

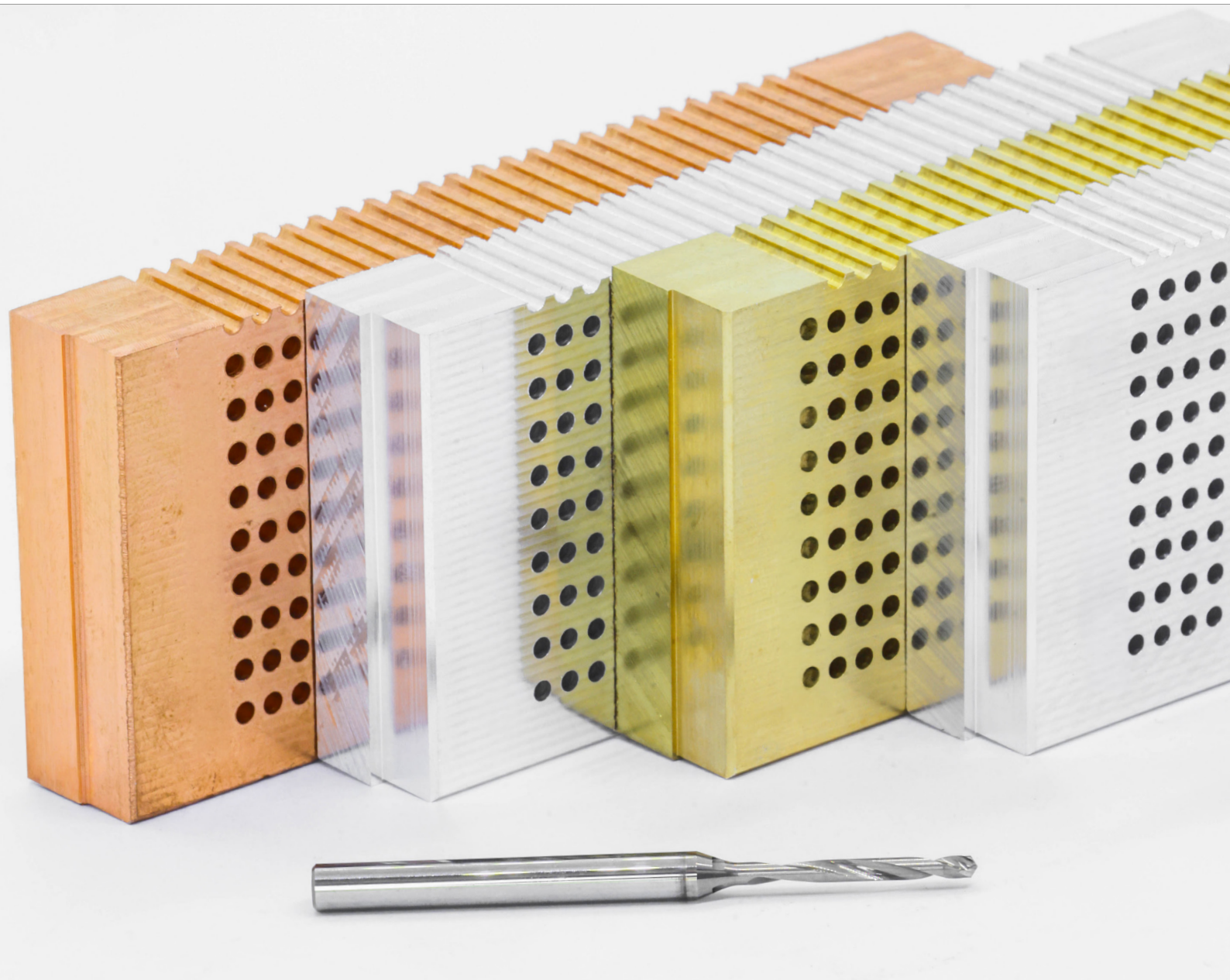


crazy about

Non-Ferrous

DRILLING UP TO 12 X D

CrazyDrill Non-Ferrous NN / NK



HIGH-PERFORMANCE DRILLING FOR COPPER, ALUMINIUM & LEAD-FREE BRASS



With CrazyDrill Non-Ferrous, Mikron Tool offers a high performance drilling solution for copper, aluminium, lead free brass and other non ferrous alloys. Covering diameters from 0.2 to 6.35 mm with drilling depths up to 12 x d.

Machining non ferrous materials in small diameters is challenging due to their high ductility, long chip formation and tendency to form built up edge. The cutting geometry is designed to deliver controlled chip formation, efficient evacuation, and stable drilling process across all non ferrous materials. The specially designed cutting edges promote manageable chips and help prevent edge breakage. A degressive helical flute further supports reliable chip evacuation, particularly in deeper drilling applications.

This product family is available in the following versions:

- **CrazyDrill Non-Ferrous NK - 8xd and 12xd:** Diameter range from 0.2 mm to 2.0 mm with through shank cooling channels.
- **CrazyDrill Non-Ferrous NN - 8xd and 12xd:** Diameter range from 0.2 mm to 2.0 mm, with external coolant supply.
- **CrazyDrill Non-Ferrous NN - 5xd:** Diameter range from 2.0 mm to 6.35 mm, with external coolant supply.

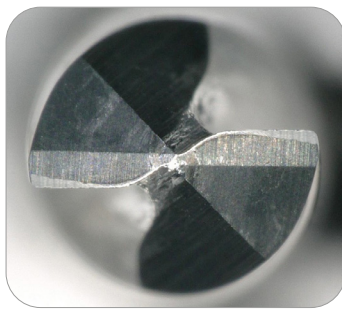
Please note: You couldn't find your suitable version of the CrazyDrill Non-Ferrous NN / NK (diameter, length, cutting direction...)? Ask us about our customized versions!

CrazyDrill Non-Ferrous NN / NK

HIGH-PERFORMANCE DRILLING FOR COPPER, ALUMINIUM & LEAD-FREE BRASS

1. Challenge

Prevent High Drill Wear



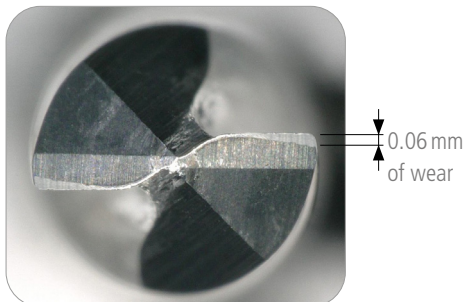
Non-ferrous materials such as copper, lead-free brass, and aluminium generate high adhesive wear, which drastically shortens tool life and compromises process reliability.

Solution

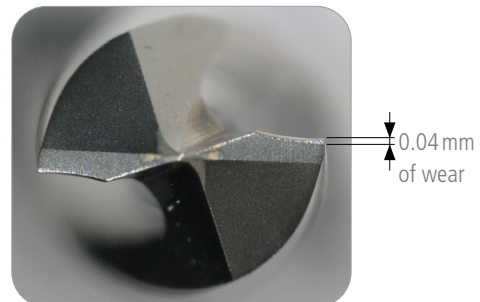
Wear-Optimized Cutting Geometry

The specifically engineered cutting geometry, combined with a ceramic-based coating characterized by low friction and high hardness, significantly reduces adhesive wear by more than 40%, ensuring extended and consistent tool life.

Competitor



Mikron Tool

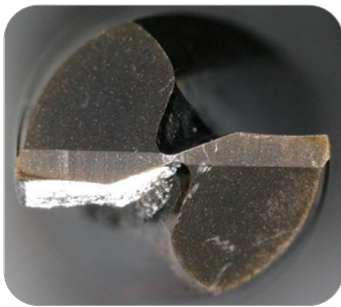


Cutting conditions:

Diameter: Ø1.2 mm; Hole depth: 9.6 mm; Material: Copper; Parameters: suggested by suppliers; Total holes: 2'500

2. Challenge

Avoid Built-Up Edge



Non-ferrous metals such as copper, lead-free brass, and aluminium tend to form built-up edge during machining.

Solution

New TDP Anti-Adhesion Coating

The new TDP ceramic-based coating prevents adhesion thanks to its smooth surface.

This ensures easier chip flow and stable cutting conditions.

Key features of the ceramic-based coating include:

- **Hardness of 4'000 HV**
- **Excellent wear resistance**
- **Reduced heat generation**
- **Prevention of material adhesion on the cutting edge**
- **Low friction coefficient (≤ 0.15)**

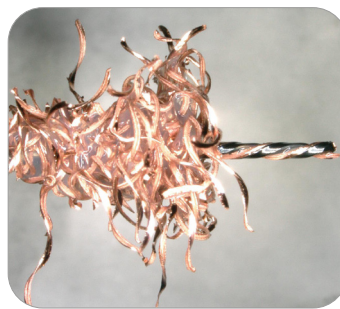
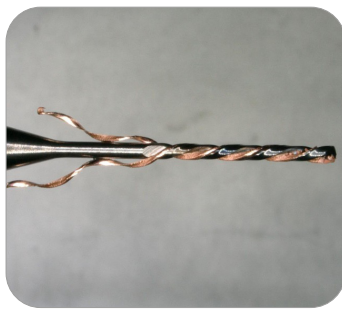


CrazyDrill Non-Ferrous NN / NK

HIGH-PERFORMANCE DRILLING FOR COPPER, ALUMINIUM & LEAD-FREE BRASS

3. Challenge

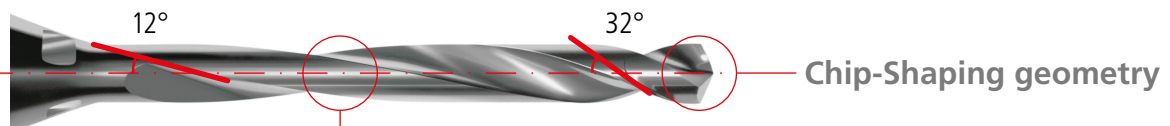
Perfect Chip Management



Non-ferrous materials are highly ductile, which often leads to long chip formation, chip evacuation problems, and bird-nesting.

Solution

Degressive Flutes & Chip-Shaping Geometry



Degressive flute

The degressive flute with constant core diameter guarantees:

- Rapid chip removal: No chip jam
- Tough construction: Avoid drill breakage

The optimized degressive flute and chip-shaping geometry produce short, controlled chips for easy handling, while ensuring smooth and reliable chip evacuation. This prevents interruptions and maintains a stable machining process.

Example

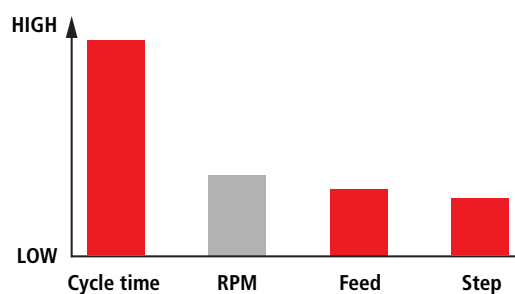
	Competitor	CrazyDrill Non-Ferrous NK
Chip dimension		
Cutting conditions	Material: Cu-OF / 2.004 (Copper); Ø2 mm; $v_c = 100$ m/min; $f = 0.19$ mm/rev	

4. Challenge

Reduce cycle time even at low RPM

Machines with limited RPM capability, such as lathes, face a clear drilling challenge. To maintain process reliability, a pecking cycle is often required to keep chip length under control. However, shorter cycle times typically rely on higher spindle speeds, an option not available on these machines.

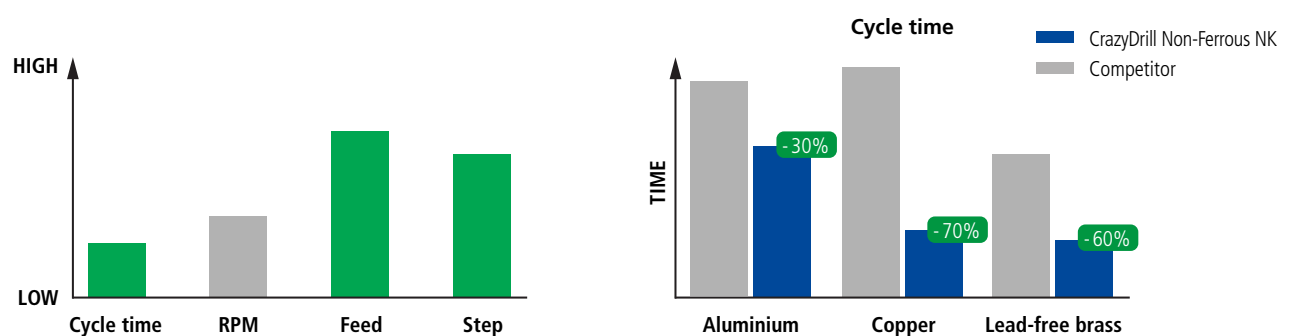
The consequence is unavoidable: **longer cycle times and lower productivity.**



Solution

Advanced cutting-edge geometry for deeper drilling steps

The specially engineered cutting-edge geometry is designed to promote consistent and manageable chip formation, even at low cutting speeds. This makes possible to run higher feed rates and execute deeper drilling steps while maintaining a stable and reliable process. As a result, machining efficiency is improved, leading to shorter cycle times even on machines with limited RPM.

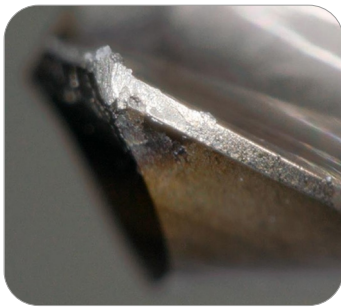


CrazyDrill Non-Ferrous NK / NN

HIGH-PERFORMANCE DRILLING FOR COPPER, ALUMINIUM & LEAD-FREE BRASS

5. Challenge

High surface quality $Ra \leq 0.8 \mu\text{m}$



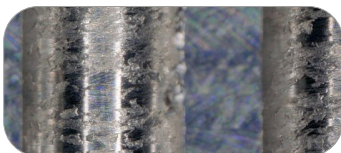
Achieving a high surface quality of $Ra \leq 0.8 \mu\text{m}$ requires a precise balance between friction at the contact surface, cutting performance, and heat generation. If this balance is not properly controlled, excessive friction and localized heat can lead to material adhesion, negatively affecting surface finish, process stability, and overall machining consistency.

Solution

New CrazyDrill Non-Ferrous

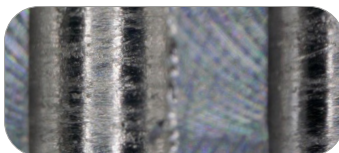
The new CrazyDrill Non-Ferrous is designed to address these challenges by combining optimized cutting geometry, advanced coating and an efficient coolant system. This engineered approach ensures the optimal balance between friction, cutting performance and thermal control, enabling high-performance machining while consistently achieving superior surface quality.

**Competitor
with external cooling**



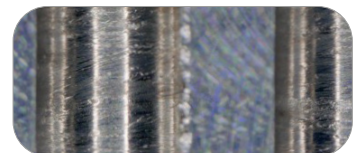
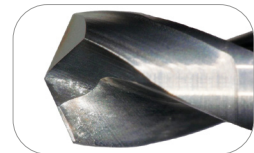
$Ra\ 1.17 \mu\text{m}$

**CrazyDrill Non-Ferrous NN
with external cooling**



$Ra\ 0.63 \mu\text{m}$

**CrazyDrill Non-Ferrous NK
with integrated cooling**

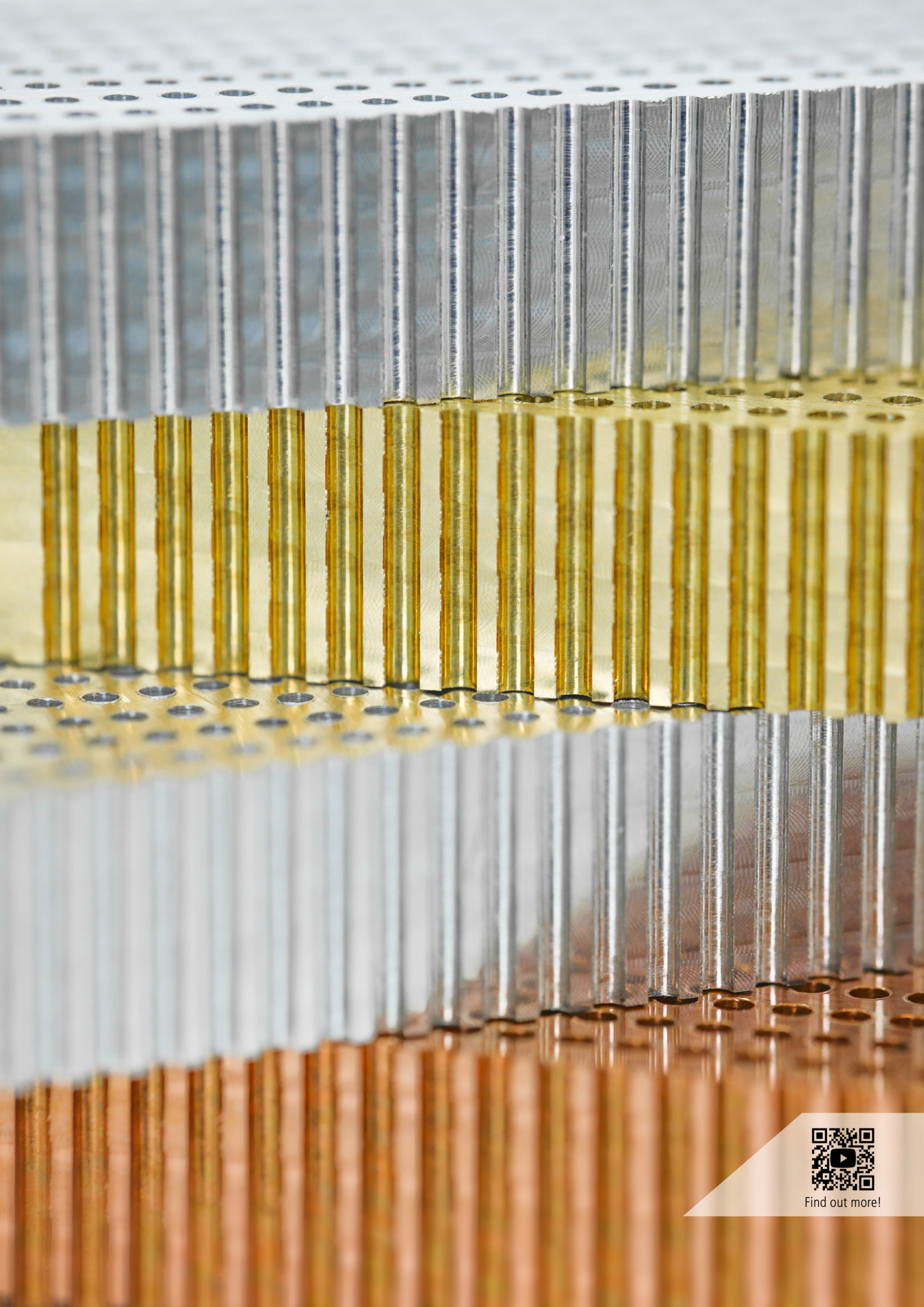


$Ra\ 0.21 \mu\text{m}$



Cutting conditions:

Material: EN AW-5083 (Aluminium); $\varnothing 2.0\text{ mm}$; $v_c = 120\text{ m/min}$; $f = 0.12\text{ mm/rev}$; total holes: 250



Find out more!

Maximum performance guaranteed

EXAMPLE OF COPPER MACHINING IN COMPARISON

■ Example

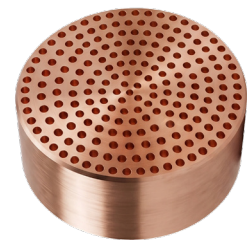
Lower cycle time

Machining: Drilling with pecks
 Number of holes: 250
 Drilling depth: 9.6 mm;
 Coolant: Emulsion 8%

Copper: 2.0040 / CU-OF / CW008A

N

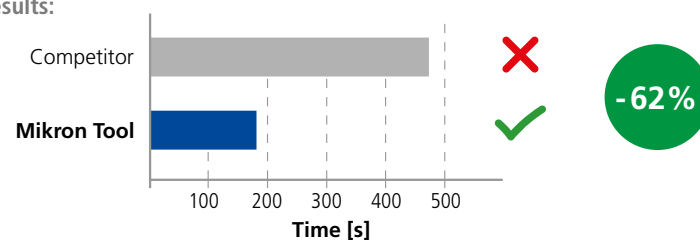
Tool: CrazyDrill Non-Ferrous NK
 Diameter: 1.2 mm



Cutting data:

Competitor drill for copper		CrazyDrill Non-Ferrous NK	
$v_c = 80$ m/min	$f = 0.04$ mm/rev	$v_c = 80$ m/min	$f = 0.12$ mm/rev
$Q_1 = 1.2$ mm	$Q_x = 1.2$ mm	$Q_1 = 4.8$ mm	$Q_x = 2.4$ mm
	7 pecks		2 pecks

Results:



Your benefits

The most important features

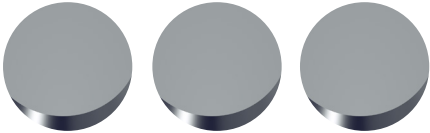
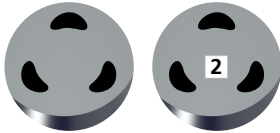
- Specially designed for optimal chips management in all non-ferrous metals
- Newest Ceramic base coating eXedur TDP
- CrazyDrill Non-Ferrous NK: Efficient cooling system, thanks to through shank cooling channels
- Degressive flutes for process-reliable chip evacuation
- Micro diameters range from Ø0.2 to 6.35 mm

Your advantages

- Perfect performance for any non-ferrous metals
- Machining is possible even with low through-spindle coolant pressure (min. 15 bar, CrazyDrill Non-Ferrous NK) or with external cooling (CrazyDrill Non-Ferrous NN)
- Low cutting forces (axial and torque)
- Process-reliable chip evacuation
- High performances even on machines with limited RPM capability
- 40% lower adhesive wear thanks to cutting geometry and new coating

Your benefits

- Reduced cycle time of 30% - 60% compared to the market leaders
- High process reliability
- Up to 5 times better hole surface quality compared to the best competitors in the market
- Longer tool life up to 40%

Type NN			Type NK	
5xd	8xd	12xd	8xd	12xd
External cooling Coated 5xd: Ø2.0 - 6.35 mm 8xd / 12xd: Ø0.2 - 2.0 mm			Integrated cooling Coated 8xd / 12xd: Ø0.2 - 2.0 mm	
				
				
Page 16	Page 15	Page 15	Page 14	Page 14

CrazyDrill Non-Ferrous NN / NK - 8xd and 12xd: This product is **not suitable for regrinding**.

CrazyDrill Non-Ferrous NN - 5xd: This product **can be reground starting from Ø2.0 mm**.

NEW

1 | SHAFT

The robust carbide shaft allows stable drilling without vibrations.

2 | COOLING

The cooling channels integrated into the shank ensure continuous and intensive cooling of the machining area starting at just 15 bar. The result is increased process reliability and productivity.

3 | CARBIDE

The carbide grade used for CrazyDrill Non-Ferrous, thanks to its high toughness, perfectly meets the requirements for machining non-ferrous metals.

4 | COATING

The especially developed high-performance coating eXedur TDP is abrasion and heat resistant. It prevents build up material and supports a smooth chip removal. The result is a long tool life.

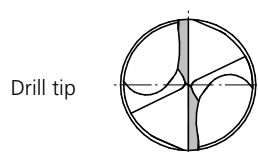
5 | DEGRESSIVE FLUTE

Advanced degressive flute enables fast chip evacuation, while the constant core diameter ensures high tool rigidity.

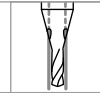
6 | CUTTING GEOMETRY

The drill cutting geometry has been specifically designed for non-ferrous metals:

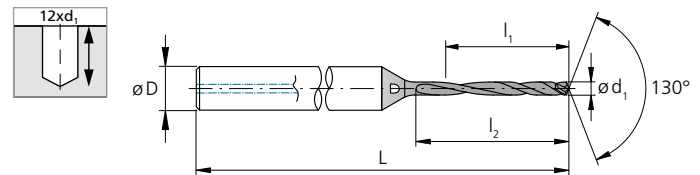
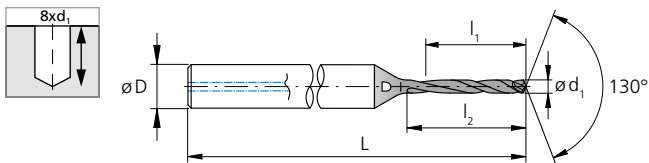
- High cutting edge stability
- Advanced "Chip-Shaping geometry" for excellent chip formation
- Self-centering design for precise positioning



Type NK 8 x d / 12 x d



DRILLING WITH INTEGRATED COOLING



d ₁	d ₁	l ₁	l ₂	D	L	Item number	Availability
[mm]	[inch]	[mm]	[mm]	(h6) [mm]	[mm]		
0.20		1.6	2.0	3	38	2.CD.080020.NK	■
0.25		2.0	2.5	3	38	2.CD.080025.NK	■
0.30		2.4	2.9	3	38	2.CD.080030.NK	■
0.35		2.8	3.4	3	38	2.CD.080035.NK	■
0.396	1/64	3.2	3.9	3	38	2.CD.080F164.NK	■
0.40		3.2	3.9	3	38	2.CD.080040.NK	■
0.45		3.6	4.4	3	42	2.CD.080045.NK	■
0.50		4.0	4.9	3	42	2.CD.080050.NK	■
0.55		4.4	5.4	3	42	2.CD.080055.NK	■
0.60		4.8	5.9	3	42	2.CD.080060.NK	■
0.65		5.2	6.4	3	45	2.CD.080065.NK	■
0.70		5.6	6.9	3	45	2.CD.080070.NK	■
0.75		6.0	7.4	3	45	2.CD.080075.NK	■
0.793	1/32	6.4	7.8	3	45	2.CD.080F132.NK	■
0.80		6.4	7.8	3	45	2.CD.080080.NK	■
0.85		6.8	8.3	3	45	2.CD.080085.NK	■
0.90		7.2	8.8	3	45	2.CD.080090.NK	■
0.95		7.6	9.3	3	48	2.CD.080095.NK	■
1.00		8.0	9.8	3	48	2.CD.080100.NK	■
1.05		8.4	10.3	3	48	2.CD.080105.NK	■
1.10		8.8	10.8	3	48	2.CD.080110.NK	■
1.15		9.2	11.3	3	48	2.CD.080115.NK	■
1.20		9.6	11.8	3	48	2.CD.080120.NK	■
1.25		10.0	12.3	4	52	2.CD.080125.NK	■
1.30		10.4	12.7	4	52	2.CD.080130.NK	■
1.35		10.8	13.2	4	52	2.CD.080135.NK	■
1.40		11.2	13.7	4	52	2.CD.080140.NK	■
1.45		11.6	14.2	4	52	2.CD.080145.NK	■
1.50		12.0	14.7	4	52	2.CD.080150.NK	■
1.55		12.4	15.2	4	55	2.CD.080155.NK	■
1.587	1/16	12.8	15.7	4	55	2.CD.080F116.NK	■
1.60		12.8	15.7	4	55	2.CD.080160.NK	■
1.65		13.2	16.2	4	55	2.CD.080165.NK	■
1.70		13.6	16.7	4	55	2.CD.080170.NK	■
1.75		14.0	17.2	4	55	2.CD.080175.NK	■
1.80		14.4	17.6	4	55	2.CD.080180.NK	■
1.85		14.8	18.1	4	55	2.CD.080185.NK	■
1.90		15.2	18.6	4	55	2.CD.080190.NK	■
1.95		15.6	19.1	4	55	2.CD.080195.NK	■
2.00		16.0	19.6	4	55	2.CD.080200.NK	■

■ Stock item

d ₁	d ₁	l ₁	l ₂	D	L	Item number	Availability
[mm]	[inch]	[mm]	[mm]	(h6) [mm]	[mm]		
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0.25		3.0	3.5	3	38	2.CD.120025.NK	■
0.30		3.6	4.1	3	38	2.CD.120030.NK	■
0.35		4.2	4.8	3	38	2.CD.120035.NK	■
0.396	1/64	4.8	5.5	3	38	2.CD.120F164.NK	■
0.40		4.8	5.5	3	38	2.CD.120040.NK	■
0.45		5.4	6.2	3	42	2.CD.120045.NK	■
0.50		6.0	6.9	3	42	2.CD.120050.NK	■
0.55		6.6	7.6	3	42	2.CD.120055.NK	■
0.60		7.2	8.3	3	42	2.CD.120060.NK	■
0.65		7.8	9.0	3	45	2.CD.120065.NK	■
0.70		8.4	9.7	3	45	2.CD.120070.NK	■
0.75		9.0	10.4	3	45	2.CD.120075.NK	■
0.793	1/32	9.6	11.0	3	45	2.CD.120F132.NK	■
0.80		9.6	11.0	3	45	2.CD.120080.NK	■
0.85		10.2	11.7	3	45	2.CD.120085.NK	■
0.90		10.8	12.4	3	45	2.CD.120090.NK	■
0.95		11.4	13.1	3	48	2.CD.120095.NK	■
1.00		12.0	13.8	3	48	2.CD.120100.NK	■
1.05		12.6	14.5	3	48	2.CD.120105.NK	■
1.10		13.2	15.2	3	48	2.CD.120110.NK	■
1.15		13.8	15.9	3	48	2.CD.120115.NK	■
1.20		14.4	16.6	3	48	2.CD.120120.NK	■
1.25		15.0	17.3	4	55	2.CD.120125.NK	■
1.30		15.6	17.9	4	55	2.CD.120130.NK	■
1.35		16.2	18.6	4	55	2.CD.120135.NK	■
1.40		16.8	19.3	4	55	2.CD.120140.NK	■
1.45		17.4	20.0	4	55	2.CD.120145.NK	■
1.50		18.0	20.7	4	55	2.CD.120150.NK	■
1.55		18.6	21.4	4	58	2.CD.120155.NK	■
1.587	1/16	19.2	22.1	4	58	2.CD.120F116.NK	■
1.60		19.2	22.1	4	58	2.CD.120160.NK	■
1.65		19.8	22.8	4	58	2.CD.120165.NK	■
1.70		20.4	23.5	4	58	2.CD.120170.NK	■
1.75		21.0	24.2	4	58	2.CD.120175.NK	■
1.80		21.6	24.8	4	58	2.CD.120180.NK	■
1.85		22.2	25.5	4	60	2.CD.120185.NK	■
1.90		22.8	26.2	4	60	2.CD.120190.NK	■
1.95		23.4	26.9	4	60	2.CD.120195.NK	■
2.00		24.0	27.6	4	60	2.CD.120200.NK	■

Type NN 8 x d / 12 x d

Carbide



Z2

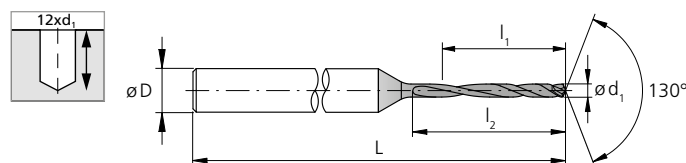
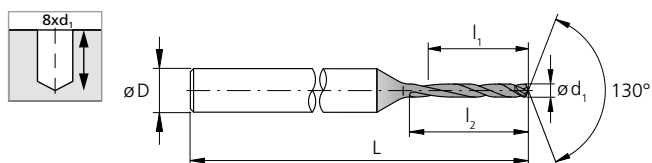


eXedur TDP



DRILLING WITH EXTERNAL COOLING

Ø d₁ 0.1 - 3.0 mm
Tolerance + 0.006 mm
0



d ₁	d ₁	l ₁	l ₂	D (h6)	L	Item number	Availability
[mm]	[inch]	[mm]	[mm]	[mm]	[mm]		
0.20		1.6	2.0	3	38	2.CD.080020.NN	Δ
0.25		2.0	2.5	3	38	2.CD.080025.NN	Δ
0.30		2.4	2.9	3	38	2.CD.080030.NN	Δ
0.35		2.8	3.4	3	38	2.CD.080035.NN	Δ
0.396	1/64	3.2	3.9	3	38	2.CD.080F164.NN	Δ
0.40		3.2	3.9	3	38	2.CD.080040.NN	Δ
0.45		3.6	4.4	3	42	2.CD.080045.NN	Δ
0.50		4.0	4.9	3	42	2.CD.080050.NN	Δ
0.55		4.4	5.4	3	42	2.CD.080055.NN	Δ
0.60		4.8	5.9	3	42	2.CD.080060.NN	Δ
0.65		5.2	6.4	3	45	2.CD.080065.NN	Δ
0.70		5.6	6.9	3	45	2.CD.080070.NN	Δ
0.75		6.0	7.4	3	45	2.CD.080075.NN	Δ
0.793	1/32	6.4	7.8	3	45	2.CD.080F132.NN	Δ
0.80		6.4	7.8	3	45	2.CD.080080.NN	Δ
0.85		6.8	8.3	3	45	2.CD.080085.NN	Δ
0.90		7.2	8.8	3	45	2.CD.080090.NN	Δ
0.95		7.6	9.3	3	48	2.CD.080095.NN	Δ
1.00		8.0	9.8	3	48	2.CD.080100.NN	Δ
1.05		8.4	10.3	3	48	2.CD.080105.NN	Δ
1.10		8.8	10.8	3	48	2.CD.080110.NN	Δ
1.15		9.2	11.3	3	48	2.CD.080115.NN	Δ
1.20		9.6	11.8	3	48	2.CD.080120.NN	Δ
1.25		10.0	12.3	3	52	2.CD.080125.NN	Δ
1.30		10.4	12.7	3	52	2.CD.080130.NN	Δ
1.35		10.8	13.2	3	52	2.CD.080135.NN	Δ
1.40		11.2	13.7	3	52	2.CD.080140.NN	Δ
1.45		11.6	14.2	3	52	2.CD.080145.NN	Δ
1.50		12.0	14.7	3	52	2.CD.080150.NN	Δ
1.55		12.4	15.2	3	55	2.CD.080155.NN	Δ
1.587	1/16	12.8	15.7	3	55	2.CD.080F116.NN	Δ
1.60		12.8	15.7	3	55	2.CD.080160.NN	Δ
1.65		13.2	16.2	3	55	2.CD.080165.NN	Δ
1.70		13.6	16.7	3	55	2.CD.080170.NN	Δ
1.75		14.0	17.2	3	55	2.CD.080175.NN	Δ
1.80		14.4	17.6	3	55	2.CD.080180.NN	Δ
1.85		14.8	18.1	3	55	2.CD.080185.NN	Δ
1.90		15.2	18.6	3	55	2.CD.080190.NN	Δ
1.95		15.6	19.1	3	55	2.CD.080195.NN	Δ
2.00		16.0	19.6	3	55	2.CD.080200.NN	Δ

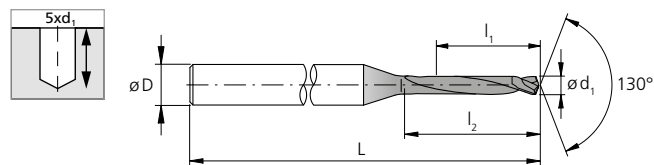
d ₁	d ₁	l ₁	l ₂	D (h6)	L	Item number	Availability
[mm]	[inch]	[mm]	[mm]	[mm]	[mm]		
0.20		2.4	2.8	3	38	2.CD.120020.NN	Δ
0.25		3.0	3.5	3	38	2.CD.120025.NN	Δ
0.30		3.6	4.1	3	38	2.CD.120030.NN	Δ
0.35		4.2	4.8	3	38	2.CD.120035.NN	Δ
0.396	1/64	4.8	5.5	3	38	2.CD.120F164.NN	Δ
0.40		4.8	5.5	3	38	2.CD.120040.NN	Δ
0.45		5.4	6.2	3	42	2.CD.120045.NN	Δ
0.50		6.0	6.9	3	42	2.CD.120050.NN	Δ
0.55		6.6	7.6	3	42	2.CD.120055.NN	Δ
0.60		7.2	8.3	3	42	2.CD.120060.NN	Δ
0.65		7.8	9.0	3	45	2.CD.120065.NN	Δ
0.70		8.4	9.7	3	45	2.CD.120070.NN	Δ
0.75		9.0	10.4	3	45	2.CD.120075.NN	Δ
0.793	1/32	9.6	11.0	3	45	2.CD.120F132.NN	Δ
0.80		9.6	11.0	3	45	2.CD.120080.NN	Δ
0.85		10.2	11.7	3	45	2.CD.120085.NN	Δ
0.90		10.8	12.4	3	45	2.CD.120090.NN	Δ
0.95		11.4	13.1	3	48	2.CD.120095.NN	Δ
1.00		12.0	13.8	3	48	2.CD.120100.NN	Δ
1.05		12.6	14.5	3	48	2.CD.120105.NN	Δ
1.10		13.2	15.2	3	48	2.CD.120110.NN	Δ
1.15		13.8	15.9	3	48	2.CD.120115.NN	Δ
1.20		14.4	16.6	3	48	2.CD.120120.NN	Δ
1.25		15.0	17.3	3	55	2.CD.120125.NN	Δ
1.30		15.6	17.9	3	55	2.CD.120130.NN	Δ
1.35		16.2	18.6	3	55	2.CD.120135.NN	Δ
1.40		16.8	19.3	3	55	2.CD.120140.NN	Δ
1.45		17.4	20.0	3	55	2.CD.120145.NN	Δ
1.50		18.0	20.7	3	55	2.CD.120150.NN	Δ
1.55		18.6	21.4	3	58	2.CD.120155.NN	Δ
1.587	1/16	19.2	22.1	3	58	2.CD.120F116.NN	Δ
1.60		19.2	22.1	3	58	2.CD.120160.NN	Δ
1.65		19.8	22.8	3	58	2.CD.120165.NN	Δ
1.70		20.4	23.5	3	58	2.CD.120170.NN	Δ
1.75		21.0	24.2	3	58	2.CD.120175.NN	Δ
1.80		21.6	24.8	3	58	2.CD.120180.NN	Δ
1.85		22.2	25.5	3	60	2.CD.120185.NN	Δ
1.90		22.8	26.2	3	60	2.CD.120190.NN	Δ
1.95		23.4	26.9	3	60	2.CD.120195.NN	Δ
2.00		24.0	27.6	3	60	2.CD.120200.NN	Δ

Δ Delivery term upon request, minimum purchase order quantity 3 pcs.

Type NN 5 x d



DRILLING WITH EXTERNAL COOLING



d ₁	d ₁	l ₁	l ₂	D	L	Item number	Availability
[mm]	[inch]	[mm]	[mm]	(h6) [mm]	[mm]		
2.00		10.00	14.00	3	45	2.CD.050200.NN	■
2.05		10.25	14.35	3	50	2.CD.050205.NN	■
2.10		10.50	14.70	3	50	2.CD.050210.NN	■
2.15		10.75	15.05	3	50	2.CD.050215.NN	■
2.20		11.00	15.40	3	50	2.CD.050220.NN	■
2.25		11.25	15.75	3	50	2.CD.050225.NN	■
2.30		11.50	16.10	3	50	2.CD.050230.NN	■
2.35		11.75	16.45	3	50	2.CD.050235.NN	■
2.381	3/32	11.91	16.67	3	50	2.CD.050F332.NN	■
2.40		12.00	16.80	3	50	2.CD.050240.NN	■
2.45		12.25	17.15	3	50	2.CD.050245.NN	■
2.50		12.50	17.50	3	50	2.CD.050250.NN	■
2.55		12.75	17.85	3	50	2.CD.050255.NN	■
2.60		13.00	18.20	3	50	2.CD.050260.NN	■
2.65		13.25	18.55	3	50	2.CD.050265.NN	■
2.70		13.50	18.90	3	50	2.CD.050270.NN	■
2.75		13.75	19.25	3	50	2.CD.050275.NN	■
2.80		14.00	19.60	3	50	2.CD.050280.NN	■
2.85		14.25	19.95	3	50	2.CD.050285.NN	■
2.90		14.50	20.30	3	50	2.CD.050290.NN	■
2.95		14.75	20.65	4	57	2.CD.050295.NN	■
3.00		15.00	21.00	4	57	2.CD.050300.NN	■
3.05		15.25	21.35	4	57	2.CD.050305.NN	■
3.10		15.50	21.70	4	57	2.CD.050310.NN	■
3.15		15.75	22.05	4	57	2.CD.050315.NN	■
3.175	1/8	15.88	22.23	4	57	2.CD.050F18.NN	■
3.20		16.00	22.40	4	57	2.CD.050320.NN	■
3.25		16.25	22.75	4	57	2.CD.050325.NN	■
3.30		16.50	23.10	4	57	2.CD.050330.NN	■
3.35		16.75	23.45	4	57	2.CD.050335.NN	■
3.40		17.00	23.80	4	57	2.CD.050340.NN	■
3.45		17.25	24.15	4	57	2.CD.050345.NN	■
3.50		17.50	24.50	4	57	2.CD.050350.NN	■
3.55		17.75	24.85	4	57	2.CD.050355.NN	■

■ Stock item

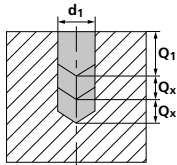
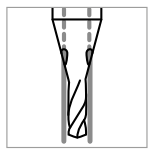
	Carbide		Z2		
Ø d _i	0.1 - 3.0 mm	3.1 - 5.9 mm	6.0 mm	6.35 mm	
Tolerance	+ 0.006 mm 0	+ 0.009 mm + 0.001 mm	- 0.010 mm - 0.018 mm	+ 0.010 mm + 0.001 mm	

d _i	d _i	l ₁	l ₂	D (h6)	L	Item number	Availability
[mm]	[inch]	[mm]	[mm]	[mm]	[mm]		
3.60		18.00	25.20	4	57	2.CD.050360.NN	■
3.65		18.25	25.55	4	57	2.CD.050365.NN	■
3.70		18.50	25.90	4	57	2.CD.050370.NN	■
3.75		18.75	26.25	4	57	2.CD.050375.NN	■
3.80		19.00	26.60	4	57	2.CD.050380.NN	■
3.85		19.25	26.95	4	57	2.CD.050385.NN	■
3.90		19.50	27.30	4	57	2.CD.050390.NN	■
3.95		19.75	27.65	6	70	2.CD.050395.NN	■
3.968	5/32	19.84	27.78	6	70	2.CD.050F532.NN	■
4.00		20.00	28.00	6	70	2.CD.050400.NN	■
4.10		20.50	28.70	6	70	2.CD.050410.NN	■
4.20		21.00	29.40	6	70	2.CD.050420.NN	■
4.30		21.50	30.10	6	70	2.CD.050430.NN	■
4.40		22.00	30.80	6	70	2.CD.050440.NN	■
4.50		22.50	31.50	6	70	2.CD.050450.NN	■
4.60		23.00	32.20	6	80	2.CD.050460.NN	■
4.70		23.50	32.90	6	80	2.CD.050470.NN	■
4.762	3/16	23.81	33.33	6	80	2.CD.050F316.NN	■
4.80		24.00	33.60	6	80	2.CD.050480.NN	■
4.90		24.50	34.30	6	80	2.CD.050490.NN	■
5.00		25.00	35.00	6	80	2.CD.050500.NN	■
5.10		25.50	35.70	6	80	2.CD.050510.NN	■
5.20		26.00	36.40	6	80	2.CD.050520.NN	■
5.30		26.50	37.10	6	80	2.CD.050530.NN	■
5.40		27.00	37.80	6	80	2.CD.050540.NN	■
5.50		27.50	38.50	6	80	2.CD.050550.NN	■
5.560	7/32	27.80	38.92	6	80	2.CD.050F732.NN	■
5.60		28.00	39.20	6	80	2.CD.050560.NN	■
5.70		28.50	39.90	6	80	2.CD.050570.NN	■
5.80		29.00	40.60	6	80	2.CD.050580.NN	■
5.90		29.50	41.30	6	80	2.CD.050590.NN	■
6.00		30.00	42.00	6	80	2.CD.050600.NN	■
6.350	1/4	31.75	44.45	8	80	2.CD.050F14.NN	■

■ Stock item

Type NK 8 x d / 12 x d

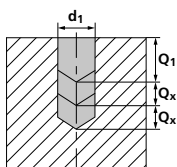
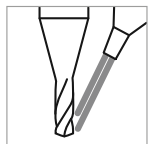
DRILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW



Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	Q ₁		Q _x	
					d1 < 1 mm	d1 ≥ 1 mm	d1 < 1 mm	d1 ≥ 1 mm
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	4xd1	4xd1 – 6xd1	2xd1	2xd1 – 4xd1
		3.4365	AlZnMgCu1.5	ASTM 7075				
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	2xd1	4xd1	2xd1	2xd1
		3.2381	GD-AlSi10Mg	UNS A03590				
	Copper	2.004	Cu-OF / CW008A	UNS C10100	2xd1	4xd1	2xd1	2xd1
		2.0065	Cu-ETP / CW004A	UNS C11000				
	Lead-free brass	2.0321	CuZn37 CW508L	UNS C27400	2xd1	4xd1	2xd1	2xd1 – 4xd1
		2.036	CuZn40 CW509L	UNS C28000				
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	2xd1 - 4xd1	4xd1	2xd1	2xd1
		2.102	CuSn6	UNS C51900				
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	2xd1	4xd1	1xd1	2xd1
		2.096	CuAl9Mn2	UNS C63200				

Type NN 8 x d / 12 x d

DRILLING WITH EXTERNAL COOLING | CUTTING DATA OVERVIEW



Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	Q ₁		Q _x	
					d1 < 1 mm	d1 ≥ 1 mm	d1 < 1 mm	d1 ≥ 1 mm
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	4xd1	4xd1	2xd1	2xd1
		3.4365	AlZnMgCu1.5	ASTM 7075				
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	2xd1	2xd1	2xd1	2xd1
		3.2381	GD-AlSi10Mg	UNS A03590				
	Copper	2.004	Cu-OF / CW008A	UNS C10100	2xd1	2xd1	1xd1 – 2xd1	1xd1 – 2xd1
		2.0065	Cu-ETP / CW004A	UNS C11000				
	Lead-free brass	2.0321	CuZn37 CW508L	UNS C27400	2xd1	4xd1	2xd1	2xd1
		2.036	CuZn40 CW509L	UNS C28000				
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	2xd1	2xd1	1xd1 – 2xd1	1xd1 – 2xd1
		2.102	CuSn6	UNS C51900				
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	2xd1	2xd1	1xd1	2xd1
		2.096	CuAl9Mn2	UNS C63200				

v_c [m/min]
 f [mm/rev]

RECOMMENDATION FOR USE

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

P	N	S ₃
M	S ₁	H ₁
K	S ₂	H ₂

0.2–0.4 mm 1/64"			0.5–0.7 mm 1/32"			0.8–1.0 mm			Ød1 1.1–1.3 mm			1.4–1.6 mm 1/16"			1.7–2.0 mm 3/32"		
v_c		f	v_c		f	v_c		f	v_c		f	v_c		f	v_c		f
Mid	High		Mid	High		Mid	High		Mid	High		Mid	High		Mid	High	
10	30	0.015–0.030	20	40	0.040–0.055	30	60	0.065–0.080	40	80	0.085–0.100	40	100	0.090–0.130	40	120	0.140–0.160
10	30	0.015–0.030	20	40	0.040–0.055	30	60	0.065–0.080	40	80	0.085–0.100	40	100	0.090–0.130	40	120	0.140–0.160
10	30	0.020–0.040	20	40	0.050–0.070	30	60	0.080–0.100	40	80	0.110–0.130	40	100	0.140–0.160	40	120	0.170–0.200
10	30	0.010–0.025	20	40	0.030–0.045	30	60	0.050–0.060	40	80	0.065–0.080	40	100	0.090–0.100	40	120	0.100–0.120
10	30	0.020–0.030	20	40	0.040–0.055	30	60	0.065–0.080	40	80	0.090–0.110	40	100	0.110–0.130	40	120	0.140–0.160
10	30	0.010–0.020	20	40	0.025–0.035	30	60	0.040–0.050	40	80	0.055–0.065	40	100	0.070–0.080	40	120	0.085–0.100

v_c [m/min]
 f [mm/rev]

RECOMMENDATION FOR USE

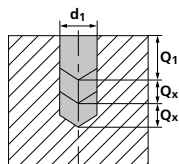
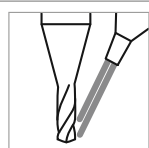
● Excellent | ● Good | ○ Acceptable | ☒ Not recommended

P	N	S ₃
M	S ₁	H ₁
K	S ₂	H ₂

0.2–0.4 mm 1/64"			0.5–0.7 mm 1/32"			0.8–1.0 mm			Ød1 1.1–1.3 mm			1.4–1.6 mm 1/16"			1.7–2.0 mm 3/32"		
v_c		f	v_c		f	v_c		f	v_c		f	v_c		f	v_c		f
Mid	High		Mid	High		Mid	High		Mid	High		Mid	High		Mid	High	
10	30	0.015–0.030	20	40	0.040–0.055	30	60	0.065–0.080	40	80	0.085–0.100	40	100	0.090–0.130	40	120	0.140–0.160
10	30	0.015–0.030	20	40	0.040–0.055	30	60	0.065–0.080	40	80	0.085–0.100	40	100	0.090–0.130	40	120	0.140–0.160
10	30	0.020–0.040	20	40	0.050–0.070	30	60	0.080–0.100	40	80	0.110–0.130	40	100	0.140–0.160	40	120	0.170–0.200
10	30	0.010–0.025	20	40	0.030–0.045	30	60	0.050–0.060	40	80	0.065–0.080	40	100	0.090–0.100	40	120	0.100–0.120
10	30	0.020–0.030	20	40	0.040–0.055	30	60	0.065–0.080	40	80	0.090–0.110	40	100	0.110–0.130	40	120	0.140–0.160
10	30	0.010–0.020	20	40	0.025–0.035	30	60	0.040–0.050	40	80	0.055–0.065	40	100	0.070–0.080	40	120	0.085–0.100

Type NN 5 x d

DRILLING WITH EXTERNAL COOLING | CUTTING DATA OVERVIEW



Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	Q ₁	Q _x
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	4xd1	2xd1
		3.4365	AlZnMgCu1.5	ASTM 7075		
	Aluminium alloy cast	3.2163	GD-ALSi9Cu3	ASTM A380	2xd1	2xd1
		3.2381	GD-ALSi10Mg	UNS A03590		
	Copper	2.004	Cu-OF / CW008A	UNS C10100	2xd1	1xd1 – 2xd1
		2.0065	Cu-ETP / CW004A	UNS C11000		
	Lead-free brass	2.0321	CuZn37 CW508L	UNS C27400	2xd1	2xd1
		2.036	CuZn40 CW509L	UNS C28000		
	Brass, Bronze Rm < 400 N/mm ²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	2xd1	1xd1 – 2xd1
		2.102	CuSn6	UNS C51900		
	Bronze Rm < 600 N/mm ²	2.0966	CuAl10Ni5Fe4	UNS C63000	2xd1	1xd1
		2.096	CuAl9Mn2	UNS C63200		

v_c [m/min]
 f [mm/rev]

RECOMMENDATION FOR USE

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

P	N	S ₃	
M	S ₁	H ₁	
K	S ₂	H ₂	

Ød1														
2.0 mm 3/32"			3.0 mm 1/8"			4.0 mm 5/32"			5.0 mm 3/16" - 7/32"			6.0 mm 1/4"		
v_c	f		v_c	f		v_c	f		v_c	f		v_c	f	
Mid	High		Mid	High		Mid	High		Mid	High		Mid	High	
40	120	0.140–0.160	40	140	0.200–0.240	50	200	0.260–0.300	50	200	0.350–0.400	50	200	0.400–0.450
40	120	0.140–0.160	40	140	0.200–0.240	50	200	0.260–0.300	50	200	0.350–0.400	50	200	0.400–0.450
40	120	0.170–0.200	40	140	0.240–0.300	40	140	0.320–0.360	40	140	0.400–0.450	40	140	0.480–0.540
40	120	0.100–0.120	40	140	0.120–0.180	40	140	0.160–0.240	40	140	0.200–0.250	40	140	0.240–0.360
40	120	0.140–0.160	40	140	0.200–0.240	40	140S	0.260–0.300	40	140	0.350–0.400	40	140	0.400–0.450
40	120	0.085–0.100	40	140	0.120–0.150	40	140	0.160–0.200	40	140	0.200–0.250	40	140	0.240–0.300

Drilling process CrazyDrill Non-Ferrous

PRECISE AND EFFICIENT DRILLING FROM Ø 0.2 MM

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 allow a standard filter with filter quality of ≤ 0.05 mm. For tools with external cooling no specific parameters have to be considered concerning filter.

Coolant pressure: For reliable drilling process using tools with through shank cooling channels the following minimal pressures are needed (see chart).

Revolution	[rpm]	$\leq 10'000$	$> 10'000$
Minimal pressure	[bar]	15	30

For tools with external cooling no specific parameters have to be considered concerning coolant pressure. But it must be ensured that the coolant is conducted directly to the drill tip, thus cooling and lubricating the drill perfectly and flushing away the chips.

CrazyDrill Non-Ferrous NN 5 x d and NN / NK 8 x d

Because of the high degree of self-centering capability, CrazyDrill Non-Ferrous can be used on regular and straight surfaces without a centering or pilot hole for drilling depths up to $8 \times d$.

Higher requirements: For irregular respectively rough or inclined surfaces or for the highest degree of position accuracy Mikron Tool recommends:

- **CrazyDrill Twicenter** as center drill
- **CrazyDrill Crosspilot** as pilot drill for inclined surfaces

CrazyDrill Non-Ferrous NN / NK 12 x d

Mikron Tool recommends a centering for CrazyDrill Non-Ferrous NN / NK 12 x d:

- **CrazyDrill Twicenter** as center drill
- **CrazyDrill Crosspilot** as pilot drill for inclined surfaces

Thus highest alignment and process accuracy are guaranteed.

Centering / pilot drilling and drilling

Centering with CrazyDrill Twicenter is the perfect combination for a precise hole (position accuracy) and a stable machining process. The pilot drill CrazyDrill Crosspilot does the same when drilling on inclined surfaces.

DRILLING PROCESS

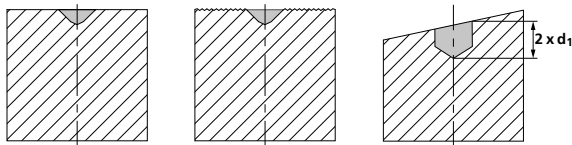
Drilling according DIN 66025 / PAL

G83 deep-drilling cycle with chip break and chip removal (pecks)

Q = depth of the respective peck

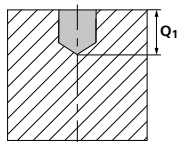
1 | CENTERING OR PILOT DRILLING

- With CrazyDrill Twicenter (irregular or rough surfaces) or CrazyDrill Crosspilot (inclined surfaces) for version 5 x d and 8 x d.
- With CrazyDrill Twicenter (straight and rough surfaces) or CrazyDrill Crosspilot (inclined surfaces) for version 12 x d.

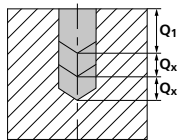


2 | DRILLING

- With CrazyDrill Non-Ferrous up to maximum drilling depth Q_1 in one step, followed by peck to remove chips.



- Further pecks Q_x according to cutting data table, followed by peck to remove chips.



Note:

Between pecks, take the drill completely out from the bore. After the drill reached desired cutting depth, return at increased feed rate (or in case of perfect conditions rapid traverse) to safety position.

Headquarter
Production and International Sales
MIKRON SWITZERLAND AG, AGNO
Division Tool
Via Campagna 1
6982 Agno
Switzerland
Phone +41 91 610 40 00
mto@mikron.com

Production and Sales
Germany & Eastern Europe
MIKRON GERMANY GMBH
Abteilung Werkzeuge
Berner Feld 71
78628 Rottweil
Germany
Phone +49 741 5380 450
info.mtr@mikron.com

Production and Sales
North & South America
MIKRON CORP. MONROE, PLANT ILLINOIS
1090 Pratt Blvd.
Elk Grove Village, IL 60007
USA
Phone +1 203 261 31 00
mmo@mikron.com

China Sales
MIKRON TOOL (SHANGHAI) CO., LTD.
Room A209, Building 3,
No. 526, 3rd East Fu Te Road,
Shanghai, 200131
P. R. China
Phone +86 21 2076 5671
mtc@mikron.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

