

CrazyMill Cool

MIKRON



Tool World Newest

Cool milling to new horizons
Through coolant, carbide Endmills

CRAZYMILL™
by Mikron Tool
Cool

CrazyMill Cool

Revolutionary in the minute detail

Integrated coolant channels

Cooling channels are integrated into the carbide shaft. Coolant ports are at the end of the shaft taper where they produce a steady and massive cooling effect of the cutting edges which facilitates in turn high cutting speeds. A targeted flushing of the chips is thus also assured and gives best surface quality.



Shaft

A robust carbide shaft helps to achieve stable and non vibrating milling. Highest precision and surface quality are achieved.

Solid carbide

A special carbide has been developed for the CrazyMill Cool product line. This carbide fulfills perfectly the requirements for chip removal machining of difficult materials.

Coating

The newly developed eXedur SL coating is resistant to wear and heat. This in turn prevents adherence and build-up of material.

Cutting geometry

The cutting edge geometry is conceived for milling of difficult to machine materials and distinguishes itself with a robust cutting diameter, a radial relieve and a distinct edge preparation. These factors afford a high cutting quality and stability.



Link to video on YouTube

www.youtube.com/mikrongroup



PATENTED

CrazyMill Cool

Always top performing

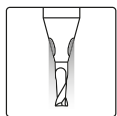
A small Endmill lives up to highest expectations - cooled.

Machining of difficult materials

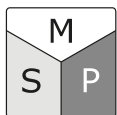
With difficult materials such as stainless and acid resistant steels, titanium chrome-cobalt alloys as well as superalloys, milling tools are exposed to considerable wear. With high temperatures and reduced heat conductivity of the material, the heat transfers usually to the cutting edges, which subsequently reduces much of the tool life expectancy. External cooling is often not enough to control sufficiently the temperature of the tool. The integrated through coolant of the CrazyMill Cool solves this problem with flying colors:

- The massive coolant flow does not allow heat at the cutting edges to begin with.
- Interfering chips are flushed from the flutes which prevents the continuous shredding of chips. Hence the milling area remains free of chips.

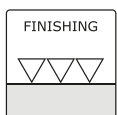
Good tool life and a surface finish of grinding quality are the result.



- CrazyMill Cool is the only Endmill in the diameter range 0,3 - 6 mm (.0118" - .236") with integrated through cooling. Perfect cooling and flushing of chips is given.



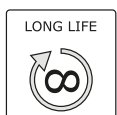
- CrazyMill Cool is specially designed for the machining of stainless steels, titanium as well as nickel based material. Obviously the machining of non ferrous materials and all carbon steels in general is also possible.



- CrazyMill Cool produces a perfect surface quality with its special geometry and cooling ability. Efficient chip removal results in surfaces, similar to grinding quality.



- CrazyMill Cool achieves with great depth feed (a_p) and high speed (v_c) extremely high chip removal rates (Q). This guarantees 10 to 20 times higher efficiency than what is usual with commercially available standard tools.



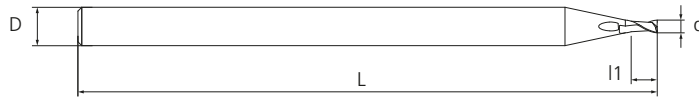
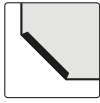
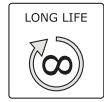
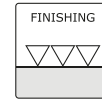
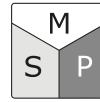
- CrazyMill Cool, with its integrated through cooling and high performance coating, reaches extremely long tool life (no heat at the cutting edges; flushing of chips).



CrazyMill Cool is available in 3 executions:
 Type A: max. machining depth 1,5 x d
 Type B: max. machining depth 3,0 x d
 Type C: max. machining depth 5,0 x d

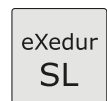
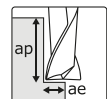
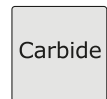
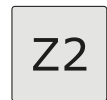
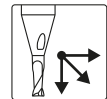
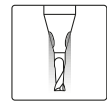
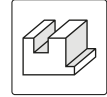
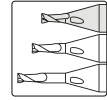
CrazyMill Cool Type A

1,5 x d



	Article no.	d +/- 0.01	D h6	L	l1	45°
■	2.CMC30.A1Z2.030.1	0.3	3	38	0.45	0.02
■	2.CMC30.A1Z2.040.1	0.4	3	38	0.60	0.02
■	2.CMC30.A1Z2.050.1	0.5	3	38	0.75	0.02
■	2.CMC30.A1Z2.060.1	0.6	3	38	0.90	0.02
■	2.CMC30.A1Z2.080.1	0.8	3	38	1.20	0.02
■	2.CMC30.A1Z2.100.1	1.0	4	40	1.50	0.02
■	2.CMC30.A1Z2.120.1	1.2	4	40	1.80	0.03
■	2.CMC30.A1Z2.150.1	1.5	4	40	2.25	0.03
■	2.CMC30.A1Z2.180.1	1.8	4	40	2.70	0.03
■	2.CMC30.A1Z2.200.1	2.0	4	40	3.00	0.03
■	2.CMC30.A1Z2.250.1	2.5	4	40	3.75	0.04
■	2.CMC30.A1Z2.300.1	3.0	6	50	4.50	0.04
■	2.CMC30.A1Z2.400.1	4.0	6	50	6.00	0.04
■	2.CMC30.A1Z2.600.1	6.0	8	60	9.00	0.05

■ Article available from stock

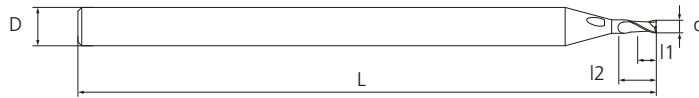
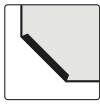
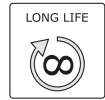
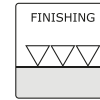
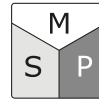


	Article no.	d +/- 0.01	D h6	L	l1	r
■	2.CMC30.A2Z2.030.1	0.3	3	38	0.45	0.05
■	2.CMC30.A2Z2.040.1	0.4	3	38	0.60	0.05
■	2.CMC30.A2Z2.050.1	0.5	3	38	0.75	0.05
■	2.CMC30.A3Z2.050.1					0.10
■	2.CMC30.A2Z2.060.1	0.6	3	38	0.90	0.05
■	2.CMC30.A3Z2.060.1					0.10
■	2.CMC30.A2Z2.080.1	0.8	3	38	1.20	0.05
■	2.CMC30.A3Z2.080.1					0.10
■	2.CMC30.A2Z2.100.1	1.0	4	40	1.50	0.10
■	2.CMC30.A3Z2.100.1					0.20
■	2.CMC30.A2Z2.120.1	1.2	4	40	1.80	0.10
■	2.CMC30.A3Z2.120.1					0.20
■	2.CMC30.A2Z2.150.1	1.5	4	40	2.25	0.10
■	2.CMC30.A3Z2.150.1					0.30
■	2.CMC30.A2Z2.180.1	1.8	4	40	2.70	0.10
■	2.CMC30.A3Z2.180.1					0.30
■	2.CMC30.A2Z2.200.1	2.0	4	40	3.00	0.10
■	2.CMC30.A3Z2.200.1					0.20
■	2.CMC30.A4Z2.200.1					0.50
■	2.CMC30.A2Z2.250.1	2.5	4	40	3.75	0.20
■	2.CMC30.A3Z2.250.1					0.50
■	2.CMC30.A2Z2.300.1	3.0	6	50	4.50	0.20
■	2.CMC30.A3Z2.300.1					0.50
■	2.CMC30.A2Z2.400.1	4.0	6	50	6.00	0.20
■	2.CMC30.A3Z2.400.1					0.50
■	2.CMC30.A2Z2.600.1	6.0	8	60	9.00	0.50
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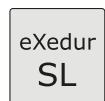
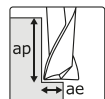
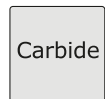
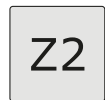
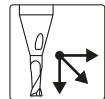
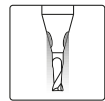
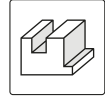
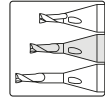
CrazyMill Cool Type B

3,0 x d



	Article no.	d +/- 0.01	D h6	L	l1	l2	45°
■	2.CMC30.B1Z2.030.1	0.3	3	38	0.45	0.90	0.02
■	2.CMC30.B1Z2.040.1	0.4	3	38	0.60	1.20	0.02
■	2.CMC30.B1Z2.050.1	0.5	3	38	0.75	1.50	0.02
■	2.CMC30.B1Z2.060.1	0.6	3	38	0.90	1.80	0.02
■	2.CMC30.B1Z2.080.1	0.8	3	38	1.20	2.40	0.02
■	2.CMC30.B1Z2.100.1	1.0	4	40	1.50	3.00	0.02
■	2.CMC30.B1Z2.120.1	1.2	4	40	1.80	3.60	0.03
■	2.CMC30.B1Z2.150.1	1.5	4	40	2.25	4.50	0.03
■	2.CMC30.B1Z2.180.1	1.8	4	40	2.70	5.40	0.03
■	2.CMC30.B1Z2.200.1	2.0	4	40	3.00	6.00	0.03
■	2.CMC30.B1Z2.250.1	2.5	4	40	3.75	7.50	0.04
■	2.CMC30.B1Z2.300.1	3.0	6	50	4.50	9.00	0.04
■	2.CMC30.B1Z2.400.1	4.0	6	55	6.00	12.00	0.04
■	2.CMC30.B1Z2.600.1	6.0	8	65	9.00	18.00	0.05

■ Article available from stock

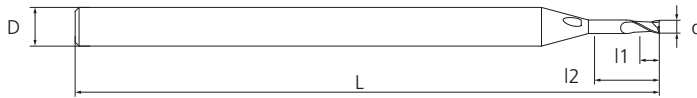
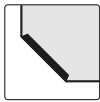
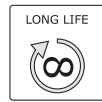
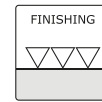
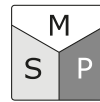


	Article no.	d +/- 0.01	D h6	L	l1	l2	r
■	2.CMC30.B2Z2.030.1	0.3	3	38	0.45	0.9	0.05
■	2.CMC30.B2Z2.040.1	0.4	3	38	0.60	1.2	0.05
■	2.CMC30.B2Z2.050.1	0.5	3	38	0.75	1.5	0.05
	2.CMC30.B3Z2.050.1						0.10
■	2.CMC30.B2Z2.060.1	0.6	3	38	0.90	1.8	0.05
	2.CMC30.B3Z2.060.1						0.10
■	2.CMC30.B2Z2.080.1	0.8	3	38	1.20	2.4	0.05
	2.CMC30.B3Z2.080.1						0.10
■	2.CMC30.B2Z2.100.1	1.0	4	40	1.50	3.0	0.10
	2.CMC30.B3Z2.100.1						0.20
■	2.CMC30.B2Z2.120.1	1.2	4	40	1.80	3.6	0.10
	2.CMC30.B3Z2.120.1						0.20
■	2.CMC30.B2Z2.150.1	1.5	4	40	2.25	4.5	0.10
	2.CMC30.B3Z2.150.1						0.30
■	2.CMC30.B2Z2.180.1	1.8	4	40	2.70	5.4	0.10
	2.CMC30.B3Z2.180.1						0.30
■	2.CMC30.B2Z2.200.1	2.0	4	40	3.00	6.0	0.10
	2.CMC30.B3Z2.200.1						0.20
	2.CMC30.B4Z2.200.1						0.50
■	2.CMC30.B2Z2.250.1	2.5	4	40	3.75	7.5	0.20
	2.CMC30.B3Z2.250.1						0.50
■	2.CMC30.B2Z2.300.1	3.0	6	50	4.50	9.0	0.20
	2.CMC30.B3Z2.300.1						0.50
■	2.CMC30.B2Z2.400.1	4.0	6	55	6.00	12.0	0.20
	2.CMC30.B3Z2.400.1						0.50
■	2.CMC30.B2Z2.600.1	6.0	8	65	9.00	18.0	0.50
	2.CMC30.B3Z2.600.1						1.00

■ Article available from stock

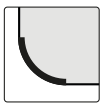
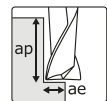
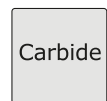
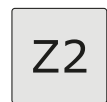
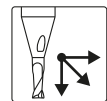
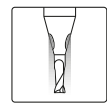
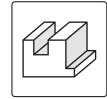
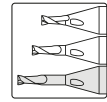
CrazyMill Cool Type C

5 x d



	Article no.	d +/- 0.01	D h6	L	l1	l2	45°
■	2.CMC30.C1Z2.030.1	0.3	3	38	0.45	1.50	0.02
■	2.CMC30.C1Z2.040.1	0.4	3	38	0.60	2.00	0.02
■	2.CMC30.C1Z2.050.1	0.5	3	38	0.75	2.50	0.02
■	2.CMC30.C1Z2.060.1	0.6	3	38	0.90	3.00	0.02
■	2.CMC30.C1Z2.080.1	0.8	3	38	1.20	4.00	0.02
■	2.CMC30.C1Z2.100.1	1.0	4	40	1.50	5.00	0.02
■	2.CMC30.C1Z2.120.1	1.2	4	40	1.80	6.00	0.03
■	2.CMC30.C1Z2.150.1	1.5	4	40	2.25	7.50	0.03
■	2.CMC30.C1Z2.180.1	1.8	4	40	2.70	9.00	0.03
■	2.CMC30.C1Z2.200.1	2.0	4	44	3.00	10.00	0.03
■	2.CMC30.C1Z2.250.1	2.5	4	44	3.75	12.50	0.04
■	2.CMC30.C1Z2.300.1	3.0	6	55	4.50	15.00	0.04
■	2.CMC30.C1Z2.400.1	4.0	6	60	6.00	20.00	0.04
■	2.CMC30.C1Z2.600.1	6.0	8	70	9.00	30.00	0.05

■ Article available from stock



	Article no.	d +/- 0.01	D h6	L	l1	l2	r
■	2.CMC30.C2Z2.030.1	0.3	3	38	0.45	1.5	0.05
■	2.CMC30.C2Z2.040.1	0.4	3	38	0.60	2.0	0.05
■	2.CMC30.C2Z2.050.1	0.5	3	38	0.75	2.5	0.05
	2.CMC30.C3Z2.050.1						0.10
■	2.CMC30.C2Z2.060.1	0.6	3	38	0.90	3.0	0.05
	2.CMC30.C3Z2.060.1						0.10
■	2.CMC30.C2Z2.080.1	0.8	3	38	1.20	4.0	0.05
	2.CMC30.C3Z2.080.1						0.10
■	2.CMC30.C2Z2.100.1	1.0	4	40	1.50	5.0	0.10
	2.CMC30.C3Z2.100.1						0.20
■	2.CMC30.C2Z2.120.1	1.2	4	40	1.80	6.0	0.10
	2.CMC30.C3Z2.120.1						0.20
■	2.CMC30.C2Z2.150.1	1.5	4	40	2.25	7.5	0.10
	2.CMC30.C3Z2.150.1						0.30
■	2.CMC30.C2Z2.180.1	1.8	4	40	2.70	9.0	0.10
	2.CMC30.C3Z2.180.1						0.30
■	2.CMC30.C2Z2.200.1	2.0	4	44	3.00	10.0	0.10
	2.CMC30.C3Z2.200.1						0.20
	2.CMC30.C4Z2.200.1						0.50
■	2.CMC30.C2Z2.250.1	2.5	4	44	3.75	12.5	0.20
	2.CMC30.C3Z2.250.1						0.50
■	2.CMC30.C2Z2.300.1	3.0	6	55	4.50	15.0	0.20
	2.CMC30.C3Z2.300.1						0.50
■	2.CMC30.C2Z2.400.1	4.0	6	60	6.00	20.0	0.20
	2.CMC30.C3Z2.400.1						0.50
■	2.CMC30.C2Z2.600.1	6.0	8	70	9.00	30.0	0.50
	2.CMC30.C3Z2.600.1						1.00

■ Article available from stock

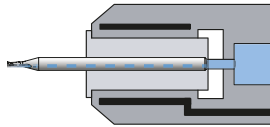
CrazyMill Cool

Technical information

Clamping equipment

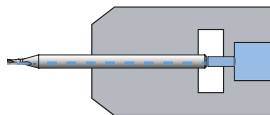
- **Hydraulic expansion chuck:**

For a "smooth" cut with a minimal run out (T.I.R.) and very high surface quality. Direct clamping for shank diameter 4, 6 and 8 mm. Clamping with intermediate sleeve for shank diameter 3 mm.



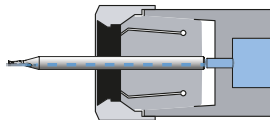
- **Shrink-fit chucks:**

Guarantee minimal run out (T.I.R.) with secure friction-type locking and provides an optimum connection between tool and holder.



- **High-precision collet systems:**

Sufficient for milling, with good balancing, for revolution speed $> n = 10'000$ rpm, high clamping force.



Circular ramping

Suggested ramp angle:

	Material	Ramp angle α	
		min	max
P	Steels	5°	15°
M	Stainless steels	5°	10°
N	Aluminum	10°	30°
S	Titanium and Ni-Co-Superalloys	2°	8°

Suggested feed correction V_f :

α	Ramp angle α			
	5°	10°	20°	30°
V_f	80 %	70 %	60 %	50 %

Cooling lubricant / filter

For optimum results Mikron Tool recommends the use of cutting oil as a coolant. Alternatively emulsion can also be used.

No specific filter is necessary. Large lubricant channels enable to use standard filter.

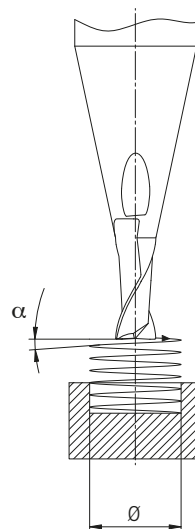
Pressure and quantity

Mikron Tool recommends lubricant pressure as defined in the table. A higher pressure is generally better for cooling the tool and flushing of chips.

Table for pressure and quantity:

Cooling lubricant: cutting oil, viscosity category 15

Revolution speed (rpm)	< 10'000	> 10'000
Minimal pressure (bar)	15	30
\varnothing Tool (mm)	Flow rate (l/min)	
0.3	0.05	0.1 - 0.3
0.5	0.15	0.3 - 0.8
1.0	1.20	1.8 - 3.0
2.0	1.50	2.0 - 4.0
3.0	3.00	4.5 - 9.0
4.0	3.50	5.0 - 10.0
6.0	10.0	12.0 - 18.0



Minimum $\varnothing = 1.3 \times$ tool diameter d

CrazyMill Cool

New horizons in machining

Application example

Material:

904L; X1NiCrMoCu 25-20-5; 1.4539

Tool:

CrazyMill Cool Type B; diameter 3 mm

High efficiency milling of a slot (1), a pocket (2) and a rib (3).



Applications



Dental



Aerospace



Watches



Machine building



Conveyor Technique



Petrochemistry



Jewelry



Medical



Food industry

		1) Slot	2) Pocket	3) Rib
Parameter	v_c [m/min]	200	220	220
	n [u/min]	21'221	23'343	23'343
	a_p [mm]	3	3	3
	a_e [mm]	3	0.9	0.9
	v_f [mm/min]	1'700	1'961	1'961
	fz [mm]	0.040	0.042	0.042
Result	Ra [μ m]	0.08	0.08	0.056
	Rz [μ m]	0.5	0.5	0.30
	Chip removal rate Q [cm ³ /min]	15.3	5.29	5.29



Through coolant Endmill



Executions:

- 1,5 * d
- 3,0 * d
- 5,0 * d



Cutting edges with protection phase of 45°.



Ideal for stainless steel, titanium and nickel based steels. Machining of non ferrous materials and all carbon steels in general is also possible.



Possible machining direction



Cutting edges with a corner radius



For perfect surface quality similar to grinding quality.



Helix angle



Tool adapted for full section and lateral milling.



Highest performance



Feed:

- a_p = depth feed
- a_e = lateral feed



High performance coating



Excellent tool life



Teeth number



Solid carbide tool

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