



**crazy about**

**milling**

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CRAZYMILL COOL P&S

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NEW: CORNER RADIUS

**NEW**

## CrazyMill Cool P&S Corner Radius - 3FL

### PLUNGE AND SLOT ENDMILL WITH CORNER RADIUS

#### Micro-grain carbide

Developed to achieve all requirements in terms of mechanical properties as perfect hardness-toughness ratio

#### High-performance coating

eXedur SNP coating is heat and wear resistant and guarantees optimum chip flushing

#### New corner radius geometry

Endmill with corner radius in multiple dimensions

#### Diameter range and length

$d = .039" - .315"$  (1 mm - 8 mm);  
Type A -  $2.5 \times d$  / Type C -  $5 \times d$

#### Integrated cooling

Constant and massive cooling of the cutting edges

#### Special end face geometry

Developed for plunging perpendicularly into the material and slot, pocket, side milling in minimal spaces



**NEW**

Mikron Tool expands the CrazyMill Cool P&S family, developed for roughing and finishing operations. The new endmill is used for applications where a rounded corner is required. The new design of the cutting edges permits to machine many materials, with emphasis on stainless steels, titanium, CoCr alloys and super alloys. Due to its special features it can plunge perpendicularly into the material and is well adapted for milling of slots, pockets and sides in minimal spaces.

### Advantages

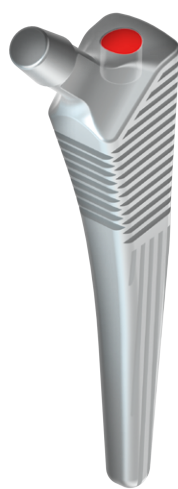
- |                                    |                                                      |
|------------------------------------|------------------------------------------------------|
| ■ <b>SHORT MACHINING TIME</b>      | Highest chip removal rate                            |
| ■ <b>LONG TOOL LIFE</b>            | Thanks to efficient and patented cooling             |
| ■ <b>EXCELLENT SURFACE QUALITY</b> | $Ra \leq 20 \mu\text{in}$ ( $0.5 \mu\text{m}$ )      |
| ■ <b>PERFECT CHIP CONTROL</b>      | Thanks to specific geometry and greater coolant flow |

Discover it!



**NEW**

## P&S in medical applications



### COMPONENT

Hip stem

### MATERIAL

TiAl6V4-ELI / 3.7165 / ASTM F136

### MACHINING

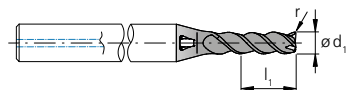
Helical interpolation and side milling of a flat hole

■ Hole depth = **.197"** | 5 mm

■ Hole diameter = **.205"** | 5.2 mm

### TOOL

Mikron Tool - CrazyMill Cool P&S Corner radius - Type A



| DATA          | MIKRON TOOL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | COMPETITOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Tool type     | CrazyMill Cool P&S<br>Corner radius<br>- Carbide<br>- Coated<br>- Integrated cooling                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Conventional<br>corner radius endmill<br>- Carbide<br>- Coated<br>- External cooling                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Item number   | 2.CMC42.A3Z3.400.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Tool features | $d_1 = .157"$   4 mm<br>$l_1 = 2.5 \times d$<br>$r = .008"$   0.2 mm<br>FL = 3 flutes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | $d_1 = .157"$   4 mm<br>$l_1 = 3.75 \times d$<br>$r = .020"$   0.5 mm<br>FL = 3 flutes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Cutting data  | <p>Helical interpolation<br/> <math>v_c = 394 \text{ SFM}</math>   120 m/min<br/> <math>f_z = .0005"</math>   0.013 mm<br/> <math>a_p = .039"</math>   1.0 mm<br/> <math>a_e = .099"</math>   2.52 mm<br/> <math>\alpha = 15^\circ</math><br/> <math>Q = .057 \text{ in}^3/\text{min}</math>  <br/> 0.94 cm<sup>3</sup>/min<br/> <math>\Delta t = 13.2 \text{ s}</math></p> <p>Finishing<br/> <math>v_c = 394 \text{ SFM}</math>   120 m/min<br/> <math>f_z = .0009"</math>   0.022 mm<br/> <math>a_p = .197"</math>   5 mm<br/> <math>a_e = .0031"</math>   0.08 mm<br/> <math>Q = .018 \text{ in}^3/\text{min}</math>  <br/> 0.29 cm<sup>3</sup>/min<br/> <math>\Delta t = 1.3 \text{ s}</math></p> | <p>Helical interpolation<br/> <math>v_c = 171 \text{ SFM}</math>   52 m/min<br/> <math>f_z = .0010"</math>   0.026 mm<br/> <math>a_p = .008"</math>   0.2 mm<br/> <math>a_e = .099"</math>   2.52 mm<br/> <math>\alpha = 3.5^\circ</math><br/> <math>Q = .010 \text{ in}^3/\text{min}</math>  <br/> 0.17 cm<sup>3</sup>/min<br/> <math>\Delta t = 1 \text{ min } 10 \text{ s}</math></p> <p>Finishing<br/> <math>v_c = 312 \text{ SFM}</math>   95 m/min<br/> <math>f_z = .0024"</math>   0.060 mm<br/> <math>a_p = .197"</math>   5 mm<br/> <math>a_e = .0031"</math>   0.08 mm<br/> <math>Q = .033 \text{ in}^3/\text{min}</math>  <br/> 0.54 cm<sup>3</sup>/min<br/> <math>\Delta t = 0.7 \text{ s}</math></p> |



■ Results:

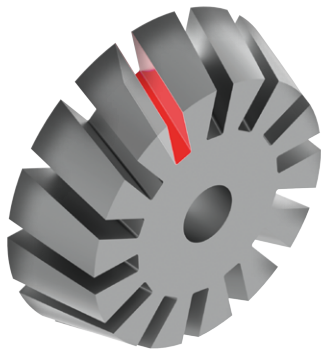
|                     | CrazyMill Cool P&S Corner radius                | Conventional corner radius endmill |
|---------------------|-------------------------------------------------|------------------------------------|
| Chip removal rate Q | Q = .057 in³/min  <br>0.94 cm³/min <b>5.5 x</b> | Q = .010 in³/min  <br>0.17 cm³/min |
| Total cycle time    | 15 s <b>5 x</b>                                 | 1 min 11 s                         |

The combination of the developed cutting geometry and the patented integrated cooling system allows to achieve higher speed and depth  $a_p$ , as well as the pitch angle  $\alpha$ . The result is a higher chip removal rate and a cycle time reduction of 5 times compared to a conventional corner radius tool.

**Reduction of cycle time per part: 56 s**

**NEW**

## P&S in aerospace



### COMPONENT

Turbine rotor

### MATERIAL

X12Cr13 / 1.4006 / AISI 410

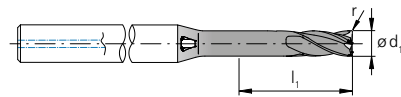
### MACHINING

Roughing and finishing 14 slots

- Slot depth = **.394"** | 10 mm
- Slot length = **.787"** | 20 mm
- Slot width = **.150"** | 3.8 mm

### TOOL

Mikron Tool - CrazyMill Cool P&S Corner radius - Type C



| DATA          | MIKRON TOOL                                                                                                                                                                                                                                                                                                                                                                                                                                   | COMPETITOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Tool type     | CrazyMill Cool P&S<br>Corner radius<br>- Carbide<br>- Coated<br>- Integrated cooling                                                                                                                                                                                                                                                                                                                                                          | Conventional<br>corner radius endmill<br>- Carbide<br>- Coated<br>- External cooling                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Item number   | 2.CMC42.C3Z3.370.1                                                                                                                                                                                                                                                                                                                                                                                                                            | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Tool features | $d_1 = .146"$   3.7 mm<br>$l_1 = 2.5 \times d$<br>$r = .020"$   0.5 mm<br>$Z = 3$ teeth                                                                                                                                                                                                                                                                                                                                                       | $d_1 = .118"$   3.0 mm<br>$l_1 = 3 \times d$<br>$r = .012"$   0.3 mm<br>$Z = 3$ teeth                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Cutting data  | <p>Roughing</p> $v_c = 623$ SFM   190 m/min<br>$f_z = .0110"$   0.028 mm<br>$a_p = .073"$   1.85 mm<br>$a_e = .146"$   3.7 mm<br>$Q = .574$ in <sup>3</sup> /min  <br>9.4 cm <sup>3</sup> /min<br>$\Delta t = 1$ min 13 s <p>Finishing</p> $v_c = 705$ SFM   215 m/min<br>$f_z = .0009"$   0.023 mm<br>$a_p = .197"$   5 mm<br>$a_e = .0020"$   0.05 mm<br>$Q = .018$ in <sup>3</sup> /min  <br>0.3 cm <sup>3</sup> /min<br>$\Delta t = 52$ s | <p>Roughing</p> $v_c = 144$ SFM   44 m/min<br>$f_z = .0059"$   0.015 mm<br>$a_p = .030"$   0.77 mm<br>$a_e = .118"$   3 mm<br>$Q = .031$ in <sup>3</sup> /min  <br>0.5 cm <sup>3</sup> /min<br>$\Delta t = 16$ min 42 s <p>Semi-finishing</p> $v_c = 266$ SFM   81 m/min<br>$f_z = .0013"$   0.032 mm<br>$a_p = .030"$   0.77 mm<br>$a_e = .013"$   0.34 mm<br>$Q = .013$ in <sup>3</sup> /min  <br>0.22 cm <sup>3</sup> /min<br>$\Delta t = 8$ min 45 s <p>Finishing</p> $v_c = 345$ SFM   105 m/min<br>$f_z = .0021"$   0.052 mm<br>$a_p = .197"$   5 mm<br>$a_e = .0024"$   0.06 mm<br>$Q = .031$ in <sup>3</sup> /min  <br>0.5 cm <sup>3</sup> /min<br>$\Delta t = 39$ s |



■ **Results:**

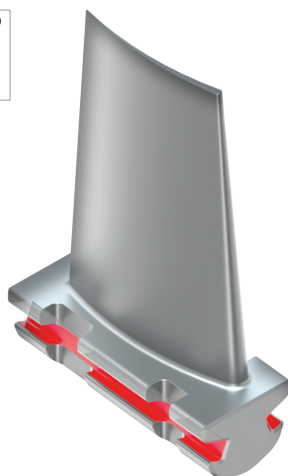
|                            | CrazyMill Cool P&S Corner radius                                        | Conventional corner radius endmill                          |
|----------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------|
| <b>Chip removal rate Q</b> | Q = .574 in <sup>3</sup> /min  <br>9.4 cm <sup>3</sup> /min <b>19 x</b> | Q = .031 in <sup>3</sup> /min  <br>0.5 cm <sup>3</sup> /min |
| <b>Total cycle time</b>    | 2 min 5 s <b>12 x</b>                                                   | 26 min 6 s                                                  |

The combination of the developed cutting geometry and the patented integrated cooling system allows to achieve higher speed and depth  $a_p$ , as well as the pitch angle  $\alpha$ . The result is a higher chip removal rate and a cycle time reduction of 12 times compared to a conventional corner radius tool.

**Reduction of cycle time per part: 24 s**

NEW

## P&S in other applications



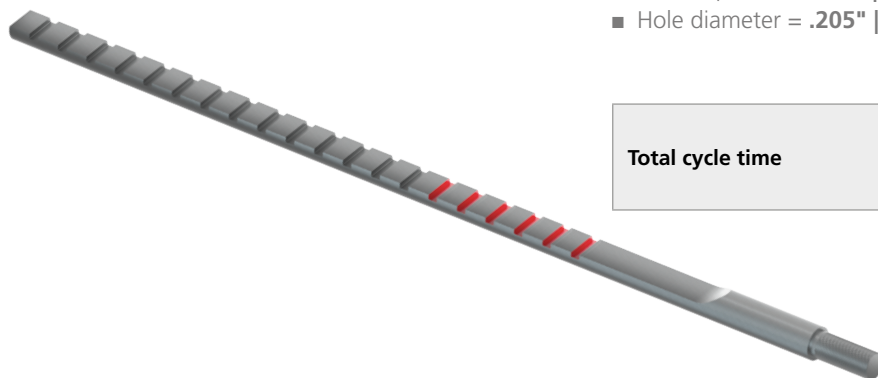
### 3. Turbine plate

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

Machining: Roughing and finishing slotting

- Slot depth = **.181"** | 4.6 mm
- Slot length = **.394"** | 10 mm
- Slot width = **.102"** | 2.6 mm

|                  | Mikron Tool      | Competitor |
|------------------|------------------|------------|
| Total cycle time | 16 s <b>15 x</b> | 4 min 8 s  |



### 4. Transmission system

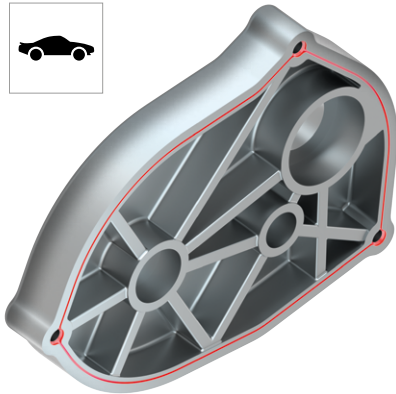
Material: X40CrMoV5-1 / 1.2344 / AISI H13

Machining: Roughing 20 slots (batch 100 pcs)

- Hole depth = **.197"** | 5 mm
- Hole diameter = **.205"** | 5.2 mm

|                  | Mikron Tool       | Competitor  |
|------------------|-------------------|-------------|
| Total cycle time | 15 min <b>3 x</b> | 45 min 30 s |

NEW



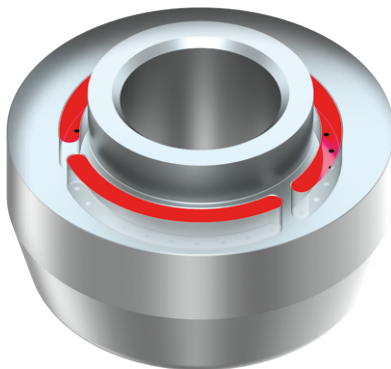
#### 5. Gear box cover

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

Machining: Linear ramp and slot milling of gasket seat

- Slot depth = **.079"** | 2 mm
- Slot length = **31.5"** | 800 mm
- Slot width = **.079"** | 2 mm

|                  | Mikron Tool           | Competitor |
|------------------|-----------------------|------------|
| Total cycle time | 1 min 45 s <b>2 x</b> | 3 min 10 s |



#### 6. Painting atomizer

Material: TiAl6V4-ELI / 3.7165 / ASTM F136

Machining: Plunging, roughing and finishing slotting

- Slot depth = **.315"** | 8 mm
- Slot length = **8.3"** | 210 mm
- Slot width = **.205"** | 5.2 mm

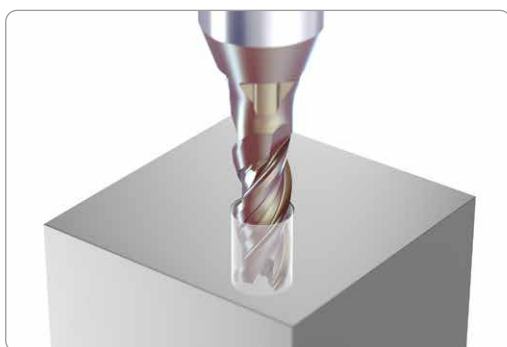
|                  | Mikron Tool           | Competitor |
|------------------|-----------------------|------------|
| Total cycle time | 2 min 10 s <b>2 x</b> | 3 min 56 s |

**NEW**

## One tool for many applications

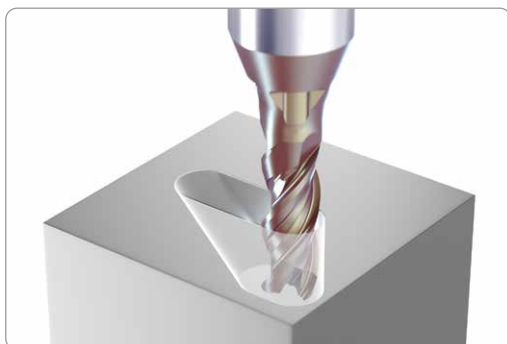
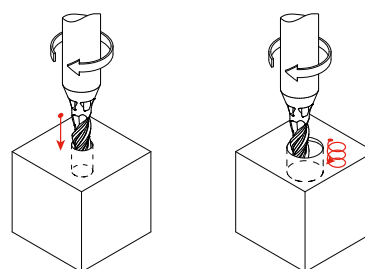
### MILLING PROCESS

CrazyMill Cool P&S Corner radius for:



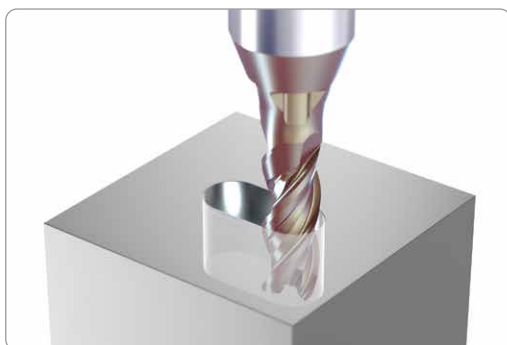
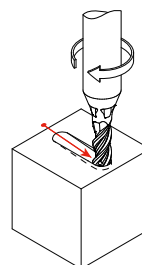
#### 1. Plunge milling

Direct or with helical interpolation



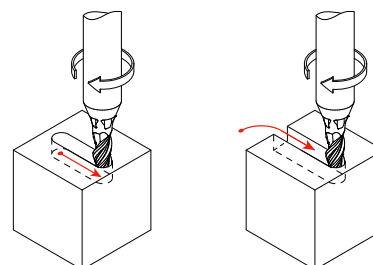
#### 2. Linear ramping

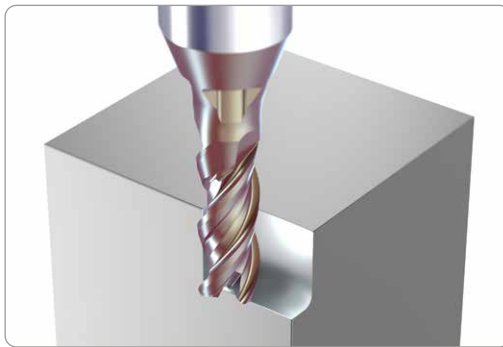
Angle depending on material



#### 3. Slot milling

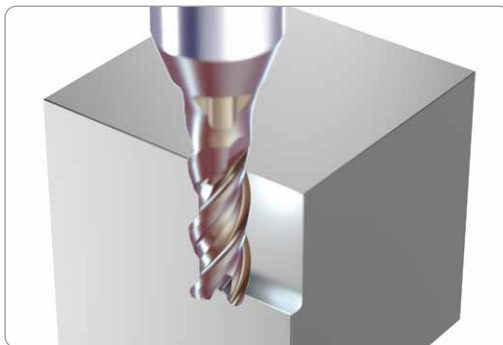
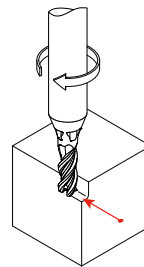
Pockets or through slots





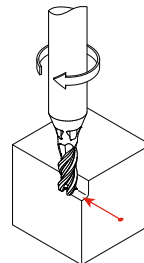
#### 4. Side milling - Semi-finishing

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



#### 5. Side milling - Finishing

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



**NEW**

## Highest performance in smallest dimensions

### PLUNGE AND SLOT ENDMILL WITH INTEGRATED COOLING

With CrazyMill Cool P&S Corner radius Mikron Tool expands its range of milling cutters for difficult-to-machine materials. The new endmill is used for applications where a rounded corner is required. The three flute CrazyMill Cool P&S Corner radius allows perpendicular plunging with subsequent milling into solid material. It is available with integrated cooling, in the diameter range from .039" to .315" (1 mm to 8 mm) and for maximal milling depth of 5 x d.

- CrazyMill Cool P&S Corner radius, type A – milling depth 2.5 x d, cutting length 2.5 x d, through shaft cooling, Z = 3
- CrazyMill Cool P&S Corner radius, type C – milling depth 5 x d, cutting length 2 x d, through shaft cooling, Z = 3

2.5 x d

Type A

- Coated
- Integrated cooling

5 x d

Type C

- Coated
- Integrated cooling



**NEW**

#### 1 | SHANK

The robust carbide shank guarantees stable and vibration-free milling. A high degree of precision and excellent surface quality is achieved.

#### 2 | INTEGRATED COOLING – PATENTED

The integrated cooling channels guarantee constant and maximal cooling of the cutting edges and optimal chip removal. The result is higher cutting speed and depth as well as improved surface quality.

#### 3 | CARBIDE

The specially developed micro-grain carbide meets all requirements in terms of mechanical properties.

#### 4 | COATING

The high-performance eXedur SNP coating is heat and wear resistant, prevents material build-up on cutting edges and guarantees optimum chip flushing. The result is long tool life.

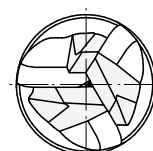
#### 5 | FLUTE GEOMETRY

The specially designed flutes provide high stability and sufficient space for perfect chip evacuation.

#### 6 | GEOMETRY OF THE END FACE

The specially designed expanded chip collection section in the end face guarantees good chip evacuation when plunging. A correction in the web prevents edge breakout, reduces the penetration force and increases tool life.

End face geometry - 3 Flutes

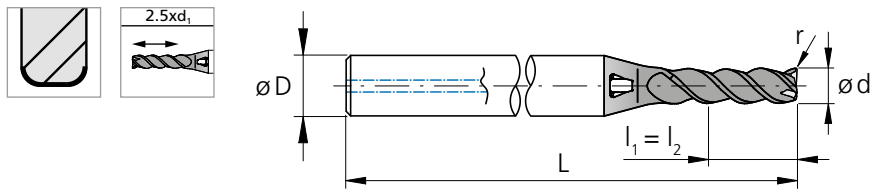


**NEW**

## Type A - 2.5 x d - Corner radius - 3FL

### MILLING WITH INTEGRATED COOLING

#### P&S - Corner radius



| d <sub>1</sub> | d <sub>1</sub> | d <sub>1</sub> | l <sub>1</sub> | l <sub>1</sub> | l <sub>2</sub> | D            | L      | L    | r      | r     | Item number        | Availability |
|----------------|----------------|----------------|----------------|----------------|----------------|--------------|--------|------|--------|-------|--------------------|--------------|
| [inch]         | [inch]         | [mm]           | [inch]         | [mm]           | [mm]           | (h6)<br>[mm] | [inch] | [mm] | [inch] | [mm]  |                    |              |
|                | .039           | 1.0            | .098           | 2.50           | 2.50           | 4            | 1.57   | 40   | .0039  | 0.10  | 2.CMC42.A2Z3.100.1 | ■            |
|                | .039           | 1.0            | .098           | 2.50           | 2.50           | 4            | 1.57   | 40   | .0079  | 0.20  | 2.CMC42.A3Z3.100.1 | ■            |
|                | .043           | 1.1            | .108           | 2.75           | 2.75           | 4            | 1.57   | 40   | .0039  | 0.10  | 2.CMC42.A2Z3.110.1 | ■            |
|                | .043           | 1.1            | .108           | 2.75           | 2.75           | 4            | 1.57   | 40   | .0079  | 0.20  | 2.CMC42.A3Z3.110.1 | ■            |
|                | .047           | 1.2            | .118           | 3.00           | 3.00           | 4            | 1.57   | 40   | .0039  | 0.10  | 2.CMC42.A2Z3.120.1 | ■            |
|                | .047           | 1.2            | .118           | 3.00           | 3.00           | 4            | 1.57   | 40   | .0079  | 0.20  | 2.CMC42.A3Z3.120.1 | ■            |
|                | .051           | 1.3            | .128           | 3.25           | 3.25           | 4            | 1.57   | 40   | .0039  | 0.10  | 2.CMC42.A2Z3.130.1 | ■            |
|                | .051           | 1.3            | .128           | 3.25           | 3.25           | 4            | 1.57   | 40   | .0079  | 0.20  | 2.CMC42.A3Z3.130.1 | ■            |
|                | .055           | 1.4            | .138           | 3.50           | 3.50           | 4            | 1.57   | 40   | .0039  | 0.10  | 2.CMC42.A2Z3.140.1 | ■            |
|                | .055           | 1.4            | .138           | 3.50           | 3.50           | 4            | 1.57   | 40   | .0079  | 0.20  | 2.CMC42.A3Z3.140.1 | ■            |
|                | .059           | 1.5            | .148           | 3.75           | 3.75           | 4            | 1.57   | 40   | .0039  | 0.10  | 2.CMC42.A2Z3.150.1 | ■            |
|                | .059           | 1.5            | .148           | 3.75           | 3.75           | 4            | 1.57   | 40   | .0118  | 0.30  | 2.CMC42.A3Z3.150.1 | ■            |
| 1/16           | .0625          | 1.587          | .157           | 3.97           | 3.97           | 4            | 1.57   | 40   | .0050  | 0.127 | 2.CMC.PSRA2Z3.F116 | ■            |
| 1/16           | .0625          | 1.587          | .157           | 3.97           | 3.97           | 4            | 1.57   | 40   | .0100  | 0.254 | 2.CMC.PSRA3Z3.F116 | ■            |
|                | .063           | 1.6            | .157           | 4.00           | 4.00           | 4            | 1.57   | 40   | .0039  | 0.10  | 2.CMC42.A2Z3.160.1 | ■            |
|                | .063           | 1.6            | .157           | 4.00           | 4.00           | 4            | 1.57   | 40   | .0118  | 0.30  | 2.CMC42.A3Z3.160.1 | ■            |
|                | .067           | 1.7            | .167           | 4.25           | 4.25           | 4            | 1.57   | 40   | .0039  | 0.10  | 2.CMC42.A2Z3.170.1 | ■            |
|                | .067           | 1.7            | .167           | 4.25           | 4.25           | 4            | 1.57   | 40   | .0118  | 0.30  | 2.CMC42.A3Z3.170.1 | ■            |
|                | .071           | 1.8            | .177           | 4.50           | 4.50           | 4            | 1.57   | 40   | .0039  | 0.10  | 2.CMC42.A2Z3.180.1 | ■            |
|                | .071           | 1.8            | .177           | 4.50           | 4.50           | 4            | 1.57   | 40   | .0118  | 0.30  | 2.CMC42.A3Z3.180.1 | ■            |
|                | .075           | 1.9            | .187           | 4.75           | 4.75           | 4            | 1.57   | 40   | .0039  | 0.10  | 2.CMC42.A2Z3.190.1 | ■            |
|                | .075           | 1.9            | .187           | 4.75           | 4.75           | 4            | 1.57   | 40   | .0118  | 0.30  | 2.CMC42.A3Z3.190.1 | ■            |
|                | .079           | 2.0            | .197           | 5.00           | 5.00           | 4            | 1.57   | 40   | .0039  | 0.10  | 2.CMC42.A2Z3.200.1 | ■            |
|                | .079           | 2.0            | .197           | 5.00           | 5.00           | 4            | 1.57   | 40   | .0079  | 0.20  | 2.CMC42.A3Z3.200.1 | ■            |
|                | .079           | 2.0            | .197           | 5.00           | 5.00           | 4            | 1.57   | 40   | .0197  | 0.50  | 2.CMC42.A4Z3.200.1 | ■            |
|                | .083           | 2.1            | .207           | 5.25           | 5.25           | 4            | 1.57   | 40   | .0079  | 0.20  | 2.CMC42.A2Z3.210.1 | ■            |
|                | .083           | 2.1            | .207           | 5.25           | 5.25           | 4            | 1.57   | 40   | .0197  | 0.50  | 2.CMC42.A3Z3.210.1 | ■            |
|                | .087           | 2.2            | .217           | 5.50           | 5.50           | 4            | 1.57   | 40   | .0079  | 0.20  | 2.CMC42.A2Z3.220.1 | ■            |
|                | .087           | 2.2            | .217           | 5.50           | 5.50           | 4            | 1.57   | 40   | .0197  | 0.50  | 2.CMC42.A3Z3.220.1 | ■            |
|                | .091           | 2.3            | .226           | 5.75           | 5.75           | 4            | 1.57   | 40   | .0079  | 0.20  | 2.CMC42.A2Z3.230.1 | ■            |
|                | .091           | 2.3            | .226           | 5.75           | 5.75           | 4            | 1.57   | 40   | .0197  | 0.50  | 2.CMC42.A3Z3.230.1 | ■            |
| 3/32           | .0937          | 2.381          | .236           | 5.95           | 5.95           | 4            | 1.57   | 40   | .0050  | 0.127 | 2.CMC.PSRA2Z3.F332 | ■            |
| 3/32           | .0937          | 2.381          | .236           | 5.95           | 5.95           | 4            | 1.57   | 40   | .0100  | 0.254 | 2.CMC.PSRA3Z3.F332 | ■            |
| 3/32           | .0937          | 2.381          | .236           | 5.95           | 5.95           | 4            | 1.57   | 40   | .0150  | 0.381 | 2.CMC.PSRA4Z3.F332 | ■            |
|                | .094           | 2.4            | .236           | 6.00           | 6.00           | 4            | 1.57   | 40   | .0079  | 0.20  | 2.CMC42.A2Z3.240.1 | ■            |
|                | .094           | 2.4            | .236           | 6.00           | 6.00           | 4            | 1.57   | 40   | .0197  | 0.50  | 2.CMC42.A3Z3.240.1 | ■            |
|                | .098           | 2.5            | .246           | 6.25           | 6.25           | 6            | 1.97   | 50   | .0079  | 0.20  | 2.CMC42.A2Z3.250.1 | ■            |
|                | .098           | 2.5            | .246           | 6.25           | 6.25           | 6            | 1.97   | 50   | .0197  | 0.50  | 2.CMC42.A3Z3.250.1 | ■            |
|                | .102           | 2.6            | .256           | 6.50           | 6.50           | 6            | 1.97   | 50   | .0079  | 0.20  | 2.CMC42.A2Z3.260.1 | ■            |
|                | .102           | 2.6            | .256           | 6.50           | 6.50           | 6            | 1.97   | 50   | .0197  | 0.50  | 2.CMC42.A3Z3.260.1 | ■            |
|                | .106           | 2.7            | .266           | 6.75           | 6.75           | 6            | 1.97   | 50   | .0079  | 0.20  | 2.CMC42.A2Z3.270.1 | ■            |
|                | .106           | 2.7            | .266           | 6.75           | 6.75           | 6            | 1.97   | 50   | .0197  | 0.50  | 2.CMC42.A3Z3.270.1 | ■            |

■ Stock item

|         |    |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
|---------|----|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Carbide | 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                                                                      |
|         |    | 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> | d <sub>1</sub> | l <sub>1</sub> | l <sub>1</sub> | l <sub>2</sub> | D<br>(h6) | L      | L    | r      | r     | Item<br>number     | Availability |
|----------------|----------------|----------------|----------------|----------------|----------------|-----------|--------|------|--------|-------|--------------------|--------------|
| [inch]         | [inch]         | [mm]           | [inch]         | [mm]           | [mm]           | [mm]      | [inch] | [mm] | [inch] | [mm]  |                    |              |
|                | .110           | 2.8            | .276           | 7.00           | 7.00           | 6.00      | 1.97   | 50   | .0079  | 0.20  | 2.CMC42.A2Z3.280.1 | ■            |
|                | .110           | 2.8            | .276           | 7.00           | 7.00           | 6.00      | 1.97   | 50   | .0197  | 0.50  | 2.CMC42.A3Z3.280.1 | ■            |
|                | .114           | 2.9            | .285           | 7.25           | 7.25           | 6.00      | 1.97   | 50   | .0079  | 0.20  | 2.CMC42.A2Z3.290.1 | ■            |
|                | .114           | 2.9            | .285           | 7.25           | 7.25           | 6.00      | 1.97   | 50   | .0197  | 0.50  | 2.CMC42.A3Z3.290.1 | ■            |
|                | .118           | 3.0            | .295           | 7.50           | 7.50           | 6.00      | 1.97   | 50   | .0079  | 0.20  | 2.CMC42.A2Z3.300.1 | ■            |
|                | .118           | 3.0            | .295           | 7.50           | 7.50           | 6.00      | 1.97   | 50   | .0197  | 0.50  | 2.CMC42.A3Z3.300.1 | ■            |
|                | .122           | 3.1            | .305           | 7.75           | 7.75           | 6.00      | 1.97   | 50   | .0079  | 0.20  | 2.CMC42.A2Z3.310.1 | ■            |
|                | .122           | 3.1            | .305           | 7.75           | 7.75           | 6.00      | 1.97   | 50   | .0197  | 0.50  | 2.CMC42.A3Z3.310.1 | ■            |
| 1/8            | .1250          | 3.175          | .325           | 7.94           | 7.94           | 6.00      | 1.97   | 50   | .0100  | 0.254 | 2.CMC.PSRA2Z3.F18  | ■            |
| 1/8            | .1250          | 3.175          | .325           | 7.94           | 7.94           | 6.00      | 1.97   | 50   | .0150  | 0.381 | 2.CMC.PSRA3Z3.F18  | ■            |
|                | .130           | 3.3            | .325           | 8.25           | 8.25           | 6.00      | 1.97   | 50   | .0079  | 0.20  | 2.CMC42.A2Z3.330.1 | ■            |
|                | .130           | 3.3            | .325           | 8.25           | 8.25           | 6.00      | 1.97   | 50   | .0197  | 0.50  | 2.CMC42.A3Z3.330.1 | ■            |
|                | .146           | 3.7            | .364           | 9.25           | 9.25           | 6.00      | 1.97   | 50   | .0079  | 0.20  | 2.CMC42.A2Z3.370.1 | ■            |
|                | .146           | 3.7            | .364           | 9.25           | 9.25           | 6.00      | 1.97   | 50   | .0197  | 0.50  | 2.CMC42.A3Z3.370.1 | ■            |
| 5/32           | .1562          | 3.968          | .394           | 9.92           | 9.92           | 6.00      | 1.97   | 50   | .0100  | 0.254 | 2.CMC.PSRA2Z3.F532 | ■            |
| 5/32           | .1562          | 3.968          | .394           | 9.92           | 9.92           | 6.00      | 1.97   | 50   | .0150  | 0.381 | 2.CMC.PSRA3Z3.F532 | ■            |
|                | .157           | 4.0            | .394           | 10.00          | 10.00          | 6.00      | 1.97   | 50   | .0079  | 0.20  | 2.CMC42.A2Z3.400.1 | ■            |
|                | .157           | 4.0            | .394           | 10.00          | 10.00          | 6.00      | 1.97   | 50   | .0197  | 0.50  | 2.CMC42.A3Z3.400.1 | ■            |
|                | .169           | 4.3            | .423           | 10.75          | 10.75          | 8.00      | 2.36   | 60   | .0079  | 0.20  | 2.CMC42.A2Z3.430.1 | ■            |
|                | .169           | 4.3            | .423           | 10.75          | 10.75          | 8.00      | 2.36   | 60   | .0197  | 0.50  | 2.CMC42.A3Z3.430.1 | ■            |
|                | .185           | 4.7            | .463           | 11.75          | 11.75          | 8.00      | 2.36   | 60   | .0079  | 0.20  | 2.CMC42.A2Z3.470.1 | ■            |
|                | .185           | 4.7            | .463           | 11.75          | 11.75          | 8.00      | 2.36   | 60   | .0197  | 0.50  | 2.CMC42.A3Z3.470.1 | ■            |
| 3/16           | .1875          | 4.762          | .472           | 11.91          | 11.91          | 8.00      | 2.36   | 60   | .0100  | 0.254 | 2.CMC.PSRA2Z3.F316 | ■            |
| 3/16           | .1875          | 4.762          | .472           | 11.91          | 11.91          | 8.00      | 2.36   | 60   | .0150  | 0.381 | 2.CMC.PSRA3Z3.F316 | ■            |
|                | .189           | 4.8            | .472           | 12.00          | 12.00          | 8.00      | 2.36   | 60   | .0079  | 0.20  | 2.CMC42.A2Z3.480.1 | ■            |
|                | .189           | 4.8            | .472           | 12.00          | 12.00          | 8.00      | 2.36   | 60   | .0197  | 0.50  | 2.CMC42.A3Z3.480.1 | ■            |
|                | .197           | 5.0            | .492           | 12.50          | 12.50          | 8.00      | 2.36   | 60   | .0079  | 0.20  | 2.CMC42.A2Z3.500.1 | ■            |
|                | .197           | 5.0            | .492           | 12.50          | 12.50          | 8.00      | 2.36   | 60   | .0197  | 0.50  | 2.CMC42.A3Z3.500.1 | ■            |
|                | .209           | 5.3            | .522           | 13.25          | 13.25          | 10.00     | 2.56   | 65   | .0079  | 0.20  | 2.CMC42.A2Z3.530.1 | ■            |
|                | .209           | 5.3            | .522           | 13.25          | 13.25          | 10.00     | 2.56   | 65   | .0197  | 0.50  | 2.CMC42.A3Z3.530.1 | ■            |
| 7/32           | .2189          | 5.560          | .561           | 13.90          | 13.90          | 10.00     | 2.56   | 65   | .0150  | 0.381 | 2.CMC.PSRA2Z3.F732 | ■            |
| 7/32           | .2189          | 5.560          | .561           | 13.90          | 13.90          | 10.00     | 2.56   | 65   | .0300  | 0.762 | 2.CMC.PSRA3Z3.F732 | ■            |
|                | .224           | 5.7            | .561           | 14.25          | 14.25          | 10.00     | 2.56   | 65   | .0079  | 0.20  | 2.CMC42.A2Z3.570.1 | ■            |
|                | .224           | 5.7            | .561           | 14.25          | 14.25          | 10.00     | 2.56   | 65   | .0197  | 0.50  | 2.CMC42.A3Z3.570.1 | ■            |
|                | .236           | 6.0            | .591           | 15.00          | 15.00          | 10.00     | 2.56   | 65   | .0079  | 0.20  | 2.CMC42.A2Z3.600.1 | ■            |
|                | .236           | 6.0            | .591           | 15.00          | 15.00          | 10.00     | 2.56   | 65   | .0197  | 0.50  | 2.CMC42.A3Z3.600.1 | ■            |
|                | .236           | 6.0            | .591           | 15.00          | 15.00          | 10.00     | 2.56   | 65   | .0394  | 1.00  | 2.CMC42.A4Z3.600.1 | ■            |
| 1/4            | .2500          | 6.350          | .625           | 15.88          | 15.88          | 10.00     | 2.56   | 65   | .0150  | 0.381 | 2.CMC.PSRA2Z3.F14  | ■            |
| 1/4            | .2500          | 6.350          | .625           | 15.88          | 15.88          | 10.00     | 2.56   | 65   | .0300  | 0.762 | 2.CMC.PSRA3Z3.F14  | ■            |
| 1/4            | .2500          | 6.350          | .625           | 15.88          | 15.88          | 10.00     | 2.56   | 65   | .0600  | 1.524 | 2.CMC.PSRA4Z3.F14  | ■            |
|                | .315           | 8.0            | .787           | 20.00          | 20.00          | 12.00     | 2.76   | 70   | .0079  | 0.20  | 2.CMC42.A2Z3.800.1 | ■            |
|                | .315           | 8.0            | .787           | 20.00          | 20.00          | 12.00     | 2.76   | 70   | .0197  | 0.50  | 2.CMC42.A3Z3.800.1 | ■            |
|                | .315           | 8.0            | .787           | 20.00          | 20.00          | 12.00     | 2.76   | 70   | .0591  | 1.50  | 2.CMC42.A4Z3.800.1 | ■            |

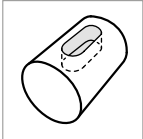
■ Stock item

**NEW**

# Type A - Keyways - Plunge - Slot milling

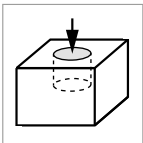
## MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

### Keyway slot milling



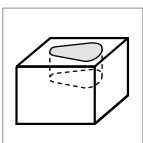
- $f_{z,p}$ : for plunge milling
- $f_{z,s}$ : for slot milling

### Plunge milling

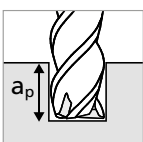
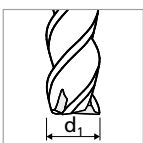


- $f_{z,p}$ : for plunge milling

### Slot milling



- $f_{z,p}$ : for plunge milling
- $f_{z,s}$ : for slot milling



| Materials group                              | Material                                               | Mat. no. | DIN                | AISI/ASTM/UNS           | 1.0 mm   .039" |                  |                  |         |
|----------------------------------------------|--------------------------------------------------------|----------|--------------------|-------------------------|----------------|------------------|------------------|---------|
|                                              |                                                        |          |                    |                         | $v_c$          | $f_{z,p}$        | $f_{z,s}$        | $a_p$   |
| <b>P</b>                                     | Unalloyed carbon steel<br>$R_m < 800 \text{ N/mm}^2$   | 1.0301   | C10                | AISI 1010               | 100<br>328     | 0.0013<br>.00005 | 0.0046<br>.00018 | 1xd1    |
|                                              |                                                        | 1.0401   | C15                | AISI 1015               |                |                  |                  |         |
|                                              |                                                        | 1.1191   | C45E/CK45          | AISI 1045               |                |                  |                  |         |
|                                              |                                                        | 1.0044   | S275JR             | AISI 1020               |                |                  |                  |         |
|                                              |                                                        | 1.0715   | 11SMn30            | AISI 1215               |                |                  |                  |         |
|                                              | Low alloyed steel<br>$R_m > 900 \text{ N/mm}^2$        | 1.5752   | 15NiCr13           | ASTM 3415 / AISI 3310   | 100<br>328     | 0.0014<br>.00006 | 0.0049<br>.00019 | 1xd1    |
|                                              |                                                        | 1.7131   | 16MnCr5            | AISI 5115               |                |                  |                  |         |
|                                              |                                                        | 1.3505   | 100Cr6             | AISI 52100              |                |                  |                  |         |
|                                              |                                                        | 1.7225   | 42CrMo4            | AISI 4140               |                |                  |                  |         |
|                                              |                                                        | 1.2842   | 90MnCrV8           | AISI O2                 |                |                  |                  |         |
|                                              | High alloyed tool steel<br>$R_m < 1200 \text{ N/mm}^2$ | 1.2379   | X153CrMoV12        | AISI D2                 | 100<br>328     | 0.0012<br>.00005 | 0.0042<br>.00017 | 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>M</b>                                     | Stainless steel ferritic                               | 1.4016   | X6Cr17             | AISI 430 / UNS S43000   | 100<br>328     | 0.0010<br>.00004 | 0.0035<br>.00014 | 1xd1    |
|                                              |                                                        | 1.4105   | X6CrMoS17          | AISI 430F               |                |                  |                  |         |
|                                              |                                                        | 1.4034   | X46Cr13            | AISI 420C               |                |                  |                  |         |
|                                              | Stainless steel martensitic                            | 1.4112   | X90CrMoV18         | AISI 440B               | 328            | 0.0010<br>.00004 | 0.0035<br>.00014 | 0.5xd1  |
|                                              |                                                        |          |                    |                         |                |                  |                  |         |
|                                              | Stainless steel martensitic – PH                       | 1.4542   | X5CrNiCuNb16-4     | AISI 630 / ASTM 17-4 PH | 100<br>328     | 0.0010<br>.00004 | 0.0035<br>.00014 | 0.5xd1  |
|                                              |                                                        | 1.4545   | X5CrNiCuNb15-5     | ASTM 15-5 PH            |                |                  |                  |         |
|                                              | Stainless steel austenitic                             | 1.4301   | X5CrNi18-10        | AISI 304                | 100<br>328     | 0.0010<br>.00004 | 0.0035<br>.00014 | 1xd1    |
|                                              |                                                        | 1.4435   | X2CrNiMo18-14-3    | AISI 316L               |                |                  |                  |         |
|                                              |                                                        | 1.4441   | X2CrNiMo18-15-3    | AISI 316LM              |                |                  |                  |         |
|                                              |                                                        | 1.4539   | X1NiCrMoCu25-20-5  | AISI 904L               |                |                  |                  |         |
| <b>K</b>                                     | Cast iron                                              | 0.6020   | GG20               | ASTM 30                 | 100<br>328     | 0.0013<br>.00005 | 0.0042<br>.00017 | 1xd1    |
|                                              |                                                        | 0.6030   | GG30               | ASTM 40B                |                |                  |                  |         |
|                                              |                                                        | 0.7040   | GGG40              | ASTM 60-40-18           |                |                  |                  |         |
|                                              |                                                        | 0.7060   | GGG60              | ASTM 80-60-03           |                |                  |                  |         |
|                                              |                                                        |          |                    |                         |                |                  |                  |         |
| <b>N</b>                                     | Aluminium alloy wrought                                | 3.2315   | AlMgSi1            | ASTM 6351               | 100<br>328     | 0.0012<br>.00005 | 0.0100<br>.00039 | 1xd1    |
|                                              |                                                        | 3.4365   | AlZnMgCu1.5        | ASTM 7075               |                |                  |                  |         |
|                                              | Aluminium alloy cast                                   | 3.2163   | GD-AlSi9Cu3        | ASTM A380               | 100<br>328     | 0.0012<br>.00005 | 0.0100<br>.00039 | 1xd1    |
|                                              |                                                        | 3.2381   | GD-AlSi10Mg        | UNS A03590              |                |                  |                  |         |
|                                              | Copper                                                 | 2.0040   | Cu-OF / CW008A     | UNS C10100              | 100<br>328     | 0.0012<br>.00005 | 0.0100<br>.00039 | 1xd1    |
|                                              |                                                        | 2.0065   | Cu-ETP / CW004A    | UNS C11000              |                |                  |                  |         |
|                                              | Brass lead free                                        | 2.0321   | CuZn37 CW508L      | UNS C27400              | 100<br>328     | 0.0012<br>.00005 | 0.0100<br>.00039 | 1xd1    |
|                                              |                                                        | 2.0360   | CuZn40 CW509L      | UNS C28000              |                |                  |                  |         |
|                                              | Brass, Bronze<br>$R_m < 400 \text{ N/mm}^2$            | 2.0401   | CuZn39Pb3 / CW614N | UNS C38500              | 100<br>328     | 0.0012<br>.00005 | 0.0100<br>.00039 | 1xd1    |
|                                              |                                                        | 2.1020   | CuSn6              | UNS C51900              |                |                  |                  |         |
|                                              | Bronze<br>$R_m < 600 \text{ N/mm}^2$                   | 2.0966   | CuAl10Ni5Fe4       | UNS C63000              | 100<br>328     | 0.0012<br>.00005 | 0.0100<br>.00039 | 1xd1    |
|                                              |                                                        | 2.0960   | CuAl9Mn2           | UNS C63200              |                |                  |                  |         |
| <b>S<sub>1</sub></b>                         | Super alloys                                           | 2.4856   |                    | Inconel 625             | 40<br>131      | 0.0010<br>.00004 | 0.0035<br>.00014 | 0.25xd1 |
|                                              |                                                        | 2.4668   |                    | Inconel 718             |                |                  |                  |         |
|                                              |                                                        | 2.4617   | NiMo28             | Hastelloy B-2           |                |                  |                  |         |
|                                              |                                                        | 2.4665   | NiCr22Fe18Mo       | Hastelloy X             |                |                  |                  |         |
|                                              |                                                        |          |                    |                         |                |                  |                  |         |
| <b>S<sub>2</sub></b>                         | Titanium pure                                          | 3.7035   | Gr.2               | ASTM B348 / F67         | 80<br>262      | 0.0010<br>.00004 | 0.0032<br>.00012 | 0.25xd1 |
|                                              |                                                        | 3.7065   | Gr.4               | ASTM B348 / F68         |                |                  |                  |         |
|                                              | Titanium alloys                                        | 3.7165   | TiAl6V4            | ASTM B348 / F136        | 80             | 0.0010           | 0.0032           | 0.25xd1 |
| <b>S<sub>3</sub></b>                         | CrCo alloys                                            | 9.9367   | TiAl6Nb7           | ASTM F1295              | 262            | .00004           | .00012           | 0.25xd1 |
|                                              |                                                        | 2.4964   | CoCr20W15Ni        | Haynes 25               | 60             | 0.0010           | 0.0035           | 0.5xd1  |
|                                              |                                                        |          | CrCoMo28           | ASTM F1537              | 197            | .00004           | .00014           | 0.5xd1  |
| <b>H<sub>1</sub></b><br><b>H<sub>2</sub></b> | Hardened steel<br>$< 55 \text{ HRC}$                   | 1.2510   | 100MnCrMoW4        | AISI O1                 |                |                  |                  |         |
|                                              | Hardened steel<br>$\geq 55 \text{ HRC}$                | 1.2379   | X153CrMoV12        | AISI D2                 |                |                  |                  |         |

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

RECOMMENDATION FOR USE

● Excellent | ● Good | ○ Acceptable | ☒ Not recommended

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

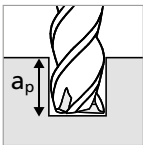
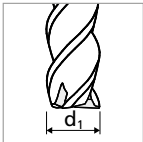
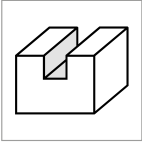
| 1/16"          |                  |                  |                | 3/32"          |                  |                  |                | 1/8"           |                  |                  |                | 5/32"          |                  |                  |                | 3/16" - 7/32"  |                  |                  |                | 1/4"                            |                  |                  |                |
|----------------|------------------|------------------|----------------|----------------|------------------|------------------|----------------|----------------|------------------|------------------|----------------|----------------|------------------|------------------|----------------|----------------|------------------|------------------|----------------|---------------------------------|------------------|------------------|----------------|
| 1.5 mm   .059" |                  |                  |                | 2.0 mm   .079" |                  |                  |                | 3.0 mm   .118" |                  |                  |                | 4.0 mm   .157" |                  |                  |                | 5.0 mm   .197" |                  |                  |                | 6.0 mm - 8.0 mm   .236" - .315" |                  |                  |                |
| 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<br>394     | 0.0020<br>.00008 | 0.0065<br>.00026 | 1xd1           | 120<br>394     | 0.0026<br>.00010 | 0.0091<br>.00036 | 1xd1           | 140<br>459     | 0.004<br>.00014  | 0.013<br>.00051  | 1xd1           | 140<br>459     | 0.005<br>.00020  | 0.020<br>.00077  | 1xd1           | 150<br>492     | 0.005<br>.00020  | 0.026<br>.00102  | 1xd1           | 160<br>525                      | 0.006<br>.00024  | 0.033<br>.00128  | 1xd1           |
| 120<br>394     | 0.0021<br>.00008 | 0.0070<br>.00028 | 1xd1           | 120<br>394     | 0.0028<br>.00011 | 0.0098<br>.00039 | 1xd1           | 140<br>459     | 0.004<br>.00014  | 0.014<br>.00055  | 1xd1           | 140<br>459     | 0.005<br>.00020  | 0.021<br>.00083  | 1xd1           | 150<br>492     | 0.006<br>.00022  | 0.027<br>.00106  | 1xd1           | 160<br>525                      | 0.006<br>.00024  | 0.034<br>.00133  | 1xd1           |
| 120<br>394     | 0.0018<br>.00007 | 0.0060<br>.00024 | 0.5xd1         | 120<br>394     | 0.0024<br>.00009 | 0.0084<br>.00033 | 0.5xd1         | 140<br>459     | 0.003<br>.00012  | 0.012<br>.00047  | 0.5xd1         | 140<br>459     | 0.004<br>.00016  | 0.017<br>.00068  | 0.5xd1         | 150<br>492     | 0.004<br>.00016  | 0.022<br>.00087  | 0.5xd1         | 160<br>525                      | 0.005<br>.00020  | 0.028<br>.00108  | 0.5xd1         |
| 120<br>394     | 0.0015<br>.00006 | 0.0050<br>.00020 | 1xd1           | 120<br>394     | 0.0020<br>.00008 | 0.0070<br>.00028 | 1xd1           | 140<br>459     | 0.003<br>.00012  | 0.010<br>.00039  | 1xd1           | 140<br>459     | 0.004<br>.00016  | 0.015<br>.00059  | 1xd1           | 150<br>492     | 0.004<br>.00016  | 0.020<br>.00079  | 1xd1           | 160<br>525                      | 0.005<br>.00020  | 0.025<br>.00098  | 1xd1           |
| 120<br>394     | 0.0015<br>.00006 | 0.0050<br>.00020 | 0.5xd1         | 120<br>394     | 0.0020<br>.00008 | 0.0070<br>.00028 | 0.5xd1         | 140<br>459     | 0.003<br>.00012  | 0.010<br>.00039  | 0.5xd1         | 140<br>459     | 0.004<br>.00016  | 0.015<br>.00059  | 0.5xd1         | 150<br>492     | 0.004<br>.00016  | 0.020<br>.00079  | 0.5xd1         | 160<br>525                      | 0.005<br>.00020  | 0.025<br>.00098  | 0.5xd1         |
| 120<br>394     | 0.0015<br>.00006 | 0.0050<br>.00020 | 0.5xd1         | 120<br>394     | 0.0020<br>.00008 | 0.0070<br>.00028 | 0.5xd1         | 140<br>459     | 0.003<br>.00012  | 0.010<br>.00039  | 0.5xd1         | 140<br>459     | 0.004<br>.00016  | 0.015<br>.00059  | 0.5xd1         | 150<br>492     | 0.004<br>.00016  | 0.020<br>.00079  | 0.5xd1         | 160<br>525                      | 0.005<br>.00020  | 0.025<br>.00098  | 0.5xd1         |
| 120<br>394     | 0.0015<br>.00006 | 0.0050<br>.00020 | 1xd1           | 120<br>394     | 0.0020<br>.00008 | 0.0070<br>.00028 | 1xd1           | 140<br>459     | 0.003<br>.00012  | 0.010<br>.00039  | 1xd1           | 140<br>459     | 0.004<br>.00016  | 0.015<br>.00059  | 1xd1           | 150<br>492     | 0.004<br>.00016  | 0.020<br>.00079  | 1xd1           | 160<br>525                      | 0.005<br>.00020  | 0.025<br>.00098  | 1xd1           |
| 120<br>394     | 0.0019<br>.00007 | 0.0060<br>.00024 | 1xd1           | 120<br>394     | 0.0024<br>.00009 | 0.0084<br>.00033 | 1xd1           | 140<br>459     | 0.004<br>.00014  | 0.012<br>.00047  | 1xd1           | 140<br>459     | 0.004<br>.00016  | 0.017<br>.00068  | 1xd1           | 150<br>492     | 0.005<br>.00019  | 0.022<br>.00087  | 1xd1           | 160<br>525                      | 0.005<br>.00020  | 0.028<br>.00108  | 1xd1           |
| 120<br>394     | 0.0018<br>.00007 | 0.0160<br>.00063 | 1xd1           | 120<br>394     | 0.0024<br>.00009 | 0.0210<br>.00083 | 1xd1           | 150<br>492     | 0.004<br>.00014  | 0.034<br>.00134  | 1xd1           | 160<br>525     | 0.004<br>.00016  | 0.035<br>.00138  | 1xd1           | 170<br>558     | 0.005<br>.00019  | 0.036<br>.00142  | 1xd1           | 180<br>591                      | 0.005<br>.00020  | 0.037<br>.00146  | 1xd1           |
| 120<br>394     | 0.0018<br>.00007 | 0.0160<br>.00063 | 1xd1           | 120<br>394     | 0.0024<br>.00009 | 0.0210<br>.00083 | 1xd1           | 150<br>492     | 0.004<br>.00014  | 0.034<br>.00134  | 1xd1           | 160<br>525     | 0.004<br>.00016  | 0.035<br>.00138  | 1xd1           | 170<br>558     | 0.005<br>.00019  | 0.036<br>.00142  | 1xd1           | 180<br>591                      | 0.005<br>.00020  | 0.037<br>.00146  | 1xd1           |
| 120<br>394     | 0.0018<br>.00007 | 0.0160<br>.00063 | 1xd1           | 120<br>394     | 0.0024<br>.00009 | 0.0210<br>.00083 | 1xd1           | 150<br>492     | 0.004<br>.00014  | 0.034<br>.00134  | 1xd1           | 160<br>525     | 0.004<br>.00016  | 0.035<br>.00138  | 1xd1           | 170<br>558     | 0.005<br>.00019  | 0.036<br>.00142  | 1xd1           | 180<br>591                      | 0.005<br>.00020  | 0.037<br>.00146  | 1xd1           |
| 120<br>394     | 0.0018<br>.00007 | 0.0160<br>.00063 | 1xd1           | 120<br>394     | 0.0024<br>.00009 | 0.0210<br>.00083 | 1xd1           | 150<br>492     | 0.004<br>.00014  | 0.034<br>.00134  | 1xd1           | 160<br>525     | 0.004<br>.00016  | 0.035<br>.00138  | 1xd1           | 170<br>558     | 0.005<br>.00019  | 0.036<br>.00142  | 1xd1           | 180<br>591                      | 0.005<br>.00020  | 0.037<br>.00146  | 1xd1           |
| 120<br>394     | 0.0018<br>.00007 | 0.0160<br>.00063 | 1xd1           | 120<br>394     | 0.0024<br>.00009 | 0.0210<br>.00083 | 1xd1           | 150<br>492     | 0.004<br>.00014  | 0.034<br>.00134  | 1xd1           | 160<br>525     | 0.004<br>.00016  | 0.035<br>.00138  | 1xd1           | 170<br>558     | 0.005<br>.00019  | 0.036<br>.00142  | 1xd1           | 180<br>591                      | 0.005<br>.00020  | 0.037<br>.00146  | 1xd1           |
| 40<br>131      | 0.0015<br>.00006 | 0.0050<br>.00020 | 0.25xd1        | 50<br>164      | 0.0020<br>.00008 | 0.0070<br>.00028 | 0.25xd1        | 50<br>164      | 0.003<br>.00012  | 0.010<br>.00039  | 0.25xd1        | 60<br>197      | 0.004<br>.00016  | 0.014<br>.00053  | 0.25xd1        | 80<br>262      | 0.004<br>.00016  | 0.018<br>.00071  | 0.25xd1        | 80<br>262                       | 0.005<br>.00020  | 0.021<br>.00084  | 0.25xd1        |
| 90<br>295      | 0.0014<br>.00005 | 0.0045<br>.00018 | 0.25xd1        | 100<br>328     | 0.0018<br>.00007 | 0.0063<br>.00025 | 0.25xd1        | 110<br>361     | 0.003<br>.00012  | 0.010<br>.00039  | 0.25xd1        | 120<br>394     | 0.004<br>.00016  | 0.013<br>.00050  | 0.25xd1        | 120<br>394     | 0.004<br>.00016  | 0.016<br>.00064  | 0.25xd1        | 120<br>394                      | 0.005<br>.00020  | 0.019<br>.00075  | 0.25xd1        |
| 90<br>295      | 0.0014<br>.00005 | 0.0045<br>.00018 | 0.25xd1        | 100<br>328     | 0.0018<br>.00007 | 0.0063<br>.00025 | 0.25xd1        | 110<br>361     | 0.003<br>.00012  | 0.010<br>.00039  | 0.25xd1        | 120<br>394     | 0.004<br>.00016  | 0.013<br>.00050  | 0.25xd1        | 120<br>394     | 0.004<br>.00016  | 0.016<br>.00064  | 0.25xd1        | 120<br>394                      | 0.005<br>.00020  | 0.019<br>.00075  | 0.25xd1        |
| 60<br>197      | 0.0015<br>.00006 | 0.0050<br>.00020 | 0.5xd1         | 80<br>262      | 0.0020<br>.00008 | 0.0070<br>.00028 | 0.5xd1         | 80<br>262      | 0.003<br>.00012  | 0.010<br>.00039  | 0.5xd1         | 100<br>328     | 0.004<br>.00016  | 0.014<br>.00053  | 0.5xd1         | 100<br>328     | 0.004<br>.00016  | 0.018<br>.00071  | 0.5xd1         | 120<br>394                      | 0.005<br>.00020  | 0.021<br>.00084  | 0.5xd1         |

**NEW**

## Type A - Milling of through slots

### MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

Through slot  
milling



| Materials group                  | Material                                   | Mat. no.          | DIN                  | AISI/ASTM/UNS           | 1.0 mm   .039"  |                 |                |  |
|----------------------------------|--------------------------------------------|-------------------|----------------------|-------------------------|-----------------|-----------------|----------------|--|
|                                  |                                            |                   |                      |                         | v <sub>c</sub>  | f <sub>z</sub>  | a <sub>p</sub> |  |
| P                                | Unalloyed carbon steel<br>Rm < 800 N/mm²   | 1.0301            | C10                  | AISI 1010               | 140<br>459      | 0.009<br>.00035 | 1xd1           |  |
|                                  |                                            | 1.0401            | C15                  | AISI 1015               |                 |                 |                |  |
|                                  |                                            | 1.1191            | C45E/CK45            | AISI 1045               |                 |                 |                |  |
|                                  |                                            | 1.0044            | S275JR               | AISI 1020               |                 |                 |                |  |
|                                  |                                            | 1.0715            | 11SMn30              | AISI 1215               |                 |                 |                |  |
|                                  | Low alloyed steel<br>Rm > 900 N/mm²        | 1.5752            | 15NiCr13             | ASTM 3415 / AISI 3310   | 140<br>459      | 0.008<br>.00032 | 1xd1           |  |
|                                  |                                            | 1.7131            | 16MnCr5              | AISI 5115               |                 |                 |                |  |
|                                  |                                            | 1.3505            | 100Cr6               | AISI 52100              |                 |                 |                |  |
|                                  |                                            | 1.7225            | 42CrMo4              | AISI 4140               |                 |                 |                |  |
|                                  |                                            | 1.2842            | 90MnCrV8             | AISI O2                 |                 |                 |                |  |
|                                  | High alloyed tool steel<br>Rm < 1200 N/mm² | 1.2379            | X153CrMoV12          | AISI D2                 | 140<br>459      | 0.006<br>.00024 | 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 |                         |                 |                 |                |  |
| M                                | Stainless steel ferritic                   | 1.4016            | X6Cr17               | AISI 430 / UNS S43000   | 140<br>459      | 0.009<br>.00035 | 1xd1           |  |
|                                  |                                            | 1.4105            | X6CrMoS17            | AISI 430F               |                 |                 |                |  |
|                                  | Stainless steel martensitic                | 1.4034            | X46Cr13              | AISI 420C               | 140<br>459      | 0.009<br>.00035 | 1xd1           |  |
|                                  |                                            | 1.4112            | X90CrMoV18           | AISI 440B               |                 |                 |                |  |
|                                  | Stainless steel martensitic – PH           | 1.4542            | X5CrNiCuNb16-4       | AISI 630 / ASTM 17-4 PH | 140<br>459      | 0.009<br>.00035 | 1xd1           |  |
|                                  |                                            | 1.4545            | X5CrNiCuNb15-5       | ASTM 15-5 PH            |                 |                 |                |  |
|                                  | Stainless steel austenitic                 | 1.4301            | X5CrNi18-10          | AISI 304                | 140<br>459      | 0.007<br>.00028 | 1xd1           |  |
|                                  |                                            | 1.4435            | X2CrNiMo18-14-3      | AISI 316L               |                 |                 |                |  |
|                                  |                                            | 1.4441            | X2CrNiMo18-15-3      | AISI 316LM              |                 |                 |                |  |
|                                  | 1.4539                                     | X1NiCrMoCu25-20-5 | AISI 904L            |                         |                 |                 |                |  |
| K                                | Cast iron                                  | 0.6020            | GG20                 | ASTM 30                 | 120<br>394      | 0.007<br>.00028 | 1xd1           |  |
|                                  |                                            | 0.6030            | GG30                 | ASTM 40B                |                 |                 |                |  |
|                                  |                                            | 0.7040            | GGG40                | ASTM 60-40-18           |                 |                 |                |  |
|                                  |                                            | 0.7060            | GGG60                | ASTM 80-60-03           |                 |                 |                |  |
| N                                | Aluminium alloy wrought                    | 3.2315            | AlMgSi1              | ASTM 6351               | 140<br>459      | 0.010<br>.00039 | 1xd1           |  |
|                                  |                                            | 3.4365            | AlZnMgCu1.5          | ASTM 7075               |                 |                 |                |  |
|                                  | Aluminium alloy cast                       | 3.2163            | GD-AlSi9Cu3          | ASTM A380               | 140<br>459      | 0.010<br>.00039 | 1xd1           |  |
|                                  |                                            | 3.2381            | GD-AlSi10Mg          | UNS A03590              |                 |                 |                |  |
|                                  | Copper                                     | 2.0040            | Cu-OF / CW008A       | UNS C10100              | 140<br>459      | 0.012<br>.00047 | 1xd1           |  |
|                                  |                                            | 2.0065            | Cu-ETP / CW004A      | UNS C11000              |                 |                 |                |  |
|                                  | Brass lead free                            | 2.0321            | CuZn37 CW508L        | UNS C27400              | 140<br>459      | 0.012<br>.00047 | 1xd1           |  |
|                                  |                                            | 2.0360            | CuZn40 CW509L        | UNS C28000              |                 |                 |                |  |
|                                  | Brass, Bronze<br>Rm < 400 N/mm²            | 2.0401            | CuZn39Pb3 / CW614N   | UNS C38500              | 140<br>459      | 0.012<br>.00047 | 1xd1           |  |
|                                  |                                            | 2.1020            | CuSn6                | UNS C51900              |                 |                 |                |  |
| Bronze<br>Rm < 600 N/mm²         | 2.0966                                     | CuAl10Ni5Fe4      | UNS C63000           | 140<br>459              | 0.011<br>.00043 | 1xd1            |                |  |
|                                  | 2.0960                                     | CuAl9Mn2          | UNS C63200           |                         |                 |                 |                |  |
| S <sub>1</sub>                   | Super alloys                               | 2.4856            |                      | Inconel 625             | 80<br>262       | 0.005<br>.00020 | 0.5xd1         |  |
|                                  |                                            | 2.4668            |                      | Inconel 718             |                 |                 |                |  |
|                                  |                                            | 2.4617            | NiMo28               | Hastelloy B-2           |                 |                 |                |  |
|                                  |                                            | 2.4665            | NiCr22Fe18Mo         | Hastelloy X             |                 |                 |                |  |
| S <sub>2</sub>                   | Titanium pure                              | 3.7035            | Gr.2                 | ASTM B348 / F67         | 100<br>328      | 0.009<br>.00035 | 0.5xd1         |  |
|                                  |                                            | 3.7065            | Gr.4                 | ASTM B348 / F68         |                 |                 |                |  |
|                                  | Titanium alloys                            | 3.7165            | TiAl6V4              | ASTM B348 / F136        | 100<br>328      | 0.009<br>.00035 | 0.5xd1         |  |
| S <sub>3</sub>                   | CrCo alloys                                | 9.9367            | TiAl6Nb7             | ASTM F1295              |                 |                 |                |  |
|                                  |                                            | 2.4964            | CoCr20W15Ni          | Haynes 25               | 80<br>262       | 0.005<br>.00020 | 0.5xd1         |  |
| H <sub>1</sub><br>H <sub>2</sub> | Hardened steel<br>< 55 HRC                 | 1.2510            | 100MnCrMoW4          | AISI O1                 |                 |                 |                |  |
|                                  | Hardened steel<br>≥ 55 HRC                 | 1.2379            | X153CrMoV12          | AISI D2                 |                 |                 |                |  |

**V<sub>c</sub>** [m/min] | [**SFM**]  
**f<sub>z</sub>** [mm] | [**IPT**]  
**a<sub>p</sub>** [mm] | [**inch**]

RECOMMENDATION FOR USE

● Excellent | ● Good | ○ Acceptable | ☒ Not recommended

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

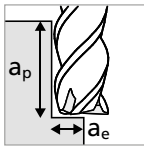
|  | 1/16"          |                 |                | 3/32"          |                 |                | 1/8"           |                 |                | 5/32"          |                 |                | 3/16" - 7/32"  |                 |                | 1/4"                            |                 |                |
|--|----------------|-----------------|----------------|----------------|-----------------|----------------|----------------|-----------------|----------------|----------------|-----------------|----------------|----------------|-----------------|----------------|---------------------------------|-----------------|----------------|
|  | 1.5 mm   .059" |                 |                | 2.0 mm   .079" |                 |                | 3.0 mm   .118" |                 |                | 4.0 mm   .157" |                 |                | 5.0 mm   .197" |                 |                | 6.0 mm - 8.0 mm   .236" - .315" |                 |                |
|  | 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> |
|  | 180<br>591     | 0.015<br>.00059 | 1xd1           | 200<br>656     | 0.020<br>.00079 | 1xd1           | 220<br>722     | 0.029<br>.00114 | 1xd1           | 230<br>755     | 0.031<br>.00122 | 1xd1           | 240<br>787     | 0.031<br>.00122 | 1xd1           | 260<br>853                      | 0.032<br>.00126 | 1xd1           |
|  | 180<br>591     | 0.013<br>.00051 | 1xd1           | 200<br>656     | 0.019<br>.00075 | 1xd1           | 220<br>722     | 0.028<br>.00110 | 1xd1           | 230<br>755     | 0.029<br>.00114 | 1xd1           | 240<br>787     | 0.030<br>.00118 | 1xd1           | 260<br>853                      | 0.031<br>.00122 | 1xd1           |
|  | 180<br>591     | 0.012<br>.00047 | 0.5xd1         | 200<br>656     | 0.017<br>.00067 | 0.5xd1         | 220<br>722     | 0.025<br>.00098 | 0.5xd1         | 230<br>755     | 0.026<br>.00102 | 0.5xd1         | 240<br>787     | 0.026<br>.00102 | 0.5xd1         | 260<br>853                      | 0.027<br>.00106 | 0.5xd1         |
|  | 180<br>591     | 0.015<br>.00059 | 1xd1           | 200<br>656     | 0.020<br>.00079 | 1xd1           | 220<br>722     | 0.028<br>.00110 | 1xd1           | 230<br>755     | 0.029<br>.00114 | 1xd1           | 240<br>787     | 0.030<br>.00118 | 1xd1           | 260<br>853                      | 0.031<br>.00122 | 1xd1           |
|  | 180<br>591     | 0.013<br>.00051 | 1xd1           | 200<br>656     | 0.019<br>.00075 | 1xd1           | 220<br>722     | 0.027<br>.00106 | 1xd1           | 230<br>755     | 0.028<br>.00110 | 1xd1           | 240<br>787     | 0.029<br>.00114 | 1xd1           | 260<br>853                      | 0.029<br>.00114 | 1xd1           |
|  | 180<br>591     | 0.013<br>.00051 | 1xd1           | 200<br>656     | 0.019<br>.00075 | 1xd1           | 220<br>722     | 0.027<br>.00106 | 1xd1           | 230<br>755     | 0.028<br>.00110 | 1xd1           | 240<br>787     | 0.029<br>.00114 | 1xd1           | 260<br>853                      | 0.029<br>.00114 | 1xd1           |
|  | 180<br>591     | 0.011<br>.00043 | 1xd1           | 200<br>656     | 0.017<br>.00067 | 1xd1           | 220<br>722     | 0.025<br>.00098 | 1xd1           | 230<br>755     | 0.027<br>.00106 | 1xd1           | 240<br>787     | 0.027<br>.00106 | 1xd1           | 260<br>853                      | 0.028<br>.00110 | 1xd1           |
|  | 140<br>459     | 0.015<br>.00059 | 1xd1           | 160<br>525     | 0.017<br>.00067 | 1xd1           | 180<br>591     | 0.025<br>.00098 | 1xd1           | 200<br>656     | 0.031<br>.00122 | 1xd1           | 200<br>656     | 0.031<br>.00122 | 1xd1           | 200<br>656                      | 0.032<br>.00126 | 1xd1           |
|  | 180<br>591     | 0.016<br>.00063 | 1xd1           | 200<br>656     | 0.021<br>.00083 | 1xd1           | 220<br>722     | 0.034<br>.00134 | 1xd1           | 260<br>853     | 0.035<br>.00139 | 1xd1           | 300<br>984     | 0.036<br>.00142 | 1xd1           | 340<br>1115                     | 0.037<br>.00146 | 1xd1           |
|  | 180<br>591     | 0.016<br>.00063 | 1xd1           | 200<br>656     | 0.021<br>.00083 | 1xd1           | 220<br>722     | 0.032<br>.00126 | 1xd1           | 260<br>853     | 0.034<br>.00134 | 1xd1           | 300<br>984     | 0.034<br>.00134 | 1xd1           | 340<br>1115                     | 0.036<br>.00142 | 1xd1           |
|  | 180<br>591     | 0.016<br>.00063 | 1xd1           | 200<br>656     | 0.021<br>.00083 | 1xd1           | 220<br>722     | 0.034<br>.00134 | 1xd1           | 260<br>853     | 0.035<br>.00139 | 1xd1           | 300<br>984     | 0.036<br>.00142 | 1xd1           | 340<br>1115                     | 0.037<br>.00146 | 1xd1           |
|  | 180<br>591     | 0.016<br>.00063 | 1xd1           | 200<br>656     | 0.021<br>.00083 | 1xd1           | 220<br>722     | 0.034<br>.00134 | 1xd1           | 260<br>853     | 0.035<br>.00139 | 1xd1           | 300<br>984     | 0.036<br>.00142 | 1xd1           | 340<br>1115                     | 0.037<br>.00146 | 1xd1           |
|  | 180<br>591     | 0.016<br>.00063 | 1xd1           | 200<br>656     | 0.021<br>.00083 | 1xd1           | 220<br>722     | 0.034<br>.00134 | 1xd1           | 260<br>853     | 0.035<br>.00139 | 1xd1           | 300<br>984     | 0.036<br>.00142 | 1xd1           | 340<br>1115                     | 0.037<br>.00146 | 1xd1           |
|  | 180<br>591     | 0.016<br>.00063 | 1xd1           | 200<br>656     | 0.021<br>.00083 | 1xd1           | 220<br>722     | 0.034<br>.00134 | 1xd1           | 260<br>853     | 0.035<br>.00139 | 1xd1           | 300<br>984     | 0.036<br>.00142 | 1xd1           | 340<br>1115                     | 0.037<br>.00146 | 1xd1           |
|  | 80<br>262      | 0.006<br>.00024 | 0.5xd1         | 100<br>328     | 0.007<br>.00028 | 0.5xd1         | 100<br>328     | 0.010<br>.00039 | 0.5xd1         | 120<br>394     | 0.013<br>.00051 | 0.5xd1         | 120<br>394     | 0.013<br>.00051 | 0.5xd1         | 120<br>394                      | 0.013<br>.00051 | 0.5xd1         |
|  | 100<br>328     | 0.012<br>.00047 | 0.5xd1         | 120<br>394     | 0.017<br>.00067 | 0.5xd1         | 120<br>394     | 0.027<br>.00106 | 0.5xd1         | 140<br>459     | 0.027<br>.00106 | 0.5xd1         | 140<br>459     | 0.027<br>.00106 | 0.5xd1         | 140<br>459                      | 0.028<br>.00110 | 0.5xd1         |
|  | 100<br>328     | 0.012<br>.00047 | 0.5xd1         | 120<br>394     | 0.017<br>.00067 | 0.5xd1         | 120<br>394     | 0.027<br>.00106 | 0.5xd1         | 140<br>459     | 0.027<br>.00106 | 0.5xd1         | 140<br>459     | 0.027<br>.00106 | 0.5xd1         | 140<br>459                      | 0.028<br>.00110 | 0.5xd1         |
|  | 80<br>262      | 0.006<br>.00024 | 0.5xd1         | 100<br>328     | 0.007<br>.00028 | 0.5xd1         | 100<br>328     | 0.010<br>.00039 | 0.5xd1         | 120<br>394     | 0.013<br>.00051 | 0.5xd1         | 120<br>394     | 0.013<br>.00051 | 0.5xd1         | 120<br>394                      | 0.013<br>.00051 | 0.5xd1         |
|  |                |                 |                |                |                 |                |                |                 |                |                |                 |                |                |                 |                |                                 |                 |                |
|  |                |                 |                |                |                 |                |                |                 |                |                |                 |                |                |                 |                |                                 |                 |                |

**NEW**

## Type A - Side milling - Semi-finishing

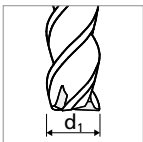
### MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

#### Semi-finishing



$$a_p = 1 \times d_1 - 2 \times d_i$$

$$a_e = 0.2 \times d_i$$

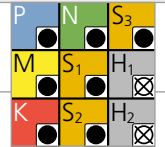


| Materials group      | Material                                               | Mat. no. | DIN                | AISI/ASTM/UNS           | 1.0 mm   .039" |                 |
|----------------------|--------------------------------------------------------|----------|--------------------|-------------------------|----------------|-----------------|
|                      |                                                        |          |                    |                         | $v_c$          | $f_z$           |
| <b>P</b>             | Unalloyed carbon steel<br>$R_m < 800 \text{ N/mm}^2$   | 1.0301   | C10                | AISI 1010               | 140<br>459     | 0.013<br>.00051 |
|                      |                                                        | 1.0401   | C15                | AISI 1015               |                |                 |
|                      |                                                        | 1.1191   | C45E/CK45          | AISI 1045               |                |                 |
|                      |                                                        | 1.0044   | S275JR             | AISI 1020               |                |                 |
|                      |                                                        | 1.0715   | 11SMn30            | AISI 1215               |                |                 |
|                      | Low alloyed steel<br>$R_m > 900 \text{ N/mm}^2$        | 1.5752   | 15NiCr13           | ASTM 3415 / AISI 3310   | 140<br>459     | 0.012<br>.00047 |
|                      |                                                        | 1.7131   | 16MnCr5            | AISI 5115               |                |                 |
|                      |                                                        | 1.3505   | 100Cr6             | AISI 52100              |                |                 |
|                      |                                                        | 1.7225   | 42CrMo4            | AISI 4140               |                |                 |
|                      |                                                        | 1.2842   | 90MnCrV8           | AISI O2                 |                |                 |
|                      | High alloyed tool steel<br>$R_m < 1200 \text{ N/mm}^2$ | 1.2379   | X153CrMoV12        | AISI D2                 | 140<br>459     | 0.009<br>.00035 |
|                      |                                                        | 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>             | Stainless steel ferritic                               | 1.4016   | X6Cr17             | AISI 430 / UNS S43000   | 140<br>459     | 0.014<br>.00055 |
|                      |                                                        | 1.4105   | X6CrMoS17          | AISI 430F               |                |                 |
|                      | Stainless steel martensitic                            | 1.4034   | X46Cr13            | AISI 420C               | 140<br>459     | 0.013<br>.00051 |
|                      |                                                        | 1.4112   | X90CrMoV18         | AISI 440B               |                |                 |
|                      | Stainless steel martensitic – PH                       | 1.4542   | X5CrNiCuNb16-4     | AISI 630 / ASTM 17-4 PH | 140<br>459     | 0.013<br>.00051 |
|                      |                                                        | 1.4545   | X5CrNiCuNb15-5     | ASTM 15-5 PH            |                |                 |
|                      | Stainless steel austenitic                             | 1.4301   | X5CrNi18-10        | AISI 304                | 140<br>459     | 0.010<br>.00039 |
|                      |                                                        | 1.4435   | X2CrNiMo18-14-3    | AISI 316L               |                |                 |
|                      |                                                        | 1.4441   | X2CrNiMo18-15-3    | AISI 316LM              |                |                 |
|                      |                                                        | 1.4539   | X1NiCrMoCu25-20-5  | AISI 904L               |                |                 |
| <b>K</b>             | Cast iron                                              | 0.6020   | GG20               | ASTM 30                 | 120<br>394     | 0.009<br>.00035 |
|                      |                                                        | 0.6030   | GG30               | ASTM 40B                |                |                 |
|                      |                                                        | 0.7040   | GGG40              | ASTM 60-40-18           |                |                 |
|                      |                                                        | 0.7060   | GGG60              | ASTM 80-60-03           |                |                 |
|                      |                                                        |          |                    |                         |                |                 |
| <b>N</b>             | Aluminium alloy wrought                                | 3.2315   | AlMgSi1            | ASTM 6351               | 140<br>459     | 0.015<br>.00059 |
|                      |                                                        | 3.4365   | AlZnMgCu1.5        | ASTM 7075               |                |                 |
|                      | Aluminium alloy cast                                   | 3.2163   | GD-AlSi9Cu3        | ASTM A380               | 140<br>459     | 0.015<br>.00059 |
|                      |                                                        | 3.2381   | GD-AlSi10Mg        | UNS A03590              |                |                 |
|                      | Copper                                                 | 2.0040   | Cu-OF / CW008A     | UNS C10100              | 140<br>459     | 0.017<br>.00067 |
|                      |                                                        | 2.0065   | Cu-ETP / CW004A    | UNS C11000              |                |                 |
|                      | Brass lead free                                        | 2.0321   | CuZn37 CW508L      | UNS C27400              | 140<br>459     | 0.017<br>.00067 |
|                      |                                                        | 2.0360   | CuZn40 CW509L      | UNS C28000              |                |                 |
|                      | Brass, Bronze<br>$R_m < 400 \text{ N/mm}^2$            | 2.0401   | CuZn39Pb3 / CW614N | UNS C38500              | 140<br>459     | 0.017<br>.00067 |
|                      |                                                        | 2.1020   | CuSn6              | UNS C51900              |                |                 |
|                      | Bronze<br>$R_m < 600 \text{ N/mm}^2$                   | 2.0966   | CuAl10Ni5Fe4       | UNS C63000              | 140<br>459     | 0.015<br>.00059 |
|                      |                                                        | 2.0960   | CuAl9Mn2           | UNS C63200              |                |                 |
| <b>S<sub>1</sub></b> | Super alloys                                           | 2.4856   |                    | Inconel 625             | 80<br>262      | 0.006<br>.00024 |
|                      |                                                        | 2.4668   |                    | Inconel 718             |                |                 |
|                      |                                                        | 2.4617   | NiMo28             | Hastelloy B-2           |                |                 |
|                      |                                                        | 2.4665   | NiCr22Fe18Mo       | Hastelloy X             |                |                 |
| <b>S<sub>2</sub></b> | Titanium pure                                          | 3.7035   | Gr.2               | ASTM B348 / F67         | 120<br>394     | 0.014<br>.00054 |
|                      |                                                        | 3.7065   | Gr.4               | ASTM B348 / F68         |                |                 |
|                      | Titanium alloys                                        | 3.7165   | TiAl6V4            | ASTM B348 / F136        | 120            | 0.014           |
| <b>S<sub>3</sub></b> | CrCo alloys                                            | 9.9367   | TiAl6Nb7           | ASTM F1295              | 394            | .00054          |
|                      |                                                        | 2.4964   | CoCr20W15Ni        | Haynes 25               | 80             | 0.006           |
|                      |                                                        |          | CrCoMo28           | ASTM F1537              | 262            | .00024          |
| <b>H<sub>1</sub></b> | Hardened steel<br>$< 55 \text{ HRC}$                   | 1.2510   | 100MnCrMoW4        | AISI O1                 |                |                 |
| <b>H<sub>2</sub></b> | Hardened steel<br>$\geq 55 \text{ HRC}$                | 1.2379   | X153CrMoV12        | AISI D2                 |                |                 |

**V<sub>c</sub>** [m/min] | [**SFM**]  
**f<sub>z</sub>** [mm] | [**IPT**]

RECOMMENDATION FOR USE

● Excellent | ● Good | ○ Acceptable | ⊗ Not recommended



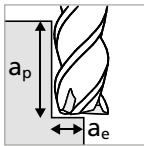
|  | 1/16"<br>1.5 mm   .059" |                 | 3/32"<br>2.0 mm   .079" |                 | 1/8"<br>3.0 mm   .118" |                 | Ød <sub>1</sub><br>5/32"<br>4.0 mm   .157" |                 | 3/16" - 7/32"<br>5.0 mm   .197" |                 | 1/4"<br>6.0 mm   .236" |                 | 8.0 mm   .315" |                 |  |
|--|-------------------------|-----------------|-------------------------|-----------------|------------------------|-----------------|--------------------------------------------|-----------------|---------------------------------|-----------------|------------------------|-----------------|----------------|-----------------|--|
|  | V <sub>c</sub>          | f <sub>z</sub>  | V <sub>c</sub>          | f <sub>z</sub>  | V <sub>c</sub>         | f <sub>z</sub>  | V <sub>c</sub>                             | f <sub>z</sub>  | V <sub>c</sub>                  | f <sub>z</sub>  | V <sub>c</sub>         | f <sub>z</sub>  | V <sub>c</sub> | f <sub>z</sub>  |  |
|  | 200<br>656              | 0.020<br>.00079 | 220<br>722              | 0.029<br>.00114 | 240<br>787             | 0.037<br>.00146 | 260<br>853                                 | 0.040<br>.00158 | 260<br>853                      | 0.040<br>.00158 | 260<br>853             | 0.043<br>.00169 | 260<br>853     | 0.051<br>.00169 |  |
|  | 200<br>656              | 0.019<br>.00075 | 220<br>722              | 0.027<br>.00106 | 240<br>787             | 0.035<br>.00138 | 260<br>853                                 | 0.038<br>.00150 | 260<br>853                      | 0.038<br>.00150 | 260<br>853             | 0.041<br>.00161 | 260<br>853     | 0.049<br>.00193 |  |
|  | 200<br>656              | 0.017<br>.00067 | 220<br>722              | 0.026<br>.00102 | 240<br>787             | 0.032<br>.00126 | 260<br>853                                 | 0.034<br>.00134 | 260<br>853                      | 0.034<br>.00134 | 260<br>853             | 0.036<br>.00141 | 260<br>853     | 0.043<br>.00169 |  |
|  | 200<br>656              | 0.020<br>.00079 | 220<br>722              | 0.029<br>.00114 | 240<br>787             | 0.035<br>.00138 | 260<br>853                                 | 0.038<br>.00150 | 260<br>853                      | 0.038<br>.00150 | 260<br>853             | 0.041<br>.00161 | 260<br>853     | 0.046<br>.00161 |  |
|  | 200<br>656              | 0.019<br>.00075 | 220<br>722              | 0.027<br>.00106 | 240<br>787             | 0.035<br>.00138 | 260<br>853                                 | 0.037<br>.00146 | 260<br>853                      | 0.037<br>.00146 | 260<br>853             | 0.039<br>.00154 | 260<br>853     | 0.045<br>.00177 |  |
|  | 200<br>656              | 0.019<br>.00075 | 220<br>722              | 0.027<br>.00106 | 240<br>787             | 0.035<br>.00138 | 260<br>853                                 | 0.037<br>.00146 | 260<br>853                      | 0.037<br>.00146 | 260<br>853             | 0.039<br>.00154 | 260<br>853     | 0.045<br>.00177 |  |
|  | 200<br>656              | 0.014<br>.00055 | 220<br>722              | 0.026<br>.00102 | 240<br>787             | 0.032<br>.00126 | 260<br>853                                 | 0.035<br>.00138 | 260<br>853                      | 0.035<br>.00138 | 260<br>853             | 0.037<br>.00146 | 260<br>853     | 0.043<br>.00146 |  |
|  | 140<br>459              | 0.020<br>.00079 | 160<br>525              | 0.024<br>.00095 | 180<br>591             | 0.034<br>.00134 | 200<br>656                                 | 0.040<br>.00158 | 200<br>656                      | 0.042<br>.00165 | 200<br>656             | 0.044<br>.00173 | 200<br>656     | 0.052<br>.00173 |  |
|  | 200<br>656              | 0.022<br>.00087 | 220<br>722              | 0.031<br>.00122 | 240<br>787             | 0.046<br>.00181 | 260<br>853                                 | 0.048<br>.00189 | 260<br>853                      | 0.048<br>.00189 | 260<br>853             | 0.051<br>.00201 | 260<br>853     | 0.063<br>.00248 |  |
|  | 200<br>656              | 0.022<br>.00087 | 220<br>722              | 0.031<br>.00122 | 240<br>787             | 0.046<br>.00181 | 260<br>853                                 | 0.048<br>.00189 | 260<br>853                      | 0.048<br>.00189 | 260<br>853             | 0.051<br>.00201 | 260<br>853     | 0.063<br>.00248 |  |
|  | 200<br>656              | 0.022<br>.00087 | 220<br>722              | 0.031<br>.00122 | 240<br>787             | 0.046<br>.00181 | 260<br>853                                 | 0.048<br>.00189 | 260<br>853                      | 0.048<br>.00189 | 260<br>853             | 0.051<br>.00201 | 260<br>853     | 0.063<br>.00248 |  |
|  | 200<br>656              | 0.022<br>.00087 | 220<br>722              | 0.031<br>.00122 | 240<br>787             | 0.046<br>.00181 | 260<br>853                                 | 0.048<br>.00189 | 260<br>853                      | 0.048<br>.00189 | 260<br>853             | 0.051<br>.00201 | 260<br>853     | 0.063<br>.00248 |  |
|  | 200<br>656              | 0.022<br>.00087 | 220<br>722              | 0.031<br>.00122 | 240<br>787             | 0.046<br>.00181 | 260<br>853                                 | 0.048<br>.00189 | 260<br>853                      | 0.048<br>.00189 | 260<br>853             | 0.051<br>.00201 | 260<br>853     | 0.063<br>.00248 |  |
|  | 200<br>656              | 0.022<br>.00087 | 220<br>722              | 0.031<br>.00122 | 240<br>787             | 0.046<br>.00181 | 260<br>853                                 | 0.048<br>.00189 | 260<br>853                      | 0.048<br>.00189 | 260<br>853             | 0.051<br>.00201 | 260<br>853     | 0.063<br>.00248 |  |
|  | 100<br>328              | 0.008<br>.00032 | 100<br>328              | 0.009<br>.00035 | 100<br>328             | 0.012<br>.00047 | 120<br>394                                 | 0.016<br>.00063 | 120<br>394                      | 0.016<br>.00063 | 120<br>394             | 0.017<br>.00067 | 120<br>394     | 0.018<br>.00071 |  |
|  | 120<br>394              | 0.017<br>.00067 | 130<br>427              | 0.024<br>.00095 | 130<br>427             | 0.032<br>.00126 | 150<br>492                                 | 0.035<br>.00138 | 150<br>492                      | 0.035<br>.00138 | 150<br>492             | 0.037<br>.00146 | 150<br>492     | 0.040<br>.00146 |  |
|  | 120<br>394              | 0.017<br>.00067 | 130<br>427              | 0.024<br>.00095 | 130<br>427             | 0.032<br>.00126 | 150<br>492                                 | 0.035<br>.00138 | 150<br>492                      | 0.035<br>.00138 | 150<br>492             | 0.037<br>.00146 | 150<br>492     | 0.040<br>.00146 |  |
|  | 100<br>328              | 0.008<br>.00032 | 100<br>328              | 0.009<br>.00035 | 100<br>328             | 0.012<br>.00047 | 120<br>394                                 | 0.016<br>.00063 | 120<br>394                      | 0.016<br>.00063 | 120<br>394             | 0.017<br>.00067 | 120<br>394     | 0.018<br>.00071 |  |
|  |                         |                 |                         |                 |                        |                 |                                            |                 |                                 |                 |                        |                 |                |                 |  |
|  |                         |                 |                         |                 |                        |                 |                                            |                 |                                 |                 |                        |                 |                |                 |  |

**NEW**

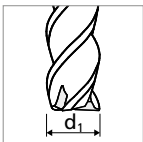
## Type A - Side milling - Finishing

### MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

#### Finishing



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



| Materials group      | Material                                               | Mat. no. | DIN                | AISI/ASTM/UNS           | 1.0 mm   .039"    |                        |  |
|----------------------|--------------------------------------------------------|----------|--------------------|-------------------------|-------------------|------------------------|--|
|                      |                                                        |          |                    |                         | $v_c$             | $f_z$                  |  |
| <b>P</b>             | Unalloyed carbon steel<br>$R_m < 800 \text{ N/mm}^2$   | 1.0301   | C10                | AISI 1010               | 130<br><b>425</b> | 0.008<br><b>.00032</b> |  |
|                      |                                                        | 1.0401   | C15                | AISI 1015               |                   |                        |  |
|                      |                                                        | 1.1191   | C45E/CK45          | AISI 1045               |                   |                        |  |
|                      |                                                        | 1.0044   | S275JR             | AISI 1020               |                   |                        |  |
|                      |                                                        | 1.0715   | 11SMn30            | AISI 1215               |                   |                        |  |
|                      | Low alloyed steel<br>$R_m > 900 \text{ N/mm}^2$        | 1.5752   | 15NiCr13           | ASTM 3415 / AISI 3310   | 130<br><b>425</b> | 0.007<br><b>.00028</b> |  |
|                      |                                                        | 1.7131   | 16MnCr5            | AISI 5115               |                   |                        |  |
|                      |                                                        | 1.3505   | 100Cr6             | AISI 52100              |                   |                        |  |
|                      |                                                        | 1.7225   | 42CrMo4            | AISI 4140               |                   |                        |  |
|                      |                                                        | 1.2842   | 90MnCrV8           | AISI O2                 |                   |                        |  |
|                      | High alloyed tool steel<br>$R_m < 1200 \text{ N/mm}^2$ | 1.2379   | X153CrMoV12        | AISI D2                 | 130<br><b>425</b> | 0.006<br><b>.00024</b> |  |
|                      |                                                        | 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>             | Stainless steel ferritic                               | 1.4016   | X6Cr17             | AISI 430 / UNS S43000   | 130<br><b>425</b> | 0.008<br><b>.00032</b> |  |
|                      |                                                        | 1.4105   | X6CrMoS17          | AISI 430F               |                   |                        |  |
|                      |                                                        | 1.4034   | X46Cr13            | AISI 420C               |                   |                        |  |
|                      | Stainless steel martensitic                            | 1.4112   | X90CrMoV18         | AISI 440B               | 130<br><b>425</b> | 0.008<br><b>.00032</b> |  |
|                      |                                                        | 1.4542   | X5CrNiCuNb16-4     | AISI 630 / ASTM 17-4 PH |                   |                        |  |
|                      | Stainless steel martensitic – PH                       | 1.4545   | X5CrNiCuNb15-5     | ASTM 15-5 PH            | 130<br><b>425</b> | 0.008<br><b>.00032</b> |  |
|                      |                                                        | 1.4301   | X5CrNi18-10        | AISI 304                |                   |                        |  |
|                      |                                                        | 1.4435   | X2CrNiMo18-14-3    | AISI 316L               |                   |                        |  |
|                      |                                                        | 1.4441   | X2CrNiMo18-15-3    | AISI 316LM              |                   |                        |  |
|                      |                                                        | 1.4539   | X1NiCrMoCu25-20-5  | AISI 904L               |                   |                        |  |
| <b>K</b>             | Cast iron                                              | 0.6020   | GG20               | ASTM 30                 | 110<br><b>361</b> | 0.006<br><b>.00024</b> |  |
|                      |                                                        | 0.6030   | GG30               | ASTM 40B                |                   |                        |  |
|                      |                                                        | 0.7040   | GGG40              | ASTM 60-40-18           |                   |                        |  |
|                      |                                                        | 0.7060   | GGG60              | ASTM 80-60-03           |                   |                        |  |
|                      |                                                        |          |                    |                         |                   |                        |  |
| <b>N</b>             | Aluminium alloy wrought                                | 3.2315   | AlMgSi1            | ASTM 6351               | 130<br><b>425</b> | 0.009<br><b>.00035</b> |  |
|                      |                                                        | 3.4365   | AlZnMgCu1.5        | ASTM 7075               |                   |                        |  |
|                      | Aluminium alloy cast                                   | 3.2163   | GD-AlSi9Cu3        | ASTM A380               | 130<br><b>425</b> | 0.009<br><b>.00035</b> |  |
|                      |                                                        | 3.2381   | GD-AlSi10Mg        | UNS A03590              |                   |                        |  |
|                      | Copper                                                 | 2.0040   | Cu-OF / CW008A     | UNS C10100              | 130<br><b>425</b> | 0.010<br><b>.00039</b> |  |
|                      |                                                        | 2.0065   | Cu-ETP / CW004A    | UNS C11000              |                   |                        |  |
|                      | Brass lead free                                        | 2.0321   | CuZn37 CW508L      | UNS C27400              | 130<br><b>425</b> | 0.010<br><b>.00039</b> |  |
|                      |                                                        | 2.0360   | CuZn40 CW509L      | UNS C28000              |                   |                        |  |
|                      | Brass, Bronze<br>$R_m < 400 \text{ N/mm}^2$            | 2.0401   | CuZn39Pb3 / CW614N | UNS C38500              | 130<br><b>425</b> | 0.010<br><b>.00039</b> |  |
|                      |                                                        | 2.1020   | CuSn6              | UNS C51900              |                   |                        |  |
|                      | Bronze<br>$R_m < 600 \text{ N/mm}^2$                   | 2.0966   | CuAl10Ni5Fe4       | UNS C63000              | 130<br><b>425</b> | 0.009<br><b>.00035</b> |  |
|                      |                                                        | 2.0960   | CuAl9Mn2           | UNS C63200              |                   |                        |  |
| <b>S<sub>1</sub></b> | Super alloys                                           | 2.4856   |                    | Inconel 625             | 110<br><b>361</b> | 0.004<br><b>.00016</b> |  |
|                      |                                                        | 2.4668   |                    | Inconel 718             |                   |                        |  |
|                      |                                                        | 2.4617   | NiMo28             | Hastelloy B-2           |                   |                        |  |
|                      |                                                        | 2.4665   | NiCr22Fe18Mo       | Hastelloy X             |                   |                        |  |
| <b>S<sub>2</sub></b> | Titanium pure                                          | 3.7035   | Gr.2               | ASTM B348 / F67         | 110<br><b>361</b> | 0.008<br><b>.00032</b> |  |
|                      |                                                        | 3.7065   | Gr.4               | ASTM B348 / F68         |                   |                        |  |
|                      | Titanium alloys                                        | 3.7165   | TiAl6V4            | ASTM B348 / F136        | 110<br><b>361</b> | 0.008<br><b>.00032</b> |  |
| <b>S<sub>3</sub></b> | CrCo alloys                                            | 9.9367   | TiAl6Nb7           | ASTM F1295              | 110<br><b>361</b> | 0.004<br><b>.00016</b> |  |
|                      |                                                        | 2.4964   | CoCr20W15Ni        | Haynes 25               |                   |                        |  |
| <b>H<sub>1</sub></b> | Hardened steel<br>$< 55 \text{ HRC}$                   |          | CrCoMo28           | ASTM F1537              |                   |                        |  |
| <b>H<sub>2</sub></b> | Hardened steel<br>$\geq 55 \text{ HRC}$                | 1.2510   | 100MnCrMoW4        | AISI O1                 |                   |                        |  |
|                      |                                                        | 1.2379   | X153CrMoV12        | AISI D2                 |                   |                        |  |

**V<sub>c</sub>** [m/min] | [**SFM**]  
**f<sub>z</sub>** [mm] | [**IPT**]

RECOMMENDATION FOR USE

● Excellent | ● Good | ○ Acceptable | ⊗ Not recommended



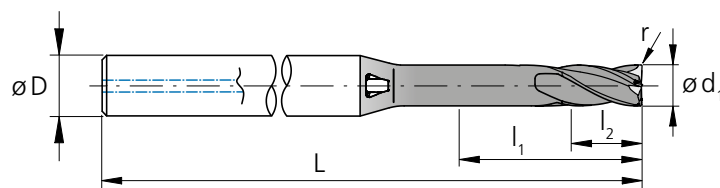
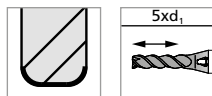
|  | 1/16"<br>1.5 mm   .059" |                 | 3/32"<br>2.0 mm   .079" |                 | 1/8"<br>3.0 mm   .118" |                  | Ød <sub>1</sub><br>5/32"<br>4.0 mm   .157" |                 | 3/16" - 7/32"<br>5.0 mm   .197" |                 | 1/4"<br>6.0 mm   .236" |                 | 8.0 mm   .315" |                 |  |
|--|-------------------------|-----------------|-------------------------|-----------------|------------------------|------------------|--------------------------------------------|-----------------|---------------------------------|-----------------|------------------------|-----------------|----------------|-----------------|--|
|  | V <sub>c</sub>          | f <sub>z</sub>  | V <sub>c</sub>          | f <sub>z</sub>  | V <sub>c</sub>         | f <sub>z</sub>   | V <sub>c</sub>                             | f <sub>z</sub>  | V <sub>c</sub>                  | f <sub>z</sub>  | V <sub>c</sub>         | f <sub>z</sub>  | V <sub>c</sub> | f <sub>z</sub>  |  |
|  | 180<br>591              | 0.012<br>.00047 | 200<br>656              | 0.017<br>.00067 | 210<br>688             | 0.023<br>.000091 | 220<br>772                                 | 0.025<br>.00098 | 220<br>772                      | 0.028<br>.00110 | 220<br>772             | 0.033<br>.00130 | 220<br>772     | 0.042<br>.00165 |  |
|  | 180<br>591              | 0.011<br>.00043 | 200<br>656              | 0.016<br>.00063 | 210<br>688             | 0.022<br>.00087  | 220<br>772                                 | 0.024<br>.00095 | 220<br>772                      | 0.026<br>.00102 | 220<br>772             | 0.029<br>.00114 | 220<br>772     | 0.038<br>.00150 |  |
|  | 180<br>591              | 0.010<br>.00039 | 200<br>656              | 0.015<br>.00059 | 210<br>688             | 0.020<br>.00079  | 220<br>772                                 | 0.021<br>.00083 | 220<br>772                      | 0.023<br>.00091 | 220<br>772             | 0.025<br>.00098 | 220<br>772     | 0.034<br>.00134 |  |
|  | 180<br>591              | 0.012<br>.00047 | 200<br>656              | 0.017<br>.00067 | 210<br>688             | 0.022<br>.00087  | 220<br>772                                 | 0.024<br>.00095 | 220<br>772                      | 0.026<br>.00102 | 220<br>772             | 0.029<br>.00114 | 220<br>772     | 0.036<br>.00142 |  |
|  | 180<br>591              | 0.011<br>.00043 | 200<br>656              | 0.016<br>.00063 | 210<br>688             | 0.022<br>.00087  | 220<br>772                                 | 0.023<br>.00091 | 220<br>772                      | 0.025<br>.00098 | 220<br>772             | 0.028<br>.00110 | 220<br>772     | 0.037<br>.00146 |  |
|  | 180<br>591              | 0.011<br>.00043 | 200<br>656              | 0.016<br>.00063 | 210<br>688             | 0.022<br>.00087  | 220<br>772                                 | 0.023<br>.00091 | 220<br>772                      | 0.025<br>.00098 | 220<br>772             | 0.028<br>.00110 | 220<br>772     | 0.037<br>.00146 |  |
|  | 180<br>591              | 0.008<br>.00032 | 200<br>656              | 0.015<br>.00059 | 210<br>688             | 0.020<br>.00079  | 220<br>772                                 | 0.022<br>.00087 | 220<br>772                      | 0.024<br>.00095 | 220<br>772             | 0.026<br>.00102 | 220<br>772     | 0.035<br>.00138 |  |
|  | 130<br>427              | 0.012<br>.00047 | 150<br>492              | 0.014<br>.00055 | 160<br>525             | 0.022<br>.00087  | 170<br>558                                 | 0.025<br>.00098 | 170<br>558                      | 0.029<br>.00114 | 170<br>558             | 0.031<br>.00122 | 200<br>656     | 0.040<br>.00157 |  |
|  | 180<br>591              | 0.013<br>.00051 | 200<br>656              | 0.018<br>.00071 | 210<br>688             | 0.029<br>.00114  | 220<br>772                                 | 0.030<br>.00118 | 220<br>772                      | 0.033<br>.00130 | 220<br>772             | 0.036<br>.00142 | 270<br>886     | 0.045<br>.00177 |  |
|  | 180<br>591              | 0.013<br>.00051 | 200<br>656              | 0.018<br>.00071 | 210<br>688             | 0.029<br>.00114  | 220<br>772                                 | 0.030<br>.00118 | 220<br>772                      | 0.033<br>.00130 | 220<br>772             | 0.036<br>.00142 | 270<br>886     | 0.045<br>.00177 |  |
|  | 180<br>591              | 0.013<br>.00051 | 200<br>656              | 0.018<br>.00071 | 210<br>688             | 0.029<br>.00114  | 220<br>772                                 | 0.030<br>.00118 | 220<br>772                      | 0.033<br>.00130 | 220<br>772             | 0.036<br>.00142 | 270<br>886     | 0.045<br>.00177 |  |
|  | 180<br>591              | 0.013<br>.00051 | 200<br>656              | 0.018<br>.00071 | 210<br>688             | 0.029<br>.00114  | 220<br>772                                 | 0.030<br>.00118 | 220<br>772                      | 0.033<br>.00130 | 220<br>772             | 0.036<br>.00142 | 270<br>886     | 0.045<br>.00177 |  |
|  | 180<br>591              | 0.013<br>.00051 | 200<br>656              | 0.018<br>.00071 | 210<br>688             | 0.029<br>.00114  | 220<br>772                                 | 0.030<br>.00118 | 220<br>772                      | 0.033<br>.00130 | 220<br>772             | 0.036<br>.00142 | 270<br>886     | 0.045<br>.00177 |  |
|  | 180<br>591              | 0.013<br>.00051 | 200<br>656              | 0.018<br>.00071 | 210<br>688             | 0.029<br>.00114  | 220<br>772                                 | 0.030<br>.00118 | 220<br>772                      | 0.033<br>.00130 | 220<br>772             | 0.036<br>.00142 | 270<br>886     | 0.045<br>.00177 |  |
|  | 180<br>591              | 0.013<br>.00051 | 200<br>656              | 0.018<br>.00071 | 210<br>688             | 0.029<br>.00114  | 220<br>772                                 | 0.030<br>.00118 | 220<br>772                      | 0.033<br>.00130 | 220<br>772             | 0.036<br>.00142 | 270<br>886     | 0.045<br>.00177 |  |
|  | 120<br>394              | 0.005<br>.00020 | 130<br>427              | 0.005<br>.00020 | 130<br>427             | 0.008<br>.00032  | 140<br>459                                 | 0.010<br>.00039 | 140<br>459                      | 0.011<br>.00043 | 150<br>492             | 0.012<br>.00047 | 160<br>525     | 0.021<br>.00083 |  |
|  | 120<br>394              | 0.010<br>.00039 | 130<br>427              | 0.014<br>.00055 | 130<br>427             | 0.020<br>.00079  | 140<br>459                                 | 0.022<br>.00087 | 150<br>492                      | 0.024<br>.00095 | 150<br>492             | 0.026<br>.00102 | 160<br>525     | 0.035<br>.00138 |  |
|  | 120<br>394              | 0.010<br>.00039 | 130<br>427              | 0.014<br>.00055 | 130<br>427             | 0.020<br>.00079  | 140<br>459                                 | 0.022<br>.00087 | 150<br>492                      | 0.024<br>.00095 | 150<br>492             | 0.026<br>.00102 | 160<br>525     | 0.035<br>.00138 |  |
|  | 120<br>394              | 0.005<br>.00020 | 130<br>427              | 0.005<br>.00020 | 130<br>427             | 0.008<br>.00032  | 140<br>459                                 | 0.010<br>.00039 | 140<br>459                      | 0.011<br>.00043 | 150<br>492             | 0.012<br>.00047 | 160<br>525     | 0.021<br>.00083 |  |
|  |                         |                 |                         |                 |                        |                  |                                            |                 |                                 |                 |                        |                 |                |                 |  |
|  |                         |                 |                         |                 |                        |                  |                                            |                 |                                 |                 |                        |                 |                |                 |  |

**NEW**

## Type C - 5 x d - Corner radius - 3FL

### MILLING WITH INTEGRATED COOLING

#### P&S - Corner radius



$l_1$  = Effective length  
 $l_2$  = Cutting length

| $d_1$  | $d_1$  | $d_1$ | $l_1$  | $l_1$ | $l_2$ | D<br>(h6) | L      | L    | r      | r     | Item<br>number     | Availability |
|--------|--------|-------|--------|-------|-------|-----------|--------|------|--------|-------|--------------------|--------------|
| [inch] | [inch] | [mm]  | [inch] | [mm]  | [mm]  | [mm]      | [inch] | [mm] | [inch] | [mm]  |                    |              |
|        | .039   | 1.0   | .197   | 5.00  | 2.00  | 4         | 1.57   | 40   | .0039  | 0.10  | 2.CMC42.C2Z3.100.1 | ■            |
|        | .039   | 1.0   | .197   | 5.00  | 2.00  | 4         | 1.57   | 40   | .0079  | 0.20  | 2.CMC42.C3Z3.100.1 | ■            |
|        | .043   | 1.1   | .217   | 5.50  | 2.20  | 4         | 1.57   | 40   | .0039  | 0.10  | 2.CMC42.C2Z3.110.1 | ■            |
|        | .043   | 1.1   | .217   | 5.50  | 2.20  | 4         | 1.57   | 40   | .0079  | 0.20  | 2.CMC42.C3Z3.110.1 | ■            |
|        | .047   | 1.2   | .236   | 6.00  | 2.40  | 4         | 1.57   | 40   | .0039  | 0.10  | 2.CMC42.C2Z3.120.1 | ■            |
|        | .047   | 1.2   | .236   | 6.00  | 2.40  | 4         | 1.57   | 40   | .0079  | 0.20  | 2.CMC42.C3Z3.120.1 | ■            |
|        | .051   | 1.3   | .256   | 6.50  | 2.60  | 4         | 1.57   | 40   | .0039  | 0.10  | 2.CMC42.C2Z3.130.1 | ■            |
|        | .051   | 1.3   | .256   | 6.50  | 2.60  | 4         | 1.57   | 40   | .0079  | 0.20  | 2.CMC42.C3Z3.130.1 | ■            |
|        | .055   | 1.4   | .276   | 7.00  | 2.80  | 4         | 1.57   | 40   | .0039  | 0.10  | 2.CMC42.C2Z3.140.1 | ■            |
|        | .055   | 1.4   | .276   | 7.00  | 2.80  | 4         | 1.57   | 40   | .0079  | 0.20  | 2.CMC42.C3Z3.140.1 | ■            |
|        | .059   | 1.5   | .295   | 7.50  | 3.00  | 4         | 1.57   | 40   | .0039  | 0.10  | 2.CMC42.C2Z3.150.1 | ■            |
|        | .059   | 1.5   | .295   | 7.50  | 3.00  | 4         | 1.57   | 40   | .0118  | 0.30  | 2.CMC42.C3Z3.150.1 | ■            |
| 1/16   | .0625  | 1.587 | .312   | 7.94  | 3.17  | 4         | 1.77   | 45   | .0050  | 0.127 | 2.CMC.PSRC2Z3.F116 | ■            |
| 1/16   | .0625  | 1.587 | .312   | 7.94  | 3.17  | 4         | 1.77   | 45   | .0100  | 0.254 | 2.CMC.PSRC3Z3.F116 | ■            |
|        | .063   | 1.6   | .315   | 8.00  | 3.20  | 4         | 1.77   | 45   | .0039  | 0.10  | 2.CMC42.C2Z3.160.1 | ■            |
|        | .063   | 1.6   | .315   | 8.00  | 3.20  | 4         | 1.77   | 45   | .0118  | 0.30  | 2.CMC42.C3Z3.160.1 | ■            |
|        | .067   | 1.7   | .335   | 8.50  | 3.40  | 4         | 1.77   | 45   | .0039  | 0.10  | 2.CMC42.C2Z3.170.1 | ■            |
|        | .067   | 1.7   | .335   | 8.50  | 3.40  | 4         | 1.77   | 45   | .0118  | 0.30  | 2.CMC42.C3Z3.170.1 | ■            |
|        | .071   | 1.8   | .354   | 9.00  | 3.60  | 4         | 1.77   | 45   | .0039  | 0.10  | 2.CMC42.C2Z3.180.1 | ■            |
|        | .071   | 1.8   | .354   | 9.00  | 3.60  | 4         | 1.77   | 45   | .0118  | 0.30  | 2.CMC42.C3Z3.180.1 | ■            |
|        | .075   | 1.9   | .374   | 9.50  | 3.80  | 4         | 1.73   | 44   | .0039  | 0.10  | 2.CMC42.C2Z3.190.1 | ■            |
|        | .075   | 1.9   | .374   | 9.50  | 3.80  | 4         | 1.73   | 44   | .0118  | 0.30  | 2.CMC42.C3Z3.190.1 | ■            |
|        | .079   | 2.0   | .394   | 10.00 | 4.00  | 4         | 1.73   | 44   | .0039  | 0.10  | 2.CMC42.C2Z3.200.1 | ■            |
|        | .079   | 2.0   | .394   | 10.00 | 4.00  | 4         | 1.73   | 44   | .0079  | 0.20  | 2.CMC42.C3Z3.200.1 | ■            |
|        | .079   | 2.0   | .394   | 10.00 | 4.00  | 4         | 1.73   | 44   | .0197  | 0.50  | 2.CMC42.C4Z3.200.1 | ■            |
|        | .083   | 2.1   | .413   | 10.50 | 4.20  | 4         | 1.73   | 44   | .0079  | 0.20  | 2.CMC42.C2Z3.210.1 | ■            |
|        | .083   | 2.1   | .413   | 10.50 | 4.20  | 4         | 1.73   | 44   | .0197  | 0.50  | 2.CMC42.C3Z3.210.1 | ■            |
|        | .087   | 2.2   | .433   | 11.00 | 4.40  | 4         | 1.73   | 44   | .0079  | 0.20  | 2.CMC42.C2Z3.220.1 | ■            |
|        | .087   | 2.2   | .433   | 11.00 | 4.40  | 4         | 1.73   | 44   | .0197  | 0.50  | 2.CMC42.C3Z3.220.1 | ■            |
|        | .091   | 2.3   | .453   | 11.50 | 4.60  | 4         | 1.73   | 44   | .0079  | 0.20  | 2.CMC42.C2Z3.230.1 | ■            |
|        | .091   | 2.3   | .453   | 11.50 | 4.60  | 4         | 1.73   | 44   | .0197  | 0.50  | 2.CMC42.C3Z3.230.1 | ■            |
| 3/32   | .0937  | 2.381 | .469   | 11.91 | 4.76  | 4         | 1.73   | 44   | .0050  | 0.127 | 2.CMC.PSRC2Z3.F332 | ■            |
| 3/32   | .0937  | 2.381 | .469   | 11.91 | 4.76  | 4         | 1.73   | 44   | .0100  | 0.254 | 2.CMC.PSRC3Z3.F332 | ■            |
| 3/32   | .0937  | 2.381 | .469   | 11.91 | 4.76  | 4         | 1.73   | 44   | .0150  | 0.381 | 2.CMC.PSRC4Z3.F332 | ■            |
|        | .094   | 2.4   | .472   | 12.00 | 4.80  | 4         | 1.73   | 44   | .0079  | 0.20  | 2.CMC42.C2Z3.240.1 | ■            |
|        | .094   | 2.4   | .472   | 12.00 | 4.80  | 4         | 1.73   | 44   | .0197  | 0.50  | 2.CMC42.C3Z3.240.1 | ■            |
|        | .098   | 2.5   | .492   | 12.50 | 5.00  | 6         | 2.17   | 55   | .0079  | 0.20  | 2.CMC42.C2Z3.250.1 | ■            |
|        | .098   | 2.5   | .492   | 12.50 | 5.00  | 6         | 2.17   | 55   | .0197  | 0.50  | 2.CMC42.C3Z3.250.1 | ■            |
|        | .102   | 2.6   | .512   | 13.00 | 5.20  | 6         | 2.17   | 55   | .0079  | 0.20  | 2.CMC42.C2Z3.260.1 | ■            |
|        | .102   | 2.6   | .512   | 13.00 | 5.20  | 6         | 2.17   | 55   | .0197  | 0.50  | 2.CMC42.C3Z3.260.1 | ■            |
|        | .106   | 2.7   | .531   | 13.50 | 5.40  | 6         | 2.17   | 55   | .0079  | 0.20  | 2.CMC42.C2Z3.270.1 | ■            |
|        | .106   | 2.7   | .531   | 13.50 | 5.40  | 6         | 2.17   | 55   | .0197  | 0.50  | 2.CMC42.C3Z3.270.1 | ■            |

■ Stock item

|         |    |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
|---------|----|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Carbide | 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                                                                      |
|         |    | 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> | d <sub>1</sub> | l <sub>1</sub> | l <sub>1</sub> | l <sub>2</sub> | D<br>(h6) | L      | L    | r      | r     | Item<br>number     | Availability |
|----------------|----------------|----------------|----------------|----------------|----------------|-----------|--------|------|--------|-------|--------------------|--------------|
| [inch]         | [inch]         | [mm]           | [inch]         | [mm]           | [mm]           | [mm]      | [inch] | [mm] | [inch] | [mm]  |                    |              |
|                | .110           | 2.8            | .551           | 14.00          | 5.60           | 6         | 2.17   | 55   | .0079  | 0.20  | 2.CMC42.C2Z3.280.1 | ■            |
|                | .110           | 2.8            | .551           | 14.00          | 5.60           | 6         | 2.17   | 55   | .0197  | 0.50  | 2.CMC42.C3Z3.280.1 | ■            |
|                | .114           | 2.9            | .571           | 14.50          | 5.80           | 6         | 2.17   | 55   | .0079  | 0.20  | 2.CMC42.C2Z3.290.1 | ■            |
|                | .114           | 2.9            | .571           | 14.50          | 5.80           | 6         | 2.17   | 55   | .0197  | 0.50  | 2.CMC42.C3Z3.290.1 | ■            |
|                | .118           | 3.0            | .591           | 15.00          | 6.00           | 6         | 2.17   | 55   | .0079  | 0.20  | 2.CMC42.C2Z3.300.1 | ■            |
|                | .118           | 3.0            | .591           | 15.00          | 6.00           | 6         | 2.17   | 55   | .0197  | 0.50  | 2.CMC42.C3Z3.300.1 | ■            |
|                | .122           | 3.1            | .610           | 15.50          | 6.20           | 6         | 2.36   | 60   | .0079  | 0.20  | 2.CMC42.C2Z3.310.1 | ■            |
|                | .122           | 3.1            | .610           | 15.50          | 6.20           | 6         | 2.36   | 60   | .0197  | 0.50  | 2.CMC42.C3Z3.310.1 | ■            |
| 1/8            | .1250          | 3.175          | .625           | 15.88          | 6.35           | 6         | 2.36   | 60   | .0100  | 0.254 | 2.CMC.PSRC2Z3.F18  | ■            |
| 1/8            | .1250          | 3.175          | .625           | 15.88          | 6.35           | 6         | 2.36   | 60   | .0150  | 0.381 | 2.CMC.PSRC3Z3.F18  | ■            |
|                | .130           | 3.3            | .650           | 16.50          | 6.60           | 6         | 2.36   | 60   | .0079  | 0.20  | 2.CMC42.C2Z3.330.1 | ■            |
|                | .130           | 3.3            | .650           | 16.50          | 6.60           | 6         | 2.36   | 60   | .0197  | 0.50  | 2.CMC42.C3Z3.330.1 | ■            |
|                | .146           | 3.7            | .728           | 18.50          | 7.40           | 6         | 2.36   | 60   | .0079  | 0.20  | 2.CMC42.C2Z3.370.1 | ■            |
|                | .146           | 3.7            | .728           | 18.50          | 7.40           | 6         | 2.36   | 60   | .0197  | 0.50  | 2.CMC42.C3Z3.370.1 | ■            |
| 5/32           | .1562          | 3.968          | .781           | 19.84          | 7.94           | 6         | 2.36   | 60   | .0100  | 0.254 | 2.CMC.PSRC2Z3.F532 | ■            |
| 5/32           | .1562          | 3.968          | .781           | 19.84          | 7.94           | 6         | 2.36   | 60   | .0150  | 0.381 | 2.CMC.PSRC3Z3.F532 | ■            |
|                | .157           | 4.0            | .787           | 20.00          | 8.00           | 6         | 2.36   | 60   | .0079  | 0.20  | 2.CMC42.C2Z3.400.1 | ■            |
|                | .157           | 4.0            | .787           | 20.00          | 8.00           | 6         | 2.36   | 60   | .0197  | 0.50  | 2.CMC42.C3Z3.400.1 | ■            |
|                | .169           | 4.3            | .846           | 21.50          | 8.60           | 8         | 2.76   | 70   | .0079  | 0.20  | 2.CMC42.C2Z3.430.1 | ■            |
|                | .169           | 4.3            | .846           | 21.50          | 8.60           | 8         | 2.76   | 70   | .0197  | 0.50  | 2.CMC42.C3Z3.430.1 | ■            |
|                | .185           | 4.7            | .925           | 23.50          | 9.40           | 8         | 2.76   | 70   | .0079  | 0.20  | 2.CMC42.C2Z3.470.1 | ■            |
|                | .185           | 4.7            | .925           | 23.50          | 9.40           | 8         | 2.76   | 70   | .0197  | 0.50  | 2.CMC42.C3Z3.470.1 | ■            |
| 3/16           | .1875          | 4.762          | .937           | 23.81          | 9.52           | 8         | 2.76   | 70   | .0100  | 0.254 | 2.CMC.PSRC2Z3.F316 | ■            |
| 3/16           | .1875          | 4.762          | .937           | 23.81          | 9.52           | 8         | 2.76   | 70   | .0150  | 0.381 | 2.CMC.PSRC3Z3.F316 | ■            |
|                | .189           | 4.8            | .945           | 24.00          | 9.60           | 8         | 2.76   | 70   | .0079  | 0.20  | 2.CMC42.C2Z3.480.1 | ■            |
|                | .189           | 4.8            | .945           | 24.00          | 9.60           | 8         | 2.76   | 70   | .0197  | 0.50  | 2.CMC42.C3Z3.480.1 | ■            |
|                | .197           | 5.0            | .984           | 25.00          | 10.00          | 8         | 2.76   | 70   | .0079  | 0.20  | 2.CMC42.C2Z3.500.1 | ■            |
|                | .197           | 5.0            | .984           | 25.00          | 10.00          | 8         | 2.76   | 70   | .0197  | 0.50  | 2.CMC42.C3Z3.500.1 | ■            |
|                | .209           | 5.3            | 1.04           | 26.50          | 10.60          | 10        | 2.76   | 70   | .0079  | 0.20  | 2.CMC42.C2Z3.530.1 | ■            |
|                | .209           | 5.3            | 1.04           | 26.50          | 10.60          | 10        | 2.76   | 70   | .0197  | 0.50  | 2.CMC42.C3Z3.530.1 | ■            |
| 7/32           | .2189          | 5.560          | 1.09           | 27.80          | 11.12          | 10        | 2.76   | 70   | .0150  | 0.381 | 2.CMC.PSRC2Z3.F732 | ■            |
| 7/32           | .2189          | 5.560          | 1.09           | 27.80          | 11.12          | 10        | 2.76   | 70   | .0300  | 0.762 | 2.CMC.PSRC3Z3.F732 | ■            |
|                | .224           | 5.7            | 1.12           | 28.50          | 11.40          | 10        | 2.76   | 70   | .0079  | 0.20  | 2.CMC42.C2Z3.570.1 | ■            |
|                | .224           | 5.7            | 1.12           | 28.50          | 11.40          | 10        | 2.76   | 70   | .0197  | 0.50  | 2.CMC42.C3Z3.570.1 | ■            |
|                | .236           | 6.0            | 1.18           | 30.00          | 12.00          | 10        | 2.76   | 70   | .0079  | 0.20  | 2.CMC42.C2Z3.600.1 | ■            |
|                | .236           | 6.0            | 1.18           | 30.00          | 12.00          | 10        | 2.76   | 70   | .0197  | 0.50  | 2.CMC42.C3Z3.600.1 | ■            |
|                | .236           | 6.0            | 1.18           | 30.00          | 12.00          | 10        | 2.76   | 70   | .0394  | 1.00  | 2.CMC42.C4Z3.600.1 | ■            |
| 1/4            | .2500          | 6.350          | 1.25           | 31.75          | 12.70          | 10        | 2.76   | 70   | .0150  | 0.381 | 2.CMC.PSRC2Z3.F14  | ■            |
| 1/4            | .2500          | 6.350          | 1.25           | 31.75          | 12.70          | 10        | 2.76   | 70   | .0300  | 0.762 | 2.CMC.PSRC3Z3.F14  | ■            |
| 1/4            | .2500          | 6.350          | 1.25           | 31.75          | 12.70          | 10        | 2.76   | 70   | .0600  | 1.524 | 2.CMC.PSRC4Z3.F14  | ■            |
|                | .315           | 8.0            | 1.57           | 40.00          | 16.00          | 12        | 3.54   | 90   | .0079  | 0.20  | 2.CMC42.C2Z3.800.1 | ■            |
|                | .315           | 8.0            | 1.57           | 40.00          | 16.00          | 12        | 3.54   | 90   | .0197  | 0.50  | 2.CMC42.C3Z3.800.1 | ■            |
|                | .315           | 8.0            | 1.57           | 40.00          | 16.00          | 12        | 3.54   | 90   | .0591  | 1.50  | 2.CMC42.C4Z3.800.1 | ■            |

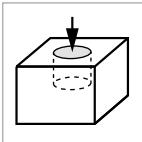
■ Stock item

**NEW**

## Type C - Plunge - Slot milling

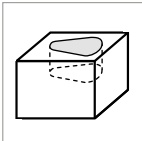
### MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

#### Plunge milling



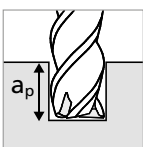
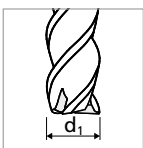
■  $f_{z,p}$ : for plunge milling

#### Slot milling



■  $f_{z,p}$ : for plunge milling

■  $f_{z,s}$ : for slot milling



| Materials group      | Material                                               | Mat. no. | DIN                | AISI/ASTM/UNS           | 1.0 mm   .039" |                  |                  |         |
|----------------------|--------------------------------------------------------|----------|--------------------|-------------------------|----------------|------------------|------------------|---------|
|                      |                                                        |          |                    |                         | $v_c$          | $f_{z,p}$        | $f_{z,s}$        | $a_p$   |
| <b>P</b>             | Unalloyed carbon steel<br>$R_m < 800 \text{ N/mm}^2$   | 1.0301   | C10                | AISI 1010               | 100<br>328     | 0.0013<br>.00005 | 0.0046<br>.00018 | 0.5xd1  |
|                      |                                                        | 1.0401   | C15                | AISI 1015               |                |                  |                  |         |
|                      |                                                        | 1.1191   | C45E/CK45          | AISI 1045               |                |                  |                  |         |
|                      |                                                        | 1.0044   | S275JR             | AISI 1020               |                |                  |                  |         |
|                      |                                                        | 1.0715   | 11SMn30            | AISI 1215               |                |                  |                  |         |
|                      | Low alloyed steel<br>$R_m > 900 \text{ N/mm}^2$        | 1.5752   | 15NiCr13           | ASTM 3415 / AISI 3310   | 100<br>328     | 0.0014<br>.00006 | 0.0049<br>.00019 | 0.5xd1  |
|                      |                                                        | 1.7131   | 16MnCr5            | AISI 5115               |                |                  |                  |         |
|                      |                                                        | 1.3505   | 100Cr6             | AISI 52100              |                |                  |                  |         |
|                      |                                                        | 1.7225   | 42CrMo4            | AISI 4140               |                |                  |                  |         |
|                      |                                                        | 1.2842   | 90MnCrV8           | AISI O2                 |                |                  |                  |         |
|                      | High alloyed tool steel<br>$R_m < 1200 \text{ N/mm}^2$ | 1.2379   | X153CrMoV12        | AISI D2                 | 100<br>328     | 0.0012<br>.00005 | 0.0042<br>.00017 | 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>             | Stainless steel ferritic                               | 1.4016   | X6Cr17             | AISI 430 / UNS S43000   | 100<br>328     | 0.0010<br>.00004 | 0.0035<br>.00014 | 0.5xd1  |
|                      |                                                        | 1.4105   | X6CrMoS17          | AISI 430F               |                |                  |                  |         |
|                      | Stainless steel martensitic                            | 1.4034   | X46Cr13            | AISI 420C               | 100<br>328     | 0.0010<br>.00004 | 0.0035<br>.00014 | 0.25xd1 |
|                      |                                                        | 1.4112   | X90CrMoV18         | AISI 440B               |                |                  |                  |         |
|                      | Stainless steel martensitic – PH                       | 1.4542   | X5CrNiCuNb16-4     | AISI 630 / ASTM 17-4 PH | 100<br>328     | 0.0010<br>.00004 | 0.0035<br>.00014 | 0.25xd1 |
|                      |                                                        | 1.4545   | X5CrNiCuNb15-5     | ASTM 15-5 PH            |                |                  |                  |         |
|                      | Stainless steel austenitic                             | 1.4301   | X5CrNi18-10        | AISI 304                | 100<br>328     | 0.0010<br>.00004 | 0.0035<br>.00014 | 0.5xd1  |
|                      |                                                        | 1.4435   | X2CrNiMo18-14-3    | AISI 316L               |                |                  |                  |         |
|                      |                                                        | 1.4441   | X2CrNiMo18-15-3    | AISI 316LM              |                |                  |                  |         |
| <b>K</b>             | Cast iron                                              | 1.4539   | X1NiCrMoCu25-20-5  | AISI 904L               | 100<br>328     | 0.0013<br>.00005 | 0.0042<br>.00017 | 0.5xd1  |
|                      |                                                        | 0.6020   | GG20               | ASTM 30                 |                |                  |                  |         |
|                      |                                                        | 0.6030   | GG30               | ASTM 40B                |                |                  |                  |         |
|                      |                                                        | 0.7040   | GGG40              | ASTM 60-40-18           |                |                  |                  |         |
| <b>N</b>             | Aluminium alloy wrought                                | 0.7060   | GGG60              | ASTM 80-60-03           | 100<br>328     | 0.0012<br>.00005 | 0.0100<br>.00039 | 0.5xd1  |
|                      |                                                        | 3.2315   | AlMgSi1            | ASTM 6351               |                |                  |                  |         |
|                      | Aluminium alloy cast                                   | 3.4365   | AlZnMgCu1.5        | ASTM 7075               | 100<br>328     | 0.0012<br>.00005 | 0.0100<br>.00039 | 0.5xd1  |
|                      |                                                        | 3.2163   | GD-AlSi9Cu3        | ASTM A380               |                |                  |                  |         |
|                      | Copper                                                 | 3.2381   | GD-AlSi10Mg        | UNS A03590              | 100<br>328     | 0.0012<br>.00005 | 0.0100<br>.00039 | 0.5xd1  |
|                      |                                                        | 2.0040   | Cu-OF / CW008A     | UNS C10100              |                |                  |                  |         |
|                      | Brass lead free                                        | 2.0065   | Cu-ETP / CW004A    | UNS C11000              | 100<br>328     | 0.0012<br>.00005 | 0.0100<br>.00039 | 0.5xd1  |
|                      |                                                        | 2.0321   | CuZn37 CW508L      | UNS C27400              |                |                  |                  |         |
|                      | Brass, Bronze<br>$R_m < 400 \text{ N/mm}^2$            | 2.0360   | CuZn40 CW509L      | UNS C28000              | 100<br>328     | 0.0012<br>.00005 | 0.0100<br>.00039 | 0.5xd1  |
|                      |                                                        | 2.0401   | CuZn39Pb3 / CW614N | UNS C38500              |                |                  |                  |         |
|                      | Bronze<br>$R_m < 600 \text{ N/mm}^2$                   | 2.1020   | CuSn6              | UNS C51900              | 100<br>328     | 0.0012<br>.00005 | 0.0100<br>.00039 | 0.5xd1  |
|                      |                                                        | 2.0966   | CuAl10Ni5Fe4       | UNS C63000              |                |                  |                  |         |
| <b>S<sub>1</sub></b> | Super alloys                                           | 2.0960   | CuAl9Mn2           | UNS C63200              | 40<br>131      | 0.0010<br>.00004 | 0.0035<br>.00014 | 0.25xd1 |
|                      |                                                        | 2.4856   |                    | Inconel 625             |                |                  |                  |         |
|                      |                                                        | 2.4668   |                    | Inconel 718             |                |                  |                  |         |
|                      |                                                        | 2.4617   | NiMo28             | Hastelloy B-2           |                |                  |                  |         |
|                      | Titanium pure                                          | 2.4665   | NiCr22Fe18Mo       | Hastelloy X             | 80<br>262      | 0.0010<br>.00004 | 0.0032<br>.00012 | 0.25xd1 |
|                      |                                                        | 3.7035   | Gr.2               | ASTM B348 / F67         |                |                  |                  |         |
|                      | Titanium alloys                                        | 3.7065   | Gr.4               | ASTM B348 / F68         | 80<br>262      | 0.0010<br>.00004 | 0.0032<br>.00012 | 0.25xd1 |
|                      |                                                        | 3.7165   | TiAl6V4            | ASTM B348 / F136        |                |                  |                  |         |
|                      | CrCo alloys                                            | 9.9367   | TiAl6Nb7           | ASTM F1295              | 60<br>197      | 0.0010<br>.00004 | 0.0035<br>.00014 | 0.25xd1 |
|                      |                                                        | 2.4964   | CoCr20W15Ni        | Haynes 25               |                |                  |                  |         |
| <b>H<sub>1</sub></b> | Hardened steel<br>$\geq 55 \text{ HRC}$                |          | CrCoMo28           | ASTM F1537              |                |                  |                  |         |
|                      |                                                        |          |                    |                         |                |                  |                  |         |
| <b>H<sub>2</sub></b> | Hardened steel<br>$\geq 55 \text{ HRC}$                | 1.2510   | 100MnCrMoW4        | AISI O1                 |                |                  |                  |         |
|                      |                                                        | 1.2379   | X153CrMoV12        | AISI D2                 |                |                  |                  |         |

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

RECOMMENDATION FOR USE  
● Excellent | ● Good | ○ Acceptable | ☒ Not recommended

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

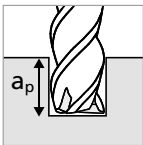
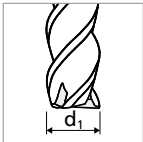
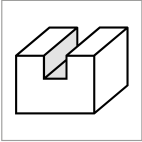
| 1/16"          |                  |                  |                | 3/32"          |                  |                  |                | 1/8"           |                  |                  |                | 5/32"          |                  |                  |                | 3/16" - 7/32"  |                  |                  |                | 1/4"                            |                  |                  |                |
|----------------|------------------|------------------|----------------|----------------|------------------|------------------|----------------|----------------|------------------|------------------|----------------|----------------|------------------|------------------|----------------|----------------|------------------|------------------|----------------|---------------------------------|------------------|------------------|----------------|
| 1.5 mm   .059" |                  |                  |                | 2.0 mm   .079" |                  |                  |                | 3.0 mm   .118" |                  |                  |                | 4.0 mm   .157" |                  |                  |                | 5.0 mm   .197" |                  |                  |                | 6.0 mm - 8.0 mm   .236" - .315" |                  |                  |                |
| 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<br>394     | 0.0020<br>.00008 | 0.0065<br>.00026 | 0.5xd1         | 120<br>394     | 0.0026<br>.00010 | 0.0091<br>.00036 | 0.5xd1         | 140<br>459     | 0.004<br>.00014  | 0.013<br>.00051  | 0.5xd1         | 140<br>459     | 0.005<br>.00020  | 0.020<br>.00077  | 0.5xd1         | 150<br>492     | 0.005<br>.00020  | 0.026<br>.00102  | 0.5xd1         | 160<br>525                      | 0.006<br>.00024  | 0.033<br>.00128  | 0.5xd1         |
| 120<br>394     | 0.0021<br>.00008 | 0.0070<br>.00028 | 0.5xd1         | 120<br>394     | 0.0028<br>.00011 | 0.0098<br>.00039 | 0.5xd1         | 140<br>459     | 0.004<br>.00014  | 0.014<br>.00055  | 0.5xd1         | 140<br>459     | 0.005<br>.00020  | 0.021<br>.00083  | 0.5xd1         | 150<br>492     | 0.006<br>.00022  | 0.027<br>.00106  | 0.5xd1         | 160<br>525                      | 0.006<br>.00024  | 0.034<br>.00133  | 0.5xd1         |
| 120<br>394     | 0.0018<br>.00007 | 0.0060<br>.00024 | 0.25xd1        | 120<br>394     | 0.0024<br>.00009 | 0.0084<br>.00033 | 0.25xd1        | 140<br>459     | 0.003<br>.00012  | 0.012<br>.00047  | 0.25xd1        | 140<br>459     | 0.004<br>.00016  | 0.017<br>.00068  | 0.25xd1        | 150<br>492     | 0.004<br>.00016  | 0.022<br>.00087  | 0.25xd1        | 160<br>525                      | 0.005<br>.00020  | 0.028<br>.00108  | 0.25xd1        |
| 120<br>394     | 0.0015<br>.00006 | 0.0050<br>.00020 | 0.5xd1         | 120<br>394     | 0.0020<br>.00008 | 0.0070<br>.00028 | 0.5xd1         | 140<br>459     | 0.003<br>.00012  | 0.010<br>.00039  | 0.5xd1         | 140<br>459     | 0.004<br>.00016  | 0.015<br>.00059  | 0.5xd1         | 150<br>492     | 0.004<br>.00016  | 0.020<br>.00079  | 0.5xd1         | 160<br>525                      | 0.005<br>.00020  | 0.025<br>.00098  | 0.5xd1         |
| 120<br>394     | 0.0015<br>.00006 | 0.0050<br>.00020 | 0.25xd1        | 120<br>394     | 0.0020<br>.00008 | 0.0070<br>.00028 | 0.25xd1        | 140<br>459     | 0.003<br>.00012  | 0.010<br>.00039  | 0.25xd1        | 140<br>459     | 0.004<br>.00016  | 0.015<br>.00059  | 0.25xd1        | 150<br>492     | 0.004<br>.00016  | 0.020<br>.00079  | 0.25xd1        | 160<br>525                      | 0.005<br>.00020  | 0.025<br>.00098  | 0.25xd1        |
| 120<br>394     | 0.0015<br>.00006 | 0.0050<br>.00020 | 0.25xd1        | 120<br>394     | 0.0020<br>.00008 | 0.0070<br>.00028 | 0.25xd1        | 140<br>459     | 0.003<br>.00012  | 0.010<br>.00039  | 0.25xd1        | 140<br>459     | 0.004<br>.00016  | 0.015<br>.00059  | 0.25xd1        | 150<br>492     | 0.004<br>.00016  | 0.020<br>.00079  | 0.25xd1        | 160<br>525                      | 0.005<br>.00020  | 0.025<br>.00098  | 0.25xd1        |
| 120<br>394     | 0.0015<br>.00006 | 0.0050<br>.00020 | 0.5xd1         | 120<br>394     | 0.0020<br>.00008 | 0.0070<br>.00028 | 0.5xd1         | 140<br>459     | 0.003<br>.00012  | 0.010<br>.00039  | 0.5xd1         | 140<br>459     | 0.004<br>.00016  | 0.015<br>.00059  | 0.5xd1         | 150<br>492     | 0.004<br>.00016  | 0.020<br>.00079  | 0.5xd1         | 160<br>525                      | 0.005<br>.00020  | 0.025<br>.00098  | 0.5xd1         |
| 120<br>394     | 0.0019<br>.00007 | 0.0060<br>.00024 | 0.5xd1         | 120<br>394     | 0.0024<br>.00009 | 0.0084<br>.00033 | 0.5xd1         | 140<br>459     | 0.004<br>.00014  | 0.012<br>.00047  | 0.5xd1         | 140<br>459     | 0.004<br>.00016  | 0.017<br>.00068  | 0.5xd1         | 150<br>492     | 0.005<br>.00019  | 0.022<br>.00087  | 0.5xd1         | 160<br>525                      | 0.005<br>.00020  | 0.028<br>.00108  | 0.5xd1         |
| 120<br>394     | 0.0018<br>.00007 | 0.0160<br>.00063 | 0.5xd1         | 120<br>394     | 0.0024<br>.00009 | 0.0210<br>.00083 | 0.5xd1         | 150<br>492     | 0.004<br>.00014  | 0.034<br>.00134  | 0.5xd1         | 160<br>525     | 0.004<br>.00016  | 0.035<br>.00138  | 0.5xd1         | 170<br>558     | 0.005<br>.00019  | 0.036<br>.00142  | 0.5xd1         | 180<br>591                      | 0.005<br>.00020  | 0.037<br>.00146  | 0.5xd1         |
| 120<br>394     | 0.0018<br>.00007 | 0.0160<br>.00063 | 0.5xd1         | 120<br>394     | 0.0024<br>.00009 | 0.0210<br>.00083 | 0.5xd1         | 150<br>492     | 0.004<br>.00014  | 0.034<br>.00134  | 0.5xd1         | 160<br>525     | 0.004<br>.00016  | 0.035<br>.00138  | 0.5xd1         | 170<br>558     | 0.005<br>.00019  | 0.036<br>.00142  | 0.5xd1         | 180<br>591                      | 0.005<br>.00020  | 0.037<br>.00146  | 0.5xd1         |
| 120<br>394     | 0.0018<br>.00007 | 0.0160<br>.00063 | 0.5xd1         | 120<br>394     | 0.0024<br>.00009 | 0.0210<br>.00083 | 0.5xd1         | 150<br>492     | 0.004<br>.00014  | 0.034<br>.00134  | 0.5xd1         | 160<br>525     | 0.004<br>.00016  | 0.035<br>.00138  | 0.5xd1         | 170<br>558     | 0.005<br>.00019  | 0.036<br>.00142  | 0.5xd1         | 180<br>591                      | 0.005<br>.00020  | 0.037<br>.00146  | 0.5xd1         |
| 120<br>394     | 0.0018<br>.00007 | 0.0160<br>.00063 | 0.5xd1         | 120<br>394     | 0.0024<br>.00009 | 0.0210<br>.00083 | 0.5xd1         | 150<br>492     | 0.004<br>.00014  | 0.034<br>.00134  | 0.5xd1         | 160<br>525     | 0.004<br>.00016  | 0.035<br>.00138  | 0.5xd1         | 170<br>558     | 0.005<br>.00019  | 0.036<br>.00142  | 0.5xd1         | 180<br>591                      | 0.005<br>.00020  | 0.037<br>.00146  | 0.5xd1         |
| 120<br>394     | 0.0018<br>.00007 | 0.0160<br>.00063 | 0.5xd1         | 120<br>394     | 0.0024<br>.00009 | 0.0210<br>.00083 | 0.5xd1         | 150<br>492     | 0.004<br>.00014  | 0.034<br>.00134  | 0.5xd1         | 160<br>525     | 0.004<br>.00016  | 0.035<br>.00138  | 0.5xd1         | 170<br>558     | 0.005<br>.00019  | 0.036<br>.00142  | 0.5xd1         | 180<br>591                      | 0.005<br>.00020  | 0.037<br>.00146  | 0.5xd1         |
| 40<br>131      | 0.0015<br>.00006 | 0.0050<br>.00020 | 0.25xd1        | 50<br>164      | 0.0020<br>.00008 | 0.0070<br>.00028 | 0.25xd1        | 50<br>164      | 0.003<br>.00012  | 0.010<br>.00039  | 0.25xd1        | 60<br>197      | 0.004<br>.00016  | 0.014<br>.00053  | 0.25xd1        | 80<br>262      | 0.004<br>.00016  | 0.018<br>.00071  | 0.25xd1        | 80<br>262                       | 0.005<br>.00020  | 0.021<br>.00084  | 0.25xd1        |
| 90<br>295      | 0.0014<br>.00005 | 0.0045<br>.00018 | 0.25xd1        | 100<br>328     | 0.0018<br>.00007 | 0.0063<br>.00025 | 0.25xd1        | 110<br>361     | 0.003<br>.00012  | 0.010<br>.00039  | 0.25xd1        | 120<br>394     | 0.004<br>.00016  | 0.013<br>.00050  | 0.25xd1        | 120<br>394     | 0.004<br>.00016  | 0.016<br>.00064  | 0.25xd1        | 120<br>394                      | 0.005<br>.00020  | 0.019<br>.00075  | 0.25xd1        |
| 90<br>295      | 0.0014<br>.00005 | 0.0045<br>.00018 | 0.25xd1        | 100<br>328     | 0.0018<br>.00007 | 0.0063<br>.00025 | 0.25xd1        | 110<br>361     | 0.003<br>.00012  | 0.010<br>.00039  | 0.25xd1        | 120<br>394     | 0.004<br>.00016  | 0.013<br>.00050  | 0.25xd1        | 120<br>394     | 0.004<br>.00016  | 0.016<br>.00064  | 0.25xd1        | 120<br>394                      | 0.005<br>.00020  | 0.019<br>.00075  | 0.25xd1        |
| 60<br>197      | 0.0015<br>.00006 | 0.0050<br>.00020 | 0.25xd1        | 80<br>262      | 0.0020<br>.00008 | 0.0070<br>.00028 | 0.25xd1        | 80<br>262      | 0.003<br>.00012  | 0.010<br>.00039  | 0.25xd1        | 100<br>328     | 0.004<br>.00016  | 0.014<br>.00053  | 0.25xd1        | 100<br>328     | 0.004<br>.00016  | 0.018<br>.00071  | 0.25xd1        | 120<br>394                      | 0.005<br>.00020  | 0.021<br>.00084  | 0.25xd1        |
|                |                  |                  |                |                |                  |                  |                |                |                  |                  |                |                |                  |                  |                |                |                  |                  |                |                                 |                  |                  |                |
|                |                  |                  |                |                |                  |                  |                |                |                  |                  |                |                |                  |                  |                |                |                  |                  |                |                                 |                  |                  |                |

**NEW**

## Type C - Milling of through slots

### MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

Through slot  
milling



| Materials group      | Material                                               | Mat. no. | DIN                | AISI/ASTM/UNS           | 1.0 mm   .039" |                 |         |
|----------------------|--------------------------------------------------------|----------|--------------------|-------------------------|----------------|-----------------|---------|
|                      |                                                        |          |                    |                         | $v_c$          | $f_z$           | $a_p$   |
| <b>P</b>             | Unalloyed carbon steel<br>$R_m < 800 \text{ N/mm}^2$   | 1.0301   | C10                | AISI 1010               | 120<br>394     | 0.009<br>.00035 | 0.5xd1  |
|                      |                                                        | 1.0401   | C15                | AISI 1015               |                |                 |         |
|                      |                                                        | 1.1191   | C45E/CK45          | AISI 1045               |                |                 |         |
|                      |                                                        | 1.0044   | S275JR             | AISI 1020               |                |                 |         |
|                      |                                                        | 1.0715   | 11SMn30            | AISI 1215               |                |                 |         |
|                      | Low alloyed steel<br>$R_m > 900 \text{ N/mm}^2$        | 1.5752   | 15NiCr13           | ASTM 3415 / AISI 3310   | 120<br>394     | 0.008<br>.00032 | 0.5xd1  |
|                      |                                                        | 1.7131   | 16MnCr5            | AISI 5115               |                |                 |         |
|                      |                                                        | 1.3505   | 100Cr6             | AISI 52100              |                |                 |         |
|                      |                                                        | 1.7225   | 42CrMo4            | AISI 4140               |                |                 |         |
|                      |                                                        | 1.2842   | 90MnCrV8           | AISI O2                 |                |                 |         |
|                      | High alloyed tool steel<br>$R_m < 1200 \text{ N/mm}^2$ | 1.2379   | X153CrMoV12        | AISI D2                 | 120<br>394     | 0.006<br>.00024 | 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>             | Stainless steel ferritic                               | 1.4016   | X6Cr17             | AISI 430 / UNS S43000   | 120<br>394     | 0.009<br>.00035 | 0.5xd1  |
|                      |                                                        | 1.4105   | X6CrMoS17          | AISI 430F               |                |                 |         |
|                      | Stainless steel martensitic                            | 1.4034   | X46Cr13            | AISI 420C               | 120<br>394     | 0.009<br>.00035 | 0.5xd1  |
|                      |                                                        | 1.4112   | X90CrMoV18         | AISI 440B               |                |                 |         |
|                      | Stainless steel martensitic – PH                       | 1.4542   | X5CrNiCuNb16-4     | AISI 630 / ASTM 17-4 PH | 120<br>394     | 0.009<br>.00035 | 0.5xd1  |
|                      |                                                        | 1.4545   | X5CrNiCuNb15-5     | ASTM 15-5 PH            |                |                 |         |
|                      | Stainless steel austenitic                             | 1.4301   | X5CrNi18-10        | AISI 304                | 120<br>394     | 0.007<br>.00028 | 0.5xd1  |
|                      |                                                        | 1.4435   | X2CrNiMo18-14-3    | AISI 316L               |                |                 |         |
|                      |                                                        | 1.4441   | X2CrNiMo18-15-3    | AISI 316LM              |                |                 |         |
| <b>K</b>             | Cast iron                                              | 0.6020   | GG20               | ASTM 30                 | 100<br>328     | 0.007<br>.00028 | 0.5xd1  |
|                      |                                                        | 0.6030   | GG30               | ASTM 40B                |                |                 |         |
|                      |                                                        | 0.7040   | GGG40              | ASTM 60-40-18           |                |                 |         |
|                      |                                                        | 0.7060   | GGG60              | ASTM 80-60-03           |                |                 |         |
|                      |                                                        |          |                    |                         |                |                 |         |
| <b>N</b>             | Aluminium alloy wrought                                | 3.2315   | AlMgSi1            | ASTM 6351               | 170<br>558     | 0.010<br>.00039 | 0.5xd1  |
|                      |                                                        | 3.4365   | AlZnMgCu1.5        | ASTM 7075               |                |                 |         |
|                      | Aluminium alloy cast                                   | 3.2163   | GD-AlSi9Cu3        | ASTM A380               | 170<br>558     | 0.010<br>.00039 | 0.5xd1  |
|                      |                                                        | 3.2381   | GD-AlSi10Mg        | UNS A03590              |                |                 |         |
|                      | Copper                                                 | 2.0040   | Cu-OF / CW008A     | UNS C10100              | 170<br>558     | 0.012<br>.00047 | 0.5xd1  |
|                      |                                                        | 2.0065   | Cu-ETP / CW004A    | UNS C11000              |                |                 |         |
|                      | Brass lead free                                        | 2.0321   | CuZn37 CW508L      | UNS C27400              | 170<br>558     | 0.012<br>.00047 | 0.5xd1  |
|                      |                                                        | 2.0360   | CuZn40 CW509L      | UNS C28000              |                |                 |         |
|                      | Brass, Bronze<br>$R_m < 400 \text{ N/mm}^2$            | 2.0401   | CuZn39Pb3 / CW614N | UNS C38500              | 170<br>558     | 0.012<br>.00047 | 0.5xd1  |
|                      |                                                        | 2.1020   | CuSn6              | UNS C51900              |                |                 |         |
|                      | Bronze<br>$R_m < 600 \text{ N/mm}^2$                   | 2.0966   | CuAl10Ni5Fe4       | UNS C63000              | 170<br>558     | 0.011<br>.00043 | 0.5xd1  |
|                      |                                                        | 2.0960   | CuAl9Mn2           | UNS C63200              |                |                 |         |
| <b>S<sub>1</sub></b> | Super alloys                                           | 2.4856   |                    | Inconel 625             | 80<br>262      | 0.005<br>.00020 | 0.25xd1 |
|                      |                                                        | 2.4668   |                    | Inconel 718             |                |                 |         |
|                      |                                                        | 2.4617   | NiMo28             | Hastelloy B-2           |                |                 |         |
|                      |                                                        | 2.4665   | NiCr22Fe18Mo       | Hastelloy X             |                |                 |         |
| <b>S<sub>2</sub></b> | Titanium pure                                          | 3.7035   | Gr.2               | ASTM B348 / F67         | 80<br>262      | 0.009<br>.00035 | 0.25xd1 |
|                      |                                                        | 3.7065   | Gr.4               | ASTM B348 / F68         |                |                 |         |
| <b>S<sub>3</sub></b> | Titanium alloys                                        | 3.7165   | TiAl6V4            | ASTM B348 / F136        | 80<br>262      | 0.009<br>.00035 | 0.25xd1 |
|                      |                                                        | 9.9367   | TiAl6Nb7           | ASTM F1295              |                |                 |         |
| <b>H<sub>1</sub></b> | CrCo alloys                                            | 2.4964   | CoCr20W15Ni        | Haynes 25               | 80<br>262      | 0.005<br>.00020 | 0.25xd1 |
|                      |                                                        |          | CrCoMo28           | ASTM F1537              |                |                 |         |
| <b>H<sub>2</sub></b> | Hardened steel<br>$< 55 \text{ HRC}$                   | 1.2510   | 100MnCrMoW4        | AISI O1                 |                |                 |         |
|                      | Hardened steel<br>$\geq 55 \text{ HRC}$                | 1.2379   | X153CrMoV12        | AISI D2                 |                |                 |         |

**V<sub>c</sub>** [m/min] | [**SFM**]  
**f<sub>z</sub>** [mm] | [**IPT**]  
**a<sub>p</sub>** [mm] | [**inch**]

RECOMMENDATION FOR USE

● Excellent | ● Good | ○ Acceptable | ⊗ Not recommended

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

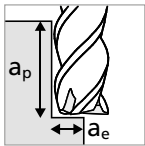
|  | 1/16"          |                 |                | 3/32"          |                 |                | 1/8"           |                 |                | 5/32"          |                 |                | 3/16" - 7/32"  |                 |                | 1/4"                            |                 |                |
|--|----------------|-----------------|----------------|----------------|-----------------|----------------|----------------|-----------------|----------------|----------------|-----------------|----------------|----------------|-----------------|----------------|---------------------------------|-----------------|----------------|
|  | 1.5 mm   .059" |                 |                | 2.0 mm   .079" |                 |                | 3.0 mm   .118" |                 |                | 4.0 mm   .157" |                 |                | 5.0 mm   .197" |                 |                | 6.0 mm - 8.0 mm   .236" - .315" |                 |                |
|  | 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<br>459     | 0.015<br>.00059 | 0.5xd1         | 160<br>525     | 0.020<br>.00079 | 0.5xd1         | 180<br>591     | 0.029<br>.00114 | 0.5xd1         | 200<br>656     | 0.031<br>.00122 | 0.5xd1         | 200<br>656     | 0.031<br>.00122 | 0.5xd1         | 220<br>722                      | 0.032<br>.00126 | 0.5xd1         |
|  | 140<br>459     | 0.013<br>.00051 | 0.5xd1         | 160<br>525     | 0.019<br>.00075 | 0.5xd1         | 180<br>591     | 0.028<br>.00110 | 0.5xd1         | 200<br>656     | 0.029<br>.00114 | 0.5xd1         | 200<br>656     | 0.030<br>.00118 | 0.5xd1         | 220<br>722                      | 0.031<br>.00122 | 0.5xd1         |
|  | 140<br>459     | 0.012<br>.00047 | 0.25xd1        | 160<br>525     | 0.017<br>.00067 | 0.25xd1        | 180<br>591     | 0.025<br>.00098 | 0.25xd1        | 200<br>656     | 0.026<br>.00102 | 0.25xd1        | 200<br>656     | 0.026<br>.00102 | 0.25xd1        | 220<br>722                      | 0.027<br>.00106 | 0.25xd1        |
|  | 140<br>459     | 0.015<br>.00059 | 0.5xd1         | 160<br>525     | 0.020<br>.00079 | 0.5xd1         | 180<br>591     | 0.028<br>.00110 | 0.5xd1         | 200<br>656     | 0.029<br>.00114 | 0.5xd1         | 200<br>656     | 0.030<br>.00118 | 0.5xd1         | 220<br>722                      | 0.031<br>.00122 | 0.5xd1         |
|  | 140<br>459     | 0.013<br>.00051 | 0.5xd1         | 160<br>525     | 0.019<br>.00075 | 0.5xd1         | 180<br>591     | 0.027<br>.00106 | 0.5xd1         | 200<br>656     | 0.028<br>.00110 | 0.5xd1         | 200<br>656     | 0.029<br>.00114 | 0.5xd1         | 220<br>722                      | 0.029<br>.00114 | 0.5xd1         |
|  | 140<br>459     | 0.013<br>.00051 | 0.5xd1         | 160<br>525     | 0.019<br>.00075 | 0.5xd1         | 180<br>591     | 0.027<br>.00106 | 0.5xd1         | 200<br>656     | 0.028<br>.00110 | 0.5xd1         | 200<br>656     | 0.029<br>.00114 | 0.5xd1         | 220<br>722                      | 0.029<br>.00114 | 0.5xd1         |
|  | 140<br>459     | 0.011<br>.00043 | 0.5xd1         | 160<br>525     | 0.017<br>.00067 | 0.5xd1         | 180<br>591     | 0.025<br>.00098 | 0.5xd1         | 200<br>656     | 0.027<br>.00106 | 0.5xd1         | 200<br>656     | 0.027<br>.00106 | 0.5xd1         | 220<br>722                      | 0.028<br>.00110 | 0.5xd1         |
|  | 120<br>394     | 0.015<br>.00059 | 0.5xd1         | 140<br>459     | 0.017<br>.00067 | 0.5xd1         | 160<br>525     | 0.025<br>.00098 | 0.5xd1         | 180<br>591     | 0.031<br>.00122 | 0.5xd1         | 200<br>656     | 0.031<br>.00122 | 0.5xd1         | 200<br>656                      | 0.032<br>.00126 | 0.5xd1         |
|  | 190<br>623     | 0.016<br>.00063 | 0.5xd1         | 210<br>689     | 0.021<br>.00083 | 0.5xd1         | 230<br>755     | 0.034<br>.00134 | 0.5xd1         | 250<br>820     | 0.035<br>.00139 | 0.5xd1         | 250<br>820     | 0.036<br>.00142 | 0.5xd1         | 270<br>886                      | 0.037<br>.00146 | 0.5xd1         |
|  | 190<br>623     | 0.016<br>.00063 | 0.5xd1         | 210<br>689     | 0.021<br>.00083 | 0.5xd1         | 230<br>755     | 0.032<br>.00126 | 0.5xd1         | 250<br>820     | 0.034<br>.00134 | 0.5xd1         | 250<br>820     | 0.034<br>.00134 | 0.5xd1         | 270<br>886                      | 0.036<br>.00142 | 0.5xd1         |
|  | 190<br>623     | 0.016<br>.00063 | 0.5xd1         | 210<br>689     | 0.021<br>.00083 | 0.5xd1         | 230<br>755     | 0.034<br>.00134 | 0.5xd1         | 250<br>820     | 0.035<br>.00139 | 0.5xd1         | 250<br>820     | 0.036<br>.00142 | 0.5xd1         | 270<br>886                      | 0.037<br>.00146 | 0.5xd1         |
|  | 190<br>623     | 0.016<br>.00063 | 0.5xd1         | 210<br>689     | 0.021<br>.00083 | 0.5xd1         | 230<br>755     | 0.034<br>.00134 | 0.5xd1         | 250<br>820     | 0.035<br>.00139 | 0.5xd1         | 250<br>820     | 0.036<br>.00142 | 0.5xd1         | 270<br>886                      | 0.037<br>.00146 | 0.5xd1         |
|  | 190<br>623     | 0.016<br>.00063 | 0.5xd1         | 210<br>689     | 0.021<br>.00083 | 0.5xd1         | 230<br>755     | 0.034<br>.00134 | 0.5xd1         | 250<br>820     | 0.035<br>.00139 | 0.5xd1         | 250<br>820     | 0.036<br>.00142 | 0.5xd1         | 270<br>886                      | 0.037<br>.00146 | 0.5xd1         |
|  | 190<br>623     | 0.016<br>.00063 | 0.5xd1         | 210<br>689     | 0.021<br>.00083 | 0.5xd1         | 230<br>755     | 0.034<br>.00134 | 0.5xd1         | 250<br>820     | 0.035<br>.00139 | 0.5xd1         | 250<br>820     | 0.036<br>.00142 | 0.5xd1         | 270<br>886                      | 0.037<br>.00146 | 0.5xd1         |
|  | 80<br>262      | 0.006<br>.00024 | 0.25xd1        | 100<br>328     | 0.007<br>.00028 | 0.25xd1        | 100<br>328     | 0.010<br>.00039 | 0.25xd1        | 120<br>394     | 0.013<br>.00051 | 0.25xd1        | 120<br>394     | 0.013<br>.00051 | 0.25xd1        | 120<br>394                      | 0.013<br>.00051 | 0.25xd1        |
|  | 80<br>262      | 0.012<br>.00047 | 0.25xd1        | 100<br>328     | 0.017<br>.00067 | 0.25xd1        | 100<br>328     | 0.027<br>.00106 | 0.25xd1        | 120<br>394     | 0.027<br>.00106 | 0.25xd1        | 120<br>394     | 0.027<br>.00106 | 0.25xd1        | 140<br>459                      | 0.028<br>.00110 | 0.25xd1        |
|  | 80<br>262      | 0.012<br>.00047 | 0.25xd1        | 100<br>328     | 0.017<br>.00067 | 0.25xd1        | 100<br>328     | 0.027<br>.00106 | 0.25xd1        | 120<br>394     | 0.027<br>.00106 | 0.25xd1        | 120<br>394     | 0.027<br>.00106 | 0.25xd1        | 140<br>459                      | 0.028<br>.00110 | 0.25xd1        |
|  | 80<br>262      | 0.006<br>.00024 | 0.25xd1        | 100<br>328     | 0.007<br>.00028 | 0.25xd1        | 100<br>328     | 0.010<br>.00039 | 0.25xd1        | 120<br>394     | 0.013<br>.00051 | 0.25xd1        | 120<br>394     | 0.013<br>.00051 | 0.25xd1        | 120<br>394                      | 0.013<br>.00051 | 0.25xd1        |
|  |                |                 |                |                |                 |                |                |                 |                |                |                 |                |                |                 |                |                                 |                 |                |
|  |                |                 |                |                |                 |                |                |                 |                |                |                 |                |                |                 |                |                                 |                 |                |

**NEW**

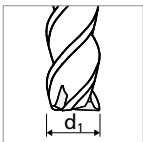
## Type C - Side milling - Semi-finishing

### MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

#### Semi-finishing



$$\begin{aligned} \blacksquare a_p &= 1 \times d_1 - 2 \times d_i \\ \blacksquare a_e &= 0.1 \times d_1 \end{aligned}$$

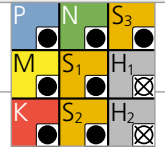


| Materials group      | Material                                               | Mat. no. | DIN                | AISI/ASTM/UNS           | 1.0 mm   .039" |                 |  |
|----------------------|--------------------------------------------------------|----------|--------------------|-------------------------|----------------|-----------------|--|
|                      |                                                        |          |                    |                         | $v_c$          | $f_z$           |  |
| <b>P</b>             | Unalloyed carbon steel<br>$R_m < 800 \text{ N/mm}^2$   | 1.0301   | C10                | AISI 1010               | 120<br>394     | 0.017<br>.00067 |  |
|                      |                                                        | 1.0401   | C15                | AISI 1015               |                |                 |  |
|                      |                                                        | 1.1191   | C45E/CK45          | AISI 1045               |                |                 |  |
|                      |                                                        | 1.0044   | S275JR             | AISI 1020               |                |                 |  |
|                      |                                                        | 1.0715   | 11SMn30            | AISI 1215               |                |                 |  |
|                      | Low alloyed steel<br>$R_m > 900 \text{ N/mm}^2$        | 1.5752   | 15NiCr13           | ASTM 3415 / AISI 3310   | 120<br>394     | 0.016<br>.00063 |  |
|                      |                                                        | 1.7131   | 16MnCr5            | AISI 5115               |                |                 |  |
|                      |                                                        | 1.3505   | 100Cr6             | AISI 52100              |                |                 |  |
|                      |                                                        | 1.7225   | 42CrMo4            | AISI 4140               |                |                 |  |
|                      |                                                        | 1.2842   | 90MnCrV8           | AISI O2                 |                |                 |  |
|                      | High alloyed tool steel<br>$R_m < 1200 \text{ N/mm}^2$ | 1.2379   | X153CrMoV12        | AISI D2                 | 120<br>394     | 0.012<br>.00035 |  |
|                      |                                                        | 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>             | Stainless steel ferritic                               | 1.4016   | X6Cr17             | AISI 430 / UNS S43000   | 120<br>394     | 0.018<br>.00055 |  |
|                      |                                                        | 1.4105   | X6CrMoS17          | AISI 430F               |                |                 |  |
|                      | Stainless steel martensitic                            | 1.4034   | X46Cr13            | AISI 420C               | 120<br>394     | 0.017<br>.00067 |  |
|                      |                                                        | 1.4112   | X90CrMoV18         | AISI 440B               |                |                 |  |
|                      | Stainless steel martensitic – PH                       | 1.4542   | X5CrNiCuNb16-4     | AISI 630 / ASTM 17-4 PH | 120<br>394     | 0.017<br>.00067 |  |
|                      |                                                        | 1.4545   | X5CrNiCuNb15-5     | ASTM 15-5 PH            |                |                 |  |
|                      | Stainless steel austenitic                             | 1.4301   | X5CrNi18-10        | AISI 304                | 120<br>394     | 0.013<br>.00039 |  |
|                      |                                                        | 1.4435   | X2CrNiMo18-14-3    | AISI 316L               |                |                 |  |
|                      |                                                        | 1.4441   | X2CrNiMo18-15-3    | AISI 316LM              |                |                 |  |
| <b>K</b>             | Cast iron                                              | 0.6020   | GG20               | ASTM 30                 | 100<br>328     | 0.012<br>.00035 |  |
|                      |                                                        | 0.6030   | GG30               | ASTM 40B                |                |                 |  |
|                      |                                                        | 0.7040   | GGG40              | ASTM 60-40-18           |                |                 |  |
|                      |                                                        | 0.7060   | GGG60              | ASTM 80-60-03           |                |                 |  |
|                      |                                                        |          |                    |                         |                |                 |  |
| <b>N</b>             | Aluminium alloy wrought                                | 3.2315   | AlMgSi1            | ASTM 6351               | 170<br>558     | 0.020<br>.00059 |  |
|                      |                                                        | 3.4365   | AlZnMgCu1.5        | ASTM 7075               |                |                 |  |
|                      | Aluminium alloy cast                                   | 3.2163   | GD-AlSi9Cu3        | ASTM A380               | 170<br>558     | 0.020<br>.00059 |  |
|                      |                                                        | 3.2381   | GD-AlSi10Mg        | UNS A03590              |                |                 |  |
|                      | Copper                                                 | 2.0040   | Cu-OF / CW008A     | UNS C10100              | 170<br>558     | 0.022<br>.00087 |  |
|                      |                                                        | 2.0065   | Cu-ETP / CW004A    | UNS C11000              |                |                 |  |
|                      | Brass lead free                                        | 2.0321   | CuZn37 CW508L      | UNS C27400              | 170<br>558     | 0.022<br>.00087 |  |
|                      |                                                        | 2.0360   | CuZn40 CW509L      | UNS C28000              |                |                 |  |
|                      | Brass, Bronze<br>$R_m < 400 \text{ N/mm}^2$            | 2.0401   | CuZn39Pb3 / CW614N | UNS C38500              | 170<br>558     | 0.022<br>.00087 |  |
|                      |                                                        | 2.1020   | CuSn6              | UNS C51900              |                |                 |  |
|                      | Bronze<br>$R_m < 600 \text{ N/mm}^2$                   | 2.0966   | CuAl10Ni5Fe4       | UNS C63000              | 170<br>558     | 0.020<br>.00059 |  |
|                      |                                                        | 2.0960   | CuAl9Mn2           | UNS C63200              |                |                 |  |
| <b>S<sub>1</sub></b> | Super alloys                                           | 2.4856   |                    | Inconel 625             | 100<br>328     | 0.008<br>.00032 |  |
|                      |                                                        | 2.4668   |                    | Inconel 718             |                |                 |  |
|                      |                                                        | 2.4617   | NiMo28             | Hastelloy B-2           |                |                 |  |
|                      |                                                        | 2.4665   | NiCr22Fe18Mo       | Hastelloy X             |                |                 |  |
| <b>S<sub>2</sub></b> | Titanium pure                                          | 3.7035   | Gr.2               | ASTM B348 / F67         | 100<br>328     | 0.018<br>.00071 |  |
|                      |                                                        | 3.7065   | Gr.4               | ASTM B348 / F68         |                |                 |  |
|                      | Titanium alloys                                        | 3.7165   | TiAl6V4            | ASTM B348 / F136        | 100            | 0.018           |  |
| <b>S<sub>3</sub></b> | CrCo alloys                                            | 9.9367   | TiAl6Nb7           | ASTM F1295              | 328            | .00071          |  |
|                      |                                                        | 2.4964   | CoCr20W15Ni        | Haynes 25               | 100            | 0.008           |  |
|                      |                                                        |          | CrCoMo28           | ASTM F1537              | 328            | .00032          |  |
| <b>H<sub>1</sub></b> | Hardened steel<br>$< 55 \text{ HRC}$                   | 1.2510   | 100MnCrMoW4        | AISI O1                 |                |                 |  |
| <b>H<sub>2</sub></b> | Hardened steel<br>$\geq 55 \text{ HRC}$                | 1.2379   | X153CrMoV12        | AISI D2                 |                |                 |  |

**V<sub>c</sub>** [m/min] | [**SFM**]  
**f<sub>z</sub>** [mm] | [**IPT**]

RECOMMENDATION FOR USE

● Excellent | ● Good | ○ Acceptable | ⊗ Not recommended



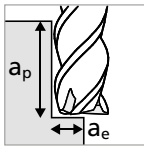
|  | 1/16"<br>1.5 mm   .059" |                 | 3/32"<br>2.0 mm   .079" |                 | 1/8"<br>3.0 mm   .118" |                 | Ød <sub>1</sub><br>5/32"<br>4.0 mm   .157" |                 | 3/16" - 7/32"<br>5.0 mm   .197" |                 | 1/4"<br>6.0 mm   .236" |                 | 8.0 mm   .315" |                 |  |
|--|-------------------------|-----------------|-------------------------|-----------------|------------------------|-----------------|--------------------------------------------|-----------------|---------------------------------|-----------------|------------------------|-----------------|----------------|-----------------|--|
|  | V <sub>c</sub>          | f <sub>z</sub>  | V <sub>c</sub>          | f <sub>z</sub>  | V <sub>c</sub>         | f <sub>z</sub>  | V <sub>c</sub>                             | f <sub>z</sub>  | V <sub>c</sub>                  | f <sub>z</sub>  | V <sub>c</sub>         | f <sub>z</sub>  | V <sub>c</sub> | f <sub>z</sub>  |  |
|  | 140<br>459              | 0.026<br>.00079 | 160<br>525              | 0.038<br>.00150 | 180<br>591             | 0.048<br>.00146 | 200<br>656                                 | 0.050<br>.00197 | 220<br>722                      | 0.052<br>.00205 | 220<br>722             | 0.056<br>.00169 | 220<br>722     | 0.068<br>.00268 |  |
|  | 140<br>459              | 0.025<br>.00075 | 160<br>525              | 0.036<br>.00106 | 180<br>591             | 0.044<br>.00138 | 200<br>656                                 | 0.048<br>.00150 | 220<br>722                      | 0.050<br>.00150 | 220<br>722             | 0.054<br>.00213 | 220<br>722     | 0.066<br>.00260 |  |
|  | 140<br>459              | 0.022<br>.00087 | 160<br>525              | 0.035<br>.00102 | 180<br>591             | 0.042<br>.00165 | 200<br>656                                 | 0.043<br>.00134 | 220<br>722                      | 0.045<br>.00134 | 220<br>722             | 0.048<br>.00189 | 220<br>722     | 0.058<br>.00228 |  |
|  | 140<br>459              | 0.026<br>.00079 | 160<br>525              | 0.038<br>.00150 | 180<br>591             | 0.046<br>.00138 | 200<br>656                                 | 0.048<br>.00150 | 220<br>722                      | 0.050<br>.00150 | 220<br>722             | 0.055<br>.00161 | 220<br>722     | 0.062<br>.00244 |  |
|  | 140<br>459              | 0.025<br>.00075 | 160<br>525              | 0.036<br>.00106 | 180<br>591             | 0.044<br>.00138 | 200<br>656                                 | 0.046<br>.00146 | 220<br>722                      | 0.048<br>.00146 | 220<br>722             | 0.052<br>.00205 | 220<br>722     | 0.060<br>.00236 |  |
|  | 140<br>459              | 0.025<br>.00075 | 160<br>525              | 0.036<br>.00106 | 180<br>591             | 0.044<br>.00138 | 200<br>656                                 | 0.046<br>.00146 | 220<br>722                      | 0.048<br>.00146 | 220<br>722             | 0.052<br>.00205 | 220<br>722     | 0.060<br>.00236 |  |
|  | 140<br>459              | 0.016<br>.00055 | 160<br>525              | 0.034<br>.00102 | 180<br>591             | 0.042<br>.00165 | 200<br>656                                 | 0.044<br>.00138 | 220<br>722                      | 0.046<br>.00138 | 220<br>722             | 0.049<br>.00146 | 220<br>722     | 0.058<br>.00228 |  |
|  | 120<br>394              | 0.026<br>.00079 | 140<br>459              | 0.032<br>.00095 | 160<br>525             | 0.043<br>.00134 | 180<br>591                                 | 0.054<br>.00213 | 200<br>656                      | 0.056<br>.00165 | 200<br>656             | 0.058<br>.00173 | 200<br>656     | 0.070<br>.00276 |  |
|  | 190<br>623              | 0.029<br>.00114 | 210<br>689              | 0.040<br>.00122 | 230<br>755             | 0.060<br>.00181 | 250<br>820                                 | 0.062<br>.00244 | 270<br>886                      | 0.064<br>.00252 | 270<br>886             | 0.068<br>.00268 | 270<br>886     | 0.084<br>.00331 |  |
|  | 190<br>623              | 0.029<br>.00114 | 210<br>689              | 0.040<br>.00122 | 230<br>755             | 0.060<br>.00181 | 250<br>820                                 | 0.062<br>.00244 | 270<br>886                      | 0.064<br>.00252 | 270<br>886             | 0.068<br>.00268 | 270<br>886     | 0.084<br>.00331 |  |
|  | 190<br>623              | 0.029<br>.00114 | 210<br>689              | 0.040<br>.00122 | 230<br>755             | 0.060<br>.00181 | 250<br>820                                 | 0.062<br>.00244 | 270<br>886                      | 0.064<br>.00252 | 270<br>886             | 0.068<br>.00268 | 270<br>886     | 0.084<br>.00331 |  |
|  | 190<br>623              | 0.029<br>.00114 | 210<br>689              | 0.040<br>.00122 | 230<br>755             | 0.060<br>.00181 | 250<br>820                                 | 0.062<br>.00244 | 270<br>886                      | 0.064<br>.00252 | 270<br>886             | 0.068<br>.00268 | 270<br>886     | 0.084<br>.00331 |  |
|  | 190<br>623              | 0.029<br>.00114 | 210<br>689              | 0.040<br>.00122 | 230<br>755             | 0.060<br>.00181 | 250<br>820                                 | 0.062<br>.00244 | 270<br>886                      | 0.064<br>.00252 | 270<br>886             | 0.068<br>.00268 | 270<br>886     | 0.084<br>.00331 |  |
|  | 190<br>623              | 0.029<br>.00114 | 210<br>689              | 0.040<br>.00122 | 230<br>755             | 0.060<br>.00181 | 250<br>820                                 | 0.062<br>.00244 | 270<br>886                      | 0.064<br>.00252 | 270<br>886             | 0.068<br>.00268 | 270<br>886     | 0.084<br>.00331 |  |
|  | 100<br>328              | 0.010<br>.00032 | 120<br>394              | 0.012<br>.00035 | 120<br>394             | 0.016<br>.00063 | 140<br>459                                 | 0.018<br>.00071 | 160<br>525                      | 0.020<br>.00079 | 160<br>525             | 0.022<br>.00087 | 160<br>525     | 0.024<br>.00094 |  |
|  | 100<br>328              | 0.022<br>.00087 | 120<br>394              | 0.032<br>.00095 | 120<br>394             | 0.042<br>.00165 | 140<br>459                                 | 0.044<br>.00138 | 160<br>525                      | 0.046<br>.00138 | 160<br>525             | 0.048<br>.00146 | 160<br>525     | 0.054<br>.00213 |  |
|  | 100<br>328              | 0.022<br>.00087 | 120<br>394              | 0.032<br>.00095 | 120<br>394             | 0.042<br>.00165 | 140<br>459                                 | 0.044<br>.00138 | 160<br>525                      | 0.046<br>.00138 | 160<br>525             | 0.048<br>.00146 | 160<br>525     | 0.054<br>.00213 |  |
|  | 100<br>328              | 0.010<br>.00032 | 120<br>394              | 0.012<br>.00035 | 120<br>394             | 0.016<br>.00063 | 140<br>459                                 | 0.018<br>.00071 | 160<br>525                      | 0.020<br>.00079 | 160<br>525             | 0.022<br>.00087 | 160<br>525     | 0.024<br>.00094 |  |
|  |                         |                 |                         |                 |                        |                 |                                            |                 |                                 |                 |                        |                 |                |                 |  |
|  |                         |                 |                         |                 |                        |                 |                                            |                 |                                 |                 |                        |                 |                |                 |  |

**NEW**

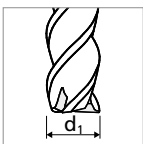
## Type C - Side milling - Finishing

### MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

#### Finishing



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



| Materials group      | Material                                               | Mat. no. | DIN                | AISI/ASTM/UNS           | 1.0 mm   .039"    |                        |  |
|----------------------|--------------------------------------------------------|----------|--------------------|-------------------------|-------------------|------------------------|--|
|                      |                                                        |          |                    |                         | $v_c$             | $f_z$                  |  |
| <b>P</b>             | Unalloyed carbon steel<br>$R_m < 800 \text{ N/mm}^2$   | 1.0301   | C10                | AISI 1010               | 130<br><b>425</b> | 0.008<br><b>.00032</b> |  |
|                      |                                                        | 1.0401   | C15                | AISI 1015               |                   |                        |  |
|                      |                                                        | 1.1191   | C45E/CK45          | AISI 1045               |                   |                        |  |
|                      |                                                        | 1.0044   | S275JR             | AISI 1020               |                   |                        |  |
|                      |                                                        | 1.0715   | 11SMn30            | AISI 1215               |                   |                        |  |
|                      | Low alloyed steel<br>$R_m > 900 \text{ N/mm}^2$        | 1.5752   | 15NiCr13           | ASTM 3415 / AISI 3310   | 130<br><b>425</b> | 0.007<br><b>.00028</b> |  |
|                      |                                                        | 1.7131   | 16MnCr5            | AISI 5115               |                   |                        |  |
|                      |                                                        | 1.3505   | 100Cr6             | AISI 52100              |                   |                        |  |
|                      |                                                        | 1.7225   | 42CrMo4            | AISI 4140               |                   |                        |  |
|                      |                                                        | 1.2842   | 90MnCrV8           | AISI O2                 |                   |                        |  |
|                      | High alloyed tool steel<br>$R_m < 1200 \text{ N/mm}^2$ | 1.2379   | X153CrMoV12        | AISI D2                 | 130<br><b>425</b> | 0.006<br><b>.00024</b> |  |
|                      |                                                        | 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>             | Stainless steel ferritic                               | 1.4016   | X6Cr17             | AISI 430 / UNS S43000   | 130<br><b>425</b> | 0.008<br><b>.00032</b> |  |
|                      |                                                        | 1.4105   | X6CrMoS17          | AISI 430F               |                   |                        |  |
|                      |                                                        | 1.4034   | X46Cr13            | AISI 420C               |                   |                        |  |
|                      | Stainless steel martensitic                            | 1.4112   | X90CrMoV18         | AISI 440B               | 130<br><b>425</b> | 0.008<br><b>.00032</b> |  |
|                      |                                                        | 1.4542   | X5CrNiCuNb16-4     | AISI 630 / ASTM 17-4 PH |                   |                        |  |
|                      | Stainless steel martensitic – PH                       | 1.4545   | X5CrNiCuNb15-5     | ASTM 15-5 PH            | 130<br><b>425</b> | 0.008<br><b>.00032</b> |  |
|                      |                                                        | 1.4301   | X5CrNi18-10        | AISI 304                |                   |                        |  |
|                      |                                                        | 1.4435   | X2CrNiMo18-14-3    | AISI 316L               |                   |                        |  |
|                      |                                                        | 1.4441   | X2CrNiMo18-15-3    | AISI 316LM              |                   |                        |  |
|                      |                                                        | 1.4539   | X1NiCrMoCu25-20-5  | AISI 904L               |                   |                        |  |
| <b>K</b>             | Cast iron                                              | 0.6020   | GG20               | ASTM 30                 | 110<br><b>361</b> | 0.006<br><b>.00024</b> |  |
|                      |                                                        | 0.6030   | GG30               | ASTM 40B                |                   |                        |  |
|                      |                                                        | 0.7040   | GGG40              | ASTM 60-40-18           |                   |                        |  |
|                      |                                                        | 0.7060   | GGG60              | ASTM 80-60-03           |                   |                        |  |
|                      |                                                        |          |                    |                         |                   |                        |  |
| <b>N</b>             | Aluminium alloy wrought                                | 3.2315   | AlMgSi1            | ASTM 6351               | 130<br><b>425</b> | 0.009<br><b>.00035</b> |  |
|                      |                                                        | 3.4365   | AlZnMgCu1.5        | ASTM 7075               |                   |                        |  |
|                      | Aluminium alloy cast                                   | 3.2163   | GD-AlSi9Cu3        | ASTM A380               | 130<br><b>425</b> | 0.009<br><b>.00035</b> |  |
|                      |                                                        | 3.2381   | GD-AlSi10Mg        | UNS A03590              |                   |                        |  |
|                      | Copper                                                 | 2.0040   | Cu-OF / CW008A     | UNS C10100              | 130<br><b>425</b> | 0.010<br><b>.00039</b> |  |
|                      |                                                        | 2.0065   | Cu-ETP / CW004A    | UNS C11000              |                   |                        |  |
|                      | Brass lead free                                        | 2.0321   | CuZn37 CW508L      | UNS C27400              | 130<br><b>425</b> | 0.010<br><b>.00039</b> |  |
|                      |                                                        | 2.0360   | CuZn40 CW509L      | UNS C28000              |                   |                        |  |
|                      | Brass, Bronze<br>$R_m < 400 \text{ N/mm}^2$            | 2.0401   | CuZn39Pb3 / CW614N | UNS C38500              | 130<br><b>425</b> | 0.010<br><b>.00039</b> |  |
|                      |                                                        | 2.1020   | CuSn6              | UNS C51900              |                   |                        |  |
|                      | Bronze<br>$R_m < 600 \text{ N/mm}^2$                   | 2.0966   | CuAl10Ni5Fe4       | UNS C63000              | 130<br><b>425</b> | 0.009<br><b>.00035</b> |  |
|                      |                                                        | 2.0960   | CuAl9Mn2           | UNS C63200              |                   |                        |  |
| <b>S<sub>1</sub></b> | Super alloys                                           | 2.4856   |                    | Inconel 625             | 110<br><b>361</b> | 0.004<br><b>.00016</b> |  |
|                      |                                                        | 2.4668   |                    | Inconel 718             |                   |                        |  |
|                      |                                                        | 2.4617   | NiMo28             | Hastelloy B-2           |                   |                        |  |
|                      |                                                        | 2.4665   | NiCr22Fe18Mo       | Hastelloy X             |                   |                        |  |
| <b>S<sub>2</sub></b> | Titanium pure                                          | 3.7035   | Gr.2               | ASTM B348 / F67         | 110<br><b>361</b> | 0.008<br><b>.00032</b> |  |
|                      |                                                        | 3.7065   | Gr.4               | ASTM B348 / F68         |                   |                        |  |
|                      | Titanium alloys                                        | 3.7165   | TiAl6V4            | ASTM B348 / F136        | 110<br><b>361</b> | 0.008<br><b>.00032</b> |  |
| <b>S<sub>3</sub></b> | CrCo alloys                                            | 9.9367   | TiAl6Nb7           | ASTM F1295              | 110<br><b>361</b> | 0.004<br><b>.00016</b> |  |
|                      |                                                        | 2.4964   | CoCr20W15Ni        | Haynes 25               |                   |                        |  |
| <b>H<sub>1</sub></b> | Hardened steel<br>$< 55 \text{ HRC}$                   |          |                    |                         |                   |                        |  |
| <b>H<sub>2</sub></b> | Hardened steel<br>$\geq 55 \text{ HRC}$                | 1.2510   | 100MnCrMoW4        | AISI O1                 |                   |                        |  |
|                      |                                                        | 1.2379   | X153CrMoV12        | AISI D2                 |                   |                        |  |

**V<sub>c</sub>** [m/min] | [**SFM**]  
**f<sub>z</sub>** [mm] | [**IPT**]

RECOMMENDATION FOR USE

● Excellent | ● Good | ○ Acceptable | ☒ Not recommended



|  | 1/16"<br>1.5 mm   .059" |                 | 3/32"<br>2.0 mm   .079" |                 | 1/8"<br>3.0 mm   .118" |                  | Ød <sub>1</sub><br>5/32"<br>4.0 mm   .157" |                 | 3/16" - 7/32"<br>5.0 mm   .197" |                 | 1/4"<br>6.0 mm   .236" |                 | 8.0 mm   .315" |                 |  |
|--|-------------------------|-----------------|-------------------------|-----------------|------------------------|------------------|--------------------------------------------|-----------------|---------------------------------|-----------------|------------------------|-----------------|----------------|-----------------|--|
|  | V <sub>c</sub>          | f <sub>z</sub>  | V <sub>c</sub>          | f <sub>z</sub>  | V <sub>c</sub>         | f <sub>z</sub>   | V <sub>c</sub>                             | f <sub>z</sub>  | V <sub>c</sub>                  | f <sub>z</sub>  | V <sub>c</sub>         | f <sub>z</sub>  | V <sub>c</sub> | f <sub>z</sub>  |  |
|  | 180<br>591              | 0.012<br>.00047 | 200<br>656              | 0.017<br>.00067 | 210<br>688             | 0.023<br>.000091 | 220<br>772                                 | 0.025<br>.00098 | 220<br>772                      | 0.028<br>.00110 | 220<br>772             | 0.033<br>.00130 | 220<br>772     | 0.042<br>.00165 |  |
|  | 180<br>591              | 0.011<br>.00043 | 200<br>656              | 0.016<br>.00063 | 210<br>688             | 0.022<br>.00087  | 220<br>772                                 | 0.024<br>.00095 | 220<br>772                      | 0.026<br>.00102 | 220<br>772             | 0.029<br>.00114 | 220<br>772     | 0.038<br>.00150 |  |
|  | 180<br>591              | 0.010<br>.00039 | 200<br>656              | 0.015<br>.00059 | 210<br>688             | 0.020<br>.00079  | 220<br>772                                 | 0.021<br>.00083 | 220<br>772                      | 0.023<br>.00091 | 220<br>772             | 0.025<br>.00098 | 220<br>772     | 0.034<br>.00134 |  |
|  | 180<br>591              | 0.012<br>.00047 | 200<br>656              | 0.017<br>.00067 | 210<br>688             | 0.022<br>.00087  | 220<br>772                                 | 0.024<br>.00095 | 220<br>772                      | 0.026<br>.00102 | 220<br>772             | 0.029<br>.00114 | 220<br>772     | 0.036<br>.00142 |  |
|  | 180<br>591              | 0.011<br>.00043 | 200<br>656              | 0.016<br>.00063 | 210<br>688             | 0.022<br>.00087  | 220<br>772                                 | 0.023<br>.00091 | 220<br>772                      | 0.025<br>.00098 | 220<br>772             | 0.028<br>.00110 | 220<br>772     | 0.037<br>.00146 |  |
|  | 180<br>591              | 0.011<br>.00043 | 200<br>656              | 0.016<br>.00063 | 210<br>688             | 0.022<br>.00087  | 220<br>772                                 | 0.023<br>.00091 | 220<br>772                      | 0.025<br>.00098 | 220<br>772             | 0.028<br>.00110 | 220<br>772     | 0.037<br>.00146 |  |
|  | 180<br>591              | 0.008<br>.00032 | 200<br>656              | 0.015<br>.00059 | 210<br>688             | 0.020<br>.00079  | 220<br>772                                 | 0.022<br>.00087 | 220<br>772                      | 0.024<br>.00095 | 220<br>772             | 0.026<br>.00102 | 220<br>772     | 0.035<br>.00138 |  |
|  | 130<br>425              | 0.012<br>.00047 | 150<br>492              | 0.014<br>.00055 | 160<br>525             | 0.022<br>.00087  | 170<br>558                                 | 0.025<br>.00098 | 170<br>558                      | 0.029<br>.00114 | 170<br>558             | 0.031<br>.00122 | 200<br>656     | 0.040<br>.00157 |  |
|  | 180<br>591              | 0.013<br>.00051 | 200<br>656              | 0.018<br>.00071 | 210<br>688             | 0.029<br>.00114  | 220<br>772                                 | 0.030<br>.00118 | 220<br>772                      | 0.033<br>.00130 | 220<br>772             | 0.036<br>.00142 | 270<br>886     | 0.045<br>.00177 |  |
|  | 180<br>591              | 0.013<br>.00051 | 200<br>656              | 0.018<br>.00071 | 210<br>688             | 0.029<br>.00114  | 220<br>772                                 | 0.030<br>.00118 | 220<br>772                      | 0.033<br>.00130 | 220<br>772             | 0.036<br>.00142 | 270<br>886     | 0.045<br>.00177 |  |
|  | 180<br>591              | 0.013<br>.00051 | 200<br>656              | 0.018<br>.00071 | 210<br>688             | 0.029<br>.00114  | 220<br>772                                 | 0.030<br>.00118 | 220<br>772                      | 0.033<br>.00130 | 220<br>772             | 0.036<br>.00142 | 270<br>886     | 0.045<br>.00177 |  |
|  | 180<br>591              | 0.013<br>.00051 | 200<br>656              | 0.018<br>.00071 | 210<br>688             | 0.029<br>.00114  | 220<br>772                                 | 0.030<br>.00118 | 220<br>772                      | 0.033<br>.00130 | 220<br>772             | 0.036<br>.00142 | 270<br>886     | 0.045<br>.00177 |  |
|  | 180<br>591              | 0.013<br>.00051 | 200<br>656              | 0.018<br>.00071 | 210<br>688             | 0.029<br>.00114  | 220<br>772                                 | 0.030<br>.00118 | 220<br>772                      | 0.033<br>.00130 | 220<br>772             | 0.036<br>.00142 | 270<br>886     | 0.045<br>.00177 |  |
|  | 180<br>591              | 0.013<br>.00051 | 200<br>656              | 0.018<br>.00071 | 210<br>688             | 0.029<br>.00114  | 220<br>772                                 | 0.030<br>.00118 | 220<br>772                      | 0.033<br>.00130 | 220<br>772             | 0.036<br>.00142 | 270<br>886     | 0.045<br>.00177 |  |
|  | 180<br>591              | 0.013<br>.00051 | 200<br>656              | 0.018<br>.00071 | 210<br>688             | 0.029<br>.00114  | 220<br>772                                 | 0.030<br>.00118 | 220<br>772                      | 0.033<br>.00130 | 220<br>772             | 0.036<br>.00142 | 270<br>886     | 0.045<br>.00177 |  |
|  | 120<br>394              | 0.005<br>.00020 | 130<br>427              | 0.005<br>.00020 | 130<br>427             | 0.008<br>.00032  | 140<br>459                                 | 0.010<br>.00039 | 140<br>459                      | 0.011<br>.00043 | 150<br>492             | 0.012<br>.00047 | 160<br>525     | 0.021<br>.00083 |  |
|  | 120<br>394              | 0.010<br>.00039 | 130<br>427              | 0.014<br>.00055 | 130<br>427             | 0.020<br>.00079  | 140<br>459                                 | 0.022<br>.00087 | 150<br>492                      | 0.024<br>.00095 | 150<br>492             | 0.026<br>.00102 | 160<br>525     | 0.035<br>.00138 |  |
|  | 120<br>394              | 0.010<br>.00039 | 130<br>427              | 0.014<br>.00055 | 150<br>492             | 0.020<br>.00079  | 140<br>459                                 | 0.022<br>.00087 | 150<br>492                      | 0.024<br>.00095 | 150<br>492             | 0.026<br>.00102 | 160<br>525     | 0.035<br>.00138 |  |
|  | 120<br>394              | 0.005<br>.00020 | 130<br>427              | 0.005<br>.00020 | 130<br>427             | 0.008<br>.00032  | 140<br>459                                 | 0.010<br>.00039 | 140<br>459                      | 0.011<br>.00043 | 150<br>492             | 0.012<br>.00047 | 160<br>525     | 0.021<br>.00083 |  |
|  |                         |                 |                         |                 |                        |                  |                                            |                 |                                 |                 |                        |                 |                |                 |  |
|  |                         |                 |                         |                 |                        |                  |                                            |                 |                                 |                 |                        |                 |                |                 |  |

**NEW**

## Process CrazyMill Cool P&S

### ACCURATE AND EFFICIENT MILLING

#### Coolant type, pressure and filtration

**Coolant:** for best results, Mikron Tool recommends the use of cutting oil as coolant. Alternatively, emulsion of 8% or more with EP-Additives (Extreme-Pressure-Additives) can be used as well.

**Filter:** the large cooling channels permit the use of a standard filter with filter quality of  $\leq 0.05$  mm.

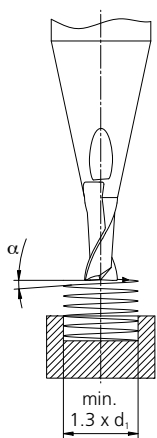
**Coolant pressure:** at least 15 bar coolant pressure is required to achieve reliable milling. High pressure is generally better for the cooling and flushing effect.

| Revolution       | [rpm] | $\leq 10'000$ | $> 10'000$ |
|------------------|-------|---------------|------------|
| Minimal pressure | [bar] | 15            | 30         |
|                  | [psi] | 218           | 435        |

#### Tool holders

For optimal use of the tool, Mikron Tool recommends a shrink fit collet as per DIN 69871 or as an alternative a hydraulic tool holder. For additional information regarding tool holding refer to "Technical Information" in our main catalogue.

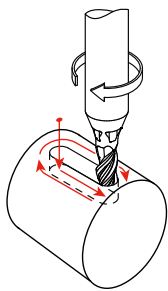
#### Maximum plunge angles in linear ramp or helical interpolation



|                | Material                                 | $\alpha$ - Linear ramp | $\alpha$ - Helical interpolation |
|----------------|------------------------------------------|------------------------|----------------------------------|
| P              | Unalloyed carbon steel                   | 45°                    | 47°                              |
|                | Low alloyed steel                        | 45°                    | 47°                              |
|                | High alloyed tool steel                  | 27°                    | 28°                              |
| M              | Stainless steel ferritic                 | 45°                    | 47°                              |
|                | Stainless steel martensitic              | 27°                    | 28°                              |
|                | Stainless steel martensitic - PH         | 27°                    | 28°                              |
|                | Stainless steel austenitic               | 45°                    | 47°                              |
| K              | Cast iron                                | 45°                    | 47°                              |
| N              | Aluminium alloy wrought                  | 45°                    | 47°                              |
|                | Aluminium alloy cast                     | 45°                    | 47°                              |
|                | Copper                                   | 45°                    | 47°                              |
|                | Brass lead free                          | 45°                    | 47°                              |
|                | Brass, Bronze Rm < 400 N/mm <sup>2</sup> | 45°                    | 47°                              |
|                | Bronze Rm < 600 N/mm <sup>2</sup>        | 45°                    | 47°                              |
|                | Super alloys                             | 14°                    | 15°                              |
| S <sub>2</sub> | Titanium pure and titanium alloys        | 14°                    | 15°                              |
| S <sub>3</sub> | CrCo alloys                              | 27°                    | 28°                              |

## Milling process

### A. Milling of keyways - only for Type A

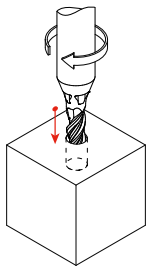


Mikron Tool recommends a machining process in 3 steps to guarantee the tolerance of the slot:

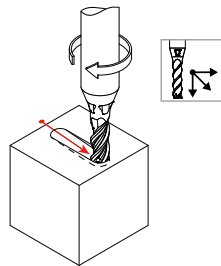
- 1. Plunge milling or plunging with a linear ramp
- 2. Slot milling
- 3. Side milling (finishing milling)

Mikron Tool generally recommends the time and space saving plunge milling (vertical). As an alternative, plunging with a linear ramp is also possible.

#### 1. Plunge milling or Linear ramp

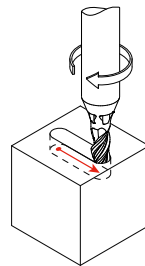


When plunge milling, an increase of the drilling diameter of approx. 0.05 mm respect to the tool diameter needs to be calculated. The maximum milling depth is  $2.5 \times d_1$  ( $a_{p,max} = 1 \times d_1$ ). For data regarding feed  $f_{z,p}$  refer to cutting data for plunge milling (page 16).



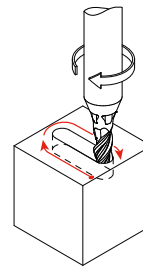
The maximum plunge angle  $\alpha$  depends on the material and cannot be overcut (see table below). For data regarding feed  $f_{z,s}$  refer to cutting data for keyway milling (page 16).

#### 2. Slot milling



Attention: a finishing operation is provided after slot milling. For data regarding feed  $f_{z,s}$  refer to cutting data for slot milling (page 16). For the corresponding selection of tool (diameter) refer to the table "Tool selection" (page 38).

#### 3. Side milling

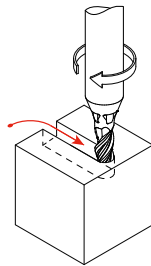


A finishing operation is necessary to reach the required tolerance and highest squareness.

**NEW**

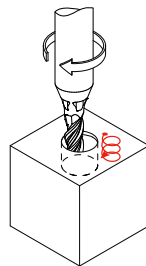
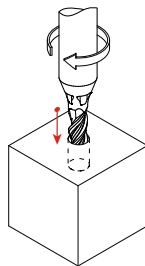
## Process CrazyMill Cool P&S

### B. Milling of through slots



When milling through slots, the maximum cutting parameters can be applied.  
Refer to the cutting data page 18 / page 28.

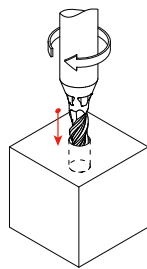
### C. Plunge milling



With CrazyMill Cool P&S, plunge milling (drilling) can be executed in two versions:

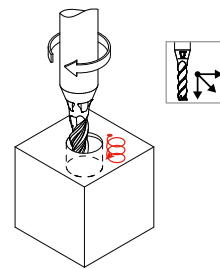
- 1. Direct plunge milling
- 2. Plunging with helical interpolation

#### 1. Direct plunge milling



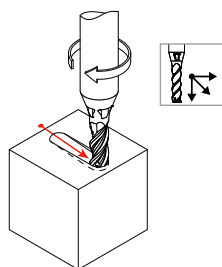
When plunge milling, an increase of the drilling diameter of approx. 0.05 mm respect to the tool diameter needs to be calculated. The maximum milling depth is  $2.5 \times d_1$  - type A /  $2 \times d_1$  - type C ( $a_{p,max} = 1 \times d_1$ ). For data regarding feed  $f_{z,p}$  refer to cutting data for plunge milling (page 16 / page 26).

#### 2. Plunging with helical interpolation



The maximum plunge angle  $\alpha$  depends on the material and cannot be overcut (see table page 34). For data regarding feed  $f_{z,s}$  refer to cutting data for keyway milling (page 16 / page 26). Attention: the minimum diameter of the hole is  $d_{hole} = 1.3 \times d_{tool}$

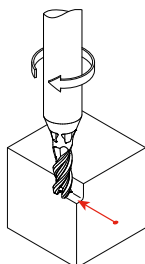
#### D. Linear ramp



The maximum plunge angle  $\alpha$  depends on the material and cannot be overcut (see table page 34). For data regarding feed  $f_{z,s}$  refer to cutting data for keyway milling (page 16 / page 26).

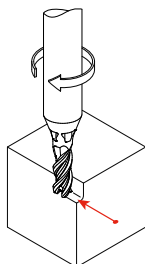
#### E. Side milling

##### Semi-finishing



Recommended cutting parameters:  
 $v_c$  and  $f_z$  = as specified in the cutting data table  
 $a_p$  = max.  $1 \times d$   
 $a_e$  =  $0.2 \times d$

##### Finishing



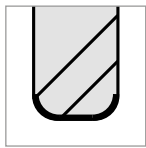
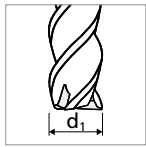
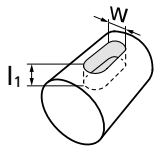
Recommended cutting parameters:  
 $v_c$  and  $f_z$  = as specified in the cutting data table  
 $a_p$  =  $2.5 \times d$  - Type A  
 $a_p$  =  $2 \times d$  - Type C  
 $a_e$  =  $0.05 - 0.1 \times d$  depending on required surface quality

**NEW**

# Process CrazyMill Cool P&S - Type A

## THE RIGHT TOOL FOR KEYWAY SLOTTING

### Tool selection



| w<br>slot<br>[inch] | w<br>slot<br>[mm] | d <sub>1</sub><br>Tool<br>[inch] | d <sub>1</sub><br>Tool<br>[mm] | l <sub>1, max</sub><br>[inch] | l <sub>1, max</sub><br>[mm] | r<br>[mm] | Item<br>number     |
|---------------------|-------------------|----------------------------------|--------------------------------|-------------------------------|-----------------------------|-----------|--------------------|
| .043                | 1.1               | .039                             | 1.0                            | .098                          | 2.50                        | 0.10      | 2.CMC42.A2Z3.100.1 |
|                     |                   | .039                             | 1.0                            | .098                          | 2.50                        | 0.20      | 2.CMC42.A3Z3.100.1 |
| .047                | 1.2               | .039                             | 1.0                            | .098                          | 2.50                        | 0.10      | 2.CMC42.A2Z3.100.1 |
|                     |                   | .039                             | 1.0                            | .098                          | 2.50                        | 0.20      | 2.CMC42.A3Z3.100.1 |
|                     |                   | .043                             | 1.1                            | .108                          | 2.75                        | 0.10      | 2.CMC42.A2Z3.110.1 |
|                     |                   | .043                             | 1.1                            | .108                          | 2.75                        | 0.20      | 2.CMC42.A3Z3.110.1 |
| .051                | 1.3               | .043                             | 1.1                            | .108                          | 2.75                        | 0.10      | 2.CMC42.A2Z3.110.1 |
|                     |                   | .043                             | 1.1                            | .108                          | 2.75                        | 0.20      | 2.CMC42.A3Z3.110.1 |
|                     |                   | .047                             | 1.2                            | .118                          | 3.00                        | 0.10      | 2.CMC42.A2Z3.120.1 |
|                     |                   | .047                             | 1.2                            | .118                          | 3.00                        | 0.20      | 2.CMC42.A3Z3.120.1 |
| .055                | 1.4               | .047                             | 1.2                            | .118                          | 3.00                        | 0.10      | 2.CMC42.A2Z3.120.1 |
|                     |                   | .047                             | 1.2                            | .118                          | 3.00                        | 0.20      | 2.CMC42.A3Z3.120.1 |
|                     |                   | .051                             | 1.3                            | .128                          | 3.25                        | 0.10      | 2.CMC42.A2Z3.130.1 |
|                     |                   | .051                             | 1.3                            | .128                          | 3.25                        | 0.20      | 2.CMC42.A3Z3.130.1 |
| .059                | 1.5               | .051                             | 1.3                            | .128                          | 3.25                        | 0.10      | 2.CMC42.A2Z3.130.1 |
|                     |                   | .051                             | 1.3                            | .128                          | 3.25                        | 0.20      | 2.CMC42.A3Z3.130.1 |
|                     |                   | .055                             | 1.4                            | .138                          | 3.50                        | 0.10      | 2.CMC42.A2Z3.140.1 |
|                     |                   | .055                             | 1.4                            | .138                          | 3.50                        | 0.20      | 2.CMC42.A3Z3.140.1 |
| 1/16                | 1.587             | .055                             | 1.4                            | .138                          | 3.50                        | 0.10      | 2.CMC42.A2Z3.140.1 |
|                     |                   | .055                             | 1.4                            | .138                          | 3.50                        | 0.20      | 2.CMC42.A3Z3.140.1 |
|                     |                   | .059                             | 1.5                            | .148                          | 3.75                        | 0.10      | 2.CMC42.A2Z3.150.1 |
|                     |                   | .059                             | 1.5                            | .148                          | 3.75                        | 0.30      | 2.CMC42.A3Z3.150.1 |
| .063                | 1.6               | .055                             | 1.4                            | .138                          | 3.50                        | 0.10      | 2.CMC42.A2Z3.140.1 |
|                     |                   | .055                             | 1.4                            | .138                          | 3.50                        | 0.20      | 2.CMC42.A3Z3.140.1 |
|                     |                   | .059                             | 1.5                            | .148                          | 3.75                        | 0.10      | 2.CMC42.A2Z3.150.1 |
|                     |                   | .059                             | 1.5                            | .148                          | 3.75                        | 0.30      | 2.CMC42.A3Z3.150.1 |
| .067                | 1.7               | .059                             | 1.5                            | .148                          | 3.75                        | 0.10      | 2.CMC42.A2Z3.150.1 |
|                     |                   | .059                             | 1.5                            | .148                          | 3.75                        | 0.30      | 2.CMC42.A3Z3.150.1 |
|                     |                   | 1/16                             | 1.587                          | .156                          | 3.97                        | 0.127     | 2.CMC.PSRA2Z3.F116 |
|                     |                   | 1/16                             | 1.587                          | .156                          | 3.97                        | 0.254     | 2.CMC.PSRA3Z3.F116 |
| .071                | 1.8               | .063                             | 1.6                            | .157                          | 4.00                        | 0.10      | 2.CMC42.A2Z3.160.1 |
|                     |                   | .063                             | 1.6                            | .157                          | 4.00                        | 0.30      | 2.CMC42.A3Z3.160.1 |
|                     |                   | .067                             | 1.7                            | .167                          | 4.25                        | 0.10      | 2.CMC42.A2Z3.170.1 |
|                     |                   | .067                             | 1.7                            | .167                          | 4.25                        | 0.30      | 2.CMC42.A3Z3.170.1 |
| .075                | 1.9               | .067                             | 1.7                            | .167                          | 4.25                        | 0.10      | 2.CMC42.A2Z3.170.1 |
|                     |                   | .067                             | 1.7                            | .167                          | 4.25                        | 0.30      | 2.CMC42.A3Z3.170.1 |
|                     |                   | .071                             | 1.8                            | .177                          | 4.50                        | 0.10      | 2.CMC42.A2Z3.180.1 |
|                     |                   | .071                             | 1.8                            | .177                          | 4.50                        | 0.30      | 2.CMC42.A3Z3.180.1 |
| .083                | 2.1               | .071                             | 1.8                            | .177                          | 4.50                        | 0.10      | 2.CMC42.A2Z3.180.1 |
|                     |                   | .071                             | 1.8                            | .177                          | 4.50                        | 0.30      | 2.CMC42.A3Z3.180.1 |
|                     |                   | .075                             | 1.9                            | .187                          | 4.75                        | 0.10      | 2.CMC42.A2Z3.190.1 |
|                     |                   | .075                             | 1.9                            | .187                          | 4.75                        | 0.30      | 2.CMC42.A3Z3.190.1 |
| .087                | 2.2               | .075                             | 1.9                            | .187                          | 4.75                        | 0.10      | 2.CMC42.A2Z3.190.1 |
|                     |                   | .075                             | 1.9                            | .187                          | 4.75                        | 0.30      | 2.CMC42.A3Z3.190.1 |
|                     |                   | .079                             | 2.0                            | .197                          | 5.00                        | 0.10      | 2.CMC42.A2Z3.200.1 |
|                     |                   | .079                             | 2.0                            | .197                          | 5.00                        | 0.20      | 2.CMC42.A3Z3.200.1 |
|                     |                   | .079                             | 2.0                            | .197                          | 5.00                        | 0.50      | 2.CMC42.A4Z3.200.1 |

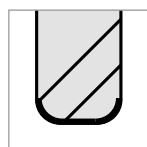
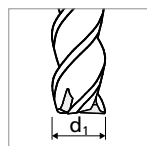
| w<br>slot<br>[inch] | w<br>slot<br>[mm] | d <sub>1</sub><br>Tool<br>[inch] | d <sub>1</sub><br>Tool<br>[mm] | l <sub>1, max</sub><br>[inch] | l <sub>1, max</sub><br>[mm] | r<br>[mm] | Item<br>number     |
|---------------------|-------------------|----------------------------------|--------------------------------|-------------------------------|-----------------------------|-----------|--------------------|
| .091                | 2.3               | .079                             | 2.0                            | .197                          | 5.00                        | 0.10      | 2.CMC42.A2Z3.200.1 |
|                     |                   | .079                             | 2.0                            | .197                          | 5.00                        | 0.20      | 2.CMC42.A3Z3.200.1 |
|                     |                   | .079                             | 2.0                            | .197                          | 5.00                        | 0.50      | 2.CMC42.A4Z3.200.1 |
|                     |                   | .083                             | 2.1                            | .207                          | 5.25                        | 0.20      | 2.CMC42.A2Z3.210.1 |
| 3/32                | 2.381             | .083                             | 2.1                            | .207                          | 5.25                        | 0.50      | 2.CMC42.A3Z3.210.1 |
|                     |                   | .079                             | 2.0                            | .197                          | 5.00                        | 0.10      | 2.CMC42.A2Z3.200.1 |
|                     |                   | .079                             | 2.0                            | .197                          | 5.00                        | 0.20      | 2.CMC42.A3Z3.200.1 |
|                     |                   | .079                             | 2.0                            | .197                          | 5.00                        | 0.50      | 2.CMC42.A4Z3.200.1 |
| .094                | 2.4               | .083                             | 2.1                            | .207                          | 5.25                        | 0.20      | 2.CMC42.A2Z3.210.1 |
|                     |                   | .083                             | 2.1                            | .207                          | 5.25                        | 0.50      | 2.CMC42.A3Z3.210.1 |
|                     |                   | .087                             | 2.2                            | .217                          | 5.50                        | 0.20      | 2.CMC42.A2Z3.220.1 |
|                     |                   | .087                             | 2.2                            | .217                          | 5.50                        | 0.50      | 2.CMC42.A3Z3.220.1 |
| .098                | 2.5               | .079                             | 2.0                            | .197                          | 5.00                        | 0.10      | 2.CMC42.A2Z3.200.1 |
|                     |                   | .079                             | 2.0                            | .197                          | 5.00                        | 0.20      | 2.CMC42.A3Z3.200.1 |
|                     |                   | .079                             | 2.0                            | .197                          | 5.00                        | 0.50      | 2.CMC42.A4Z3.200.1 |
|                     |                   | .083                             | 2.1                            | .207                          | 5.25                        | 0.20      | 2.CMC42.A2Z3.210.1 |
| .102                | 2.6               | .083                             | 2.1                            | .207                          | 5.25                        | 0.50      | 2.CMC42.A3Z3.210.1 |
|                     |                   | .087                             | 2.2                            | .217                          | 5.50                        | 0.20      | 2.CMC42.A2Z3.220.1 |
|                     |                   | .087                             | 2.2                            | .217                          | 5.50                        | 0.50      | 2.CMC42.A3Z3.220.1 |
|                     |                   | .091                             | 2.3                            | .226                          | 5.75                        | 0.20      | 2.CMC42.A2Z3.230.1 |
| .106                | 2.7               | .091                             | 2.3                            | .226                          | 5.75                        | 0.50      | 2.CMC42.A3Z3.230.1 |
|                     |                   | .091                             | 2.3                            | .226                          | 5.75                        | 0.50      | 2.CMC42.A3Z3.230.1 |
|                     |                   | 3/32                             | 2.381                          | .234                          | 5.95                        | 0.127     | 2.CMC.PSRA2Z3.F332 |
|                     |                   | 3/32                             | 2.381                          | .234                          | 5.95                        | 0.254     | 2.CMC.PSRA3Z3.F332 |
| .110                | 2.8               | 3/32                             | 2.381                          | .234                          | 5.95                        | 0.381     | 2.CMC.PSRA4Z3.F332 |
|                     |                   | .094                             | 2.4                            | .236                          | 6.00                        | 0.20      | 2.CMC42.A2Z3.240.1 |
|                     |                   | .094                             | 2.4                            | .236                          | 6.00                        | 0.50      | 2.CMC42.A3Z3.240.1 |
|                     |                   | .091                             | 2.3                            | .226                          | 5.75                        | 0.20      | 2.CMC42.A2Z3.230.1 |
| .114                | 2.9               | .091                             | 2.3                            | .226                          | 5.75                        | 0.50      | 2.CMC42.A3Z3.230.1 |
|                     |                   | 3/32                             | 2.381                          | .234                          | 5.95                        | 0.127     | 2.CMC.PSRA2Z3.F332 |
|                     |                   | 3/32                             | 2.381                          | .234                          | 5.95                        | 0.254     | 2.CMC.PSRA3Z3.F332 |
|                     |                   | 3/32                             | 2.381                          | .234                          | 5.95                        | 0.381     | 2.CMC.PSRA4Z3.F332 |
|                     |                   | .094                             | 2.4                            | .236                          | 6.00                        | 0.20      | 2.CMC42.A2Z3.240.1 |
|                     |                   | .094                             | 2.4                            | .236                          | 6.00                        | 0.50      | 2.CMC42.A3Z3.240.1 |
|                     |                   | .098                             | 2.5                            | .246                          | 6.25                        | 0.20      | 2.CMC42.A2Z3.250.1 |
|                     |                   | .098                             | 2.5                            | .246                          | 6.25                        | 0.50      | 2.CMC42.A3Z3.250.1 |
|                     |                   | .094                             | 2.4                            | .236                          | 6.00                        | 0.20      | 2.CMC42.A2Z3.240.1 |
|                     |                   | .094                             | 2.4                            | .236                          | 6.00                        | 0.50      | 2.CMC42.A3Z3.240.1 |
|                     |                   | .098                             | 2.5                            | .246                          | 6.25                        | 0.20      | 2.CMC42.A2Z3.250.1 |
|                     |                   | .098                             | 2.5                            | .246                          | 6.25                        | 0.50      | 2.CMC42.A3Z3.250.1 |
|                     |                   | .102                             | 2.6                            | .256                          | 6.50                        | 0.20      | 2.CMC42.A2Z3.260.1 |
|                     |                   | .102                             | 2.6                            | .256                          | 6.50                        | 0.50      | 2.CMC42.A3Z3.260.1 |
|                     |                   | .098                             | 2.5                            | .246                          | 6.25                        | 0.20      | 2.CMC42.A2Z3.250.1 |
|                     |                   | .098                             | 2.5                            | .246                          | 6.25                        | 0.50      | 2.CMC42.A3Z3.250.1 |
|                     |                   | .102                             | 2.6                            | .256                          | 6.50                        | 0.20      | 2.CMC42.A2Z3.260.1 |
|                     |                   | .102                             | 2.6                            | .256                          | 6.50                        | 0.50      | 2.CMC42.A3Z3.260.1 |
|                     |                   | .106                             | 2.7                            | .266                          | 6.75                        | 0.20      | 2.CMC42.A2Z3.270.1 |
|                     |                   | .106                             | 2.7                            | .266                          | 6.75                        | 0.50      | 2.CMC42.A3Z3.270.1 |

| w<br>slot<br>[inch] | w<br>slot<br>[mm] | d <sub>1</sub><br>Tool<br>[inch] | d <sub>1</sub><br>Tool<br>[mm] | l <sub>1, max</sub><br>[inch] | l <sub>1, max</sub><br>[mm] | r<br>[mm]    | Item<br>number     |
|---------------------|-------------------|----------------------------------|--------------------------------|-------------------------------|-----------------------------|--------------|--------------------|
| <b>.118</b>         | <b>3.0</b>        | <b>.102</b>                      | 2.6                            | <b>.256</b>                   | 6.50                        | 0.20         | 2.CMC42.A2Z3.260.1 |
|                     |                   | <b>.102</b>                      | 2.6                            | <b>.256</b>                   | 6.50                        | 0.50         | 2.CMC42.A3Z3.260.1 |
|                     |                   | <b>.106</b>                      | 2.7                            | <b>.266</b>                   | 6.75                        | 0.20         | 2.CMC42.A2Z3.270.1 |
|                     |                   | <b>.106</b>                      | 2.7                            | <b>.266</b>                   | 6.75                        | 0.50         | 2.CMC42.A3Z3.270.1 |
|                     |                   | <b>.110</b>                      | 2.8                            | <b>.276</b>                   | 7.00                        | 0.20         | 2.CMC42.A2Z3.280.1 |
|                     |                   | <b>.110</b>                      | 2.8                            | <b>.276</b>                   | 7.00                        | 0.50         | 2.CMC42.A3Z3.280.1 |
| <b>.122</b>         | <b>3.1</b>        | <b>.102</b>                      | 2.6                            | <b>.256</b>                   | 6.50                        | 0.20         | 2.CMC42.A2Z3.260.1 |
|                     |                   | <b>.102</b>                      | 2.6                            | <b>.256</b>                   | 6.50                        | 0.50         | 2.CMC42.A3Z3.260.1 |
|                     |                   | <b>.106</b>                      | 2.7                            | <b>.266</b>                   | 6.75                        | 0.20         | 2.CMC42.A2Z3.270.1 |
|                     |                   | <b>.106</b>                      | 2.7                            | <b>.266</b>                   | 6.75                        | 0.50         | 2.CMC42.A3Z3.270.1 |
|                     |                   | <b>.110</b>                      | 2.8                            | <b>.276</b>                   | 7.00                        | 0.20         | 2.CMC42.A2Z3.280.1 |
|                     |                   | <b>.110</b>                      | 2.8                            | <b>.276</b>                   | 7.00                        | 0.50         | 2.CMC42.A3Z3.280.1 |
| <b>1/8</b>          | <b>3.175</b>      | <b>.114</b>                      | 2.9                            | <b>.285</b>                   | 7.25                        | 0.20         | 2.CMC42.A2Z3.290.1 |
|                     |                   | <b>.114</b>                      | 2.9                            | <b>.285</b>                   | 7.25                        | 0.50         | 2.CMC42.A3Z3.290.1 |
|                     |                   | <b>.106</b>                      | 2.7                            | <b>.266</b>                   | 6.75                        | 0.20         | 2.CMC42.A2Z3.270.1 |
|                     |                   | <b>.106</b>                      | 2.7                            | <b>.266</b>                   | 6.75                        | 0.50         | 2.CMC42.A3Z3.270.1 |
|                     |                   | <b>.110</b>                      | 2.8                            | <b>.276</b>                   | 7.00                        | 0.20         | 2.CMC42.A2Z3.280.1 |
|                     |                   | <b>.110</b>                      | 2.8                            | <b>.276</b>                   | 7.00                        | 0.50         | 2.CMC42.A3Z3.280.1 |
| <b>.126</b>         | <b>3.2</b>        | <b>.114</b>                      | 2.9                            | <b>.285</b>                   | 7.25                        | 0.20         | 2.CMC42.A2Z3.290.1 |
|                     |                   | <b>.114</b>                      | 2.9                            | <b>.285</b>                   | 7.25                        | 0.50         | 2.CMC42.A3Z3.290.1 |
|                     |                   | <b>.118</b>                      | 3.0                            | <b>.285</b>                   | 7.50                        | 0.20         | 2.CMC42.A2Z3.300.1 |
|                     |                   | <b>.118</b>                      | 3.0                            | <b>.285</b>                   | 7.50                        | 0.50         | 2.CMC42.A3Z3.300.1 |
|                     |                   | <b>.110</b>                      | 2.8                            | <b>.276</b>                   | 7.00                        | 0.20         | 2.CMC42.A2Z3.280.1 |
|                     |                   | <b>.110</b>                      | 2.8                            | <b>.276</b>                   | 7.00                        | 0.50         | 2.CMC42.A3Z3.280.1 |
| <b>.130</b>         | <b>3.3</b>        | <b>.114</b>                      | 2.9                            | <b>.285</b>                   | 7.25                        | 0.20         | 2.CMC42.A2Z3.290.1 |
|                     |                   | <b>.114</b>                      | 2.9                            | <b>.285</b>                   | 7.25                        | 0.50         | 2.CMC42.A3Z3.290.1 |
|                     |                   | <b>.118</b>                      | 3.0                            | <b>.285</b>                   | 7.50                        | 0.20         | 2.CMC42.A2Z3.300.1 |
|                     |                   | <b>.118</b>                      | 3.0                            | <b>.285</b>                   | 7.50                        | 0.50         | 2.CMC42.A3Z3.300.1 |
|                     |                   | <b>.122</b>                      | 3.1                            | <b>.305</b>                   | 7.75                        | 0.20         | 2.CMC42.A2Z3.310.1 |
|                     |                   | <b>.122</b>                      | 3.1                            | <b>.305</b>                   | 7.75                        | 0.50         | 2.CMC42.A3Z3.310.1 |
| <b>.134</b>         | <b>3.4</b>        | <b>.114</b>                      | 2.9                            | <b>.285</b>                   | 7.25                        | 0.20         | 2.CMC42.A2Z3.290.1 |
|                     |                   | <b>.114</b>                      | 2.9                            | <b>.285</b>                   | 7.25                        | 0.50         | 2.CMC42.A3Z3.290.1 |
|                     |                   | <b>.118</b>                      | 3.0                            | <b>.285</b>                   | 7.50                        | 0.20         | 2.CMC42.A2Z3.300.1 |
|                     |                   | <b>.118</b>                      | 3.0                            | <b>.285</b>                   | 7.50                        | 0.50         | 2.CMC42.A3Z3.300.1 |
|                     |                   | <b>.122</b>                      | 3.1                            | <b>.305</b>                   | 7.75                        | 0.20         | 2.CMC42.A2Z3.310.1 |
|                     |                   | <b>.122</b>                      | 3.1                            | <b>.305</b>                   | 7.75                        | 0.50         | 2.CMC42.A3Z3.310.1 |
| <b>.138</b>         | <b>3.5</b>        | <b>.118</b>                      | 3.0                            | <b>.285</b>                   | 7.50                        | 0.20         | 2.CMC42.A2Z3.300.1 |
|                     |                   | <b>.118</b>                      | 3.0                            | <b>.285</b>                   | 7.50                        | 0.50         | 2.CMC42.A3Z3.300.1 |
|                     |                   | <b>.122</b>                      | 3.1                            | <b>.305</b>                   | 7.75                        | 0.20         | 2.CMC42.A2Z3.310.1 |
|                     |                   | <b>.122</b>                      | 3.1                            | <b>.305</b>                   | 7.75                        | 0.50         | 2.CMC42.A3Z3.310.1 |
|                     |                   | <b>1/8</b>                       | 3.175                          | <b>.313</b>                   | 7.94                        | <b>0.254</b> | 2.CMC.PSRA2Z3.F18  |
|                     |                   | <b>1/8</b>                       | 3.175                          | <b>.313</b>                   | 7.94                        | <b>0.381</b> | 2.CMC.PSRA3Z3.F18  |
| <b>.142</b>         | <b>3.6</b>        | <b>.130</b>                      | 3.3                            | <b>.325</b>                   | 8.25                        | 0.20         | 2.CMC42.A2Z3.330.1 |
|                     |                   | <b>.130</b>                      | 3.3                            | <b>.325</b>                   | 8.25                        | 0.50         | 2.CMC42.A3Z3.330.1 |
|                     |                   | <b>.118</b>                      | 3.0                            | <b>.285</b>                   | 7.50                        | 0.20         | 2.CMC42.A2Z3.300.1 |
|                     |                   | <b>.118</b>                      | 3.0                            | <b>.285</b>                   | 7.50                        | 0.50         | 2.CMC42.A3Z3.300.1 |
|                     |                   | <b>.122</b>                      | 3.1                            | <b>.305</b>                   | 7.75                        | 0.20         | 2.CMC42.A2Z3.310.1 |
|                     |                   | <b>.122</b>                      | 3.1                            | <b>.305</b>                   | 7.75                        | 0.50         | 2.CMC42.A3Z3.310.1 |

| w<br>slot<br>[inch] | w<br>slot<br>[mm] | d <sub>1</sub><br>Tool<br>[inch] | d <sub>1</sub><br>Tool<br>[mm] | l <sub>1, max</sub><br>[inch] | l <sub>1, max</sub><br>[mm] | r<br>[mm]    | Item<br>number     |
|---------------------|-------------------|----------------------------------|--------------------------------|-------------------------------|-----------------------------|--------------|--------------------|
|                     | <b>3.7</b>        | <b>.122</b>                      | 3.1                            | <b>.305</b>                   | 7.75                        | 0.20         | 2.CMC42.A2Z3.310.1 |
|                     |                   | <b>.122</b>                      | 3.1                            | <b>.305</b>                   | 7.75                        | 0.50         | 2.CMC42.A3Z3.310.1 |
|                     |                   | <b>1/8</b>                       | 3.175                          | <b>.313</b>                   | 7.94                        | <b>0.254</b> | 2.CMC.PSRA2Z3.F18  |
|                     |                   | <b>1/8</b>                       | 3.175                          | <b>.313</b>                   | 7.94                        | <b>0.381</b> | 2.CMC.PSRA3Z3.F18  |
|                     |                   | <b>.130</b>                      | 3.3                            | <b>.325</b>                   | 8.25                        | 0.20         | 2.CMC42.A2Z3.330.1 |
|                     |                   | <b>.130</b>                      | 3.3                            | <b>.325</b>                   | 8.25                        | 0.50         | 2.CMC42.A3Z3.330.1 |
|                     | <b>3.8</b>        | <b>.130</b>                      | 3.3                            | <b>.325</b>                   | 8.25                        | 0.20         | 2.CMC42.A2Z3.330.1 |
|                     |                   | <b>.130</b>                      | 3.3                            | <b>.325</b>                   | 8.25                        | 0.50         | 2.CMC42.A3Z3.330.1 |
|                     | <b>3.9</b>        | <b>.130</b>                      | 3.3                            | <b>.325</b>                   | 8.25                        | 0.20         | 2.CMC42.A2Z3.330.1 |
|                     |                   | <b>.130</b>                      | 3.3                            | <b>.325</b>                   | 8.25                        | 0.50         | 2.CMC42.A3Z3.330.1 |
|                     |                   | <b>.146</b>                      | 3.7                            | <b>.364</b>                   | 9.25                        | 0.20         | 2.CMC42.A2Z3.370.1 |
|                     |                   | <b>.146</b>                      | 3.7                            | <b>.364</b>                   | 9.25                        | 0.50         | 2.CMC42.A3Z3.370.1 |
| <b>5/32</b>         | <b>3.968</b>      | <b>.130</b>                      | 3.3                            | <b>.325</b>                   | 8.25                        | 0.20         | 2.CMC42.A2Z3.330.1 |
|                     |                   | <b>.130</b>                      | 3.3                            | <b>.325</b>                   | 8.25                        | 0.50         | 2.CMC42.A3Z3.330.1 |
|                     |                   | <b>.146</b>                      | 3.7                            | <b>.364</b>                   | 9.25                        | 0.20         | 2.CMC42.A2Z3.370.1 |
|                     |                   | <b>.146</b>                      | 3.7                            | <b>.364</b>                   | 9.25                        | 0.50         | 2.CMC42.A3Z3.370.1 |
|                     |                   | <b>.146</b>                      | 3.7                            | <b>.364</b>                   | 9.25                        | 0.20         | 2.CMC42.A2Z3.370.1 |
|                     |                   | <b>.146</b>                      | 3.7                            | <b>.364</b>                   | 9.25                        | 0.50         | 2.CMC42.A3Z3.370.1 |
|                     | <b>4.0</b>        | <b>.146</b>                      | 3.7                            | <b>.364</b>                   | 9.25                        | 0.20         | 2.CMC42.A2Z3.370.1 |
|                     |                   | <b>.146</b>                      | 3.7                            | <b>.364</b>                   | 9.25                        | 0.50         | 2.CMC42.A3Z3.370.1 |
|                     | <b>4.1</b>        | <b>.146</b>                      | 3.7                            | <b>.364</b>                   | 9.25                        | 0.20         | 2.CMC42.A2Z3.370.1 |
|                     |                   | <b>.146</b>                      | 3.7                            | <b>.364</b>                   | 9.25                        | 0.50         | 2.CMC42.A3Z3.370.1 |
|                     |                   | <b>.146</b>                      | 3.7                            | <b>.364</b>                   | 9.25                        | 0.20         | 2.CMC42.A2Z3.370.1 |
|                     |                   | <b>.146</b>                      | 3.7                            | <b>.364</b>                   | 9.25                        | 0.50         | 2.CMC42.A3Z3.370.1 |
|                     | <b>4.2</b>        | <b>5/32</b>                      | 3.968                          | <b>.391</b>                   | 9.92                        | <b>0.254</b> | 2.CMC.PSRA2Z3.F532 |
|                     |                   | <b>5/32</b>                      | 3.968                          | <b>.391</b>                   | 9.92                        | <b>0.381</b> | 2.CMC.PSRA3Z3.F532 |
|                     |                   | <b>.157</b>                      | 4.0                            | <b>.394</b>                   | 10.00                       | 0.20         | 2.CMC42.A2Z3.400.1 |
|                     |                   | <b>.157</b>                      | 4.0                            | <b>.394</b>                   | 10.00                       | 0.50         | 2.CMC42.A3Z3.400.1 |
|                     | <b>4.3</b>        | <b>.146</b>                      | 3.7                            | <b>.364</b>                   | 9.25                        | 0.20         | 2.CMC42.A2Z3.370.1 |
|                     |                   | <b>.146</b>                      | 3.7                            | <b>.364</b>                   | 9.25                        | 0.50         | 2.CMC42.A3Z3.370.1 |
|                     |                   | <b>5/32</b>                      | 3.968                          | <b>.391</b>                   | 9.92                        | <b>0.254</b> | 2.CMC.PSRA2Z3.F532 |
|                     |                   | <b>5/32</b>                      | 3.968                          | <b>.391</b>                   | 9.92                        | <b>0.381</b> | 2.CMC.PSRA3Z3.F532 |
|                     |                   | <b>.157</b>                      | 4.0                            | <b>.394</b>                   | 10.00                       | 0.20         | 2.CMC42.A2Z3.400.1 |
|                     |                   | <b>.157</b>                      | 4.0                            | <b>.394</b>                   | 10.00                       | 0.50         | 2.CMC42.A3Z3.400.1 |
|                     | <b>4.4</b>        | <b>.146</b>                      | 3.7                            | <b>.364</b>                   | 9.25                        | 0.20         | 2.CMC42.A2Z3.370.1 |
|                     |                   | <b>.146</b>                      | 3.7                            | <b>.364</b>                   | 9.25                        | 0.50         | 2.CMC42.A3Z3.370.1 |
|                     |                   | <b>5/32</b>                      | 3.968                          | <b>.391</b>                   | 9.92                        | <b>0.254</b> | 2.CMC.PSRA2Z3.F532 |
|                     |                   | <b>5/32</b>                      | 3.968                          | <b>.391</b>                   | 9.92                        | <b>0.381</b> | 2.CMC.PSRA3Z3.F532 |
|                     |                   | <b>.157</b>                      | 4.0                            | <b>.394</b>                   | 10.00                       | 0.20         | 2.CMC42.A2Z3.400.1 |
|                     |                   | <b>.157</b>                      | 4.0                            | <b>.394</b>                   | 10.00                       | 0.50         | 2.CMC42.A3Z3.400.1 |
|                     | <b>4.5</b>        | <b>.157</b>                      | 4.0                            | <b>.394</b>                   | 10.00                       | 0.20         | 2.CMC42.A2Z3.400.1 |
|                     |                   | <b>.157</b>                      | 4.0                            | <b>.394</b>                   | 10.00                       | 0.50         | 2.CMC42.A3Z3.400.1 |
|                     |                   | <b>.169</b>                      | 4.3                            | <b>.423</b>                   | 10.75                       | 0.20         | 2.CMC42.A2Z3.430.1 |
|                     |                   | <b>.169</b>                      | 4.3                            | <b>.423</b>                   | 10.75                       | 0.50         | 2.CMC42.A3Z3.430.1 |
|                     | <b>4.6</b>        | <b>.157</b>                      | 4.0                            | <b>.394</b>                   | 10.00                       | 0.20         | 2.CMC42.A2Z3.400.1 |
|                     |                   | <b>.157</b>                      | 4.0                            | <b>.394</b>                   | 10.00                       | 0.50         | 2.CMC42.A3Z3.400.1 |
|                     |                   | <b>.169</b>                      | 4.3                            | <b>.423</b>                   | 10.75                       | 0.20         | 2.CMC42.A2Z3.430.1 |
|                     |                   | <b>.169</b>                      | 4.3                            | <b>.423</b>                   | 10.75                       | 0.50         | 2.CMC42.A3Z3.430.1 |
|                     | <b>4.7</b>        | <b>.157</b>                      | 4.0                            | <b>.394</b>                   | 10.00                       | 0.20         | 2.CMC42.A2Z3.400.1 |
|                     |                   | <b>.157</b>                      | 4.0                            | <b>.394</b>                   | 10.00                       | 0.50         | 2.CMC42.A3Z3.400.1 |
|                     |                   | <b>.169</b>                      | 4.3                            | <b>.423</b>                   | 10.75                       | 0.20         | 2.CMC42.A2Z3.430.1 |
|                     |                   | <b>.169</b>                      | 4.3                            | <b>.423</b>                   | 10.75                       | 0.50         | 2.CMC42.A3Z3.430.1 |
| <b>3/16</b>         | <b>4.762</b>      | <b>.157</b>                      | 4.0                            | <b>.394</b>                   | 10.00                       | 0.20         | 2.CMC42.A2Z3.400.1 |
|                     |                   | <b>.157</b>                      | 4.0                            | <b>.394</b>                   | 10.00                       | 0.50         | 2.CMC42.A3Z3.400.1 |
|                     |                   | <b>.169</b>                      | 4.3                            | <b>.423</b>                   | 10.75                       | 0.20         | 2.CMC42.A2Z3.430.1 |
|                     |                   | <b>.169</b>                      | 4.3                            | <b>.423</b>                   | 10.75                       | 0.50         | 2.CMC42.A3Z3.430.1 |
|                     | <b>4.8</b>        | <b>.157</b>                      | 4.0                            | <b>.394</b>                   | 10.00                       | 0.20         | 2.CMC42.A2Z3.400.1 |
|                     |                   | <b>.157</b>                      | 4.0                            | <b>.394</b>                   | 10.00                       | 0.50         | 2.CMC42.A3Z3.400.1 |
|                     |                   | <b>.169</b>                      | 4.3                            | <b>.423</b>                   | 10.75                       | 0.20         | 2.CMC42.A2Z3.430.1 |
|                     |                   | <b>.169</b>                      | 4.3                            | <b>.423</b>                   | 10.75                       | 0.50         | 2.CMC42.A3Z3.430.1 |

NEW

## THE RIGHT TOOL FOR KEYWAY SLOTTING



| w<br>slot<br>[inch] | w<br>slot<br>[mm] | d <sub>1</sub><br>Tool<br>[inch] | d <sub>1</sub><br>Tool<br>[mm] | l <sub>1, max</sub><br>[inch] | l <sub>1, max</sub><br>[mm] | r<br>[mm][inch] | Item<br>number     |
|---------------------|-------------------|----------------------------------|--------------------------------|-------------------------------|-----------------------------|-----------------|--------------------|
| .193                | 4.9               | .169                             | 4.3                            | .423                          | 10.75                       | 0.20            | 2.CMC42.A2Z3.430.1 |
|                     |                   | .169                             | 4.3                            | .423                          | 10.75                       | 0.50            | 2.CMC42.A3Z3.430.1 |
|                     |                   | .185                             | 4.7                            | .463                          | 11.75                       | 0.20            | 2.CMC42.A2Z3.470.1 |
|                     |                   | .185                             | 4.7                            | .463                          | 11.75                       | 0.50            | 2.CMC42.A3Z3.470.1 |
| .197                | 5.0               | .169                             | 4.3                            | .423                          | 10.75                       | 0.20            | 2.CMC42.A2Z3.430.1 |
|                     |                   | .169                             | 4.3                            | .423                          | 10.75                       | 0.50            | 2.CMC42.A3Z3.430.1 |
|                     |                   | .185                             | 4.7                            | .463                          | 11.75                       | 0.20            | 2.CMC42.A2Z3.470.1 |
|                     |                   | .185                             | 4.7                            | .463                          | 11.75                       | 0.50            | 2.CMC42.A3Z3.470.1 |
|                     |                   | 3/16                             | 4.762                          | .469                          | 11.91                       | <b>0.254</b>    | 2.CMC.PSRA2Z3.F316 |
|                     |                   | 3/16                             | 4.762                          | .469                          | 11.91                       | <b>0.381</b>    | 2.CMC.PSRA3Z3.F316 |
|                     |                   | .189                             | 4.8                            | .472                          | 12.00                       | 0.20            | 2.CMC42.A2Z3.480.1 |
|                     |                   | .189                             | 4.8                            | .472                          | 12.00                       | 0.50            | 2.CMC42.A3Z3.480.1 |
| .201                | 5.1               | .169                             | 4.3                            | .423                          | 10.75                       | 0.20            | 2.CMC42.A2Z3.430.1 |
|                     |                   | .169                             | 4.3                            | .423                          | 10.75                       | 0.50            | 2.CMC42.A3Z3.430.1 |
|                     |                   | .185                             | 4.7                            | .463                          | 11.75                       | 0.20            | 2.CMC42.A2Z3.470.1 |
|                     |                   | .185                             | 4.7                            | .463                          | 11.75                       | 0.50            | 2.CMC42.A3Z3.470.1 |
|                     |                   | 3/16                             | 4.762                          | .469                          | 11.91                       | <b>0.254</b>    | 2.CMC.PSRA2Z3.F316 |
|                     |                   | 3/16                             | 4.762                          | .469                          | 11.91                       | <b>0.381</b>    | 2.CMC.PSRA3Z3.F316 |
|                     |                   | .189                             | 4.8                            | .472                          | 12.00                       | 0.20            | 2.CMC42.A2Z3.480.1 |
|                     |                   | .189                             | 4.8                            | .472                          | 12.00                       | 0.50            | 2.CMC42.A3Z3.480.1 |
| .205                | 5.2               | .185                             | 4.7                            | .463                          | 11.75                       | 0.20            | 2.CMC42.A2Z3.470.1 |
|                     |                   | .185                             | 4.7                            | .463                          | 11.75                       | 0.50            | 2.CMC42.A3Z3.470.1 |
|                     |                   | 3/16                             | 4.762                          | .469                          | 11.91                       | <b>0.254</b>    | 2.CMC.PSRA2Z3.F316 |
|                     |                   | 3/16                             | 4.762                          | .469                          | 11.91                       | <b>0.381</b>    | 2.CMC.PSRA3Z3.F316 |
|                     |                   | .189                             | 4.8                            | .472                          | 12.00                       | 0.20            | 2.CMC42.A2Z3.480.1 |
|                     |                   | .189                             | 4.8                            | .472                          | 12.00                       | 0.50            | 2.CMC42.A3Z3.480.1 |
|                     |                   | .197                             | 5.0                            | .492                          | 12.50                       | 0.20            | 2.CMC42.A2Z3.500.1 |
|                     |                   | .197                             | 5.0                            | .492                          | 12.50                       | 0.50            | 2.CMC42.A3Z3.500.1 |
| .209                | 5.3               | .185                             | 4.7                            | .463                          | 11.75                       | 0.20            | 2.CMC42.A2Z3.470.1 |
|                     |                   | .185                             | 4.7                            | .463                          | 11.75                       | 0.50            | 2.CMC42.A3Z3.470.1 |
|                     |                   | 3/16                             | 4.762                          | .469                          | 11.91                       | <b>0.254</b>    | 2.CMC.PSRA2Z3.F316 |
|                     |                   | 3/16                             | 4.762                          | .469                          | 11.91                       | <b>0.381</b>    | 2.CMC.PSRA3Z3.F316 |
|                     |                   | .189                             | 4.8                            | .472                          | 12.00                       | 0.20            | 2.CMC42.A2Z3.480.1 |
|                     |                   | .189                             | 4.8                            | .472                          | 12.00                       | 0.50            | 2.CMC42.A3Z3.480.1 |
|                     |                   | .197                             | 5.0                            | .492                          | 12.50                       | 0.20            | 2.CMC42.A2Z3.500.1 |
|                     |                   | .197                             | 5.0                            | .492                          | 12.50                       | 0.50            | 2.CMC42.A3Z3.500.1 |
| .213                | 5.4               | .185                             | 4.7                            | .463                          | 11.75                       | 0.20            | 2.CMC42.A2Z3.470.1 |
|                     |                   | .185                             | 4.7                            | .463                          | 11.75                       | 0.50            | 2.CMC42.A3Z3.470.1 |
|                     |                   | 3/16                             | 4.762                          | .469                          | 11.91                       | <b>0.254</b>    | 2.CMC.PSRA2Z3.F316 |
|                     |                   | 3/16                             | 4.762                          | .469                          | 11.91                       | <b>0.381</b>    | 2.CMC.PSRA3Z3.F316 |
|                     |                   | .189                             | 4.8                            | .472                          | 12.00                       | 0.20            | 2.CMC42.A2Z3.480.1 |
|                     |                   | .189                             | 4.8                            | .472                          | 12.00                       | 0.50            | 2.CMC42.A3Z3.480.1 |
|                     |                   | .197                             | 5.0                            | .492                          | 12.50                       | 0.20            | 2.CMC42.A2Z3.500.1 |
|                     |                   | .197                             | 5.0                            | .492                          | 12.50                       | 0.50            | 2.CMC42.A3Z3.500.1 |
| .217                | 5.5               | .185                             | 4.7                            | .463                          | 11.75                       | 0.20            | 2.CMC42.A2Z3.470.1 |
|                     |                   | .185                             | 4.7                            | .463                          | 11.75                       | 0.50            | 2.CMC42.A3Z3.470.1 |
|                     |                   | 3/16                             | 4.762                          | .469                          | 11.91                       | <b>0.254</b>    | 2.CMC.PSRA2Z3.F316 |
|                     |                   | 3/16                             | 4.762                          | .469                          | 11.91                       | <b>0.381</b>    | 2.CMC.PSRA3Z3.F316 |
|                     |                   | .189                             | 4.8                            | .472                          | 12.00                       | 0.20            | 2.CMC42.A2Z3.480.1 |
|                     |                   | .189                             | 4.8                            | .472                          | 12.00                       | 0.50            | 2.CMC42.A3Z3.480.1 |
|                     |                   | .197                             | 5.0                            | .492                          | 12.50                       | 0.20            | 2.CMC42.A2Z3.500.1 |
|                     |                   | .197                             | 5.0                            | .492                          | 12.50                       | 0.50            | 2.CMC42.A3Z3.500.1 |
|                     |                   | .209                             | 5.3                            | .522                          | 13.25                       | 0.20            | 2.CMC42.A2Z3.530.1 |
|                     |                   | .209                             | 5.3                            | .522                          | 13.25                       | 0.50            | 2.CMC42.A3Z3.530.1 |
|                     |                   |                                  |                                |                               |                             |                 |                    |
|                     |                   |                                  |                                |                               |                             |                 |                    |

| w<br>slot<br>[inch] | w<br>slot<br>[mm] | d <sub>1</sub><br>Tool<br>[inch] | d <sub>1</sub><br>[mm] | l <sub>1, max</sub><br>[inch] | l <sub>1, max</sub><br>[mm] | r<br>[mm][inch] | Item<br>number     |
|---------------------|-------------------|----------------------------------|------------------------|-------------------------------|-----------------------------|-----------------|--------------------|
| 7/32                | 5.560             | .185                             | 4.7                    | .463                          | 11.75                       | 0.20            | 2.CMC42.A2Z3.470.1 |
|                     |                   | .185                             | 4.7                    | .463                          | 11.75                       | 0.50            | 2.CMC42.A3Z3.470.1 |
|                     |                   | 3/16                             | 4.762                  | .469                          | 11.91                       | <b>0.254</b>    | 2.CMC.PSRA2Z3.F316 |
|                     |                   | 3/16                             | 4.762                  | .469                          | 11.91                       | <b>0.381</b>    | 2.CMC.PSRA3Z3.F316 |
|                     |                   | .189                             | 4.8                    | .472                          | 12.00                       | 0.20            | 2.CMC42.A2Z3.480.1 |
|                     |                   | .189                             | 4.8                    | .472                          | 12.00                       | 0.50            | 2.CMC42.A3Z3.480.1 |
|                     |                   | .197                             | 5.0                    | .492                          | 12.50                       | 0.20            | 2.CMC42.A2Z3.500.1 |
|                     |                   | .197                             | 5.0                    | .492                          | 12.50                       | 0.50            | 2.CMC42.A3Z3.500.1 |
|                     |                   | .209                             | 5.3                    | .522                          | 13.25                       | 0.20            | 2.CMC42.A2Z3.530.1 |
| .209                | 5.3               | .522                             | 13.25                  | 0.50                          | 2.CMC42.A3Z3.530.1          |                 |                    |
| .220                | 5.6               | .185                             | 4.7                    | .463                          | 11.75                       | 0.20            | 2.CMC42.A2Z3.470.1 |
|                     |                   | .185                             | 4.7                    | .463                          | 11.75                       | 0.50            | 2.CMC42.A3Z3.470.1 |
|                     |                   | 3/16                             | 4.762                  | .469                          | 11.91                       | <b>0.254</b>    | 2.CMC.PSRA2Z3.F316 |
|                     |                   | 3/16                             | 4.762                  | .469                          | 11.91                       | <b>0.381</b>    | 2.CMC.PSRA3Z3.F316 |
|                     |                   | .189                             | 4.8                    | .472                          | 12.00                       | 0.20            | 2.CMC42.A2Z3.480.1 |
|                     |                   | .189                             | 4.8                    | .472                          | 12.00                       | 0.50            | 2.CMC42.A3Z3.480.1 |
|                     |                   | .197                             | 5.0                    | .492                          | 12.50                       | 0.20            | 2.CMC42.A2Z3.500.1 |
|                     |                   | .197                             | 5.0                    | .492                          | 12.50                       | 0.50            | 2.CMC42.A3Z3.500.1 |
|                     |                   | .209                             | 5.3                    | .522                          | 13.25                       | 0.20            | 2.CMC42.A2Z3.530.1 |
| .209                | 5.3               | .522                             | 13.25                  | 0.50                          | 2.CMC42.A3Z3.530.1          |                 |                    |
| .224                | 5.7               | .189                             | 4.8                    | .472                          | 12.00                       | 0.20            | 2.CMC42.A2Z3.480.1 |
|                     |                   | .189                             | 4.8                    | .472                          | 12.00                       | 0.50            | 2.CMC42.A3Z3.480.1 |
|                     |                   | .197                             | 5.0                    | .492                          | 12.50                       | 0.20            | 2.CMC42.A2Z3.500.1 |
|                     |                   | .197                             | 5.0                    | .492                          | 12.50                       | 0.50            | 2.CMC42.A3Z3.500.1 |
|                     |                   | .209                             | 5.3                    | .522                          | 13.25                       | 0.20            | 2.CMC42.A2Z3.530.1 |
|                     |                   | .209                             | 5.3                    | .522                          | 13.25                       | 0.50            | 2.CMC42.A3Z3.530.1 |
| .228                | 5.8               | .197                             | 5.0                    | .492                          | 12.50                       | 0.20            | 2.CMC42.A2Z3.500.1 |
|                     |                   | .197                             | 5.0                    | .492                          | 12.50                       | 0.50            | 2.CMC42.A3Z3.500.1 |
|                     |                   | .209                             | 5.3                    | .522                          | 13.25                       | 0.20            | 2.CMC42.A2Z3.530.1 |
|                     |                   | .209                             | 5.3                    | .522                          | 13.25                       | 0.50            | 2.CMC42.A3Z3.530.1 |
| .232                | 5.9               | .197                             | 5.0                    | .492                          | 12.50                       | 0.20            | 2.CMC42.A2Z3.500.1 |
|                     |                   | .197                             | 5.0                    | .492                          | 12.50                       | 0.50            | 2.CMC42.A3Z3.500.1 |
|                     |                   | .209                             | 5.3                    | .522                          | 13.25                       | 0.20            | 2.CMC42.A2Z3.530.1 |
|                     |                   | .209                             | 5.3                    | .522                          | 13.25                       | 0.50            | 2.CMC42.A3Z3.530.1 |
|                     |                   | 7/32                             | 5.560                  | .547                          | 13.90                       | <b>0.381</b>    | 2.CMC.PSRA2Z3.F732 |
|                     |                   | 7/32                             | 5.560                  | .547                          | 13.90                       | <b>0.762</b>    | 2.CMC.PSRA3Z3.F732 |
|                     |                   | .224                             | 5.7                    | .561                          | 14.25                       | 0.20            | 2.CMC42.A2Z3.570.1 |
|                     |                   | .224                             | 5.7                    | .561                          | 14.25                       | 0.50            | 2.CMC42.A3Z3.570.1 |
| .236                | 6.0               | .197                             | 5.0                    | .492                          | 12.50                       | 0.20            | 2.CMC42.A2Z3.500.1 |
|                     |                   | .197                             | 5.0                    | .492                          | 12.50                       | 0.50            | 2.CMC42.A3Z3.500.1 |
|                     |                   | .209                             | 5.3                    | .522                          | 13.25                       | 0.20            | 2.CMC42.A2Z3.530.1 |
|                     |                   | .209                             | 5.3                    | .522                          | 13.25                       | 0.50            | 2.CMC42.A3Z3.530.1 |
|                     |                   | 7/32                             | 5.560                  | .547                          | 13.90                       | <b>0.381</b>    | 2.CMC.PSRA2Z3.F732 |
|                     |                   | 7/32                             | 5.560                  | .547                          | 13.90                       | <b>0.762</b>    | 2.CMC.PSRA3Z3.F732 |
|                     |                   | .224                             | 5.7                    | .561                          | 14.25                       | 0.20            | 2.CMC42.A2Z3.570.1 |
|                     |                   | .224                             | 5.7                    | .561                          | 14.25                       | 0.50            | 2.CMC42.A3Z3.570.1 |
| .240                | 6.1               | .209                             | 5.3                    | .522                          | 13.25                       | 0.20            | 2.CMC42.A2Z3.530.1 |
|                     |                   | .209                             | 5.3                    | .522                          | 13.25                       | 0.50            | 2.CMC42.A3Z3.530.1 |
|                     |                   | 7/32                             | 5.560                  | .547                          | 13.90                       | <b>0.381</b>    | 2.CMC.PSRA2Z3.F732 |
|                     |                   | 7/32                             | 5.560                  | .547                          | 13.90                       | <b>0.762</b>    | 2.CMC.PSRA3Z3.F732 |
|                     |                   | .224                             | 5.7                    | .561                          | 14.25                       | 0.20            | 2.CMC42.A2Z3.570.1 |
|                     |                   | .224                             | 5.7                    | .561                          | 14.25                       | 0.50            | 2.CMC42.A3Z3.570.1 |
|                     |                   |                                  |                        |                               |                             |                 |                    |
|                     |                   |                                  |                        |                               |                             |                 |                    |

| w<br>slot<br>[inch] | w<br>slot<br>[mm] | d <sub>1</sub><br>Tool<br>[inch] | d <sub>1</sub><br>Tool<br>[mm] | l <sub>1, max</sub><br>[inch] | l <sub>1, max</sub><br>[mm] | r<br>[mm]    | Item<br>number     |
|---------------------|-------------------|----------------------------------|--------------------------------|-------------------------------|-----------------------------|--------------|--------------------|
| .244                | 6.2               | .209                             | 5.3                            | .522                          | 13.25                       | 0.20         | 2.CMC42.A2Z3.530.1 |
|                     |                   | .209                             | 5.3                            | .522                          | 13.25                       | 0.50         | 2.CMC42.A3Z3.530.1 |
|                     |                   | 7/32                             | 5.560                          | .547                          | 13.90                       | <b>0.381</b> | 2.CMC.PSRA2Z3.F732 |
|                     |                   | 7/32                             | 5.560                          | .547                          | 13.90                       | <b>0.762</b> | 2.CMC.PSRA3Z3.F732 |
|                     |                   | .224                             | 5.7                            | .561                          | 14.25                       | 0.20         | 2.CMC42.A2Z3.570.1 |
|                     |                   | .224                             | 5.7                            | .561                          | 14.25                       | 0.50         | 2.CMC42.A3Z3.570.1 |
|                     |                   | .236                             | 6.0                            | .591                          | 15.00                       | 0.20         | 2.CMC42.A2Z3.600.1 |
|                     |                   | .236                             | 6.0                            | .591                          | 15.00                       | 0.50         | 2.CMC42.A3Z3.600.1 |
| .248                | 6.3               | .209                             | 5.3                            | .522                          | 13.25                       | 0.20         | 2.CMC42.A2Z3.530.1 |
|                     |                   | .209                             | 5.3                            | .522                          | 13.25                       | 0.50         | 2.CMC42.A3Z3.530.1 |
|                     |                   | 7/32                             | 5.560                          | .547                          | 13.90                       | <b>0.381</b> | 2.CMC.PSRA2Z3.F732 |
|                     |                   | 7/32                             | 5.560                          | .547                          | 13.90                       | <b>0.762</b> | 2.CMC.PSRA3Z3.F732 |
|                     |                   | .224                             | 5.7                            | .561                          | 14.25                       | 0.20         | 2.CMC42.A2Z3.570.1 |
|                     |                   | .224                             | 5.7                            | .561                          | 14.25                       | 0.50         | 2.CMC42.A3Z3.570.1 |
|                     |                   | .236                             | 6.0                            | .591                          | 15.00                       | 0.20         | 2.CMC42.A2Z3.600.1 |
|                     |                   | .236                             | 6.0                            | .591                          | 15.00                       | 0.50         | 2.CMC42.A3Z3.600.1 |
| 1/4                 | 6.350             | .209                             | 5.3                            | .522                          | 13.25                       | 0.20         | 2.CMC42.A2Z3.530.1 |
|                     |                   | .209                             | 5.3                            | .522                          | 13.25                       | 0.50         | 2.CMC42.A3Z3.530.1 |
|                     |                   | 7/32                             | 5.560                          | .547                          | 13.90                       | <b>0.381</b> | 2.CMC.PSRA2Z3.F732 |
|                     |                   | 7/32                             | 5.560                          | .547                          | 13.90                       | <b>0.762</b> | 2.CMC.PSRA3Z3.F732 |
|                     |                   | .224                             | 5.7                            | .561                          | 14.25                       | 0.20         | 2.CMC42.A2Z3.570.1 |
|                     |                   | .224                             | 5.7                            | .561                          | 14.25                       | 0.50         | 2.CMC42.A3Z3.570.1 |
|                     |                   | .236                             | 6.0                            | .591                          | 15.00                       | 0.20         | 2.CMC42.A2Z3.600.1 |
|                     |                   | .236                             | 6.0                            | .591                          | 15.00                       | 0.50         | 2.CMC42.A3Z3.600.1 |
| .252                | 6.4               | .224                             | 5.7                            | .561                          | 14.25                       | 0.20         | 2.CMC42.A2Z3.570.1 |
|                     |                   | .224                             | 5.7                            | .561                          | 14.25                       | 0.50         | 2.CMC42.A3Z3.570.1 |
|                     |                   | .236                             | 6.0                            | .591                          | 15.00                       | 0.20         | 2.CMC42.A2Z3.600.1 |
|                     |                   | .236                             | 6.0                            | .591                          | 15.00                       | 0.50         | 2.CMC42.A3Z3.600.1 |
|                     |                   | .236                             | 6.0                            | .591                          | 15.00                       | 1.00         | 2.CMC42.A4Z3.600.1 |
|                     |                   | .224                             | 5.7                            | .561                          | 14.25                       | 0.20         | 2.CMC42.A2Z3.570.1 |
| .256                | 6.5               | .224                             | 5.7                            | .561                          | 14.25                       | 0.50         | 2.CMC42.A3Z3.570.1 |
|                     |                   | .236                             | 6.0                            | .591                          | 15.00                       | 0.20         | 2.CMC42.A2Z3.600.1 |
|                     |                   | .236                             | 6.0                            | .591                          | 15.00                       | 0.50         | 2.CMC42.A3Z3.600.1 |
|                     |                   | .236                             | 6.0                            | .591                          | 15.00                       | 1.00         | 2.CMC42.A4Z3.600.1 |
| .260                | 6.6               | .224                             | 5.7                            | .561                          | 14.25                       | 0.20         | 2.CMC42.A2Z3.570.1 |
|                     |                   | .224                             | 5.7                            | .561                          | 14.25                       | 0.50         | 2.CMC42.A3Z3.570.1 |
|                     |                   | .236                             | 6.0                            | .591                          | 15.00                       | 0.20         | 2.CMC42.A2Z3.600.1 |
|                     |                   | .236                             | 6.0                            | .591                          | 15.00                       | 0.50         | 2.CMC42.A3Z3.600.1 |
|                     |                   | .236                             | 6.0                            | .591                          | 15.00                       | 1.00         | 2.CMC42.A4Z3.600.1 |
|                     |                   | 1/4                              | 6.350                          | .625                          | 15.88                       | <b>0.381</b> | 2.CMC.PSRA2Z3.F14  |
|                     |                   | 1/4                              | 6.350                          | .625                          | 15.88                       | <b>0.762</b> | 2.CMC.PSRA3Z3.F14  |
|                     |                   | 1/4                              | 6.350                          | .625                          | 15.88                       | <b>1.524</b> | 2.CMC.PSRA4Z3.F14  |
| .264                | 6.7               | .224                             | 5.7                            | .561                          | 14.25                       | 0.20         | 2.CMC42.A2Z3.570.1 |
|                     |                   | .224                             | 5.7                            | .561                          | 14.25                       | 0.50         | 2.CMC42.A3Z3.570.1 |
|                     |                   | .236                             | 6.0                            | .591                          | 15.00                       | 0.20         | 2.CMC42.A2Z3.600.1 |
|                     |                   | .236                             | 6.0                            | .591                          | 15.00                       | 0.50         | 2.CMC42.A3Z3.600.1 |
|                     |                   | .236                             | 6.0                            | .591                          | 15.00                       | 1.00         | 2.CMC42.A4Z3.600.1 |
|                     |                   | 1/4                              | 6.350                          | .625                          | 15.88                       | <b>0.381</b> | 2.CMC.PSRA2Z3.F14  |
|                     |                   | 1/4                              | 6.350                          | .625                          | 15.88                       | <b>0.762</b> | 2.CMC.PSRA3Z3.F14  |
| 1/4                 | 6.350             | .625                             | 15.88                          | <b>1.524</b>                  | 2.CMC.PSRA4Z3.F14           |              |                    |

| w<br>slot<br>[inch] | w<br>slot<br>[mm] | d <sub>1</sub><br>Tool<br>[inch] | d <sub>1</sub><br>Tool<br>[mm] | l <sub>1,max</sub><br>[inch] | l <sub>1,max</sub><br>[mm] | r<br>[mm] | Item<br>number     |  |
|---------------------|-------------------|----------------------------------|--------------------------------|------------------------------|----------------------------|-----------|--------------------|--|
| .268                | 6.8               | .224                             | 5.7                            | .561                         | 14.25                      | 0.20      | 2.CMC42.A2Z3.570.1 |  |
|                     |                   | .224                             | 5.7                            | .561                         | 14.25                      | 0.50      | 2.CMC42.A3Z3.570.1 |  |
|                     |                   | .236                             | 6.0                            | .591                         | 15.00                      | 0.20      | 2.CMC42.A2Z3.600.1 |  |
|                     |                   | .236                             | 6.0                            | .591                         | 15.00                      | 0.50      | 2.CMC42.A3Z3.600.1 |  |
|                     |                   | .236                             | 6.0                            | .591                         | 15.00                      | 1.00      | 2.CMC42.A4Z3.600.1 |  |
|                     |                   | 1/4                              | 6.350                          | .625                         | 15.88                      | 0.381     | 2.CMC.PSRA2Z3.F14  |  |
|                     |                   | 1/4                              | 6.350                          | .625                         | 15.88                      | 0.762     | 2.CMC.PSRA3Z3.F14  |  |
| 1/4                 | 6.350             | .625                             | 15.88                          | 1.524                        | 2.CMC.PSRA4Z3.F14          |           |                    |  |
| .272                | 6.9               | .236                             | 6.0                            | .591                         | 15.00                      | 0.20      | 2.CMC42.A2Z3.600.1 |  |
|                     |                   | .236                             | 6.0                            | .591                         | 15.00                      | 0.50      | 2.CMC42.A3Z3.600.1 |  |
|                     |                   | .236                             | 6.0                            | .591                         | 15.00                      | 1.00      | 2.CMC42.A4Z3.600.1 |  |
|                     |                   | 1/4                              | 6.350                          | .625                         | 15.88                      | 0.381     | 2.CMC.PSRA2Z3.F14  |  |
|                     |                   | 1/4                              | 6.350                          | .625                         | 15.88                      | 0.762     | 2.CMC.PSRA3Z3.F14  |  |
|                     |                   | 1/4                              | 6.350                          | .625                         | 15.88                      | 1.524     | 2.CMC.PSRA4Z3.F14  |  |
|                     |                   |                                  |                                |                              |                            |           |                    |  |
| .276                | 7.0               | .236                             | 6.0                            | .591                         | 15.00                      | 0.20      | 2.CMC42.A2Z3.600.1 |  |
|                     |                   | .236                             | 6.0                            | .591                         | 15.00                      | 0.50      | 2.CMC42.A3Z3.600.1 |  |
|                     |                   | .236                             | 6.0                            | .591                         | 15.00                      | 1.00      | 2.CMC42.A4Z3.600.1 |  |
|                     |                   | 1/4                              | 6.350                          | .625                         | 15.88                      | 0.381     | 2.CMC.PSRA2Z3.F14  |  |
|                     |                   | 1/4                              | 6.350                          | .625                         | 15.88                      | 0.762     | 2.CMC.PSRA3Z3.F14  |  |
|                     |                   | 1/4                              | 6.350                          | .625                         | 15.88                      | 1.524     | 2.CMC.PSRA4Z3.F14  |  |
|                     |                   |                                  |                                |                              |                            |           |                    |  |
| .280                | 7.1               | .236                             | 6.0                            | .591                         | 15.00                      | 0.20      | 2.CMC42.A2Z3.600.1 |  |
|                     |                   | .236                             | 6.0                            | .591                         | 15.00                      | 0.50      | 2.CMC42.A3Z3.600.1 |  |
|                     |                   | .236                             | 6.0                            | .591                         | 15.00                      | 1.00      | 2.CMC42.A4Z3.600.1 |  |
|                     |                   | 1/4                              | 6.350                          | .625                         | 15.88                      | 0.381     | 2.CMC.PSRA2Z3.F14  |  |
|                     |                   | 1/4                              | 6.350                          | .625                         | 15.88                      | 0.762     | 2.CMC.PSRA3Z3.F14  |  |
|                     |                   | 1/4                              | 6.350                          | .625                         | 15.88                      | 1.524     | 2.CMC.PSRA4Z3.F14  |  |
|                     |                   |                                  |                                |                              |                            |           |                    |  |
| .283                | 7.2               | .236                             | 6.0                            | .591                         | 15.00                      | 0.20      | 2.CMC42.A2Z3.600.1 |  |
|                     |                   | .236                             | 6.0                            | .591                         | 15.00                      | 0.50      | 2.CMC42.A3Z3.600.1 |  |
|                     |                   | .236                             | 6.0                            | .591                         | 15.00                      | 1.00      | 2.CMC42.A4Z3.600.1 |  |
|                     |                   | 1/4                              | 6.350                          | .625                         | 15.88                      | 0.381     | 2.CMC.PSRA2Z3.F14  |  |
|                     |                   | 1/4                              | 6.350                          | .625                         | 15.88                      | 0.762     | 2.CMC.PSRA3Z3.F14  |  |
|                     |                   | 1/4                              | 6.350                          | .625                         | 15.88                      | 1.524     | 2.CMC.PSRA4Z3.F14  |  |
|                     |                   |                                  |                                |                              |                            |           |                    |  |
| .287                | 7.3               | 1/4                              | 6.350                          | .625                         | 15.88                      | 0.381     | 2.CMC.PSRA2Z3.F14  |  |
|                     |                   | 1/4                              | 6.350                          | .625                         | 15.88                      | 0.762     | 2.CMC.PSRA3Z3.F14  |  |
|                     |                   | 1/4                              | 6.350                          | .625                         | 15.88                      | 1.524     | 2.CMC.PSRA4Z3.F14  |  |
|                     |                   |                                  |                                |                              |                            |           |                    |  |
| .291                | 7.4               | 1/4                              | 6.350                          | .625                         | 15.88                      | 0.381     | 2.CMC.PSRA2Z3.F14  |  |
|                     |                   | 1/4                              | 6.350                          | .625                         | 15.88                      | 0.762     | 2.CMC.PSRA3Z3.F14  |  |
|                     |                   | 1/4                              | 6.350                          | .625                         | 15.88                      | 1.524     | 2.CMC.PSRA4Z3.F14  |  |
| .295                | 7.5               | 1/4                              | 6.350                          | .625                         | 15.88                      | 0.381     | 2.CMC.PSRA2Z3.F14  |  |
|                     |                   | 1/4                              | 6.350                          | .625                         | 15.88                      | 0.762     | 2.CMC.PSRA3Z3.F14  |  |
|                     |                   | 1/4                              | 6.350                          | .625                         | 15.88                      | 1.524     | 2.CMC.PSRA4Z3.F14  |  |
| .299                | 7.6               | 1/4                              | 6.350                          | .625                         | 15.88                      | 0.381     | 2.CMC.PSRA2Z3.F14  |  |
|                     |                   | 1/4                              | 6.350                          | .625                         | 15.88                      | 0.762     | 2.CMC.PSRA3Z3.F14  |  |
|                     |                   | 1/4                              | 6.350                          | .625                         | 15.88                      | 1.524     | 2.CMC.PSRA4Z3.F14  |  |
| .323                | 8.2               | .315                             | 8.0                            | .787                         | 20.00                      | 0.20      | 2.CMC42.A2Z3.800.1 |  |
| -                   | -                 | .315                             | 8.0                            | .787                         | 20.00                      | 0.50      | 2.CMC42.A3Z3.800.1 |  |
| .378                | 9.6               | .315                             | 8.0                            | .787                         | 20.00                      | 1.50      | 2.CMC42.A4Z3.800.1 |  |

## CrazyMill Cool P&S Square - 3FL





## ALREADY AVAILABLE: SQUARE VERSION



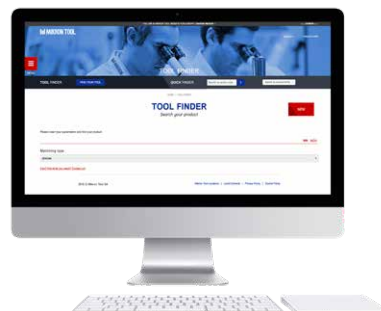
This product is well introduced to the market. Due to its special features, great customer benefits are guaranteed specially for difficult-to-machine materials such as stainless steels, titanium, CoCr alloys and super alloys. The design of the cutting edges permits to machine with the same advantages as with the corner radius version. This endmill can plunge perpendicularly into the material and is well adapted for milling of slots, pockets and sides in minimal spaces.

### Advantages

- **SHORT MACHINING TIME** | Up to 5 times faster
- **LONG TOOL LIFE** | Up to 5 times longer
- **HIGH DEGREE OF PROCESS RELIABILITY** | Thanks to greater coolant flow
- **HIGH DEGREE OF PRECISION** | Thanks to specific cutting geometry

### Item table, machining process and cutting data

For the square version, please refer to ToolBook 2020 on page 540 for all details on item table, machining process and cutting data.



Headquarter and Production

**MIKRON SWITZERLAND AG, AGNO**

Division Tool

Via Campagna 1

6982 Agno

Switzerland

Phone +41 91 610 40 00

mtomikron.com

Production and Regrinding

**MIKRON GMBH ROTTWEIL**

Abteilung Werkzeuge

Berner Feld 71

78628 Rottweil

Germany

Phone +49 741 5380 450

info.mtrmikron.com

North and South America Sales

**MIKRON CORP. MONROE**

200 Main Street

Monroe, CT 06468

USA

Phone +1 203 261 3100

mmonikron.com

China Sales

**MIKRON TOOL SHANGHAI LTD.**

Room A209, Building 3,

No. 526, 3rd East Fute Road,

Shanghai, 200131

P. R. China

Phone +86 21 2076 5671

mtcmikron.com

地址: 中国 (上海) 自由贸易试验区

中国上海市富特东三路526号3号楼第二层

A209室

邮编: 200131

[www.mikrontool.com](http://www.mikrontool.com)

[www.youtube.com/mikrongroup](http://www.youtube.com/mikrongroup)

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2.MKTG.00651- 11.2021 - US - EN