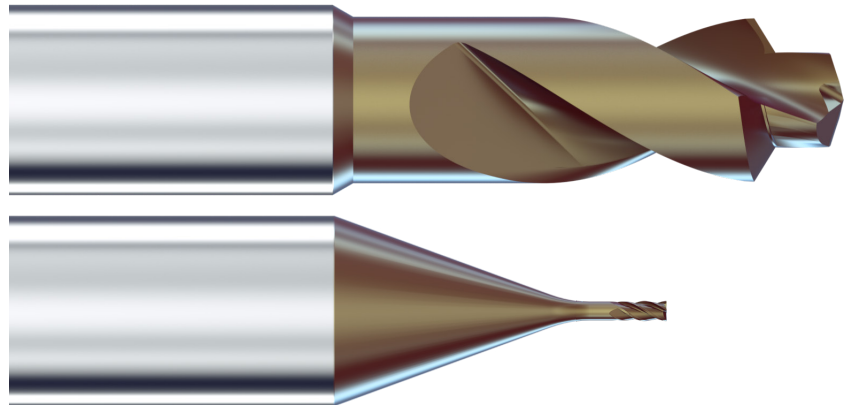


MIKRON TOOL



crazy about

hexalobe

THE NEW MACHINING
CONCEPT



crazy about new concept

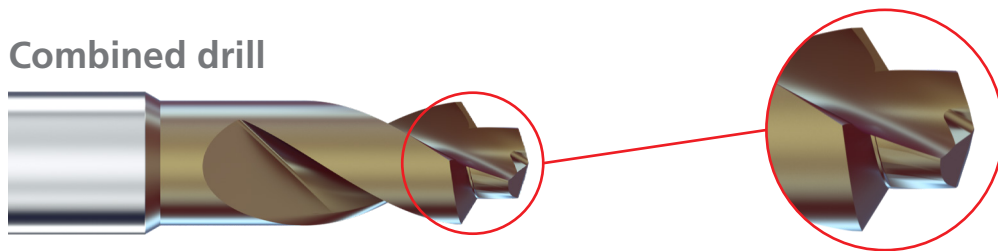


THE NEW CONCEPT FOR MACHINING YOUR "TORX®" SOCKET

New concept

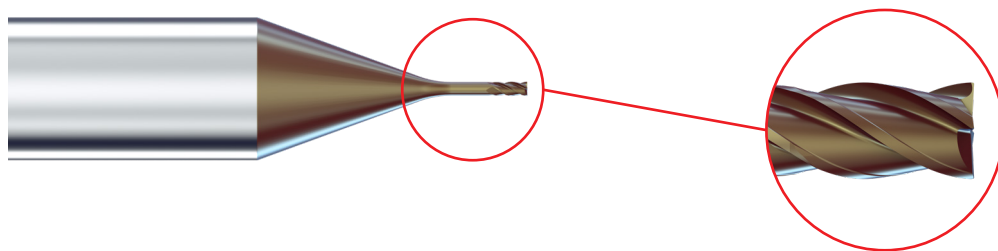
- Drilling - Chamfering - Milling - Deburring: Four operations in three steps with two tools.
- High efficient machining in shorter time for titanium and stainless steel.

Combined drill



Drilling and chamfering in one step

Micro endmill



Micro endmill with special micro-grain carbide for high stiffness and edge chipping resistance

Performance features

- Highest stiffness
- New cutting geometry



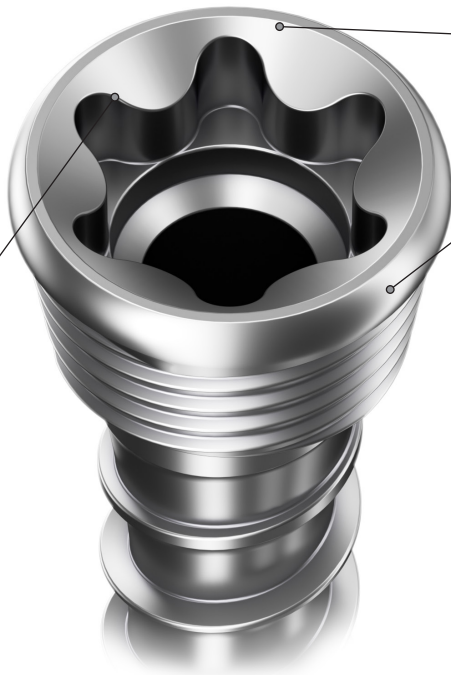
Your advantages

- Shorter milling process
- Highest profile precision
- Excellent surface quality
- Minimal burr

NEW

Best performance machining hexalobular sockets

TURNKEY SOLUTION FOR TITANIUM AND STAINLESS STEEL



Material

■ Titanium

S2

Ti Gr.5 ELI
TiAl6V4 ELI
3.7165

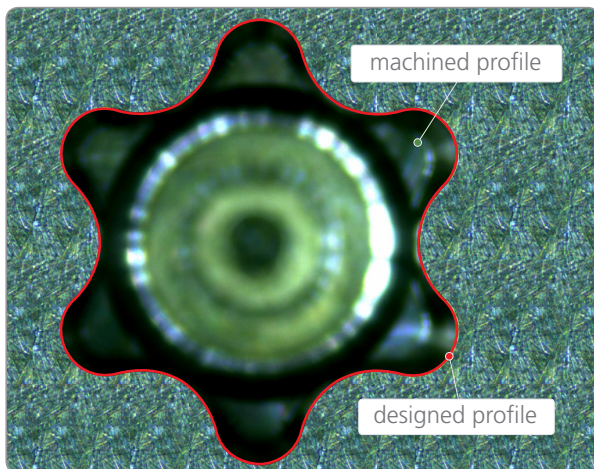
■ Stainless Steel

M

316 LM
X2CrNiMo18-15-3
1.4441

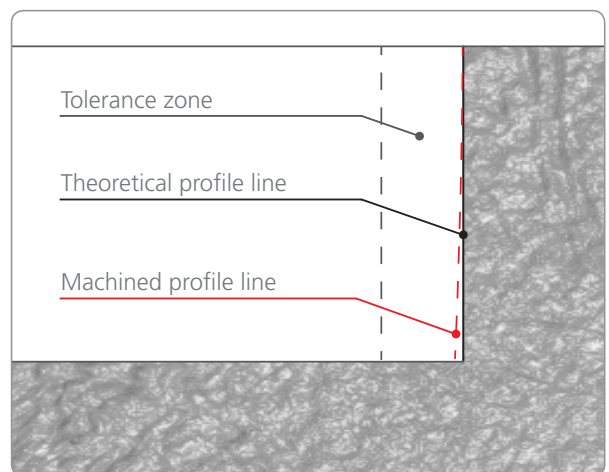
Shape precision

■ Nearly perfect profile



Perfect profile matching.

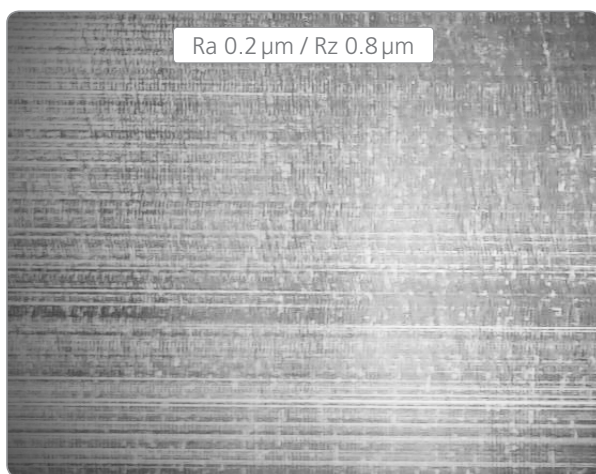
■ Perpendicularity



Guaranteed profile geometry.

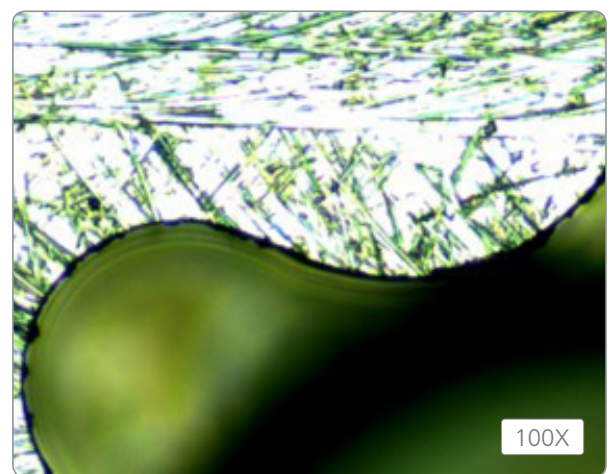
Quality and performance

■ Surface quality



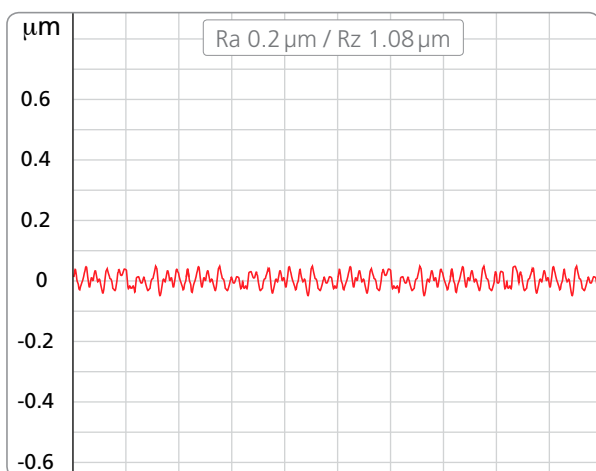
Excellent surface quality.*¹

■ Nearly burr free



Machining profile with minimal burrs.

■ Chamfer roughness



Lowest roughness on chamfer surface.*¹

■ Milling cycle time

Torx type	Time [s]
T6	27
T8	24
T10	22
T15	22
T20	21
T25	20

Machined on titanium with version 3.5 x d and p = 0.4 x d.*¹

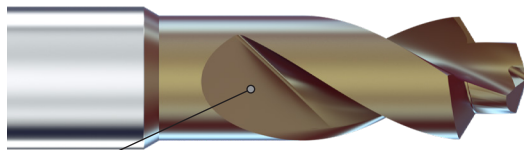
Note *1: The quality and cycle time depends on cutting parameters and machine conditions.

NEW

High efficient drilling hexalobular socket

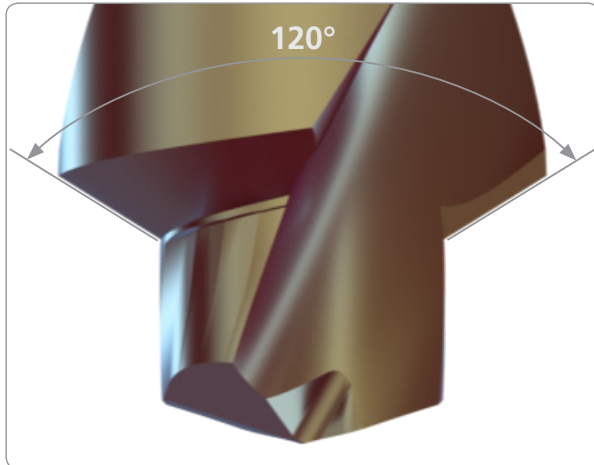
CrazyDrill Hexalobe

The new combined drill for "Torx®" socket machining



Features

■ Two in one



The pre-hole and a 120° chamfer are combined in one single operation.

■ Two cutting geometries

Two types of drills have been developed for best machining titanium and stainless steel.

■ Diameter range

Standard diameters for pre-hole drilling "Torx®" socket from T4 to T30.

■ On request

Special sizes available on request.

■ Coating



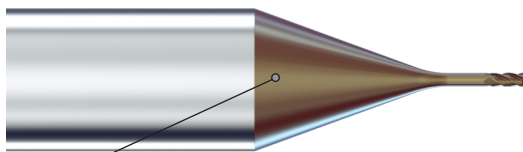
Chrome free coating to avoid cross contamination on medical parts.

High efficient milling hexalobular socket

NEW

CrazyMill Hexalobe

The new endmill for "Torx®" socket machining

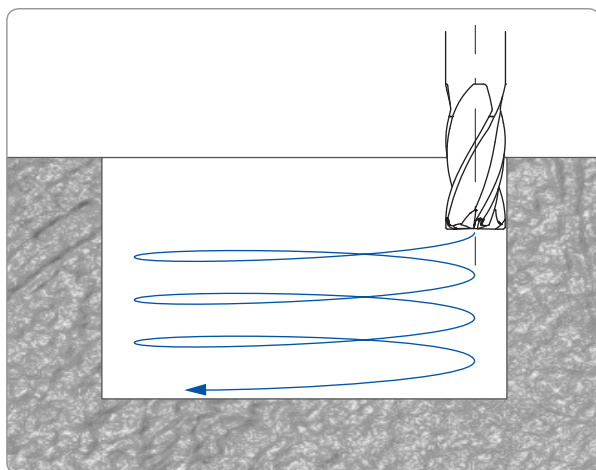


Performance

■ Real cutting conditions

Tested and approved cutting conditions for best process execution and tool life.

■ Helical interpolation



Higher pitch up to $0.8 \times d$.

■ New carbide

A special micro-grain carbide with high stiffness and edge chipping resistance has been developed to guarantee high profile precision.

■ Two cutting geometries

Two types of endmills have been developed for vibration free machining in titanium and stainless steel.

■ Coating



Chrome free coating to avoid cross contamination on medical parts.

NEW

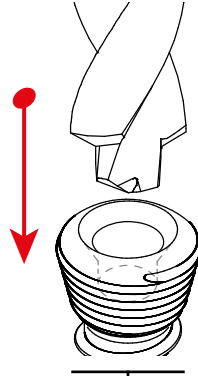
Machining process

HELICAL INTERPOLATION FOR TITANIUM



Step 1

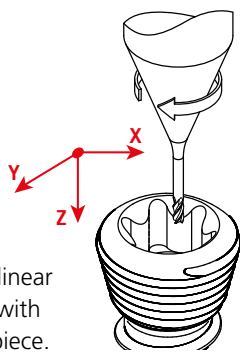
Pre-hole drilling with 120° chamfer



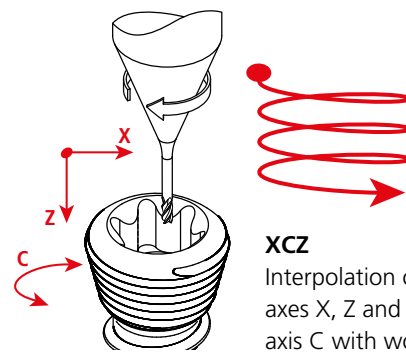
Step 2

Helical interpolation
XYZ

Helical interpolation
XCZ



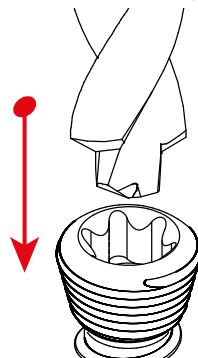
XYZ
Interpolation of linear axes X, Y and Z with stationary workpiece.



XCZ
Interpolation of linear axes X, Z and subspindle axis C with workpiece on rotation.

Step 3

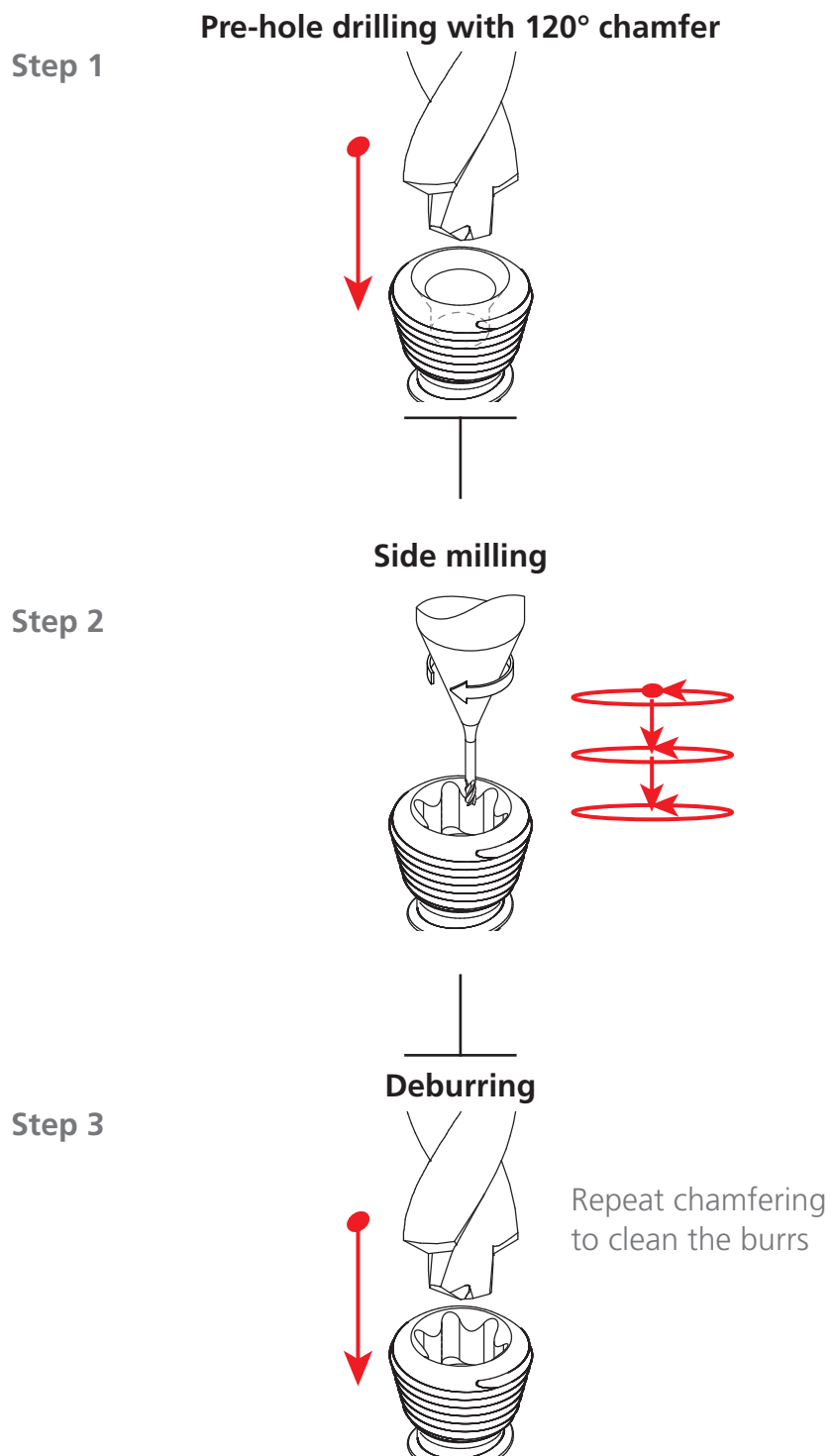
Deburring



Repeat chamfering to clean the burrs

Note: Helical interpolation process is optimal for titanium, saving up to 20% of cycle time in comparison to side milling process.

SIDE MILLING FOR TITANIUM AND STAINLESS STEEL



CrazyDrill Hexalobe

NEW

Titanium

SST-Inox

1 | SHANK

The reinforced solid carbide shank guarantees stability, high degree of concentricity and hence maximum drilling precision.

2 | CARBIDE

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

3 | NEW COATING

The high-performance coating eXedur SNP is heat-resistant and super wear-resistant, prevents buildup edges and promotes uniform chip flushing. The result is long tool life.

4 | 120° CHAMFER

The pre-hole and a 120° chamfer are combined on one single operation.

5 | CUTTING GEOMETRY

Two specific geometries have been developed for the machining of:

- **Titanium**
- **Stainless steel**

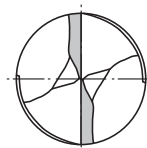
Good chip breaking and quick chip removal are guaranteed.

- Coated
- External cooling

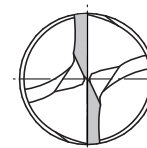
- Coated
- External cooling











Drill tip form



Drill tip form



CrazyMill Hexalobe

Titanium		SST-Inox	
3.5 x d	5 x d	3.5 x d	5 x d
 Coated	 External cooling	 Coated	 External cooling
			

NEW

1 | SHANK

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

2 | NEW CARBIDE

Due to the high degree of toughness and low thermal conductivity of titanium and stainless steel, a specially micro-grain carbide with high stiffness and edge chipping resistance has been developed to perfectly meet all requirements in terms of mechanical properties.

3 | NEW COATING

The high-performance coating eXedur SNP is heat and wear resistant, prevents buildup edges and guarantees optimum chip flushing. The result is a long tool life.

4 | CUTTING GEOMETRY

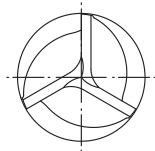
Two specific geometries have been developed for the machining of:

- Titanium
- Stainless steel

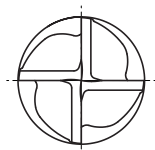
Vibration free cutting for machining with helical interpolation.

Diameter range
Ø .008" - .012"
Ø 0.2 - 0.3 mm

Mill tip form
3 Flute



4 Flute



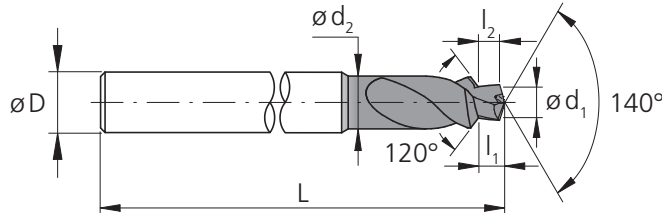
Ø .016" - .039"
Ø 0.4 - 1.0 mm

NEW

CrazyDrill Hexalobe



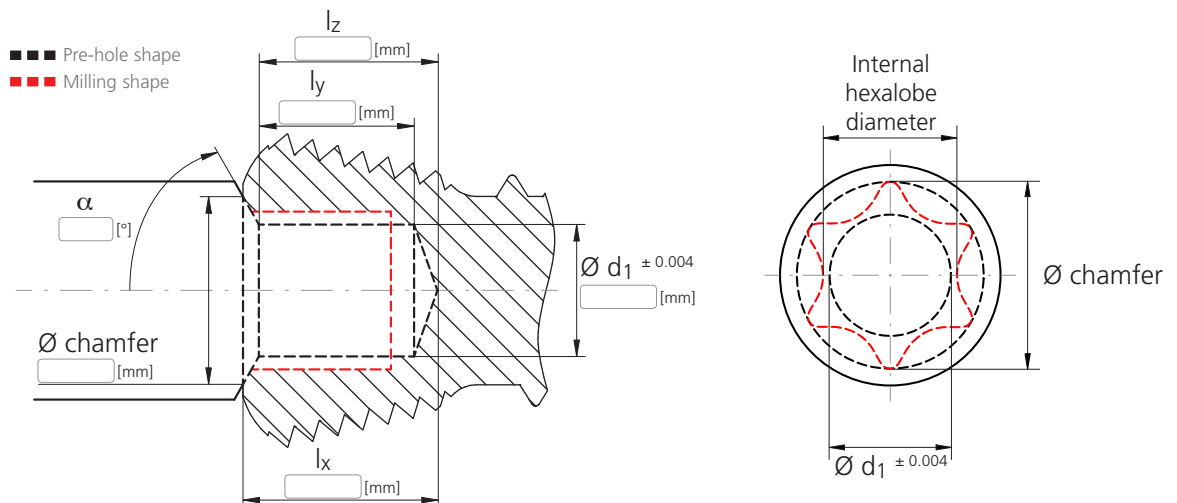
Dimensions related to ISO 10664



Torx type	d ₁ 0/-0.0031 [inch]	d ₁ 0/-0.008 [mm]	l ₁ [inch]	l ₁ [mm]	d ₂ [mm]	l ₂ [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Titanium	SST-Inox	Availability
T4	.035	0.9	.028	0.70	1.7	0.56	3	1.57	40	2.CD.006090.120	.T	.I	■
T5	.039	1.0	.034	0.87	2.0	0.72	3	1.57	40	2.CD.007100.120	.T	.I	■
T5	.039	1.0	.030	0.75	2.0	0.59	3	1.57	40	2.CD.006100.120	.T	.I	■
T6	.047	1.2	.042	1.06	2.2	0.88	3	1.57	40	2.CD.007120.120	.T	.I	■
T6	.047	1.2	.034	0.86	2.2	0.67	3	1.57	40	2.CD.006120.120	.T	.I	■
T7	.055	1.4	.041	1.05	3.0	0.83	3	1.57	40	2.CD.006140.120	.T	.I	■
T7	.055	1.4	.040	1.01	3.0	0.79	3	1.57	40	2.CD.005140.120	.T	.I	■
T8	.063	1.6	.055	1.40	3.0	1.15	3	1.57	40	2.CD.007160.120	.T	.I	■
T8	.063	1.6	.041	1.05	3.0	0.81	3	1.57	40	2.CD.005160.120	.T	.I	■
T10	.075	1.9	.056	1.42	4.0	1.13	4	1.57	40	2.CD.005190.120	.T	.I	■
T15	.091	2.3	.070	1.78	4.0	1.42	4	1.97	50	2.CD.006230.120	.T	.I	■
T20	.106	2.7	.083	2.12	5.0	1.70	6	1.97	50	2.CD.006270.120	.T	.I	■
T25	.122	3.1	.112	2.84	6.0	2.36	6	1.97	50	2.CD.007310.120	.T	.I	■
T30	.150	3.8	.139	3.52	6.0	2.93	6	1.97	50	2.CD.008380.120	.T	.I	■
T30	.150	3.8	.120	3.04	6.0	2.45	6	1.97	50	2.CD.007380.120	.T	.I	■

■ Stock item

Customized combined drill



Mikron Tool has an international team of cutting technology experts who are pleased to meet your specific needs and requirements.

You can: [contact us](mailto:mto@mikron.com)
mto@mikron.com

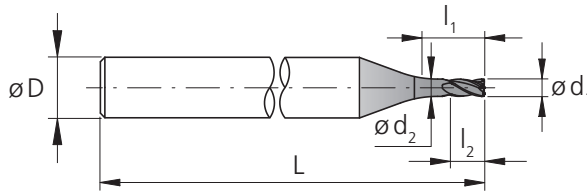
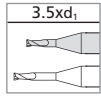
Regrinding: This product is not suitable for regrinding.

CrazyMill Hexalobe

NEW



Short version

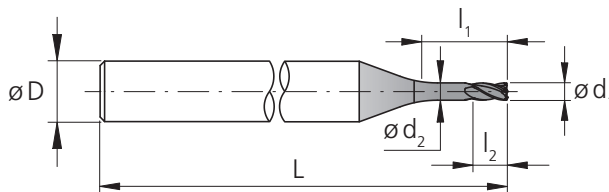
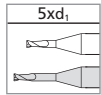


l_1 = Effective length
 l_2 = Cutting length

Torx type	d_1 0/-0.004 [inch]	d_1 0/-0.01 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	d_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Z [Teeth]	Item number Titanium	Item number SST-Inox	Availability
T4	.008	0.20	.028	0.70	0.30	0.19	4	1.57	40	3	2.CMT35.B1Z3.020.1	2.CMI35.B1Z3.020.1	■
T5	.010	0.25	.034	0.875	0.40	0.23	4	1.57	40	3	2.CMT35.B1Z3.025.1	2.CMI35.B1Z3.025.1	■
T6 / T7	.012	0.30	.041	1.05	0.45	0.28	4	1.57	40	3	2.CMT35.B1Z3.030.1	2.CMI35.B1Z3.030.1	■
T8 / T10	.016	0.40	.055	1.40	0.60	0.38	4	1.57	40	4	2.CMT35.B1Z4.040.1	2.CMI35.B1Z4.040.1	■
T10 / T15	.020	0.50	.069	1.75	0.75	0.47	4	1.57	40	4	2.CMT35.B1Z4.050.1	2.CMI35.B1Z4.050.1	■
T20	.024	0.60	.083	2.10	0.90	0.56	4	1.57	40	4	2.CMT35.B1Z4.060.1	2.CMI35.B1Z4.060.1	■
T25	.031	0.80	.110	2.80	1.20	0.75	4	1.57	40	4	2.CMT35.B1Z4.080.1	2.CMI35.B1Z4.080.1	■
T30	.039	1.00	.138	3.50	1.50	0.94	4	1.57	40	4	2.CMT35.B1Z4.100.1	2.CMI35.B1Z4.100.1	■

■ Stock item

Long version



l_1 = Effective length
 l_2 = Cutting length

Torx type	d_1 0/-0.004 [inch]	d_1 0/-0.01 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	d_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Z [Teeth]	Item number Titanium	Item number SST-Inox	Availability
T4	.008	0.20	.039	1.00	0.30	0.19	4	1.57	40	3	2.CMT35.C1Z3.020.1	2.CMI35.C1Z3.020.1	■
T5	.010	0.25	.049	1.25	0.40	0.23	4	1.57	40	3	2.CMT35.C1Z3.025.1	2.CMI35.C1Z3.025.1	■
T6 / T7	.012	0.30	.059	1.50	0.45	0.28	4	1.57	40	3	2.CMT35.C1Z3.030.1	2.CMI35.C1Z3.030.1	■
T8 / T10	.016	0.40	.079	2.00	0.60	0.38	4	1.57	40	4	2.CMT35.C1Z4.040.1	2.CMI35.C1Z4.040.1	■
T10 / T15	.020	0.50	.098	2.50	0.75	0.47	4	1.57	40	4	2.CMT35.C1Z4.050.1	2.CMI35.C1Z4.050.1	■
T20	.024	0.60	.118	3.00	0.90	0.56	4	1.57	40	4	2.CMT35.C1Z4.060.1	2.CMI35.C1Z4.060.1	■
T25	.031	0.80	.157	4.00	1.20	0.75	4	1.57	40	4	2.CMT35.C1Z4.080.1	2.CMI35.C1Z4.080.1	■
T30	.039	1.00	.197	5.00	1.50	0.94	4	1.57	40	4	2.CMT35.C1Z4.100.1	2.CMI35.C1Z4.100.1	■

■ Stock item

Regrinding: This product is not suitable for regrinding.

Pre-hole drilling



Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [SFM] [m/min]	
					3.5 x d1	5 x d1
M	Stainless steel austenitic	1.4435	X2CrNiMo 18-14-3	AISI 316L	82 – 115	25 – 35
		1.4441	X2CrNiMo 18-15-3	AISI 316LM		
S ₂	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	66 – 98	20 – 30
		9.9367	TiAl6Nb7	ASTM F1295		

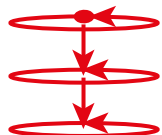
Helical interpolation (XYZ / X CZ) - 3.5 x d / 5 x d



Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	p (pitch)	
					3.5 x d1	5 x d1
S ₂	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	0.2 - 0.8 x d1	0.1 - 0.4 x d1
		9.9367	TiAl6Nb7	ASTM F1295		

Note: In case of $p = 0.8 \times d1$ decrease the feed f_z by 30% to increase tool life and profile precision.

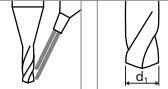
Side milling - 3.5 x d / 5 x d



Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	$a_{p, max}$	a_e
					3.5 x d1	5 x d1
M	Stainless steel austenitic	1.4435	X2CrNiMo 18-14-3	AISI 316L	0.5 x d1	0.1 x d1
		1.4441	X2CrNiMo 18-15-3	AISI 316LM		
S ₂	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	0.5 x d1	variable
		9.9367	TiAl6Nb7	ASTM F1295		

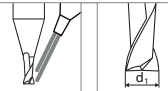
General advise: Cutting conditions have been tested and approved with $n = 30'000 - 40'000$ rpm, different cutting speeds may affect tool life.

V_c [SFM] | [m/min]
f [IPR] | [mm/rev]



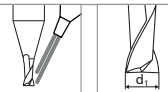
T4 Ød1 .039" 0.9mm f	T5 Ød1 .039" 1.0mm f	T6 Ød1 .047" 1.2mm f	T7 Ød1 .055" 1.4mm f	T8 Ød1 .063" 1.6mm f	T10 Ød1 .075" 1.9mm f	T15 Ød1 .091" 2.3mm f	T20 Ød1 .106" 2.7mm f	T25 Ød1 .122" 3.1mm f	T30 Ød1 .150" 3.8mm f
.0008 - .0012 0.02 - 0.03	.0008 - .0012 0.02 - 0.03	.0012 - .0016 0.03 - 0.04	.0012 - .0016 0.03 - 0.04	.0012 - .0016 0.03 - 0.04	.0020 - .0024 0.05 - 0.06	.0020 - .0024 0.05 - 0.06	.0024 - .0028 0.06 - 0.07	.0028 - .0032 0.07 - 0.08	.0028 - .0032 0.07 - 0.08
.00039 - .00059 0.010 - 0.015	.00039 - .00059 0.010 - 0.015	.00047 - .00071 0.012 - 0.018	.00055 - .00079 0.014 - 0.020	.00059 - .00098 0.015 - 0.025	.00079 - .00118 0.020 - 0.030	.00098 - .00138 0.025 - 0.035	.00098 - .00157 0.025 - 0.040	.00118 - .00177 0.030 - 0.045	.00177 - .00276 0.045 - 0.070

V_c [SFM] | [m/min]
f_z [IPT] | [mm]
p [inch] | [mm]



T4 Ød1 .0079" 0.20mm v _c f _z		T5 Ød1 .0098" 0.25mm v _c f _z		T6 - T7 Ød1 .0118" 0.30mm v _c f _z		T8 - T10 Ød1 .0157" 0.40mm v _c f _z		T10 - T15 Ød1 .0197" 0.50mm v _c f _z		T20 Ød1 .0236" 0.60mm v _c f _z		T25 Ød1 .0315" 0.80mm v _c f _z		T30 Ød1 .0394" 1.00mm v _c f _z	
66 - 131 20 - 40	.00004 0.0010	82 - 164 25 - 50	.00004 0.0010	98 - 197 30 - 60	.00004 0.0010	131 - 246 40 - 75	.00006 0.0015	164 - 295 50 - 90	.00008 0.0020	197 - 328 60 - 100	.00010 0.0025	230 - 427 70 - 130	.00012 0.0030	263 - 459 80 - 140	.00016 0.0040

V_c [SFM] | [m/min] **a_p [inch] | [mm]**
f_z [IPT] | [mm] **a_e [inch] | [mm]**



T4 Ød1 .0079" 0.20mm v _c f _z		T5 Ød1 .0098" 0.25mm v _c f _z		T6 - T7 Ød1 .0118" 0.30mm v _c f _z		T8 - T10 Ød1 .0157" 0.40mm v _c f _z		T10 - T15 Ød1 .0197" 0.50mm v _c f _z		T20 Ød1 .0236" 0.60mm v _c f _z		T25 Ød1 .0315" 0.80mm v _c f _z		T30 Ød1 .0394" 1.00mm v _c f _z	
66 - 131 20 - 40	.00006 0.0015	82 - 164 25 - 50	.00010 0.0025	98 - 197 30 - 60	.00012 0.0030	131 - 246 40 - 75	.00018 0.0045	164 - 295 50 - 90	.00024 0.0060	197 - 328 60 - 100	.00026 0.0065	230 - 427 70 - 130	.00032 0.0080	263 - 459 80 - 140	.00039 0.0100
66 - 131 20 - 40	.00006 0.0015	82 - 164 25 - 50	.00010 0.0025	98 - 197 30 - 60	.00012 0.0030	131 - 246 40 - 75	.00018 0.0045	164 - 295 50 - 90	.00024 0.0060	197 - 328 60 - 100	.00026 0.0065	230 - 427 70 - 130	.00032 0.0080	263 - 459 80 - 140	.00039 0.0100

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