                     | 0.023 | 220            | 0.025 | 220    | 0.034 |
|  | 180             | 0.012 | 200             | 0.017 | 210            | 0.022 | 220                                | 0.024 | 220                     | 0.026 | 220            | 0.029 | 220    | 0.036 |
|  | 180             | 0.011 | 200             | 0.016 | 210            | 0.022 | 220                                | 0.023 | 220                     | 0.025 | 220            | 0.028 | 220    | 0.037 |
|  | 180             | 0.011 | 200             | 0.016 | 210            | 0.022 | 220                                | 0.023 | 220                     | 0.025 | 220            | 0.028 | 220    | 0.037 |
|  | 180             | 0.008 | 200             | 0.015 | 210            | 0.020 | 220                                | 0.022 | 220                     | 0.024 | 220            | 0.026 | 220    | 0.035 |
|  | 130             | 0.012 | 150             | 0.014 | 160            | 0.022 | 170                                | 0.025 | 170                     | 0.029 | 170            | 0.031 | 200    | 0.040 |
|  | 180             | 0.013 | 200             | 0.018 | 210            | 0.029 | 220                                | 0.030 | 220                     | 0.033 | 220            | 0.036 | 220    | 0.045 |
|  | 180             | 0.013 | 200             | 0.018 | 210            | 0.029 | 220                                | 0.030 | 220                     | 0.033 | 220            | 0.036 | 220    | 0.045 |
|  | 180             | 0.013 | 200             | 0.018 | 210            | 0.029 | 220                                | 0.030 | 220                     | 0.033 | 220            | 0.036 | 220    | 0.045 |
|  | 180             | 0.013 | 200             | 0.018 | 210            | 0.029 | 220                                | 0.030 | 220                     | 0.033 | 220            | 0.036 | 220    | 0.045 |
|  | 180             | 0.013 | 200             | 0.018 | 210            | 0.029 | 220                                | 0.030 | 220                     | 0.033 | 220            | 0.036 | 220    | 0.045 |
|  | 120             | 0.005 | 130             | 0.005 | 130            | 0.008 | 140                                | 0.010 | 140                     | 0.011 | 150            | 0.012 | 150    | 0.021 |
|  | 120             | 0.010 | 130             | 0.014 | 130            | 0.020 | 140                                | 0.022 | 140                     | 0.024 | 150            | 0.026 | 150    | 0.035 |
|  | 120             | 0.010 | 130             | 0.014 | 130            | 0.020 | 140                                | 0.022 | 140                     | 0.024 | 150            | 0.026 | 150    | 0.035 |
|  | 120             | 0.005 | 130             | 0.005 | 130            | 0.008 | 140                                | 0.010 | 140                     | 0.011 | 150            | 0.012 | 150    | 0.021 |
|  |                 |       |                 |       |                |       |                                    |       |                         |       |                |       |        |       |
|  |                 |       |                 |       |                |       |                                    |       |                         |       |                |       |        |       |



**NEW**

## Processo CrazyMill Cool P&S

### FRESATURA PRECISA ED EFFICIENTE

#### Refrigerazione, filtro e pressione

**Refrigerante:** per ottenere risultati ottimali, Mikron Tool raccomanda l'utilizzo di olio da taglio come refrigerante. In alternativa, è possibile utilizzare anche emulsioni all'8% o più con additivi EP (Extreme-Pressure-Additive).

**Filtro:** i grandi canali di lubrificazione permettono un filtro standard con una qualità di  $\leq 0.05$  mm.

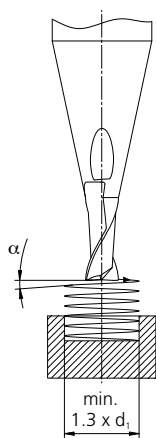
**Pressione del refrigerante:** una pressione minima del refrigerante di 15 bar è necessaria per operare con sicurezza di processo. Una pressione elevata è generalmente preferibile per l'effetto di raffreddamento e d'allontanamento del truciolo dalla zona di taglio.

| Numero di giri   | [giri/min] | $\leq 10'000$ | $> 10'000$ |
|------------------|------------|---------------|------------|
| Pressione minima | [bar]      | 15            | 30         |

#### Dispositivo di bloccaggio

Per un corretto utilizzo dell'utensile Mikron Tool consiglia l'utilizzo di un mandrino a calettamento secondo DIN 69871 oppure in alternativa un mandrino a bloccaggio idraulico. Per ulteriori dettagli consultare il capitolo "Informazioni tecniche" nel nostro catalogo generale.

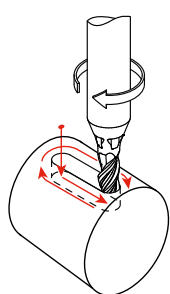
#### Angoli d'entrata massimi in rampa lineare o per interpolazione elicoidale



|                | Materiale                             | $\alpha$ - Rampa lineare | $\alpha$ - Interpolazione elicoidale |
|----------------|---------------------------------------|--------------------------|--------------------------------------|
| P              | Acciai non legati                     | 45°                      | 47°                                  |
|                | Acciai debolmente legati              | 45°                      | 47°                                  |
|                | Acciai da utensili fortemente legati  | 27°                      | 28°                                  |
| M              | Acciai inossidabili ferritici         | 45°                      | 47°                                  |
|                | Acciai inossidabili martensitici      | 27°                      | 28°                                  |
|                | Acciai inossidabili martensitici - PH | 27°                      | 28°                                  |
|                | Acciai inossidabili austenitici       | 45°                      | 47°                                  |
| K              | Ghise                                 | 45°                      | 47°                                  |
| N              | Leghe d'alluminio battute             | 45°                      | 47°                                  |
|                | Leghe d'alluminio pressofuse          | 45°                      | 47°                                  |
|                | Rame                                  | 45°                      | 47°                                  |
|                | Ottoni senza piombo                   | 45°                      | 47°                                  |
|                | Ottoni, Bronzi Rm < 400 N/mm²         | 45°                      | 47°                                  |
|                | Bronzi Rm < 600 N/mm²                 | 45°                      | 47°                                  |
| S <sub>1</sub> | Super leghe                           | 14°                      | 15°                                  |
| S <sub>2</sub> | Titanio puro e leghe di titanio       | 14°                      | 15°                                  |
| S <sub>3</sub> | Leghe CrCo                            | 27°                      | 28°                                  |

## Processo di fresatura

### A. Fresatura di sedi per chiavette - unicamente per Tipo A



Mikron Tool consiglia un processo di lavorazione in tre fasi che permette di ottenere una sede in tolleranza:

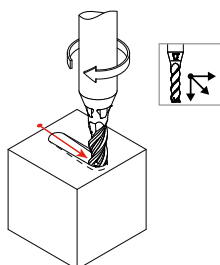
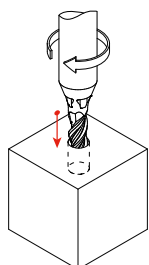
- 1. **Fresatura a tuffo o con entrata in rampa lineare**
- 2. **Fresatura di cave**
- 3. **Contornatura (fresatura di finitura)**

In generale, Mikron Tool consiglia la fresatura a tuffo (diretta) per un risparmio di tempo ed in minimi spazi. In alternativa, l'entrata può essere effettuata mediante una rampa lineare.

#### 1. A tuffo

oppure

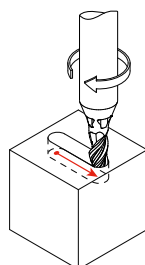
#### A rampa lineare



Per la fresatura a tuffo si deve considerare un aumento del diametro del foro di ca. 0.05mm rispetto al diametro della fresa. La profondità massima di fresatura è  $2.5 \times d_1$  ( $a_{p,max} = 1 \times d_1$ ). Per informazioni sull'avanzamento  $f_{z,p}$  vedere dati di taglio per fresatura a tuffo (pagina 16).

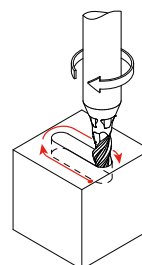
Il massimo angolo  $\alpha$  d'entrata dipende dal materiale e non deve essere superato (vedere tabella sottostante). Per informazioni sull'avanzamento  $f_{z,s}$  vedere dati di taglio per sedi chiavette (pagina 16).

#### 2. Di cave



Attenzione: dopo la fresatura di scanalatura è prevista una operazione di finitura. Per informazioni sull'avanzamento  $f_{z,s}$  vedere dati di taglio per cave (pagina 16). Per la selezione dell'utensile (diametro) vedere tabella "selezione utensile per sedi chiavette" (pagina 38).

#### 3. Contornatura

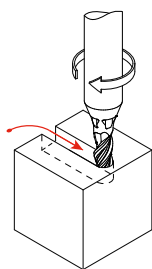


La finitura è necessaria per ottenere la tolleranza desiderata, così come la massima perpendicolarità richiesta.

**NEW**

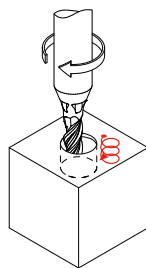
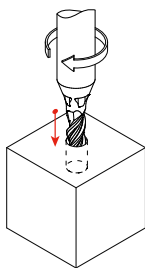
## Processo CrazyMill Cool P&S

### B. Fresatura di scanalature aperte



Nella fresatura di scanalature aperte è possibile lavorare con dati di taglio più elevati. Vedere dati di taglio a pagina 18 / pagina 28.

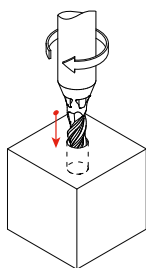
### C. Fresatura a tuffo



Con CrazyMill Cool P&S è possibile usare due approcci per eseguire una fresatura a tuffo (foratura):

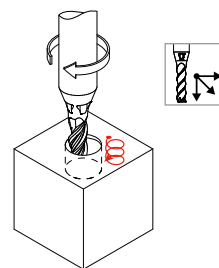
- 1. Entrata diretta
- 2. Entrata con interpolazione elicoidale

#### 1. Entrata diretta



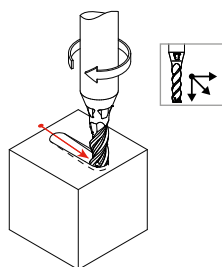
Per la fresatura a tuffo si deve considerare un aumento del diametro del foro di ca. 0.05mm rispetto al diametro della fresa. La profondità massima di fresatura è  $2.5 \times d_1$  - tipo A /  $2 \times d_1$  - tipo C ( $a_{p,max} = 1 \times d_1$ ). Per informazioni sull'avanzamento  $f_{z,p}$  vedere dati di taglio per fresatura a tuffo (pagina 16 / pagina 26).

#### 2. Entrata con interpolazione elicoidale



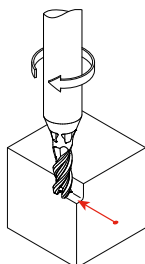
Il massimo angolo  $\alpha$  d'entrata dipende dal materiale e non deve essere superato (vedere tabella pagina 34). Per informazioni sull'avanzamento  $f_{z,s}$  vedere dati di taglio per sedi chiavette (pagina 16 / pagina 26). Attenzione: il diametro minimo del foro è  $d_{foro} = 1.3 \times d_{utensile}$

#### D. Fresatura a rampa lineare



Il massimo angolo  $\alpha$  d'entrata dipende dal materiale e non deve essere superato (vedere tabella pagina 34). Per informazioni sull'avanzamento  $f_{z,s}$  vedere dati di taglio per sedi chiavette (pagina 16 / pagina 26).

#### E. Contornatura Semi-finitura



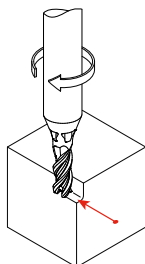
Parametri di taglio consigliati:

$v_c$  e  $f_z$  = come indicato nella tabella dei dati di taglio

$a_p$  = max. 1 x d

$a_e$  = 0.2 x d

#### Finitura



Parametri di taglio consigliati:

$v_c$  e  $f_z$  = come indicato nella tabella dei dati di taglio

$a_p$  = 2.5 x d - Tipo A

$a_p$  = 2 x d - Tipo C

$a_e$  = 0.05 – 0.1 x d in base alla qualità di superficie richiesta

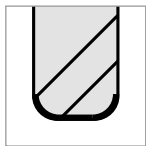
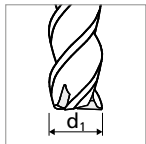
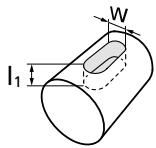


**NEW**

## Processo CrazyMill Cool P&S - Tipo A

IL GIUSTO UTENSILE PER LA GIUSTA SEDE PER CHIAVETTE

### Selezione utensile



| w<br>Gola<br>[mm] | w<br>Gola<br>[inch] | d <sub>1</sub><br>Utensile<br>[mm][inch] | l <sub>1, max</sub><br>[mm] | r<br>[mm][inch] | Numero<br>articolo |
|-------------------|---------------------|------------------------------------------|-----------------------------|-----------------|--------------------|
| 1.1               |                     | 1.0                                      | 2.50                        | 0.10            | 2.CMC42.A2Z3.100.1 |
|                   |                     | 1.0                                      | 2.50                        | 0.20            | 2.CMC42.A3Z3.100.1 |
| 1.2               |                     | 1.0                                      | 2.50                        | 0.10            | 2.CMC42.A2Z3.100.1 |
|                   |                     | 1.0                                      | 2.50                        | 0.20            | 2.CMC42.A3Z3.100.1 |
|                   |                     | 1.1                                      | 2.75                        | 0.10            | 2.CMC42.A2Z3.110.1 |
|                   |                     | 1.1                                      | 2.75                        | 0.20            | 2.CMC42.A3Z3.110.1 |
| 1.3               |                     | 1.1                                      | 2.75                        | 0.10            | 2.CMC42.A2Z3.110.1 |
|                   |                     | 1.1                                      | 2.75                        | 0.20            | 2.CMC42.A3Z3.110.1 |
|                   |                     | 1.2                                      | 3.00                        | 0.10            | 2.CMC42.A2Z3.120.1 |
|                   |                     | 1.2                                      | 3.00                        | 0.20            | 2.CMC42.A3Z3.120.1 |
| 1.4               |                     | 1.2                                      | 3.00                        | 0.10            | 2.CMC42.A2Z3.120.1 |
|                   |                     | 1.2                                      | 3.00                        | 0.20            | 2.CMC42.A3Z3.120.1 |
|                   |                     | 1.3                                      | 3.25                        | 0.10            | 2.CMC42.A2Z3.130.1 |
| 1.5               |                     | 1.3                                      | 3.25                        | 0.20            | 2.CMC42.A3Z3.130.1 |
|                   |                     | 1.3                                      | 3.25                        | 0.10            | 2.CMC42.A2Z3.130.1 |
|                   |                     | 1.3                                      | 3.25                        | 0.20            | 2.CMC42.A3Z3.130.1 |
|                   |                     | 1.4                                      | 3.50                        | 0.10            | 2.CMC42.A2Z3.140.1 |
| 1.587             | 1/16                | 1.4                                      | 3.50                        | 0.20            | 2.CMC42.A3Z3.140.1 |
|                   |                     | 1.4                                      | 3.50                        | 0.10            | 2.CMC42.A2Z3.140.1 |
|                   |                     | 1.4                                      | 3.50                        | 0.20            | 2.CMC42.A3Z3.140.1 |
|                   |                     | 1.5                                      | 3.75                        | 0.10            | 2.CMC42.A2Z3.150.1 |
| 1.6               |                     | 1.5                                      | 3.75                        | 0.30            | 2.CMC42.A3Z3.150.1 |
|                   |                     | 1.4                                      | 3.50                        | 0.10            | 2.CMC42.A2Z3.140.1 |
|                   |                     | 1.4                                      | 3.50                        | 0.20            | 2.CMC42.A3Z3.140.1 |
|                   |                     | 1.5                                      | 3.75                        | 0.10            | 2.CMC42.A2Z3.150.1 |
| 1.7               |                     | 1.5                                      | 3.75                        | 0.30            | 2.CMC42.A3Z3.150.1 |
|                   |                     | 1.5                                      | 3.75                        | 0.10            | 2.CMC42.A2Z3.150.1 |
|                   |                     | 1/16                                     | 3.97                        | 0.127           | 2.CMC.PSRA2Z3.F116 |
|                   |                     | 1/16                                     | 3.97                        | 0.254           | 2.CMC.PSRA3Z3.F116 |
| 1.8               |                     | 1.6                                      | 4.00                        | 0.10            | 2.CMC42.A2Z3.160.1 |
|                   |                     | 1.6                                      | 4.00                        | 0.30            | 2.CMC42.A3Z3.160.1 |
|                   |                     | 1.5                                      | 3.75                        | 0.10            | 2.CMC42.A2Z3.150.1 |
|                   |                     | 1.5                                      | 3.75                        | 0.30            | 2.CMC42.A3Z3.150.1 |
| 1.9               |                     | 1/16                                     | 3.97                        | 0.127           | 2.CMC.PSRA2Z3.F116 |
|                   |                     | 1/16                                     | 3.97                        | 0.254           | 2.CMC.PSRA3Z3.F116 |
|                   |                     | 1.6                                      | 4.00                        | 0.10            | 2.CMC42.A2Z3.160.1 |
|                   |                     | 1.6                                      | 4.00                        | 0.30            | 2.CMC42.A3Z3.160.1 |
| 2.0               |                     | 1.6                                      | 4.00                        | 0.10            | 2.CMC42.A2Z3.160.1 |
|                   |                     | 1.6                                      | 4.00                        | 0.30            | 2.CMC42.A3Z3.160.1 |
|                   |                     | 1.7                                      | 4.25                        | 0.10            | 2.CMC42.A2Z3.170.1 |
|                   |                     | 1.7                                      | 4.25                        | 0.30            | 2.CMC42.A3Z3.170.1 |
| 2.1               |                     | 1.7                                      | 4.25                        | 0.10            | 2.CMC42.A2Z3.170.1 |
|                   |                     | 1.7                                      | 4.25                        | 0.30            | 2.CMC42.A3Z3.170.1 |
|                   |                     | 1.8                                      | 4.50                        | 0.10            | 2.CMC42.A2Z3.180.1 |
|                   |                     | 1.8                                      | 4.50                        | 0.30            | 2.CMC42.A3Z3.180.1 |
| 2.2               |                     | 1.8                                      | 4.50                        | 0.10            | 2.CMC42.A2Z3.180.1 |
|                   |                     | 1.8                                      | 4.50                        | 0.30            | 2.CMC42.A3Z3.180.1 |
|                   |                     | 1.9                                      | 4.75                        | 0.10            | 2.CMC42.A2Z3.190.1 |
|                   |                     | 1.9                                      | 4.75                        | 0.30            | 2.CMC42.A3Z3.190.1 |
| 2.3               |                     | 1.9                                      | 4.75                        | 0.10            | 2.CMC42.A2Z3.190.1 |
|                   |                     | 1.9                                      | 4.75                        | 0.30            | 2.CMC42.A3Z3.190.1 |
|                   |                     | 2.0                                      | 5.00                        | 0.10            | 2.CMC42.A2Z3.200.1 |
|                   |                     | 2.0                                      | 5.00                        | 0.20            | 2.CMC42.A3Z3.200.1 |
| 2.4               |                     | 2.0                                      | 5.00                        | 0.50            | 2.CMC42.A4Z3.200.1 |
|                   |                     | 2.0                                      | 5.00                        | 0.20            | 2.CMC42.A3Z3.200.1 |
|                   |                     | 2.1                                      | 5.25                        | 0.10            | 2.CMC42.A2Z3.210.1 |
|                   |                     | 2.1                                      | 5.25                        | 0.20            | 2.CMC42.A3Z3.210.1 |
| 2.5               |                     | 2.1                                      | 5.25                        | 0.10            | 2.CMC42.A2Z3.210.1 |
|                   |                     | 2.1                                      | 5.25                        | 0.20            | 2.CMC42.A3Z3.210.1 |
|                   |                     | 2.2                                      | 5.50                        | 0.10            | 2.CMC42.A2Z3.220.1 |
|                   |                     | 2.2                                      | 5.50                        | 0.20            | 2.CMC42.A3Z3.220.1 |
| 2.6               |                     | 2.2                                      | 5.50                        | 0.10            | 2.CMC42.A2Z3.220.1 |
|                   |                     | 2.2                                      | 5.50                        | 0.20            | 2.CMC42.A3Z3.220.1 |
|                   |                     | 2.3                                      | 5.75                        | 0.10            | 2.CMC42.A2Z3.230.1 |
|                   |                     | 2.3                                      | 5.75                        | 0.20            | 2.CMC42.A3Z3.230.1 |
| 2.7               |                     | 2.3                                      | 5.75                        | 0.10            | 2.CMC42.A2Z3.230.1 |
|                   |                     | 2.3                                      | 5.75                        | 0.20            | 2.CMC42.A3Z3.230.1 |
|                   |                     | 2.4                                      | 6.00                        | 0.10            | 2.CMC42.A2Z3.240.1 |
|                   |                     | 2.4                                      | 6.00                        | 0.20            | 2.CMC42.A3Z3.240.1 |
| 2.8               |                     | 2.4                                      | 6.00                        | 0.10            | 2.CMC42.A2Z3.240.1 |
|                   |                     | 2.4                                      | 6.00                        | 0.20            | 2.CMC42.A3Z3.240.1 |
|                   |                     | 2.5                                      | 6.25                        | 0.10            | 2.CMC42.A2Z3.250.1 |
|                   |                     | 2.5                                      | 6.25                        | 0.20            | 2.CMC42.A3Z3.250.1 |
| 2.9               |                     | 2.5                                      | 6.25                        | 0.10            | 2.CMC42.A2Z3.250.1 |
|                   |                     | 2.5                                      | 6.25                        | 0.20            | 2.CMC42.A3Z3.250.1 |
|                   |                     | 2.6                                      | 6.50                        | 0.10            | 2.CMC42.A2Z3.260.1 |
|                   |                     | 2.6                                      | 6.50                        | 0.20            | 2.CMC42.A3Z3.260.1 |
| 3.0               |                     | 2.6                                      | 6.50                        | 0.10            | 2.CMC42.A2Z3.260.1 |
|                   |                     | 2.6                                      | 6.50                        | 0.20            | 2.CMC42.A3Z3.260.1 |
|                   |                     | 2.7                                      | 6.75                        | 0.10            | 2.CMC42.A2Z3.270.1 |
|                   |                     | 2.7                                      | 6.75                        | 0.20            | 2.CMC42.A3Z3.270.1 |

| w<br>Gola<br>[mm] | w<br>Gola<br>[inch] | d <sub>1</sub><br>Utensile<br>[mm][inch] | l <sub>1, max</sub><br>[mm] | r<br>[mm][inch] | Numero<br>articolo |
|-------------------|---------------------|------------------------------------------|-----------------------------|-----------------|--------------------|
| 2.3               |                     | 2.0                                      | 5.00                        | 0.10            | 2.CMC42.A2Z3.200.1 |
|                   |                     | 2.0                                      | 5.00                        | 0.20            | 2.CMC42.A3Z3.200.1 |
|                   |                     | 2.0                                      | 5.00                        | 0.50            | 2.CMC42.A4Z3.200.1 |
|                   |                     | 2.1                                      | 5.25                        | 0.20            | 2.CMC42.A2Z3.210.1 |
| 2.381             | 3/32                | 2.1                                      | 5.25                        | 0.50            | 2.CMC42.A3Z3.210.1 |
|                   |                     | 2.0                                      | 5.00                        | 0.10            | 2.CMC42.A2Z3.200.1 |
|                   |                     | 2.0                                      | 5.00                        | 0.20            | 2.CMC42.A3Z3.200.1 |
|                   |                     | 2.0                                      | 5.00                        | 0.50            | 2.CMC42.A4Z3.200.1 |
| 2.4               |                     | 2.1                                      | 5.25                        | 0.20            | 2.CMC42.A2Z3.210.1 |
|                   |                     | 2.1                                      | 5.25                        | 0.50            | 2.CMC42.A3Z3.210.1 |
|                   |                     | 2.2                                      | 5.50                        | 0.20            | 2.CMC42.A2Z3.220.1 |
|                   |                     | 2.2                                      | 5.50                        | 0.50            | 2.CMC42.A3Z3.220.1 |
| 2.5               |                     | 2.0                                      | 5.00                        | 0.10            | 2.CMC42.A2Z3.200.1 |
|                   |                     | 2.0                                      | 5.00                        | 0.20            | 2.CMC42.A3Z3.200.1 |
|                   |                     | 2.0                                      | 5.00                        | 0.50            | 2.CMC42.A4Z3.200.1 |
|                   |                     | 2.1                                      | 5.25                        | 0.20            | 2.CMC42.A2Z3.210.1 |
| 2.6               |                     | 2.1                                      | 5.25                        | 0.50            | 2.CMC42.A3Z3.210.1 |
|                   |                     | 2.2                                      | 5.50                        | 0.20            | 2.CMC42.A2Z3.220.1 |
|                   |                     | 2.2                                      | 5.50                        | 0.50            | 2.CMC42.A3Z3.220.1 |
|                   |                     | 2.3                                      | 5.75                        | 0.20            | 2.CMC42.A2Z3.230.1 |
| 2.7               |                     | 2.3                                      | 5.75                        | 0.50            | 2.CMC42.A3Z3.230.1 |
|                   |                     | 2.2                                      | 5.50                        | 0.20            | 2.CMC42.A2Z3.220.1 |
|                   |                     | 2.2                                      | 5.50                        | 0.50            | 2.CMC42.A3Z3.220.1 |
|                   |                     | 2.3                                      | 5.75                        | 0.20            | 2.CMC42.A2Z3.230.1 |
| 2.8               |                     | 2.3                                      | 5.75                        | 0.50            | 2.CMC42.A3Z3.230.1 |
|                   |                     | 2.3                                      | 5.75                        | 0.20            | 2.CMC42.A2Z3.230.1 |
|                   |                     | 2.4                                      | 6.00                        | 0.20            | 2.CMC42.A2Z3.240.1 |
|                   |                     | 2.4                                      | 6.00                        | 0.50            | 2.CMC42.A3Z3.240.1 |
| 2.9               |                     | 2.3                                      | 5.75                        | 0.20            | 2.CMC42.A2Z3.230.1 |
|                   |                     | 2.3                                      | 5.75                        | 0.50            | 2.CMC42.A3Z3.230.1 |
|                   |                     | 3/32                                     | 5.95                        | 0.127           | 2.CMC.PSRA2Z3.F332 |
|                   |                     | 3/32                                     | 5.95                        | 0.254           | 2.CMC.PSRA3Z3.F332 |
| 3.0               |                     | 3/32                                     | 5.95                        | 0.381           | 2.CMC.PSRA4Z3.F332 |
|                   |                     | 2.4                                      | 6.00                        | 0.20            | 2.CMC42.A2Z3.240.1 |
|                   |                     | 2.4                                      | 6.00                        | 0.50            | 2.CMC42.A3Z3.240.1 |
|                   |                     | 2.5                                      | 6.25                        | 0.20            | 2.CMC42.A2Z3.250.1 |
| 3.1               |                     | 2.5                                      | 6.25                        | 0.50            | 2.CMC42.A3Z3.250.1 |
|                   |                     | 2.4                                      | 6.00                        | 0.20            | 2.CMC42.A2Z3.240.1 |
|                   |                     | 2.4                                      | 6.00                        | 0.50            | 2.CMC42.A3Z3.240.1 |
|                   |                     | 2.5                                      | 6.25                        | 0.20            | 2.CMC42.A2Z3.250.1 |
| 3.2               |                     | 2.5                                      | 6.25                        | 0.50            | 2.CMC42.A3Z3.250.1 |
|                   |                     | 2.6                                      | 6.50                        | 0.20            | 2.CMC42.A2Z3.260.1 |
|                   |                     | 2.6                                      | 6.50                        | 0.50            | 2.CMC42.A3Z3.260.1 |
|                   |                     | 2.5                                      | 6.25                        | 0.20            | 2.CMC42.A2Z3.250.1 |
| 3.3               |                     | 2.5                                      | 6.25                        | 0.50            | 2.CMC42.A3Z3.250.1 |
|                   |                     | 2.6                                      | 6.50                        | 0.20            | 2.CMC42.A2Z3.260.1 |
|                   |                     | 2.6                                      | 6.50                        | 0.50            | 2.CMC42.A3Z3.260.1 |
|                   |                     | 2.7                                      | 6.75                        | 0.20            | 2.CMC42.A2Z3.270.1 |
| 3.4               |                     | 2.7                                      | 6.75                        | 0.50            | 2.CMC42.A3Z3.270.1 |
|                   |                     | 2.7                                      | 6.75                        | 0.20            | 2.CMC42.A2Z3.270.1 |
|                   |                     | 2.8                                      | 7.00                        | 0.10            | 2.CMC42.A2Z3.280.1 |
|                   |                     | 2.8                                      | 7.00                        | 0.20            | 2.CMC42.A3Z3.280.1 |

| w<br>Gola<br>[mm] | w<br>Gola<br>[inch] | d <sub>1</sub><br>Utensile<br>[mm][inch] | l <sub>1, max</sub><br>[mm] | r<br>[mm][inch] | Numero<br>articolo |
|-------------------|---------------------|------------------------------------------|-----------------------------|-----------------|--------------------|
| 3.0               |                     | 2.6                                      | 6.50                        | 0.20            | 2.CMC42.A2Z3.260.1 |
|                   |                     | 2.6                                      | 6.50                        | 0.50            | 2.CMC42.A3Z3.260.1 |
|                   |                     | 2.7                                      | 6.75                        | 0.20            | 2.CMC42.A2Z3.270.1 |
|                   |                     | 2.7                                      | 6.75                        | 0.50            | 2.CMC42.A3Z3.270.1 |
|                   |                     | 2.8                                      | 7.00                        | 0.20            | 2.CMC42.A2Z3.280.1 |
| 3.1               |                     | 2.8                                      | 7.00                        | 0.50            | 2.CMC42.A3Z3.280.1 |
|                   |                     | 2.6                                      | 6.50                        | 0.20            | 2.CMC42.A2Z3.260.1 |
|                   |                     | 2.6                                      | 6.50                        | 0.50            | 2.CMC42.A3Z3.260.1 |
|                   |                     | 2.7                                      | 6.75                        | 0.20            | 2.CMC42.A2Z3.270.1 |
|                   |                     | 2.7                                      | 6.75                        | 0.50            | 2.CMC42.A3Z3.270.1 |
|                   |                     | 2.8                                      | 7.00                        | 0.20            | 2.CMC42.A2Z3.280.1 |
|                   |                     | 2.8                                      | 7.00                        | 0.50            | 2.CMC42.A3Z3.280.1 |
| 3.175             | 1/8                 | 2.9                                      | 7.25                        | 0.20            | 2.CMC42.A2Z3.290.1 |
|                   |                     | 2.9                                      | 7.25                        | 0.50            | 2.CMC42.A3Z3.290.1 |
|                   |                     | 2.7                                      | 6.75                        | 0.20            | 2.CMC42.A2Z3.270.1 |
|                   |                     | 2.7                                      | 6.75                        | 0.50            | 2.CMC42.A3Z3.270.1 |
|                   |                     | 2.8                                      | 7.00                        | 0.20            | 2.CMC42.A2Z3.280.1 |
| 3.2               |                     | 2.8                                      | 7.00                        | 0.50            | 2.CMC42.A3Z3.280.1 |
|                   |                     | 2.9                                      | 7.25                        | 0.20            | 2.CMC42.A2Z3.290.1 |
|                   |                     | 2.9                                      | 7.25                        | 0.50            | 2.CMC42.A3Z3.290.1 |
|                   |                     | 3.0                                      | 7.50                        | 0.20            | 2.CMC42.A2Z3.300.1 |
|                   |                     | 3.0                                      | 7.50                        | 0.50            | 2.CMC42.A3Z3.300.1 |
|                   |                     | 2.8                                      | 7.00                        | 0.20            | 2.CMC42.A2Z3.280.1 |
|                   |                     | 2.8                                      | 7.00                        | 0.50            | 2.CMC42.A3Z3.280.1 |
| 3.3               |                     | 2.9                                      | 7.25                        | 0.20            | 2.CMC42.A2Z3.290.1 |
|                   |                     | 2.9                                      | 7.25                        | 0.50            | 2.CMC42.A3Z3.290.1 |
|                   |                     | 3.0                                      | 7.50                        | 0.20            | 2.CMC42.A2Z3.300.1 |
|                   |                     | 3.0                                      | 7.50                        | 0.50            | 2.CMC42.A3Z3.300.1 |
|                   |                     | 3.1                                      | 7.75                        | 0.20            | 2.CMC42.A2Z3.310.1 |
|                   |                     | 3.1                                      | 7.75                        | 0.50            | 2.CMC42.A3Z3.310.1 |
| 3.4               |                     | 2.9                                      | 7.25                        | 0.20            | 2.CMC42.A2Z3.290.1 |
|                   |                     | 2.9                                      | 7.25                        | 0.50            | 2.CMC42.A3Z3.290.1 |
|                   |                     | 3.0                                      | 7.50                        | 0.20            | 2.CMC42.A2Z3.300.1 |
|                   |                     | 3.0                                      | 7.50                        | 0.50            | 2.CMC42.A3Z3.300.1 |
|                   |                     | 3.1                                      | 7.75                        | 0.20            | 2.CMC42.A2Z3.310.1 |
| 3.5               |                     | 3.1                                      | 7.75                        | 0.50            | 2.CMC42.A3Z3.310.1 |
|                   |                     | 3.0                                      | 7.50                        | 0.20            | 2.CMC42.A2Z3.300.1 |
|                   |                     | 3.0                                      | 7.50                        | 0.50            | 2.CMC42.A3Z3.300.1 |
|                   |                     | 3.1                                      | 7.75                        | 0.20            | 2.CMC42.A2Z3.310.1 |
|                   |                     | 3.1                                      | 7.75                        | 0.50            | 2.CMC42.A3Z3.310.1 |
|                   |                     | 1/8                                      | 7.94                        | 0.254           | 2.CMC.PSRA2Z3.F18  |
|                   |                     | 1/8                                      | 7.94                        | 0.381           | 2.CMC.PSRA3Z3.F18  |
| 3.6               |                     | 3.3                                      | 8.25                        | 0.20            | 2.CMC42.A2Z3.330.1 |
|                   |                     | 3.3                                      | 8.25                        | 0.50            | 2.CMC42.A3Z3.330.1 |
|                   |                     | 3.0                                      | 7.50                        | 0.20            | 2.CMC42.A2Z3.300.1 |
|                   |                     | 3.0                                      | 7.50                        | 0.50            | 2.CMC42.A3Z3.300.1 |
|                   |                     | 3.1                                      | 7.75                        | 0.20            | 2.CMC42.A2Z3.310.1 |
|                   |                     | 3.1                                      | 7.75                        | 0.50            | 2.CMC42.A3Z3.310.1 |
|                   |                     | 1/8                                      | 7.94                        | 0.254           | 2.CMC.PSRA2Z3.F18  |
|                   |                     | 1/8                                      | 7.94                        | 0.381           | 2.CMC.PSRA3Z3.F18  |
|                   |                     | 3.3                                      | 8.25                        | 0.20            | 2.CMC42.A2Z3.330.1 |
|                   |                     | 3.3                                      | 8.25                        | 0.50            | 2.CMC42.A3Z3.330.1 |

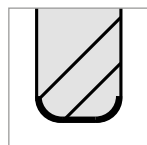
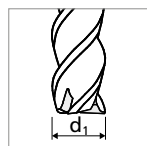
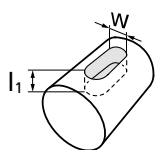
| w<br>Gola<br>[mm] | w<br>Gola<br>[inch] | d <sub>1</sub><br>Utensile<br>[mm][inch] | l <sub>1, max</sub><br>[mm] | r<br>[mm][inch] | Numero<br>articolo |
|-------------------|---------------------|------------------------------------------|-----------------------------|-----------------|--------------------|
| 3.7               |                     | 3.1                                      | 7.75                        | 0.20            | 2.CMC42.A2Z3.310.1 |
|                   |                     | 3.1                                      | 7.75                        | 0.50            | 2.CMC42.A3Z3.310.1 |
|                   |                     | 1/8                                      | 7.94                        | 0.254           | 2.CMC.PSRA2Z3.F18  |
|                   |                     | 1/8                                      | 7.94                        | 0.381           | 2.CMC.PSRA3Z3.F18  |
|                   |                     | 3.3                                      | 8.25                        | 0.20            | 2.CMC42.A2Z3.330.1 |
| 3.8               |                     | 3.3                                      | 8.25                        | 0.50            | 2.CMC42.A3Z3.330.1 |
|                   |                     | 3.3                                      | 8.25                        | 0.20            | 2.CMC42.A2Z3.330.1 |
|                   |                     | 3.3                                      | 8.25                        | 0.50            | 2.CMC42.A3Z3.330.1 |
| 3.9               |                     | 3.3                                      | 8.25                        | 0.20            | 2.CMC42.A2Z3.330.1 |
|                   |                     | 3.3                                      | 8.25                        | 0.50            | 2.CMC42.A3Z3.330.1 |
|                   |                     | 3.7                                      | 9.25                        | 0.20            | 2.CMC42.A2Z3.370.1 |
| 3.968             | 5/32                | 3.7                                      | 9.25                        | 0.50            | 2.CMC42.A3Z3.370.1 |
|                   |                     | 3.3                                      | 8.25                        | 0.20            | 2.CMC42.A2Z3.330.1 |
|                   |                     | 3.3                                      | 8.25                        | 0.50            | 2.CMC42.A3Z3.330.1 |
|                   |                     | 3.7                                      | 9.25                        | 0.20            | 2.CMC42.A2Z3.370.1 |
|                   |                     | 3.7                                      | 9.25                        | 0.50            | 2.CMC42.A3Z3.370.1 |
| 4.0               |                     | 3.7                                      | 9.25                        | 0.20            | 2.CMC42.A2Z3.370.1 |
|                   |                     | 3.7                                      | 9.25                        | 0.50            | 2.CMC42.A3Z3.370.1 |
|                   |                     | 3.7                                      | 9.25                        | 0.20            | 2.CMC42.A2Z3.370.1 |
| 4.1               |                     | 3.7                                      | 9.25                        | 0.50            | 2.CMC42.A3Z3.370.1 |
|                   |                     | 3.7                                      | 9.25                        | 0.20            | 2.CMC42.A2Z3.370.1 |
|                   |                     | 3.7                                      | 9.25                        | 0.50            | 2.CMC42.A3Z3.370.1 |
|                   |                     | 3.7                                      | 9.25                        | 0.20            | 2.CMC42.A2Z3.370.1 |
|                   |                     | 3.7                                      | 9.25                        | 0.50            | 2.CMC42.A3Z3.370.1 |
| 4.2               |                     | 5/32                                     | 9.92                        | 0.254           | 2.CMC.PSRA2Z3.F532 |
|                   |                     | 5/32                                     | 9.92                        | 0.381           | 2.CMC.PSRA3Z3.F532 |
|                   |                     | 4.0                                      | 10.00                       | 0.20            | 2.CMC42.A2Z3.400.1 |
|                   |                     | 4.0                                      | 10.00                       | 0.50            | 2.CMC42.A3Z3.400.1 |
|                   |                     | 3.7                                      | 9.25                        | 0.20            | 2.CMC42.A2Z3.370.1 |
| 4.3               |                     | 3.7                                      | 9.25                        | 0.50            | 2.CMC42.A3Z3.370.1 |
|                   |                     | 5/32                                     | 9.92                        | 0.254           | 2.CMC.PSRA2Z3.F532 |
|                   |                     | 5/32                                     | 9.92                        | 0.381           | 2.CMC.PSRA3Z3.F532 |
|                   |                     | 4.0                                      | 10.00                       | 0.20            | 2.CMC42.A2Z3.400.1 |
|                   |                     | 4.0                                      | 10.00                       | 0.50            | 2.CMC42.A3Z3.400.1 |
| 4.4               |                     | 3.7                                      | 9.25                        | 0.20            | 2.CMC42.A2Z3.370.1 |
|                   |                     | 3.7                                      | 9.25                        | 0.50            | 2.CMC42.A3Z3.370.1 |
|                   |                     | 5/32                                     | 9.92                        | 0.254           | 2.CMC.PSRA2Z3.F532 |
|                   |                     | 5/32                                     | 9.92                        | 0.381           | 2.CMC.PSRA3Z3.F532 |
|                   |                     | 4.0                                      | 10.00                       | 0.20            | 2.CMC42.A2Z3.400.1 |
| 4.5               |                     | 4.0                                      | 10.00                       | 0.50            | 2.CMC42.A3Z3.400.1 |
|                   |                     | 4.0                                      | 10.00                       | 0.20            | 2.CMC42.A2Z3.400.1 |
|                   |                     | 4.3                                      | 10.75                       | 0.20            | 2.CMC42.A2Z3.430.1 |
|                   |                     | 4.3                                      | 10.75                       | 0.50            | 2.CMC42.A3Z3.430.1 |
|                   |                     | 4.0                                      | 10.00                       | 0.20            | 2.CMC42.A2Z3.400.1 |
| 4.6               |                     | 4.0                                      | 10.00                       | 0.50            | 2.CMC42.A3Z3.400.1 |
|                   |                     | 4.3                                      | 10.75                       | 0.20            | 2.CMC42.A2Z3.430.1 |
|                   |                     | 4.3                                      | 10.75                       | 0.50            | 2.CMC42.A3Z3.430.1 |
|                   |                     | 4.0                                      | 10.00                       | 0.20            | 2.CMC42.A2Z3.400.1 |
|                   |                     | 4.0                                      | 10.00                       | 0.50            | 2.CMC42.A3Z3.400.1 |
| 4.7               |                     | 4.3                                      | 10.75                       | 0.20            | 2.CMC42.A2Z3.430.1 |
|                   |                     | 4.3                                      | 10.75                       | 0.50            | 2.CMC42.A3Z3.430.1 |
|                   |                     | 4.0                                      | 10.00                       | 0.20            | 2.CMC42.A2Z3.400.1 |
|                   |                     | 4.0                                      | 10.00                       | 0.50            | 2.CMC42.A3Z3.400.1 |
|                   |                     | 4.3                                      | 10.75                       | 0.20            | 2.CMC42.A2Z3.430.1 |
| 4.762             | 3/16                | 4.3                                      | 10.75                       | 0.50            | 2.CMC42.A3Z3.430.1 |
|                   |                     | 4.0                                      | 10.00                       | 0.20            | 2.CMC42.A2Z3.400.1 |
|                   |                     | 4.0                                      | 10.00                       | 0.50            | 2.CMC42.A3Z3.400.1 |
|                   |                     | 4.3                                      | 10.75                       | 0.20            | 2.CMC42.A2Z3.430.1 |
|                   |                     | 4.3                                      | 10.75                       | 0.50            | 2.CMC42.A3Z3.430.1 |
| 4.8               |                     | 4.0                                      | 10.00                       | 0.20            | 2.CMC42.A2Z3.400.1 |
|                   |                     | 4.0                                      | 10.00                       | 0.50            | 2.CMC42.A3Z3.400.1 |
|                   |                     | 4.3                                      | 10.75                       | 0.20            | 2.CMC42.A2Z3.430.1 |
|                   |                     | 4.3                                      | 10.75                       | 0.50            | 2.CMC42.A3Z3.430.1 |

**NEW**

## Processo CrazyMill Cool P&S - Tipo A

IL GIUSTO UTENSILE PER LA GIUSTA SEDE PER CHIAVETTE

### Selezione utensile



| w<br>Gola<br>[mm] | w<br>Gola<br>[inch] | d <sub>1</sub><br>Utensile<br>[mm][inch] | l <sub>1, max</sub><br>[mm] | r<br>[mm][inch] | Numero<br>articolo |
|-------------------|---------------------|------------------------------------------|-----------------------------|-----------------|--------------------|
| 4.9               |                     | 4.3                                      | 10.75                       | 0.20            | 2.CMC42.A2Z3.430.1 |
|                   |                     | 4.3                                      | 10.75                       | 0.50            | 2.CMC42.A3Z3.430.1 |
|                   |                     | 4.7                                      | 11.75                       | 0.20            | 2.CMC42.A2Z3.470.1 |
|                   |                     | 4.7                                      | 11.75                       | 0.50            | 2.CMC42.A3Z3.470.1 |
| 5.0               |                     | 4.3                                      | 10.75                       | 0.20            | 2.CMC42.A2Z3.430.1 |
|                   |                     | 4.3                                      | 10.75                       | 0.50            | 2.CMC42.A3Z3.430.1 |
|                   |                     | 4.7                                      | 11.75                       | 0.20            | 2.CMC42.A2Z3.470.1 |
|                   |                     | 4.7                                      | 11.75                       | 0.50            | 2.CMC42.A3Z3.470.1 |
|                   |                     | <b>3/16</b>                              | 11.91                       | <b>0.254</b>    | 2.CMC.PSRA2Z3.F316 |
|                   |                     | <b>3/16</b>                              | 11.91                       | <b>0.381</b>    | 2.CMC.PSRA3Z3.F316 |
|                   |                     | 4.8                                      | 12.00                       | 0.20            | 2.CMC42.A2Z3.480.1 |
|                   |                     | 4.8                                      | 12.00                       | 0.50            | 2.CMC42.A3Z3.480.1 |
| 5.1               |                     | 4.3                                      | 10.75                       | 0.20            | 2.CMC42.A2Z3.430.1 |
|                   |                     | 4.3                                      | 10.75                       | 0.50            | 2.CMC42.A3Z3.430.1 |
|                   |                     | 4.7                                      | 11.75                       | 0.20            | 2.CMC42.A2Z3.470.1 |
|                   |                     | 4.7                                      | 11.75                       | 0.50            | 2.CMC42.A3Z3.470.1 |
|                   |                     | <b>3/16</b>                              | 11.91                       | <b>0.254</b>    | 2.CMC.PSRA2Z3.F316 |
|                   |                     | <b>3/16</b>                              | 11.91                       | <b>0.381</b>    | 2.CMC.PSRA3Z3.F316 |
|                   |                     | 4.8                                      | 12.00                       | 0.20            | 2.CMC42.A2Z3.480.1 |
|                   |                     | 4.8                                      | 12.00                       | 0.50            | 2.CMC42.A3Z3.480.1 |
| 5.2               |                     | 4.7                                      | 11.75                       | 0.20            | 2.CMC42.A2Z3.470.1 |
|                   |                     | 4.7                                      | 11.75                       | 0.50            | 2.CMC42.A3Z3.470.1 |
|                   |                     | <b>3/16</b>                              | 11.91                       | <b>0.254</b>    | 2.CMC.PSRA2Z3.F316 |
|                   |                     | <b>3/16</b>                              | 11.91                       | <b>0.381</b>    | 2.CMC.PSRA3Z3.F316 |
|                   |                     | 4.8                                      | 12.00                       | 0.20            | 2.CMC42.A2Z3.480.1 |
|                   |                     | 4.8                                      | 12.00                       | 0.50            | 2.CMC42.A3Z3.480.1 |
|                   |                     | 5.0                                      | 12.50                       | 0.20            | 2.CMC42.A2Z3.500.1 |
|                   |                     | 5.0                                      | 12.50                       | 0.50            | 2.CMC42.A3Z3.500.1 |
| 5.3               |                     | 4.7                                      | 11.75                       | 0.20            | 2.CMC42.A2Z3.470.1 |
|                   |                     | 4.7                                      | 11.75                       | 0.50            | 2.CMC42.A3Z3.470.1 |
|                   |                     | <b>3/16</b>                              | 11.91                       | <b>0.254</b>    | 2.CMC.PSRA2Z3.F316 |
|                   |                     | <b>3/16</b>                              | 11.91                       | <b>0.381</b>    | 2.CMC.PSRA3Z3.F316 |
|                   |                     | 4.8                                      | 12.00                       | 0.20            | 2.CMC42.A2Z3.480.1 |
|                   |                     | 4.8                                      | 12.00                       | 0.50            | 2.CMC42.A3Z3.480.1 |
|                   |                     | 5.0                                      | 12.50                       | 0.20            | 2.CMC42.A2Z3.500.1 |
|                   |                     | 5.0                                      | 12.50                       | 0.50            | 2.CMC42.A3Z3.500.1 |
| 5.4               |                     | 4.7                                      | 11.75                       | 0.20            | 2.CMC42.A2Z3.470.1 |
|                   |                     | 4.7                                      | 11.75                       | 0.50            | 2.CMC42.A3Z3.470.1 |
|                   |                     | <b>3/16</b>                              | 11.91                       | <b>0.254</b>    | 2.CMC.PSRA2Z3.F316 |
|                   |                     | <b>3/16</b>                              | 11.91                       | <b>0.381</b>    | 2.CMC.PSRA3Z3.F316 |
|                   |                     | 4.8                                      | 12.00                       | 0.20            | 2.CMC42.A2Z3.480.1 |
|                   |                     | 4.8                                      | 12.00                       | 0.50            | 2.CMC42.A3Z3.480.1 |
|                   |                     | 5.0                                      | 12.50                       | 0.20            | 2.CMC42.A2Z3.500.1 |
|                   |                     | 5.0                                      | 12.50                       | 0.50            | 2.CMC42.A3Z3.500.1 |
| 5.5               |                     | 4.7                                      | 11.75                       | 0.20            | 2.CMC42.A2Z3.470.1 |
|                   |                     | 4.7                                      | 11.75                       | 0.50            | 2.CMC42.A3Z3.470.1 |
|                   |                     | <b>3/16</b>                              | 11.91                       | <b>0.254</b>    | 2.CMC.PSRA2Z3.F316 |
|                   |                     | <b>3/16</b>                              | 11.91                       | <b>0.381</b>    | 2.CMC.PSRA3Z3.F316 |
|                   |                     | 4.8                                      | 12.00                       | 0.20            | 2.CMC42.A2Z3.480.1 |
|                   |                     | 4.8                                      | 12.00                       | 0.50            | 2.CMC42.A3Z3.480.1 |
|                   |                     | 5.0                                      | 12.50                       | 0.20            | 2.CMC42.A2Z3.500.1 |
|                   |                     | 5.0                                      | 12.50                       | 0.50            | 2.CMC42.A3Z3.500.1 |

| w<br>Gola<br>[mm] | w<br>Gola<br>[inch] | d <sub>1</sub><br>Utensile<br>[mm][inch] | l <sub>1, max</sub><br>[mm] | r<br>[mm][inch] | Numero<br>articolo |
|-------------------|---------------------|------------------------------------------|-----------------------------|-----------------|--------------------|
| 5.560             | <b>7/32</b>         | 4.7                                      | 11.75                       | 0.20            | 2.CMC42.A2Z3.470.1 |
|                   |                     | 4.7                                      | 11.75                       | 0.50            | 2.CMC42.A3Z3.470.1 |
|                   |                     | <b>3/16</b>                              | 11.91                       | <b>0.254</b>    | 2.CMC.PSRA2Z3.F316 |
|                   |                     | <b>3/16</b>                              | 11.91                       | <b>0.381</b>    | 2.CMC.PSRA3Z3.F316 |
|                   |                     | 4.8                                      | 12.00                       | 0.20            | 2.CMC42.A2Z3.480.1 |
|                   |                     | 4.8                                      | 12.00                       | 0.50            | 2.CMC42.A3Z3.480.1 |
|                   |                     | 5.0                                      | 12.50                       | 0.20            | 2.CMC42.A2Z3.500.1 |
|                   |                     | 5.0                                      | 12.50                       | 0.50            | 2.CMC42.A3Z3.500.1 |
|                   |                     | 5.3                                      | 13.25                       | 0.20            | 2.CMC42.A2Z3.530.1 |
|                   |                     | 5.3                                      | 13.25                       | 0.50            | 2.CMC42.A3Z3.530.1 |
|                   |                     | 4.7                                      | 11.75                       | 0.20            | 2.CMC42.A2Z3.470.1 |
|                   |                     | 4.7                                      | 11.75                       | 0.50            | 2.CMC42.A3Z3.470.1 |
| 5.6               |                     | <b>3/16</b>                              | 11.91                       | <b>0.254</b>    | 2.CMC.PSRA2Z3.F316 |
|                   |                     | <b>3/16</b>                              | 11.91                       | <b>0.381</b>    | 2.CMC.PSRA3Z3.F316 |
|                   |                     | 4.8                                      | 12.00                       | 0.20            | 2.CMC42.A2Z3.480.1 |
|                   |                     | 4.8                                      | 12.00                       | 0.50            | 2.CMC42.A3Z3.480.1 |
|                   |                     | 5.0                                      | 12.50                       | 0.20            | 2.CMC42.A2Z3.500.1 |
|                   |                     | 5.0                                      | 12.50                       | 0.50            | 2.CMC42.A3Z3.500.1 |
|                   |                     | 5.3                                      | 13.25                       | 0.20            | 2.CMC42.A2Z3.530.1 |
|                   |                     | 5.3                                      | 13.25                       | 0.50            | 2.CMC42.A3Z3.530.1 |
| 5.7               |                     | 4.8                                      | 12.00                       | 0.20            | 2.CMC42.A2Z3.480.1 |
|                   |                     | 4.8                                      | 12.00                       | 0.50            | 2.CMC42.A3Z3.480.1 |
|                   |                     | 5.0                                      | 12.50                       | 0.20            | 2.CMC42.A2Z3.500.1 |
|                   |                     | 5.0                                      | 12.50                       | 0.50            | 2.CMC42.A3Z3.500.1 |
|                   |                     | 5.3                                      | 13.25                       | 0.20            | 2.CMC42.A2Z3.530.1 |
|                   |                     | 5.3                                      | 13.25                       | 0.50            | 2.CMC42.A3Z3.530.1 |
|                   |                     | 5.0                                      | 12.50                       | 0.20            | 2.CMC42.A2Z3.500.1 |
|                   |                     | 5.0                                      | 12.50                       | 0.50            | 2.CMC42.A3Z3.500.1 |
| 5.8               |                     | 5.3                                      | 13.25                       | 0.20            | 2.CMC42.A2Z3.530.1 |
|                   |                     | 5.3                                      | 13.25                       | 0.50            | 2.CMC42.A3Z3.530.1 |
| 5.9               |                     | 5.0                                      | 12.50                       | 0.20            | 2.CMC42.A2Z3.500.1 |
|                   |                     | 5.0                                      | 12.50                       | 0.50            | 2.CMC42.A3Z3.500.1 |
|                   |                     | 5.3                                      | 13.25                       | 0.20            | 2.CMC42.A2Z3.530.1 |
|                   |                     | 5.3                                      | 13.25                       | 0.50            | 2.CMC42.A3Z3.530.1 |
|                   |                     | <b>7/32</b>                              | 13.90                       | <b>0.381</b>    | 2.CMC.PSRA2Z3.F732 |
|                   |                     | <b>7/32</b>                              | 13.90                       | <b>0.762</b>    | 2.CMC.PSRA3Z3.F732 |
|                   |                     | 5.7                                      | 14.25                       | 0.20            | 2.CMC42.A2Z3.570.1 |
|                   |                     | 5.7                                      | 14.25                       | 0.50            | 2.CMC42.A3Z3.570.1 |
| 6.0               |                     | 5.0                                      | 12.50                       | 0.20            | 2.CMC42.A2Z3.500.1 |
|                   |                     | 5.0                                      | 12.50                       | 0.50            | 2.CMC42.A3Z3.500.1 |
|                   |                     | 5.3                                      | 13.25                       | 0.20            | 2.CMC42.A2Z3.530.1 |
|                   |                     | 5.3                                      | 13.25                       | 0.50            | 2.CMC42.A3Z3.530.1 |
|                   |                     | <b>7/32</b>                              | 13.90                       | <b>0.381</b>    | 2.CMC.PSRA2Z3.F732 |
|                   |                     | <b>7/32</b>                              | 13.90                       | <b>0.762</b>    | 2.CMC.PSRA3Z3.F732 |
|                   |                     | 5.7                                      | 14.25                       | 0.20            | 2.CMC42.A2Z3.570.1 |
|                   |                     | 5.7                                      | 14.25                       | 0.50            | 2.CMC42.A3Z3.570.1 |
| 6.1               |                     | 5.3                                      | 13.25                       | 0.20            | 2.CMC42.A2Z3.530.1 |
|                   |                     | 5.3                                      | 13.25                       | 0.50            | 2.CMC42.A3Z3.530.1 |
|                   |                     | <b>7/32</b>                              | 13.90                       | <b>0.381</b>    | 2.CMC.PSRA2Z3.F732 |
|                   |                     | <b>7/32</b>                              | 13.90                       | <b>0.762</b>    | 2.CMC.PSRA3Z3.F732 |
|                   |                     | 5.7                                      | 14.25                       | 0.20            | 2.CMC42.A2Z3.570.1 |
|                   |                     | 5.7                                      | 14.25                       | 0.50            | 2.CMC42.A3Z3.570.1 |



| w<br>Gola<br>[mm] | w<br>Gola<br>[inch] | d <sub>1</sub><br>Utensile<br>[mm][inch] | l <sub>1, max</sub><br>[mm] | r<br>[mm][inch] | Numero<br>articolo |
|-------------------|---------------------|------------------------------------------|-----------------------------|-----------------|--------------------|
| 6.2               |                     | 5.3                                      | 13.25                       | 0.20            | 2.CMC42.A2Z3.530.1 |
|                   |                     | 5.3                                      | 13.25                       | 0.50            | 2.CMC42.A3Z3.530.1 |
|                   |                     | <b>7/32</b>                              | 13.90                       | <b>0.381</b>    | 2.CMC.PSRA2Z3.F732 |
|                   |                     | <b>7/32</b>                              | 13.90                       | <b>0.762</b>    | 2.CMC.PSRA3Z3.F732 |
|                   |                     | 5.7                                      | 14.25                       | 0.20            | 2.CMC42.A2Z3.570.1 |
|                   |                     | 5.7                                      | 14.25                       | 0.50            | 2.CMC42.A3Z3.570.1 |
|                   |                     | 6.0                                      | 15.00                       | 0.20            | 2.CMC42.A2Z3.600.1 |
|                   |                     | 6.0                                      | 15.00                       | 0.50            | 2.CMC42.A3Z3.600.1 |
| 6.3               |                     | 6.0                                      | 15.00                       | 1.00            | 2.CMC42.A4Z3.600.1 |
|                   |                     | 5.3                                      | 13.25                       | 0.20            | 2.CMC42.A2Z3.530.1 |
|                   |                     | 5.3                                      | 13.25                       | 0.50            | 2.CMC42.A3Z3.530.1 |
|                   |                     | <b>7/32</b>                              | 13.90                       | <b>0.381</b>    | 2.CMC.PSRA2Z3.F732 |
|                   |                     | <b>7/32</b>                              | 13.90                       | <b>0.762</b>    | 2.CMC.PSRA3Z3.F732 |
|                   |                     | 5.7                                      | 14.25                       | 0.20            | 2.CMC42.A2Z3.570.1 |
|                   |                     | 5.7                                      | 14.25                       | 0.50            | 2.CMC42.A3Z3.570.1 |
|                   |                     | 6.0                                      | 15.00                       | 0.20            | 2.CMC42.A2Z3.600.1 |
| 6.350             | <b>1/4</b>          | 6.0                                      | 15.00                       | 0.50            | 2.CMC42.A3Z3.600.1 |
|                   |                     | 6.0                                      | 15.00                       | 1.00            | 2.CMC42.A4Z3.600.1 |
|                   |                     | 5.3                                      | 13.25                       | 0.20            | 2.CMC42.A2Z3.530.1 |
|                   |                     | 5.3                                      | 13.25                       | 0.50            | 2.CMC42.A3Z3.530.1 |
|                   |                     | <b>7/32</b>                              | 13.90                       | <b>0.381</b>    | 2.CMC.PSRA2Z3.F732 |
|                   |                     | <b>7/32</b>                              | 13.90                       | <b>0.762</b>    | 2.CMC.PSRA3Z3.F732 |
|                   |                     | 5.7                                      | 14.25                       | 0.20            | 2.CMC42.A2Z3.570.1 |
|                   |                     | 5.7                                      | 14.25                       | 0.50            | 2.CMC42.A3Z3.570.1 |
| 6.4               |                     | 6.0                                      | 15.00                       | 0.20            | 2.CMC42.A2Z3.600.1 |
|                   |                     | 6.0                                      | 15.00                       | 0.50            | 2.CMC42.A3Z3.600.1 |
|                   |                     | 6.0                                      | 15.00                       | 1.00            | 2.CMC42.A4Z3.600.1 |
|                   |                     | 5.7                                      | 14.25                       | 0.20            | 2.CMC42.A2Z3.570.1 |
|                   |                     | 5.7                                      | 14.25                       | 0.50            | 2.CMC42.A3Z3.570.1 |
| 6.5               |                     | 6.0                                      | 15.00                       | 0.20            | 2.CMC42.A2Z3.600.1 |
|                   |                     | 6.0                                      | 15.00                       | 0.50            | 2.CMC42.A3Z3.600.1 |
|                   |                     | 6.0                                      | 15.00                       | 1.00            | 2.CMC42.A4Z3.600.1 |
|                   |                     | 5.7                                      | 14.25                       | 0.20            | 2.CMC42.A2Z3.570.1 |
|                   |                     | 5.7                                      | 14.25                       | 0.50            | 2.CMC42.A3Z3.570.1 |
| 6.6               |                     | 6.0                                      | 15.00                       | 0.20            | 2.CMC42.A2Z3.600.1 |
|                   |                     | 6.0                                      | 15.00                       | 0.50            | 2.CMC42.A3Z3.600.1 |
|                   |                     | 6.0                                      | 15.00                       | 1.00            | 2.CMC42.A4Z3.600.1 |
|                   |                     | 5.7                                      | 14.25                       | 0.20            | 2.CMC42.A2Z3.570.1 |
|                   |                     | 5.7                                      | 14.25                       | 0.50            | 2.CMC42.A3Z3.570.1 |
|                   |                     | <b>1/4</b>                               | 15.88                       | <b>0.381</b>    | 2.CMC.PSRA2Z3.F14  |
|                   |                     | <b>1/4</b>                               | 15.88                       | <b>0.762</b>    | 2.CMC.PSRA3Z3.F14  |
| 6.7               |                     | <b>1/4</b>                               | 15.88                       | <b>1.524</b>    | 2.CMC.PSRA4Z3.F14  |
|                   |                     | 5.7                                      | 14.25                       | 0.20            | 2.CMC42.A2Z3.570.1 |
|                   |                     | 5.7                                      | 14.25                       | 0.50            | 2.CMC42.A3Z3.570.1 |
|                   |                     | 6.0                                      | 15.00                       | 0.20            | 2.CMC42.A2Z3.600.1 |
|                   |                     | 6.0                                      | 15.00                       | 0.50            | 2.CMC42.A3Z3.600.1 |
|                   |                     | 6.0                                      | 15.00                       | 1.00            | 2.CMC42.A4Z3.600.1 |
|                   |                     | <b>1/4</b>                               | 15.88                       | <b>0.381</b>    | 2.CMC.PSRA2Z3.F14  |
|                   |                     | <b>1/4</b>                               | 15.88                       | <b>0.762</b>    | 2.CMC.PSRA3Z3.F14  |
|                   |                     | <b>1/4</b>                               | 15.88                       | <b>1.524</b>    | 2.CMC.PSRA4Z3.F14  |
|                   |                     | 5.7                                      | 14.25                       | 0.20            | 2.CMC42.A2Z3.570.1 |

| w<br>Gola<br>[mm] | w<br>Gola<br>[inch] | d <sub>1</sub><br>Utensile<br>[mm][inch] | l <sub>1, max</sub><br>[mm] | r<br>[mm][inch] | Numero<br>articolo |
|-------------------|---------------------|------------------------------------------|-----------------------------|-----------------|--------------------|
| 6.8               |                     | 5.7                                      | 14.25                       | 0.20            | 2.CMC42.A2Z3.570.1 |
|                   |                     | 5.7                                      | 14.25                       | 0.50            | 2.CMC42.A3Z3.570.1 |
|                   |                     | 6.0                                      | 15.00                       | 0.20            | 2.CMC42.A2Z3.600.1 |
|                   |                     | 6.0                                      | 15.00                       | 0.50            | 2.CMC42.A3Z3.600.1 |
|                   |                     | 6.0                                      | 15.00                       | 1.00            | 2.CMC42.A4Z3.600.1 |
|                   |                     | <b>1/4</b>                               | 15.88                       | <b>0.381</b>    | 2.CMC.PSRA2Z3.F14  |
|                   |                     | <b>1/4</b>                               | 15.88                       | <b>0.762</b>    | 2.CMC.PSRA3Z3.F14  |
|                   |                     | <b>1/4</b>                               | 15.88                       | <b>1.524</b>    | 2.CMC.PSRA4Z3.F14  |
| 6.9               |                     | 6.0                                      | 15.00                       | 0.20            | 2.CMC42.A2Z3.600.1 |
|                   |                     | 6.0                                      | 15.00                       | 0.50            | 2.CMC42.A3Z3.600.1 |
|                   |                     | 6.0                                      | 15.00                       | 1.00            | 2.CMC42.A4Z3.600.1 |
|                   |                     | <b>1/4</b>                               | 15.88                       | <b>0.381</b>    | 2.CMC.PSRA2Z3.F14  |
|                   |                     | <b>1/4</b>                               | 15.88                       | <b>0.762</b>    | 2.CMC.PSRA3Z3.F14  |
| 7.0               |                     | <b>1/4</b>                               | 15.88                       | <b>1.524</b>    | 2.CMC.PSRA4Z3.F14  |
|                   |                     | 6.0                                      | 15.00                       | 0.20            | 2.CMC42.A2Z3.600.1 |
|                   |                     | 6.0                                      | 15.00                       | 0.50            | 2.CMC42.A3Z3.600.1 |
|                   |                     | 6.0                                      | 15.00                       | 1.00            | 2.CMC42.A4Z3.600.1 |
|                   |                     | <b>1/4</b>                               | 15.88                       | <b>0.381</b>    | 2.CMC.PSRA2Z3.F14  |
| 7.1               |                     | <b>1/4</b>                               | 15.88                       | <b>0.762</b>    | 2.CMC.PSRA3Z3.F14  |
|                   |                     | <b>1/4</b>                               | 15.88                       | <b>1.524</b>    | 2.CMC.PSRA4Z3.F14  |
|                   |                     | 6.0                                      | 15.00                       | 0.20            | 2.CMC42.A2Z3.600.1 |
|                   |                     | 6.0                                      | 15.00                       | 0.50            | 2.CMC42.A3Z3.600.1 |
|                   |                     | 6.0                                      | 15.00                       | 1.00            | 2.CMC42.A4Z3.600.1 |
| 7.2               |                     | <b>1/4</b>                               | 15.88                       | <b>0.381</b>    | 2.CMC.PSRA2Z3.F14  |
|                   |                     | <b>1/4</b>                               | 15.88                       | <b>0.762</b>    | 2.CMC.PSRA3Z3.F14  |
|                   |                     | <b>1/4</b>                               | 15.88                       | <b>1.524</b>    | 2.CMC.PSRA4Z3.F14  |
|                   |                     | 6.0                                      | 15.00                       | 0.20            | 2.CMC42.A2Z3.600.1 |
|                   |                     | 6.0                                      | 15.00                       | 0.50            | 2.CMC42.A3Z3.600.1 |
| 7.3               |                     | 6.0                                      | 15.00                       | 1.00            | 2.CMC42.A4Z3.600.1 |
|                   |                     | <b>1/4</b>                               | 15.88                       | <b>0.381</b>    | 2.CMC.PSRA2Z3.F14  |
|                   |                     | <b>1/4</b>                               | 15.88                       | <b>0.762</b>    | 2.CMC.PSRA3Z3.F14  |
|                   |                     | <b>1/4</b>                               | 15.88                       | <b>1.524</b>    | 2.CMC.PSRA4Z3.F14  |
|                   |                     | 6.0                                      | 15.00                       | 0.20            | 2.CMC42.A2Z3.600.1 |
| 7.4               |                     | 6.0                                      | 15.00                       | 0.50            | 2.CMC42.A3Z3.600.1 |
|                   |                     | 6.0                                      | 15.00                       | 1.00            | 2.CMC42.A4Z3.600.1 |
|                   |                     | <b>1/4</b>                               | 15.88                       | <b>0.381</b>    | 2.CMC.PSRA2Z3.F14  |
|                   |                     | <b>1/4</b>                               | 15.88                       | <b>0.762</b>    | 2.CMC.PSRA3Z3.F14  |
|                   |                     | <b>1/4</b>                               | 15.88                       | <b>1.524</b>    | 2.CMC.PSRA4Z3.F14  |
| 7.5               |                     | 6.0                                      | 15.00                       | 0.20            | 2.CMC42.A2Z3.600.1 |
|                   |                     | 6.0                                      | 15.00                       | 0.50            | 2.CMC42.A3Z3.600.1 |
|                   |                     | 6.0                                      | 15.00                       | 1.00            | 2.CMC42.A4Z3.600.1 |
|                   |                     | <b>1/4</b>                               | 15.88                       | <b>0.381</b>    | 2.CMC.PSRA2Z3.F14  |
|                   |                     | <b>1/4</b>                               | 15.88                       | <b>0.762</b>    | 2.CMC.PSRA3Z3.F14  |
| 7.6               |                     | <b>1/4</b>                               | 15.88                       | <b>1.524</b>    | 2.CMC.PSRA4Z3.F14  |
|                   |                     | 6.0                                      | 15.00                       | 0.20            | 2.CMC42.A2Z3.600.1 |
|                   |                     | 6.0                                      | 15.00                       | 0.50            | 2.CMC42.A3Z3.600.1 |
|                   |                     | 6.0                                      | 15.00                       | 1.00            | 2.CMC42.A4Z3.600.1 |
|                   |                     | <b>1/4</b>                               | 15.88                       | <b>0.381</b>    | 2.CMC.PSRA2Z3.F14  |
| 8.2               |                     | <b>1/4</b>                               | 15.88                       | <b>0.762</b>    | 2.CMC.PSRA3Z3.F14  |
|                   |                     | <b>1/4</b>                               | 15.88                       | <b>1.524</b>    | 2.CMC.PSRA4Z3.F14  |
| -                 | -                   | 8.0                                      | 20.00                       | 0.20            | 2.CMC42.A2Z3.800.1 |
| 9.6               |                     | 8.0                                      | 20.00                       | 0.50            | 2.CMC42.A3Z3.800.1 |
|                   |                     | 8.0                                      | 20.00                       | 1.50            | 2.CMC42.A4Z3.800.1 |



FRESARE

CRAZYMILL COOL P&S CILINDRICA - Z3

## CrazyMill Cool P&S Cilindrica - Z3





## GIÀ DISPONIBILE: VERSIONE CILINDRICA



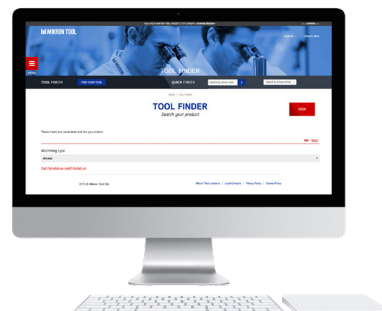
Questo prodotto è ben introdotto sul mercato. Grazie alle sue caratteristiche uniche, sono garantiti grandi vantaggi per i clienti, specialmente per materiali difficili da lavorare come gli acciai inossidabili, il titanio, le leghe di CoCr e le superleghe. specially for difficult to machine materials such as stainless steels, titanium, CoCr alloys and super alloys. Il design dei taglienti permette di lavorare con le stesse prestazioni della versione torica. Questa fresa può "forare" perpendicolarmente il materiale e si adatta bene alla fresatura di scanalature, tasche e pareti in spazi minimi.

### Vantaggi

- TEMPO DI LAVORAZIONE PIÙ BREVE | fino a 5 volte più veloce
- ELEVATA DURATA DI VITA | fino a 5 volte superiore
- MAGGIORE SICUREZZA DI PROCESSO | grazie alla maggior portata di refrigerante
- ALTA PRECISIONE | grazie alla geometria dei taglienti specifica

### Tabella articoli, processo di lavorazione e dati di taglio

Per la versione Cilindrica, si prega di fare riferimento al ToolBook 2020 a pagina 540 per tutti i dettagli sulla tabella articoli, sul processo di lavorazione e sui dati di taglio.



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