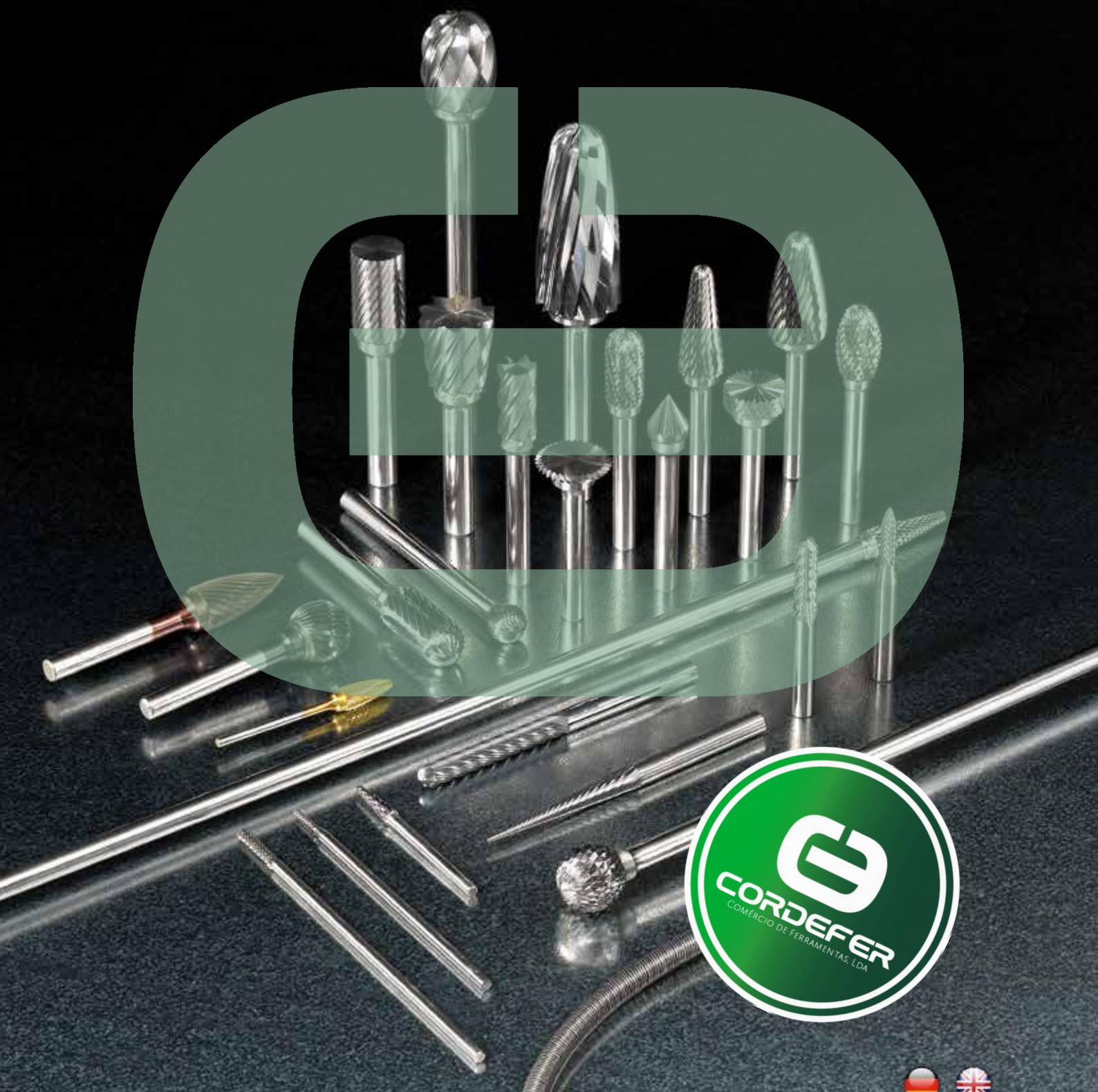


Cerim

THE QUALITY OF EXPERIENCE



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THE QUALITY OF EXPERIENCE

Die Firma **CERIN** begann mit ihren Aktivitäten im Jahre 1971 und ist heute eines der bestbekannten und solidesten **italienischen Unternehmen im Bereich Hartmetall-Präzisionswerkzeuge**.

Im Laufe der Jahre hat sich die Firma **CERIN** zu einem Branchenführer entwickelt und konnte sich auf den weltweiten Märkten behaupten durch ihre Produktqualität, Leistungsfähigkeit und Flexibilität der internen Strukturen. Außerdem bewährte sich ihr starkes Entwicklungs- und Forschungsengagement, das sich am Entwurf neuer Produkte orientiert.

Um die Wünsche und Anforderungen unserer Kunden zu erfüllen, steht ein technischer- und kaufmännischer Beratungsdienst immer zur Verfügung.

Die Firma **CERIN** ist zertifiziert nach Norm UNI EN ISO 9001:2008.

*CERIN has been present on the market since 1971 and currently represents one of the most well known and well reputed **Italian manufacturer of carbide precision tools**.*

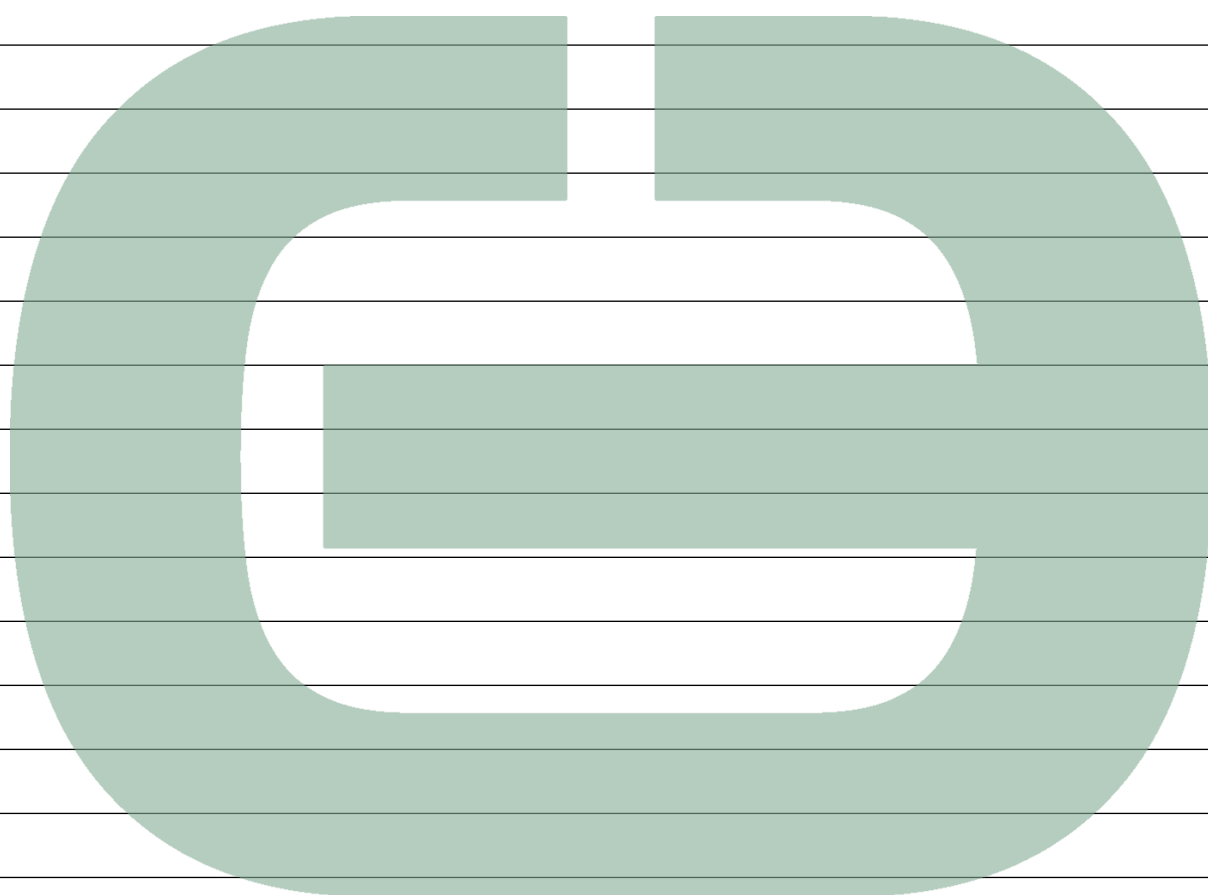
During the years CERIN has become leader in the field and have been known on the domestic and international markets as high quality manufacturer thanks, above all, to the constant commitment focused to the main purpose: total customer's satisfaction pursued through: Quality of the Products, Efficiency of the inner structure, Services available for the clientele and Research and Development engaged in new products development.

A service of technical and commercial assistance is always available to meet customer needs.

The company is UNI EN ISO 9001:2008 certified.







Werkstückwerkstoffe / Materials

01

Gruppe Group		Werkstoff Materials	Festigkeit N/mm ² Strength N/mm ²
Leichtmetalle Light Alloys	Aluminium - Aluminium Knetlegierungen - Alu Gußlegierungen / Aluminium - Wrought aluminium alloys - Cast aluminium alloys		
	A 1	A 1.1 Alu Gußlegierungen <5% Si / Cast aluminium alloys <5% Si	≤ 255
		A 1.2 Alu Knetlegierungen / Wrought aluminium alloys	≤ 255
		A 1.3 Alu Gußlegierungen > 12% <Si / Cast aluminium alloys <12% Si	≤ 255
		A 1.4 Alu Gußlegierungen >5% <12% / Cast aluminium alloys >5 % <12%	≤ 400
		A 1.5 Alu Gußlegierungen >5% <12% / Cast aluminium alloys >5 % <12%	≤ 400
		A 1.6 Alu Knetlegierungen / Wrought aluminium alloys	≤ 705
		A 1.7 Faserverstärkte LM Legierungen / Reinforced aluminium alloys	≤ 705
	Kupfer - Kupfer Legierungen - Messing - Bronze / Cooper - Cooper alloys - Brass - Bronze		
	A 2	A 2.1 Rein- und niedriglegiertes Kupfer / Low alloys cooper	≤ 400
		A 2.2 Kupfer Zinn Legierung / Cu-Sn alloys (cooper)	≤ 400
		A 2.3 Bronze kurzspanend / Cu-Sn alloys (cooper)	≤ 400
		A 2.4 Kupfer-Zinn Legierungen / Cu-Zn alloys (brass) (long chipping)	≤ 705
		A 2.5 Messing kurzspanend / Cu-Zn alloys (brass) (short chipping)	≤ 705
		A 2.6 Messing langspanend / Cu-Zn alloys (brass) (long chipping)	≤ 705
		A 2.7 Kupfer-Alu Legierung/Alubronze / Cu-Sn alloys (bronze)	≤ 850
	Kupfer Sonderlegierungen / Cooper special alloys		
	A 3	A 3.1 Kupfer Sonderlegierungen bis Q18 / Cooper special alloys from Q18	≤ 705
		A 3.2 Kupfer Sonderlegierungen über Q18 / Cooper special alloys	≤ 705
	Magnesium Legierungen - Magnesium Gußlegierungen / Magnesium alloys - Cast magnesium alloys		
	A 4	A 4.1 Magnesium Knetlegierungen / Magnesium wrought alloys	≤ 705
		A 4.2 Magnesium Gußlegierungen / Cast magnesium alloys	≤ 705
Kunststoffe und Verbundwerkstoffe Plastic & Comp. Materials	Kunststoffe - kurz- und langspanend / Plastics - short and long chipping		
	B 1	B 1.1 Duroplaste kurzspanend / Duroplaste short chipping	110
		B 1.2 Thermoplaste langspanend / Thermoplaste long chipping	80
		B 1.3 Polykarbonate / Polycarbonate	110
		B 1.4 Faserverstärkte Kunststoffe / Reinforced Plastics Fibers	800-1500
		B 1.5 Plexiglas / Plexiglass	130
		B 1.6 Kevlar / Kevlar	110
	NE Werkstoffe - Sonderwerkstoffe / Nonferrous metals - Special plastic		
	B 2	B 2.1 Hartholz / Hardwood	< 80
		B 2.2 Hartgummi / Hard rubber	< 80
		B 2.3 NE-Metalle / Nonferrous metals	< 80
		B 2.4 Presskarton / Pressed carton	< 80
Stähle Steels	Allgemeine Stähle - Baustähle - Legierte Stähle / Structural Steel		
	C 1	C 1.1 Kaltfließpressstähle / Materials for rail vehicles	≤ 400
		C 1.2 Magnetweicheisen / Soft magnetic material	≤ 400
		C 1.3 Automatenstähle / Automatic steel	≤ 705
		C 1.4 Allgemeine Baustähle / Structural steel (unalloyed, warm-rolled)	≤ 705
		C 1.5 Einsatzstähle / Hardened steel (unalloyed/alloyed)	≤ 705
		C 1.6 Vergütungsstähle / Heat-treatable steel (special steel)	≤ 850
		C 1.7 Legierte Stähle Stahlguß / Cold upsetting and cold extrusion steel, heat-treatable steel	≤ 1125
		C 1.8 Automatenstähle Baustähle / Structural steel (unalloyed, warm-rolled)	≤ 1125
	Nitrierstähle Kalt- und Warmarbeitsstähle / Roller bearing steel - Tool steel for warm working		
	C 2	C 2.1 Nitrierstähle / Roller bearing steel	≤ 1125
		C 2.2 Kaltarbeitsstähle / Tool steel for cold working (alloyed)	≤ 1125
		C 2.3 Warmarbeitsstähle / Tool steel for warm working	≤ 1125
		C 2.4 Vergütungsstähle Nitrierstähle / Cast steel for flame and induction hardening	≤ 1420
	Gehärtete Stähle / Tool Steel for warm working		
	C 3	C 3.1 Gehärtete Stähle / Tool steel for warm working	< 44,5HRC
		C 3.2 Gehärtete Stähle / Tool steel for warm- and cold-working	44 - 56 HRC
		C 3.3 Gehärtete Stähle / Tool steel for warm- and cold-working	56 - 60 HRC
		C 3.4 Gehärtete Stähle / Tool steel for cold working (alloyed)	58 - 63 HRC
		C 3.5 Gehärtete Stähle / Tool steel for cold working (alloyed)	56 - 67 HRC
	Sonder Stahl-Werkstoffe / Special Steel		
	C 4	C 4.1 Stahl Sonderwerkstoffe / Specialsteel	≤ 1125
		C 4.2 Stahl Sonderwerkstoffe / Specialsteel	≤ 1420
Rostfreier Stahl Stainless Steel	Rost- Säure- und Hitzebeständige Stähle / Heat-resistant steel - Stainless austenitic steel		
	D 1	D 1.1 Rostbeständige Stähle / Heat-resistant steel	≤ 850
		D 1.2 Rostbeständige Stähle / Heat-resistant steel	≤ 850
		D 1.3 Hitzebeständige Stähle / Austenitic stainless steel	≤ 850
		D 1.4 Rost- Säure- Hitzebeständige Stähle / Valve materials (heat-resistant)	≤ 1125
		D 1.5 Rost- Säure- Hitzebeständige Stähle / High heat-resistant steel and alloys	≤ 1420
Titan Titanium	Titan - Titanlegierungen / Titanium and Titanium alloys		
	E 1	E 1.1 Reintitan / Titanium (pure)	≤ 705
		E 1.2 Titanlegierungen / Wrought titanium alloy	≤ 1125
		E 1.3 Titanlegierungen Wrought titanium alloy	≤ 1420
	Nickel/Kobaltlegierungen / Wrought nickel-copper alloy		
	E 2	E 2.1 Nickel-/Kobaltlegierungen warmfest / Wrought nickel-copper alloy	≤ 705
		E 2.2 Nickel/Kobaltlegierungen hochwarmfest / Wrought nickel-chrome alloy	≤ 1420
		E 2.3 Nickel/Kobaltlegierungen hochwarmfest / Wrought nickel-chrome alloy	≤ 2030
Gußeisen Cast Irons	Grau- Hart- und Temperguß / Grey and hard cast iron		
	F 1	F 1.1 Grauguß GG 20 / Grey cast iron	< 333 HB
		F 1.2 Grauguß GG 30 / Grey cast iron	< 333 HB
		F 1.3 Hartguß / Hard cast iron	≤ 416 HB
		F 1.4 Temperguß / Malleable cast iron, decarbonized annealed	≤ 705
		F 1.5 Temperguß / Malleable cast iron, non-decarbonized annealed	≤ 705
	Gußeisen / Cast Iron		
	F 2	F 2.1 Gußeisen mit Kugelgraphit / Nodular graphite iron	≤ 400
		F 2.2 Gußeisen mit Kugelgraphit / Nodular graphite iron	≤ 1125
		F 2.3 Gußeisen mit Vermikulargraphit / Cast iron with vermicular	< 333 HB
		F 2.4 Gußeisen mit Vermikulargraphit / Cast iron with vermicular	< 333 HB
Graphit Graphite	Graphit / Graphite		
	G 1	G 1.1 Graphit / Graphite	≤ 255
	Wolfram/Kupferlegierungen / Tungsten-copper alloys		
	G 2	G 2.1 Wolfram-Kupfer Legierungen / Tungsten-copper alloys	≤ 255 HV 10

Eine detaillierte Aufstellung über gebräuchliche Kunststoffe finden Sie in der Werkzeug Gruppe 2-4 - Fräswerkzeuge für Kunststoff / Detailed description of plastic materials to be worked is available under section 2-4 - End Mills for composite materials.
 ■ gut geeignet / Suggested ▲ mit Beschichtung gut geeignet / Suggested with coating



Werkstückwerkstoffe / Materials

Werkstoff Bezeichnung Material designation	Werkstoff Nummer Material Number	Festigkeit N/mm² Strength N/mm²	Frässtifte / Rotary burs					
			1 - Aluminium 1 - Aluminium	2 - Grob 2 - Course	3 - Mittel / Standard 3 - Medium	4 - Diamant 4 - Diamond	5 - Fein 5 - Fine	6 - Kreuzverzahnt 6 - Double cut
G-AlMg3	3.3541	130 - 190						
Al 99.5 / F13	3.0255	100 - 250						
GDAISI17Cu4		180 - 250		■				
GD-AlSi12	3.2582	220 - 300		■				
GD-AlSi9Cu3	3.2163	240 - 320		■				
AlCuMg1 / F39	3.1325	300 - 500	■	■				
MMC		600 - 1400	▲	■				
E-Cu	2.0060	220 - 350	■	■				
GCuSn5ZnPb / Rg5	2.1096	150 - 350	■	■				
GCuSn7ZnPb / Rg7	2.1090	150 - 350	■	■				
CuZn40 / Ms60	2.0360	340 - 500	■	■				
CuZn39Pb2 / Ms58	2.0380	350 - 500	■	■				
CuZn37 / Ms63	2.0321	300 - 550	■	■				
CuAl10Ni	2.0966	500 - 800	■	■				
Ampco 16		630	▲	▲	■			■
Ampco 20		600	▲	▲	■			■
MgAl6	3.5662	300 - 500	▲	▲	■			■
GMgAl9Zn1	3.5912	300 - 500	▲	▲	■			■
AFK-CFK-GFK			■					■
			■					■
			■					■
			▲					■
			■	■		■		
			▲	■		■		■
			■	■		■		
Q-St-37-3	1.0123	< 400		■	■	■	■	■
R-Fe80	1.1014	< 400		■	■	■	■	■
9SMnPb28	1.0718	500 - 700		■	■	■	■	■
St37-2	1.0037	320 - 470		■	■	■	■	■
16MnCr5	1.7131	500 - 700		■	■	■	■	■
Ck45	1.1191	600 - 800		■	■	■	■	■
Gs25CrMo4	1.7218	650 - 950		■	■	■	■	■
St70-2	1.0070	700 - 900		■	■	■	■	■
100Cr6	1.3505	700 - 900			■	■	■	■
X155CrVMo12-1	1.2379	900 - 1100			■	■	■	■
X30WCrV5-3	1.2567	1100			■	■	■	■
42CrMo4V	1.7225	1200 - 1400			■	■	■	■
X38CrMoV5-3	1.2367	900 - 1100			■	■	■	■
55NiCrMoV6	1.2713	47 - 52 HRC			■	■	■	■
45WCrV7	1.2542	56 - 60 HRC			■	■	■	■
X155CrVMo12-1	1.2379	60 - 63 HRC			■	■	■	■
X210CrW12	1.2436	63 - 66 HRC			■	■	■	■
FeroTiC		800 - 900			■	■	■	■
Hardox500		1300 - 1400			■	■	■	■
X10NiCrAlTi32-20 (INCO.800)	1.4876	610 - 850		▲	▲	■		■
X12CrNiTi18-9	1.4878	500 - 700		▲	▲	■		■
X6CrNiMoTi17-12-2	1.4571	500 - 730		▲	▲	■		■
X45SiCr4	1.4704	900 - 1100		▲	▲	■		■
X5NiCrTi26-15	1.4980	1200		▲	▲	■		■
Ti3 (Ti99.4)	3.7055	700		▲				
TiAl6V4	3.7164	700 - 900		▲				
TiAlMo4Sn2	3.7185	900 - 1250		▲				
NiCu30Fe (MONEL400)	2.4360	420 - 610		▲	▲	■		■
NiCr19NbMo (INCONEL718)	2.4668	850-1200		▲	▲	■		■
Haynes 25 (L605)		1550 - 2000		▲	▲	■		■
GG 20	0.6020	120-220 HB			■	■		■
GG 30	0.6030	220 - 270 HB			■	■		■
GTW40	0.8040	360 - 420			■	■		■
GTS65	0.8165	560 - 650			■	■		■
GGG 40	0.7040	400		■	■	■		■
GGG 70	0.7070	700 - 1050		■	■	■		■
GGV (80% Perlit)		220 HB		■	■	■		■
GGV (100% Perlit)		230 HB		■	■	■		■
C-800		60		▲	▲	■		■
W-Cu 80/20		230-250 HV	▲	▲	▲			■

Eine detaillierte Aufstellung über gebräuchliche Kunststoffe finden Sie in der Werkzeug Gruppe 2-4 - Fräswerkzeuge für Kunststoff / Detailed description of plastic materials to be worked is available under section 2-4 - End Mills for composite materials.

■ gut geeignet / Suggested ▲ mit Beschichtung gut geeignet / Suggested with coating

01



WERKZEUG - GRUPPE 1 TOOL - GROUP 1

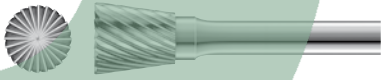
STANDARD ROTIERFRÄSER - FRÄSSTIFTE / STANDARD ROTARY BURS

Form Shape	Schaftabmessungen Shank dimensions	Ident - Nr. Code	Seite Page	
ZYA	Ø 2,35 mm	20	17	
Ohne	Ø 3,00 mm	40	17	
Stirnverzahnung	Standard / Standard	30	17	
Cylindrical	Schaftlänge / Shank length 100 mm	30-100	31	
without end cut	Schaftlänge / Shank length 150 mm	30-150	33	
	Schaftlänge / Shank length 300 mm	30-300	35	
ZYA/ST	Ø 2,35 mm	20-ST	18	
Mit	Ø 3,00 mm	40-ST	18	
Stirnverzahnung	Standard / Standard	30-ST	18	
Cylindrical	Schaftlänge / Shank length 100 mm	30-ST100	31	
with end cut	Schaftlänge / Shank length 150 mm	30-ST150	33	
	Schaftlänge / Shank length 300 mm	30-ST300	35	
WRC	Ø 2,35 mm	21	19	
Walzenrund	Ø 3,00 mm	41	19	
Cylindrical	Standard / Standard	31	19	
radius end	Schaftlänge / Shank length 100 mm	31-100	31	
	Schaftlänge / Shank length 150 mm	31-150	33	
	Schaftlänge / Shank length 300 mm	31-300	35	
KEL	Ø 2,35 mm	22	20	
Rundbogen	Ø 3,00 mm	42	20	
Taper radius	Standard / Standard	32	20	
end	Schaftlänge / Shank length 100 mm	32-100	31	
	Schaftlänge / Shank length 150 mm	32-150	33	
	Schaftlänge / Shank length 300 mm	32-300	35	
RBF	Ø 2,35 mm	23	21	
Rundbogen	Ø 3,00 mm	43	21	
Tree with	Standard / Standard	33	21	
radius end	Schaftlänge / Shank length 100 mm	33-100	32	
	Schaftlänge / Shank length 150 mm	33-150	34	
	Schaftlänge / Shank length 300 mm	33-300	36	
SPG	Ø 2,35 mm	24	22	
Spitzbogen	Ø 3,00 mm	44	22	
Tree with	Standard / Standard	34	22	
pointed end	Schaftlänge / Shank length 100 mm	34-100	32	
	Schaftlänge / Shank length 150 mm	34-150	34	
	Schaftlänge / Shank length 300 mm	34-300	36	
SKM	Ø 2,35 mm	25	23	
Spitzkegel	Ø 3,00 mm	45	23	
Conical	Standard / Standard	35	23	
KSK-90°	Ø 3,00 mm	46-90°	24	
Kegel	Standard / Standard	36-90°	24	
90° Conical				

01



STANDARD ROTIERFRÄSER - FRÄSSTIFTE / STANDARD ROTARY BURS

Form Shape	Schaftabmessungen Shank dimensions	Ident - Nr. Code	Seite Page	
KSJ-60° Kegel 60° Conical	Ø 3,00 mm	46-60°	25	
	Standard / Standard	36-60°	25	
TRE Tropfen Oval	Ø 2,35 mm	27	26	
	Ø 3,00 mm	47	26	
	Standard / Standard	37	26	
	Schaftlänge / Shank length 100 mm	37-100	32	
	Schaftlänge / Shank length 150 mm	37-150	34	
KUD Kugel Ball	Ø 2,35 mm	28	27	
	Ø 3,00 mm	48	27	
	Standard / Standard	38	27	
	Schaftlänge / Shank length 100 mm	38-100	32	
	Schaftlänge / Shank length 150 mm	38-150	34	
WKN Winkel ohne Stirnverzahnung Inverted cone without end cut	Ø 3,00 mm	49	28	
	Standard / Standard	39	28	
WKN/ST Winkel mit Stirnverzahnung Inverted cone with end cut	Ø 3,00 mm	49-ST	29	
	Standard / Standard	39-ST	29	

SÄTZE & ZUBEHÖR / SETS & ACCESSORIES

		Ident - Nr. Code	Seite Page	
Sätze Sets	Nr. 10	10	30	
	Nr. 11	11	30	
	Nr. 12	12	30	
Druckluftschleifer Air grinding unit	Nr. 13	13	30	

01



MATRIZENFRÄSER - WN / MOULD, TOOL AND DIE MAKING ROTARY BURS - INTERNAL STANDARD

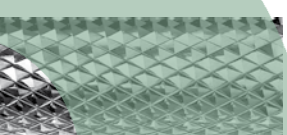
Form Shape	Schaftabmessungen Shank dimensions	Ident - Nr. Code	Seite Page	
Zylinder Cylindrical	Zahnung 4 Cut type	40ST-4	37-38	
Zylinder Cylindrical	Zahnung 6 Cut type	40ST-6	37-38	

SPEZIAL ROTIERFRÄSER - WN / SPECIAL ROTARY BURS - INTERNAL STANDARD

Form Shape	Schaftabmessungen Shank dimensions	Ident - Nr. Code	Seite Page	
Glasnuten- Fräser Groove cutters	WN - 6,00 mm Internal standard	114-90°	39	
Scheiben- Radiusfräser Radius groove cutters	WN - 6,00 mm Internal standard 6,00 mm	115	40	
Scheiben- Zylinderfräser Disc cutters	WN - 6,00 mm Internal standard 6,00 mm	116	40	



Schnittgeschwindigkeiten (Richtwerte) für Cerin Frässtifte Cutting speeds (approximative values) for Cerin rotary burs

Werkstoff Material	VHM V _c (m/min)	Cer-T V _c (m/min)	Zahnung Cut type	
< 400 N/mm ²	800 - 1000	800 - 1000	Zahnung 1	
< 705 N/mm ²	600 - 800	800 - 1000	Cut type 1	
Titan Titanlegierungen	max n = 2000 (min ⁻¹)			①
< 400 N/mm ²	650 - 800	650 - 1000	Zahnung 2	
< 850 N/mm ²	500 - 650	600 - 800	Cut type 2	
Titan Titanlegierungen	max n = 2000 (min ⁻¹)			②
< 705 N/mm ²	500 - 650	600 - 800	Zahnung 3	
< 1125 N/mm ²	400 - 500	400 - 600	Cut type 3	
< 46 HRC	200 - 450	300 - 500		
Titan Titanlegierungen	max n = 2000 (min ⁻¹)			
< 850 N/mm ²	450 - 650	500 - 750	Zahnung 4	
< 1125 N/mm ²	350 - 500	400 - 600	Cut type 4	
< 46 HRC	250 - 350	250 - 500		
< 418 HB	200 - 350	300 - 450		
Titan Titanlegierungen	max n = 2000 (min ⁻¹)			④
< 1125 N/mm ²	350 - 600	400 - 600	Zahnung 5	
< 1450 N/mm ²	250 - 300	250 - 400	Cut type 5	
< 2050 N/mm ²	150 - 250	150 - 300		
< 66HRC	150 - 300	200 - 400		
Titan Titanlegierungen	max n = 2000 (min ⁻¹)			⑤
< 705 N/mm ²	500 - 650	600 - 800	Zahnung 6	
< 1125 N/mm ²	300 - 500	400 - 600	Cut type 6	
< 46 HRC	200 - 450	300 - 500		
Titan Titanlegierungen	max n = 2000 (min ⁻¹)			⑥

* Achtung! Titan und Titanlegierungen max. n = 2000 (min⁻¹) * Attention! Titanium and Titanium alloys max. n = 2000 (min⁻¹)

Schnittgeschwindigkeiten V_c (m/min) - Drehzahlen n (min⁻¹) Cutting speeds V_c (m/min) - Revolution per minute n (min⁻¹)

Berechnungsformeln: Schnittgeschwindigkeit V_c (m/min) - Drehzahl n (min⁻¹)
Formula: cutting speed V_c (m/min) - Revolution per minute n (min⁻¹)

$$V_c \text{ (m/min)} = \frac{\varnothing D_c \text{ (mm)} \times 3,14 \times n \text{ (min}^{-1}\text{)}}{1000}$$

$$n \text{ (min}^{-1}\text{)} = \frac{V_c \text{ (m/min)} \times 1000}{\varnothing D_c \text{ (mm)} \times 3,14}$$

V _c (m/min)	D _c (mm)									
	2,35	3,00	4,00	5,00	6,00	8,00	10,00	12,00	16,00	20,00
	Drehzahl n (min ⁻¹) / Revolution per minute n (min ⁻¹)									
100	13550	10616	7962	6369	5308	3981	3185	2654	1990	1592
150	20325	15924	11943	9554	7962	5971	4777	3981	2986	2389
200	27100	21231	15924	12739	10616	7962	6369	5308	3981	3185
250	33875	26539	19904	15924	13270	9952	7962	6635	4976	3981
300	40650	31847	23885	19108	15924	11943	9554	7962	5971	4777
350	47425	37155	27866	22293	18577	13933	11146	9289	6967	5573
400	54201	42463	31847	25478	21231	15924	12739	10616	7962	6369
500	67751	53079	39809	31847	26539	19904	15924	13270	9952	7962
600	81301	63694	47771	38217	31847	23885	19108	15924	11943	9554
700	94851	74310	55732	44586	37155	27866	22293	18577	13933	11146
800	108401	84926	63694	50955	42463	31847	25478	21231	15924	12739
900	121951	95541	71656	57325	47771	35828	28662	23885	17914	14331
1000	135501	106157	79618	63694	53079	39809	31847	26539	19904	15924

* Achtung! Titan und Titanlegierungen max. n = 2000 (min⁻¹) * Attention! Titanium and Titanium alloys max. n = 2000 (min⁻¹)



Verzahnungen bei Cerin Frässtiften

Cut types of Cerin rotary burs

Zahnung 1 - Aluminium

Cut type 1 - Aluminium



Besonders geeignet für Aluminium, Magnesium, Kunststoffe, Hartholz und Hartgummi.

Gute Schnittleistung und hohe Materialabtragung. Die besondere Auslegung der Zahn- und Nutengeometrie erleichtert die Spanabfuhr und verhindert damit das Zusetzen des Werkzeuges.

Particularly suitable for working on aluminium, magnesium, plastic, and hard rubber. Gives high cutter efficiency, with good removal of material. The specific features of this type of cut facilitate rapid removal of chips preventing these from clogging the tool.

Zahnung 2 - Grob

Cut type 2 - Course



Diese Verzahnung liegt zwischen der Ausführung 1 und 3. Sie eignet sich besonders für Leichtmetalle, Bronze, Messing, Zinn, Zink, Kupfer und andere, leicht zu bearbeitende Werkstoffe. Für langspanige Werkstoffe sollte diese Verzahnung mit Spanbrechernuten eingesetzt werden.

This type of cut is intermediate between cut 1 and cut 3 and, it is recommended for soft materials, bronze, brass, tin, zinc, copper and other easily removable materials. For long chipping material this cut should be used with chip breaker.

Zahnung 3 - Mittel / Standard

Cut type 3 - Medium



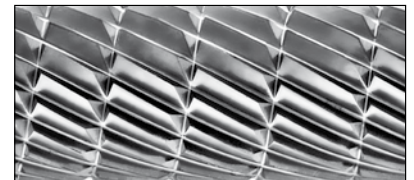
Die Standardverzahnung eignet sich für Stahl bis ca 56 HRC, Gußstahl, Stahllegierungen, Schweißnähte und fast alle metallischen Werkstoffe. Mit diesem Werkzeug werden optimale Schnittleistungen und gute Oberflächen erzielt.

Standard cut. Suitable for steel (including tempered) cast steel, weld seams, and in general almost all metallic materials.

To gether with optimum efficiency, it gives a good surface finish.

Spanbrechernuten

Chip breaker



Geeignet für langspanende Werkstoffe, um kurze Späne zu erzeugen. Alle Werkzeuge mit den Verzahnungen 1-2-3-und 5 können auf Wunsch mit Spanbrechernuten zu einem geringen Aufpreis geliefert werden.

This can be executed on all single cut file cutters. Use is recommended for working of materials which produce long chips. Upon request, Cerin rotary burs with cut type 1-2-3 and 5 can be supplied with chip breaker with a small additional price.

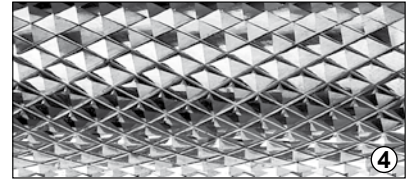


Verzahnungen bei Cerin Frässtiften und Rotierfräsern

Cut types of Cerin rotary burs

Zahnung 4 - Diamant

Cut type 4 - Diamond

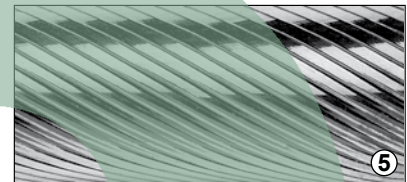


Geeignet für Grauguß, hochlegierte- rostfreie- CrNi- und Mangan-Stähle. Durch die besondere geometrische Verzahnung werden Kurz- und Kleinspäne erzeugt. Damit erfolgt eine gute Spanabfuhr und bessere Leistung als beim Standardwerkzeug.

Recommended for high alloy steel, stainless steel, magnesium alloys, grey cast iron and CrNi steels. Its particular geometry allows considerable material penetration with a removal capacity greater than the standard cut. It avoids the formation of true proper chips pulverising the removed material and thus avoiding the associated disadvantage for the operator during working.

Zahnung 5 - Fein

Cut type 5 - Fine



Durch die Feilverzahnung können gehärtete Stähle bis 66 HRC bearbeitet werden. Es wird eine sehr gute Oberflächengüte erzielt.

Fine cut. Particularly suitable for tempered steel up to 66 HRC and for obtaining high surface finish.

Zahnung 6 - Kreuzverzahnt

Cut type 6 - Double cut

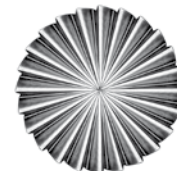


Mit dieser Universalverzahnung können fast alle Metallwerkstoffe, auch gehärtete und korrosionsbeständige Stähle, weitestgehend vibrationsarm bearbeitet werden. Es wird eine beachtliche Schnittleistung mit guter Oberflächengüte erreicht.

Universal cut suitable for working on almost metallic materials, including tempered steels and corrosion resistant material. Reduces vibration and gives a better control of the cutter during working. Considerable removal capacity with good surface finish.

Stirnverzahnung

Frontal teeth



Damit kann auch frontal Material abgetragen werden.

Cerin Frässtifte - Bestell Nummer 30ST und 39ST haben eine Stirnverzahnung.

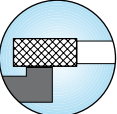
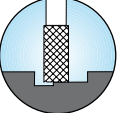
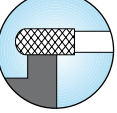
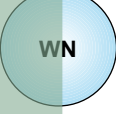
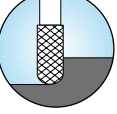
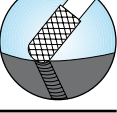
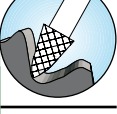
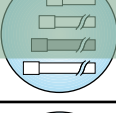
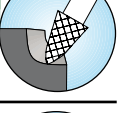
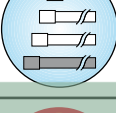
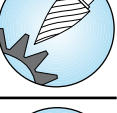
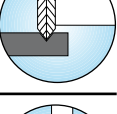
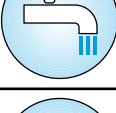
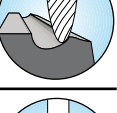
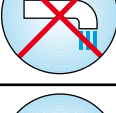
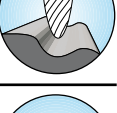
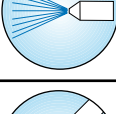
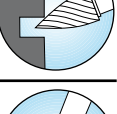
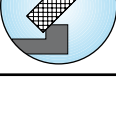
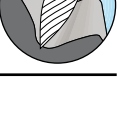
Cerin rotary burs type 30 and 39 can be supplied with end cut upon request.

Used if frontal material has to be removed.



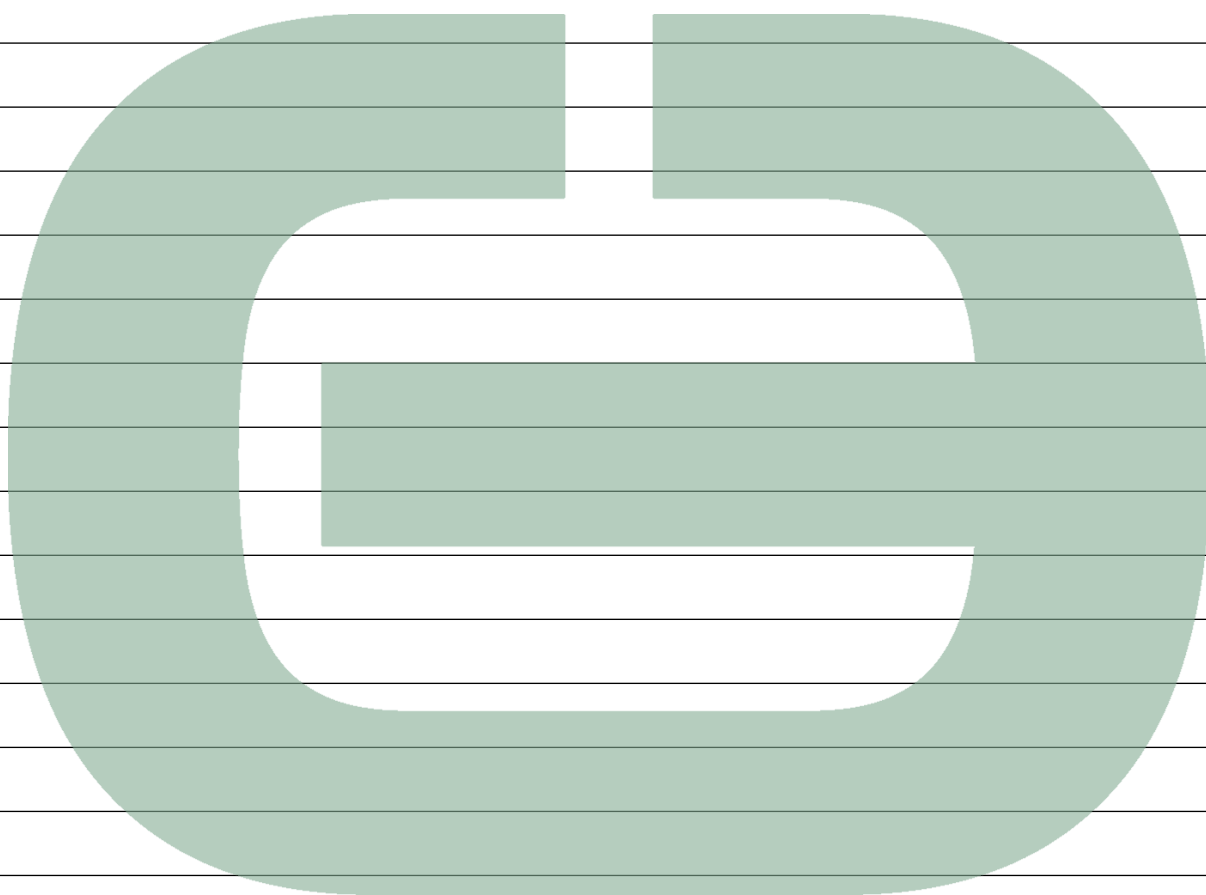
PIKTOGRAMME (SYMBOLS) ERKLÄRUNG ICONS (SYMBOLS) DESCRIPTION

01

Hartmetall Qualität Carbide grade		Bearbeitungsbeispiel Application example	
Hartmetall Qualität Carbide grade		Bearbeitungsbeispiel Application example	
Baumaße ähnlich DIN 8033 Dimensions similar to DIN 8033		Bearbeitungsbeispiel Application example	
Werksnorm (WN) Internal standard (WN)		Bearbeitungsbeispiel Application example	
Werkzeug - Länge Tool length		Bearbeitungsbeispiel Application example	
Werkzeug - Länge Tool length		Bearbeitungsbeispiel Application example	
Werkzeug - Länge Tool length		Bearbeitungsbeispiel Application example	
Werkzeug - Länge Tool length		Bearbeitungsbeispiel Application example	
Achtung! Reduzierte Schnittgeschwindigkeit Attention! Reduced cutting speed		Bearbeitungsbeispiel Application example	
mit Emulsion With emulsion		Bearbeitungsbeispiel Application example	
Trockenbearbeitung Dry machining		Bearbeitungsbeispiel Application example	
mit Luft With compressed air		Bearbeitungsbeispiel Application example	
Bearbeitungsbeispiel Application example		Bearbeitungsbeispiel Application example	

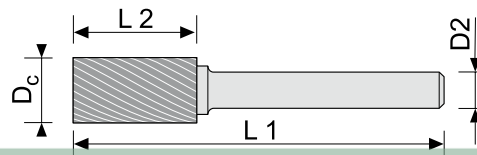


01



Form ZYA - ohne Stirnverzahnung Shape ZYA - Cylindrical without end cut

Auf Anfrage auch mit Cer-T Beschichtung lieferbar
Cer-T coating upon request



HM
CK 30 M
Medium

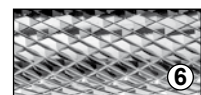
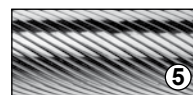
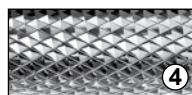
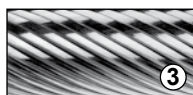
Sim. to
DIN
8033



Dc	L2	L1	D2	Zahnung / Cut type						20	40	30
				1	2	3	4	5	6			
1,5	8	40	2,35	-	•	•	•	•	•	2015/...		
2,35	12	40	2,35	-	•	•	•	•	•	2020/...		
4	10	45	2,35	-	•	•	•	•	•	2043/...		
5	12	47	2,35	-	•	•	•	•	•	2053/...		
6	13	48	2,35	-	•	•	•	•	•	2063/...		
1,5	8	40	3,00	-	•	•	•	•	•		4015/...	
2	10	40	3,00	-	•	•	•	•	•		4020/...	
2,5	12	40	3,00	-	•	•	•	•	•		4025/...	
3	13	40	3,00	-	•	•	•	•	•		4033/...	
4	10	45	3,00	-	•	•	•	•	•		4043/...	
5	12	47	3,00	-	•	•	•	•	•		4053/...	
6	13	48	3,00	-	•	•	•	•	•		4063/...	
4	13	50	6,00	•	•	•	•	•	•			300406/...
6	16	50	6,00	•	•	•	•	•	•			300606/...
8	20	65	6,00	•	•	•	•	•	•			300806/...
10	20	65	6,00	•	•	•	•	•	•			301006/...
12	25	70	6,00	•	•	•	•	•	•			301206/...
16	25	70	6,00	•	•	•	•	•	•			301606/...
16	25	70	8,00	•	•	•	•	•	•			301608/...
20	25	70	6,00	•	•	•	•	•	•			302006/...
20	25	70	8,00	•	•	•	•	•	•			302008/...

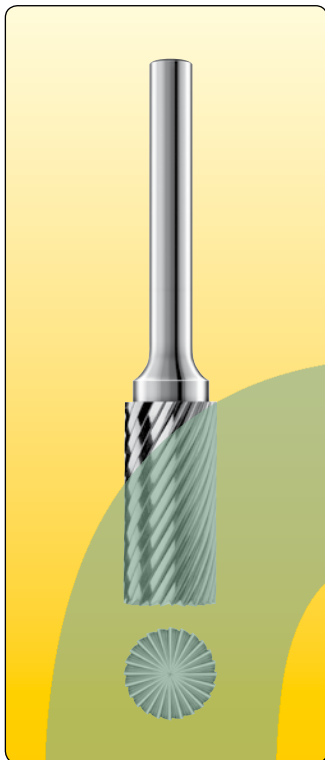
... Zahnung immer mit angeben (zum Beispiel: 2015/4)

... Please always indicate cut type (example: 2015/4)

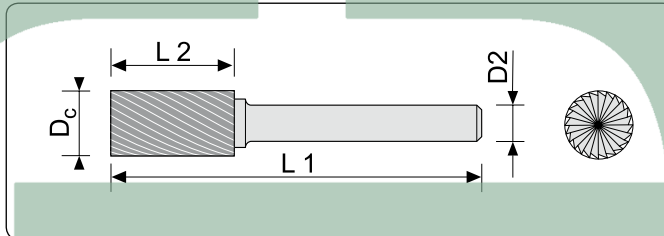


Form ZYA/ST - mit Stirnverzahnung Shape ZYA/ST - Cylindrical with end cut

1.
01



Auf Anfrage auch mit Cer-T Beschichtung lieferbar
Cer-T coating upon request



HM
CK 30 M
Medium

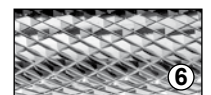
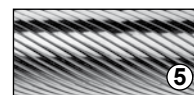
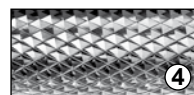
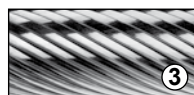
Sim. to
DIN
8033



D _c	L2	L1	D2	Zahnung / Cut type						20-ST	40-ST	30-ST
				1	2	3	4	5	6			
1,5	8	40	2,35	-	●	●	●	●	●	2015/...ST		
2,35	12	40	2,35	-	●	●	●	●	●	2020/...ST		
4	10	45	2,35	-	●	●	●	●	●	2043/...ST		
5	12	47	2,35	-	●	●	●	●	●	2053/...ST		
6	13	48	2,35	-	●	●	●	●	●	2063/...ST		
1,5	8	40	3,00	-	●	●	●	●	●		4015/...ST	
2	10	40	3,00	-	●	●	●	●	●		4020/...ST	
2,5	12	40	3,00	-	●	●	●	●	●		4025/...ST	
3	13	40	3,00	-	●	●	●	●	●		4033/...ST	
4	10	45	3,00	-	●	●	●	●	●		4043/...ST	
5	12	47	3,00	-	●	●	●	●	●		4053/...ST	
6	13	48	3,00	-	●	●	●	●	●		4063/...ST	
4	13	50	6,00	●	●	●	●	●	●			300406/...ST
6	16	50	6,00	●	●	●	●	●	●			300606/...ST
8	20	65	6,00	●	●	●	●	●	●			300806/...ST
10	20	65	6,00	●	●	●	●	●	●			301006/...ST
12	25	70	6,00	●	●	●	●	●	●			301206/...ST
16	25	70	6,00	●	●	●	●	●	●			301606/...ST
16	25	70	8,00	●	●	●	●	●	●			301608/...ST
20	25	70	6,00	●	●	●	●	●	●			302006/...ST
20	25	70	8,00	●	●	●	●	●	●			302008/...ST

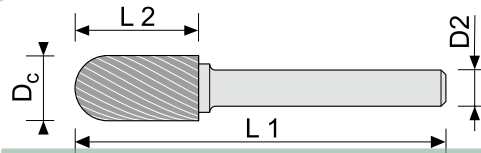
... Zahnung immer mit angeben (zum Beispiel: 2015/4)

... Please always indicate cut type (example: 2015/4)



Form WRC - Walzenrund Shape WRC - Cylindrical radius end

Auf Anfrage auch mit Cer-T Beschichtung lieferbar
Cer-T coating upon request



HM
CK 30 M
Medium

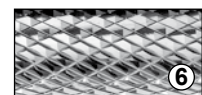
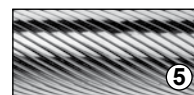
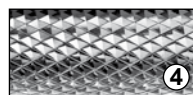
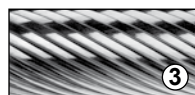
Sim. to
DIN
8033



D _c	L ₂	L ₁	D ₂	Zahnung / Cut type						21	41	31
				1	2	3	4	5	6			
1,5	8	40	2,35	-	•	•	•	•	•	2115/...		
2,35	12	40	2,35	-	•	•	•	•	•	2120/...		
4	10	45	2,35	-	•	•	•	•	•	2143/...		
5	12	47	2,35	-	•	•	•	•	•	2153/...		
6	13	48	2,35	-	•	•	•	•	•	2163/...		
1,5	8	40	3,00	-	•	•	•	•	•		4115/...	
2	10	40	3,00	-	•	•	•	•	•		4120/...	
2,5	12	40	3,00	-	•	•	•	•	•		4125/...	
3	13	40	3,00	-	•	•	•	•	•		4133/...	
4	10	45	3,00	-	•	•	•	•	•		4143/...	
5	12	47	3,00	-	•	•	•	•	•		4153/...	
6	13	48	3,00	-	•	•	•	•	•		4163/...	
4	13	50	6,00	•	•	•	•	•	•			310406/...
6	16	50	6,00	•	•	•	•	•	•			310606/...
8	20	65	6,00	•	•	•	•	•	•			310806/...
10	20	65	6,00	•	•	•	•	•	•			311006/...
12	25	70	6,00	•	•	•	•	•	•			311206/...
16	25	70	6,00	•	•	•	•	•	•			311606/...
16	25	70	8,00	•	•	•	•	•	•			311608/...
20	25	70	6,00	•	•	•	•	•	•			312006/...
20	25	70	8,00	•	•	•	•	•	•			312008/...

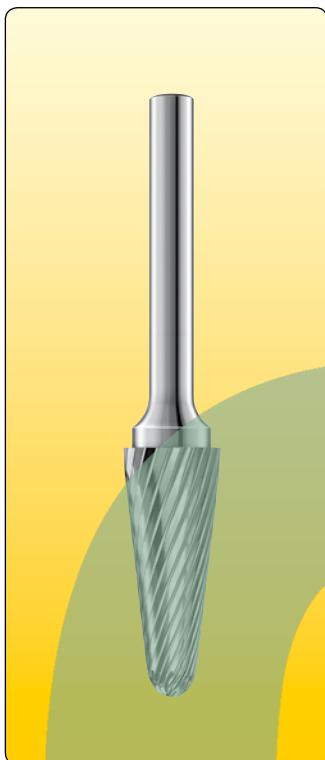
... Zahnung immer mit angeben (zum Beispiel: 2015/4)

... Please always indicate cut type (example: 2015/4)

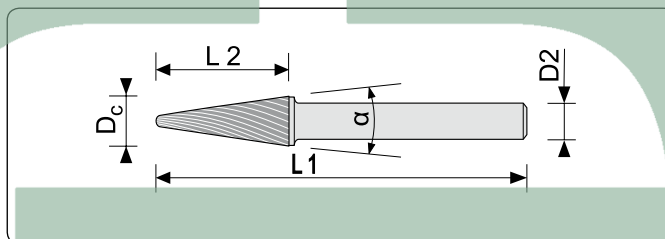


Form KEL - Rundbogen Shape KEL - Taper radius end

1.
01



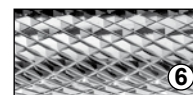
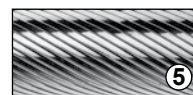
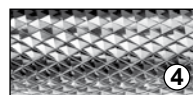
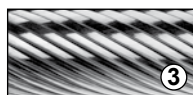
Auf Anfrage auch mit Cer-T Beschichtung lieferbar
Cer-T coating upon request



D _c	L2	L1	D2	R	α	Zahnung / Cut type						22	42	32
						1	2	3	4	5	6			
2,35	12	40	2,35	1	4°	-	●	●	●	●	●	2220/...		
4	14	49	2,35	1	10°	-	●	●	●	●	●	2243/...		
5	16	51	2,35	1,5	10°	-	●	●	●	●	●	2253/...		
6	20	55	2,35	1,5	10°	-	●	●	●	●	●	2263/...		
3	14	40	3,00	1	6°	-	●	●	●	●	●		4233/...	
4	14	49	3,00	1	10°	-	●	●	●	●	●		4243/...	
5	16	51	3,00	1,5	10°	-	●	●	●	●	●		4253/...	
6	20	55	3,00	1,5	10°	-	●	●	●	●	●		4263/...	
4	14	50	6,00	1	10°	●	●	●	●	●	●			320406/...
6	20	50	6,00	1,5	10°	●	●	●	●	●	●			320606/...
8	20	65	6,00	1,5	14°	●	●	●	●	●	●			320806/...
10	20	65	6,00	2,9	14°	●	●	●	●	●	●			321006/...
12	30	75	6,00	2,6	14°	●	●	●	●	●	●			321206/...
16	30	75	6,00	4,8	14°	●	●	●	●	●	●			321606/...
16	30	75	8,00	4,8	14°	●	●	●	●	●	●			321608/...
20	42	87	6,00	5,9	14°	●	●	●	●	●	●			322006/...
20	42	87	8,00	5,9	14°	●	●	●	●	●	●			322008/...

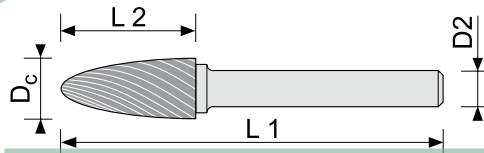
... Zahnung immer mit angeben (zum Beispiel: 2015/4)

... Please always indicate cut type (example: 2015/4)



Form RBF - Rundbogen Shape RBF - Tree with radius end

Auf Anfrage auch mit Cer-T Beschichtung lieferbar
Cer-T coating upon request



HM
CK 30 M
Medium

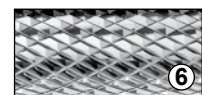
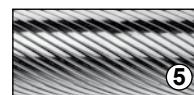
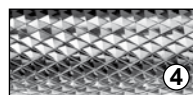
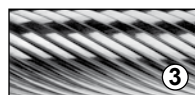
Sim. to
DIN
8033



D _c	L2	L1	D2	R~	Zahnung / Cut type						23	43	33
					1	2	3	4	5	6			
2,35	12	40	2,35	0,5	-	●	●	●	●	●	2320/...		
4	10	45	2,35	1	-	●	●	●	●	●	2343/...		
5	12	47	2,35	1,2	-	●	●	●	●	●	2353/...		
6	13	48	2,35	1,5	-	●	●	●	●	●	2363/...		
3	13	40	3,00	0,8	-	●	●	●	●	●		4333/...	
4	10	45	3,00	1	-	●	●	●	●	●		4343/...	
5	12	47	3,00	1,2	-	●	●	●	●	●		4353/...	
6	13	48	3,00	1,4	-	●	●	●	●	●		4363/...	
4	14	50	6,00	1	●	●	●	●	●	●			330406/...
6	18	50	6,00	1,5	●	●	●	●	●	●			330606/...
8	20	65	6,00	1,8	●	●	●	●	●	●			330806/...
10	20	65	6,00	2,5	●	●	●	●	●	●			331006/...
12	25	70	6,00	2,5	●	●	●	●	●	●			331206/...
16	30	75	6,00	3,6	●	●	●	●	●	●			331606/...
16	30	75	8,00	3,6	●	●	●	●	●	●			331608/...
20	35	80	6,00	5	●	●	●	●	●	●			332006/...
20	35	80	8,00	5	●	●	●	●	●	●			332008/...

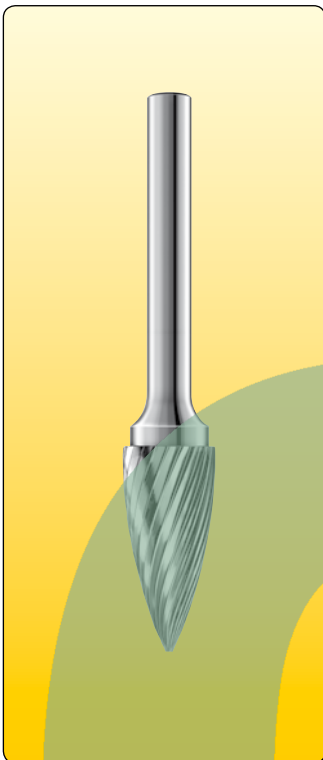
... Zahnung immer mit angeben (zum Beispiel: 2015/4)

... Please always indicate cut type (example: 2015/4)

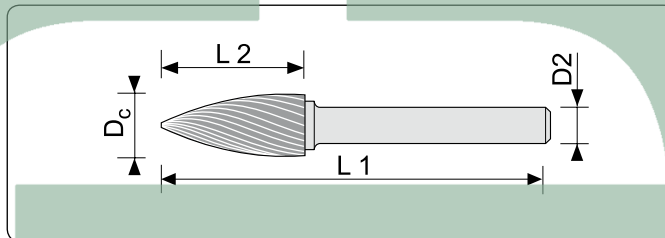


Form SPG - Spitzbogen Shape SPG - Tree with pointed end

1.
01



Auf Anfrage auch mit Cer-T Beschichtung lieferbar
Cer-T coating upon request



HM
CK 30 M
Medium

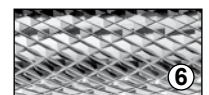
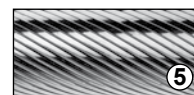
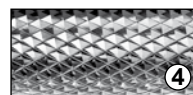
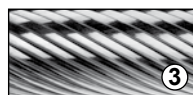
Sim. to
DIN
8033



D _c	L2	L1	D2	Zahnung / Cut type						24	44	34
				1	2	3	4	5	6			
2,35	12	40	2,35	-	●	●	●	●	●	2420/...		
4	10	45	2,35	-	●	●	●	●	●	2443/...		
5	12	47	2,35	-	●	●	●	●	●	2453/...		
6	13	48	2,35	-	●	●	●	●	●	2463/...		
3	13	40	3,00	-	●	●	●	●	●		4433/...	
4	10	45	3,00	-	●	●	●	●	●		4443/...	
5	12	47	3,00	-	●	●	●	●	●		4453/...	
6	13	48	3,00	-	●	●	●	●	●		4463/...	
4	14	50	6,00	●	●	●	●	●	●			340406/...
6	18	50	6,00	●	●	●	●	●	●			340606/...
8	20	65	6,00	●	●	●	●	●	●			340806/...
10	20	65	6,00	●	●	●	●	●	●			341006/...
12	25	70	6,00	●	●	●	●	●	●			341206/...
16	30	75	6,00	●	●	●	●	●	●			341606/...
16	30	75	8,00	●	●	●	●	●	●			341608/...
20	40	85	6,00	●	●	●	●	●	●			342006/...
20	40	85	8,00	●	●	●	●	●	●			342008/...

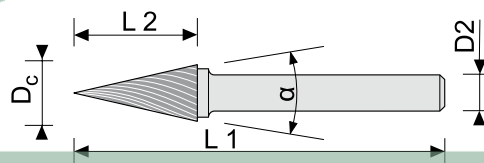
... Zahnung immer mit angeben (zum Beispiel: 2015/4)

... Please always indicate cut type (example: 2015/4)



Form SKM - Spitzkegel Shape SKM - Conical

Auf Anfrage auch mit Cer-T Beschichtung lieferbar
Cer-T coating upon request



HM
CK 30 M
Medium

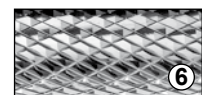
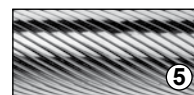
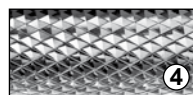
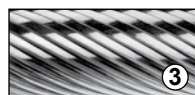
Sim. to
DIN
8033



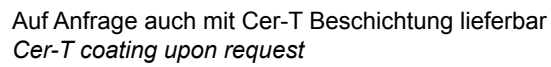
D _c	L2	L1	D2	Zahnung / Cut type						25	45	35
				1	2	3	4	5	6			
2,35	11	40	2,35	-	●	●	●	●	●	2520/...		
4	10	45	2,35	-	●	●	●	●	●	2543/...		
5	12	47	2,35	-	●	●	●	●	●	2553/...		
6	13	48	2,35	-	●	●	●	●	●	2563/...		
3	11	40	3,00	-	●	●	●	●	●		4533/...	
4	10	45	3,00	-	●	●	●	●	●		4543/...	
5	12	47	3,00	-	●	●	●	●	●		4553/...	
6	13	48	3,00	-	●	●	●	●	●		4563/...	
4	14	50	6,00	●	●	●	●	●	●			350406/...
6	18	50	6,00	●	●	●	●	●	●			350606/...
8	20	65	6,00	●	●	●	●	●	●			350806/...
10	20	65	6,00	●	●	●	●	●	●			351006/...
12	25	70	6,00	●	●	●	●	●	●			351206/...
16	25	70	6,00	●	●	●	●	●	●			351606/...
16	25	70	8,00	●	●	●	●	●	●			351608/...
20	24	69	6,00	●	●	●	●	●	●			352006/...
20	24	69	8,00	●	●	●	●	●	●			352008/...

... Zahnung immer mit angeben (zum Beispiel: 2015/4)

... Please always indicate cut type (example: 2015/4)



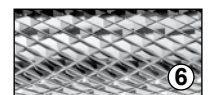
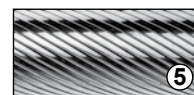
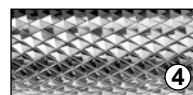
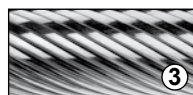
1.01



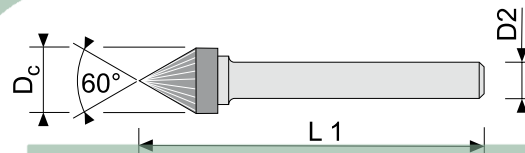
Sim. to
DIN
8033



- ... Zahnung immer mit angeben (zum Beispiel: 2015/4)
- ... *Please always indicate cut type (example: 2015/4)*



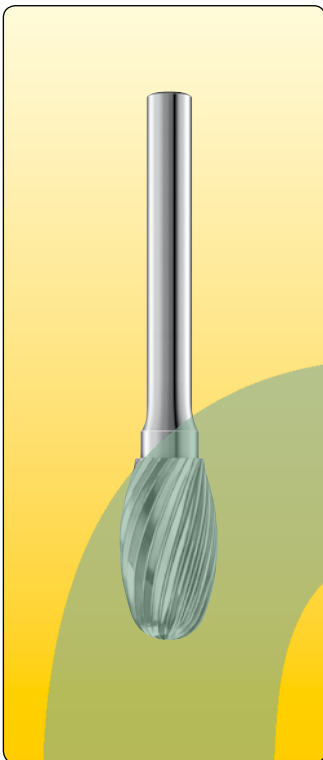
1.01



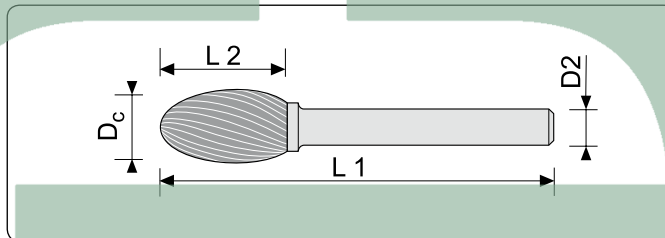
6

Form TRE - Tropfen Shape TRE - Oval

1.
01



Auf Anfrage auch mit Cer-T Beschichtung lieferbar
Cer-T coating upon request



HM
CK 30 M
Medium

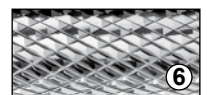
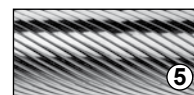
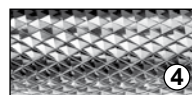
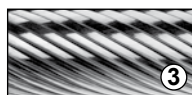
Sim. to
DIN
8033



D _c	L2	L1	D2	R	Zahnung / Cut type						27	47	37
					1	2	3	4	5	6			
1,5	2,5	40	2,35	0,64	-	●	●	●	●	●	2715/...		
2,35	4	40	2,35	1	-	●	●	●	●	●	2720/...		
4	7	42	2,35	1,5	-	●	●	●	●	●	2743/...		
5	8	43	2,35	2	-	●	●	●	●	●	2753/...		
6	10	45	2,35	2,8	-	●	●	●	●	●	2763/...		
3	7	40	3,00	1,2	-	●	●	●	●	●		4733/...	
4	7	42	3,00	1,5	-	●	●	●	●	●		4743/...	
5	8	43	3,00	2	-	●	●	●	●	●		4753/...	
6	10	45	3,00	2,8	-	●	●	●	●	●		4763/...	
4	7	50	6,00	1,5	●	●	●	●	●	●			370406/...
6	10	50	6,00	2,8	●	●	●	●	●	●			370606/...
8	13	58	6,00	3,7	●	●	●	●	●	●			370806/...
10	16	61	6,00	4	●	●	●	●	●	●			371006/...
12	20	65	6,00	5	●	●	●	●	●	●			371206/...
16	25	70	6,00	6,5	●	●	●	●	●	●			371606/...
16	25	70	8,00	6,5	●	●	●	●	●	●			371608/...
20	25	70	6,00	9	●	●	●	●	●	●			372006/...
20	25	70	8,00	9	●	●	●	●	●	●			372008/...

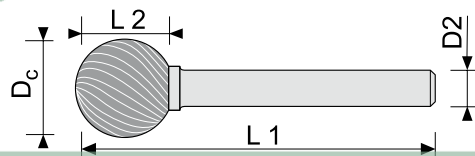
... Zahnung immer mit angeben (zum Beispiel: 2015/4)

... Please always indicate cut type (example: 2015/4)



Form KUD - Kugel Shape KUD - Ball

Auf Anfrage auch mit Cer-T Beschichtung lieferbar
Cer-T coating upon request



HM
CK 30 M
Medium

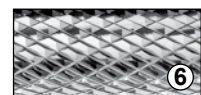
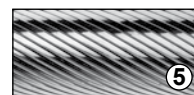
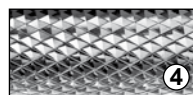
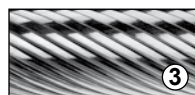
Sim. to
DIN
8033



Dc	L2	L1	D2	Zahnung / Cut type						28	48	38
				1	2	3	4	5	6			
1,5	1,35	40	2,35		●	●	●	●	●	2815/...		
2,35	2,1	40	2,35	-	●	●	●	●	●	2820/...		
4	3,6	38,5	2,35	-	●	●	●	●	●	2843/...		
5	4,5	39,5	2,35	-	●	●	●	●	●	2853/...		
6	5,4	40,4	2,35	-	●	●	●	●	●	2863/...		
1,5	1,35	40	3,00	-	●	●	●	●	●		4815/...	
2	1,8	40	3,00	-	●	●	●	●	●		4820/...	
2,5	2,2	40	3,00	-	●	●	●	●	●		4825/...	
3	2,7	40	3,00	-	●	●	●	●	●		4833/...	
4	3,6	38,5	3,00	-	●	●	●	●	●		4843/...	
5	4,5	39,5	3,00	-	●	●	●	●	●		4853/...	
6	5,4	40,4	3,00	-	●	●	●	●	●		4863/...	
4	3,6	50	6,00	●	●	●	●	●	●			380406/...
6	5	50	6,00	●	●	●	●	●	●			380606/...
8	7,2	52,2	6,00	●	●	●	●	●	●			380806/...
10	9	54	6,00	●	●	●	●	●	●			381006/...
12	10,8	55,8	6,00	●	●	●	●	●	●			381206/...
16	14,4	59,4	6,00	●	●	●	●	●	●			381606/...
16	14,4	59,4	8,00	●	●	●	●	●	●			381608/...
20	18	63	6,00	●	●	●	●	●	●			382006/...
20	18	63	8,00	●	●	●	●	●	●			382008/...

... Zahnung immer mit angeben (zum Beispiel: 2015/4)

... Please always indicate cut type (example: 2015/4)



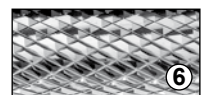
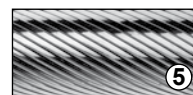
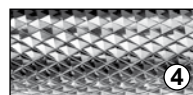
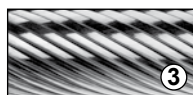
1.01



The diagram shows a tapered pin (Drehbolzen) with a tapered section of length L_2 and a cylindrical section of length L_1 . The diameter of the tapered section is D_c at the base and D_2 at the end. The taper angle is α .



- ... Zahnung immer mit angeben (zum Beispiel: 2015/4)
- ... Please always indicate cut type (example: 2015/4)



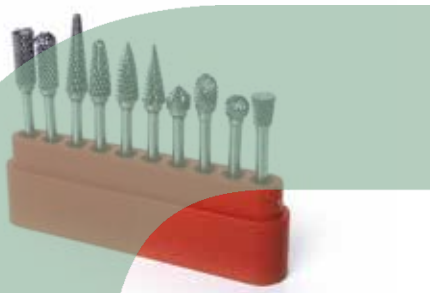
1.01



6

Sätze & Zubehör Sets & Accessories

Satz / Set	Nr. 10
	Satz Nr. 10 - bestehend aus: 4033 - 4133 - 4233 - 4333 - 4433 - 4533 - 4633 - 4733 - 4833 - 4933 Lieferbar in Zahnung Typ 3-4-5-6 <i>Set Nr. 10 - including:</i> 4033 - 4133 - 4233 - 4333 - 4433 - 4533 - 4633 - 4733 - 4833 - 4933 <i>Available in cut type 3-4-5-6</i>

Satz / Set	Nr. 11
	Satz Nr. 11 - bestehend aus: 4063 - 4163 - 4263 - 4363 - 4463 - 4563 - 4663 - 4763 - 4863 - 4963 Lieferbar in Zahnung Typ 2-3-4-5-6 <i>Set Nr. 11 - including:</i> 4063 - 4163 - 4263 - 4363 - 4463 - 4563 - 4663 - 4763 - 4863 - 4963 <i>Available in cut type 2-3-4-5-6</i>

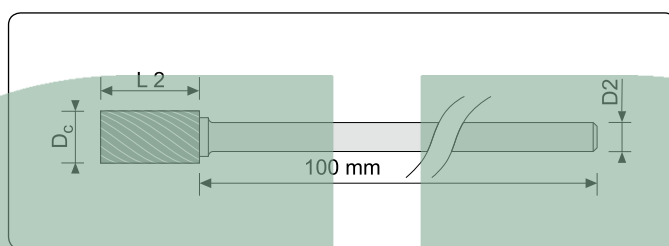
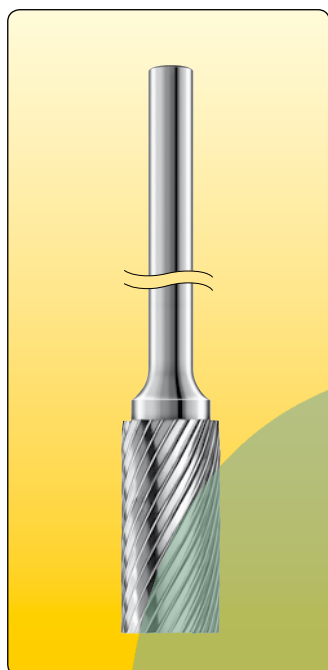
Satz / Set	Nr. 12
	Satz Nr. 12 - bestehend aus: 300606 - 310606 - 320606 - 330606 - 340606 - 350606 - 360606 - 370606 - 380606 - 390606 Lieferbar in Zahnung Typ 1-2-3-4-5-6 <i>Set Nr. 12 - including:</i> 300606 - 310606 - 320606 - 330606 - 340606 - 350606 - 360606 - 370606 - 380606 - 390606 <i>Available in cut type 1-2-3-4-5-6</i>

DRUCKLUFTSCHLEIFER Drehzahl: 24.000 min⁻¹ - Luftverbrauch: 250 l/min
AIR GRINDING UNIT 24.000 min⁻¹ - Air consumption: 250 l/min

Satz / Set	Nr. 13
	Satz Nr. 13 - bestehend aus: 301206/1 - 311206/2 - 321206/3 - 331206/4 - 341206/5 - 351206/3SP - 361206/3 - 371206/3 - 381206/6 - 391206/3 SMS 30 DC <i>Set Nr. 13 - including:</i> 301206/1 - 311206/2 - 321206/3 - 331206/4 - 341206/5 - 351206/3SP - 361206/3 - 371206/3 - 381206/6 - 391206/3 SMS 30 DC



Frässtifte - Schaftlänge 100 mm Rotary burs shank length 100 mm



HM
CK 30 M
Medium

WN

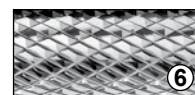
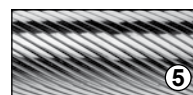
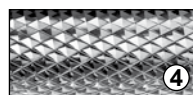
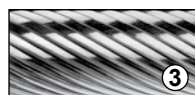


1.
02

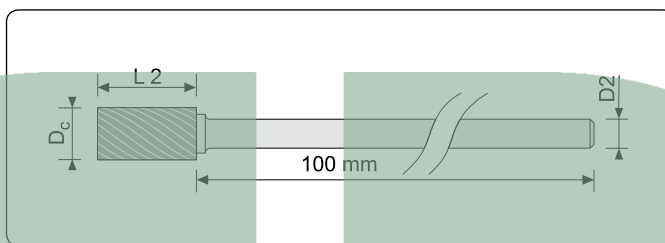
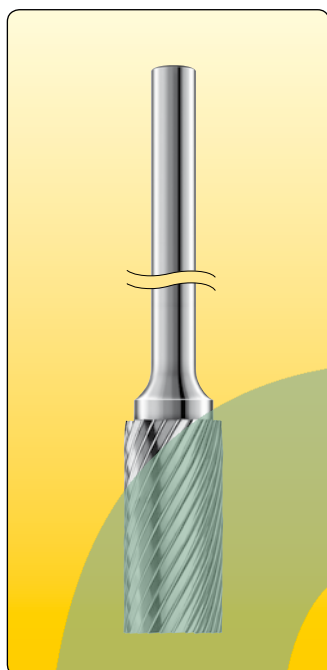
D _c	L2	D2	Zahnung / Cut type						Bestell - Nummer Order code	Ausführung Design
			1	2	3	4	5	6		
6	18	6	-	-	●	●	-	●	300606/...x100	Form - Shape ZYA 
8	20	6	-	-	●	●	-	●	300806/...x100	
10	20	6	-	-	●	●	-	●	301006/...x100	
12	25	6	-	-	●	●	-	●	301206/...x100	
16	25	6	-	-	●	●	-	●	301606/...x100	
16	25	8	-	-	●	●	-	●	301608/...x100	
20	25	6	-	-	●	●	-	●	302006/...x100	
20	25	8	-	-	●	●	-	●	302008/...x100	
6	18	6	-	-	●	●	-	●	300606/...STx100	Form - Shape ZYA-ST 
8	20	6	-	-	●	●	-	●	300806/...STx100	
10	20	6	-	-	●	●	-	●	301006/...STx100	
12	25	6	-	-	●	●	-	●	301206/...STx100	
16	25	6	-	-	●	●	-	●	301606/...STx100	
16	25	8	-	-	●	●	-	●	301608/...STx100	
20	25	6	-	-	●	●	-	●	302006/...STx100	
20	25	8	-	-	●	●	-	●	302008/...STx100	
6	18	6	-	-	●	●	-	●	310606/...x100	Form - Shape WRC 
8	20	6	-	-	●	●	-	●	310806/...x100	
10	20	6	-	-	●	●	-	●	311006/...x100	
12	25	6	-	-	●	●	-	●	311206/...x100	
16	25	6	-	-	●	●	-	●	311606/...x100	
16	25	8	-	-	●	●	-	●	311608/...x100	
20	25	6	-	-	●	●	-	●	312006/...x100	
20	25	8	-	-	●	●	-	●	312008/...x100	
6	20	6	-	-	●	●	-	●	320606/...x100	Form - Shape KEL-14° 
8	20	6	-	-	●	●	-	●	320806/...x100	
10	20	6	-	-	●	●	-	●	321006/...x100	
12	30	6	-	-	●	●	-	●	321206/...x100	
16	30	6	-	-	●	●	-	●	321606/...x100	
16	30	8	-	-	●	●	-	●	321608/...x100	
20	42	6	-	-	●	●	-	●	322006/...x100	
20	42	8	-	-	●	●	-	●	322008/...x100	

... Zahnung immer mit angeben (zum Beispiel: 2015/4)

... Please always indicate cut type (example: 2015/4)



Frässtifte - Schaftlänge 100 mm Rotary burs shank length 100 mm

1.
02

HM
CK 30 M
Medium

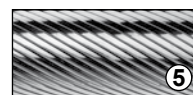
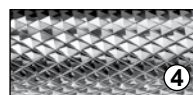
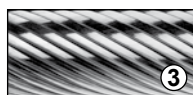
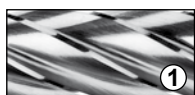
WN



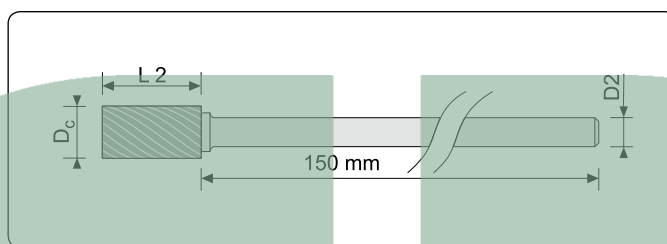
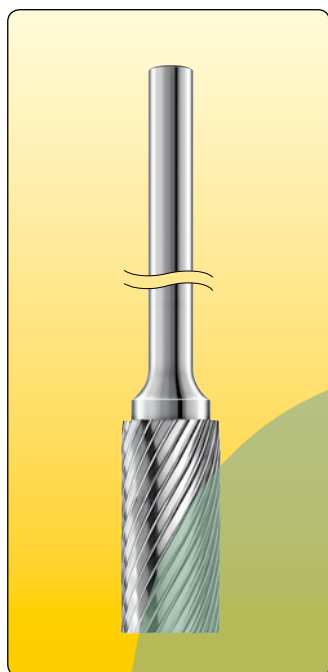
D _c	L2	D2	Zahnung / Cut type						Bestell - Nummer Order code	Ausführung Design	
			1	2	3	4	5	6			
6	18	6	-	-	•	•	-	•	330606/...x100	Form - Shape RBF	Ident. 33
8	20	6	-	-	•	•	-	•	330806/...x100		
10	20	6	-	-	•	•	-	•	331006/...x100		
12	25	6	-	-	•	•	-	•	331206/...x100		
16	30	6	-	-	•	•	-	•	331606/...x100		
16	30	8	-	-	•	•	-	•	331608/...x100		
20	35	6	-	-	•	•	-	•	332006/...x100		
20	35	8	-	-	•	•	-	•	332008/...x100		
6	18	6	-	-	•	•	-	•	340606/...x100	Form - Shape SPG	Ident. 34
8	20	6	-	-	•	•	-	•	340806/...x100		
10	20	6	-	-	•	•	-	•	341006/...x100		
12	25	6	-	-	•	•	-	•	341206/...x100		
16	30	6	-	-	•	•	-	•	341606/...x100		
16	30	8	-	-	•	•	-	•	341608/...x100		
20	40	6	-	-	•	•	-	•	342006/...x100		
20	40	8	-	-	•	•	-	•	342008/...x100		
6	20	6	-	-	•	•	-	•	370606/...x100	Form - Shape TRE	Ident. 37
8	13	6	-	-	•	•	-	•	370806/...x100		
10	16	6	-	-	•	•	-	•	371006/...x100		
12	20	6	-	-	•	•	-	•	371206/...x100		
16	25	6	-	-	•	•	-	•	371606/...x100		
16	25	8	-	-	•	•	-	•	371608/...x100		
20	25	6	-	-	•	•	-	•	372006/...x100		
20	25	8	-	-	•	•	-	•	372008/...x100		
6	5,4	6	-	-	•	•	-	•	380606/...x100	Form - Shape KUD	Ident. 38
8	7,2	6	-	-	•	•	-	•	380806/...x100		
10	9	6	-	-	•	•	-	•	381006/...x100		
12	10,8	6	-	-	•	•	-	•	381206/...x100		
16	14,4	6	-	-	•	•	-	•	381606/...x100		
16	14,4	8	-	-	•	•	-	•	381608/...x100		
20	18	6	-	-	•	•	-	•	382006/...x100		
20	18	8	-	-	•	•	-	•	382008/...x100		

... Zahnung immer mit angeben (zum Beispiel: 2015/4)

... Please always indicate cut type (example: 2015/4)



Frässtifte - Schaftlänge 150 mm Rotary burs shank length 150 mm



HM
CK 30 M
Medium

WN

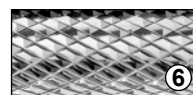
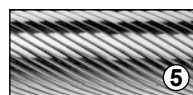
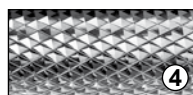
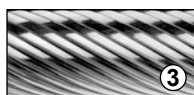


1.
02

D _c	L2	D2	Zahnung / Cut type						Bestell - Nummer Order code	Ausführung Design	
			1	2	3	4	5	6			
6	18	6	-	-	●	●	-	●	300606/...x150	Form - Shape ZYA	Ident. 30
8	20	6	-	-	●	●	-	●	300806/...x150		
10	20	6	-	-	●	●	-	●	301006/...x150		
12	25	6	-	-	●	●	-	●	301206/...x150		
16	25	6	-	-	●	●	-	●	301606/...x150		
16	25	8	-	-	●	●	-	●	301608/...x150		
20	25	6	-	-	●	●	-	●	302006/...x150		
20	25	8	-	-	●	●	-	●	302008/...x150		
6	18	6	-	-	●	●	-	●	300606/...STx150	Form - Shape ZYA-ST	Ident. 30-ST
8	20	6	-	-	●	●	-	●	300806/...STx150		
10	20	6	-	-	●	●	-	●	301006/...STx150		
12	25	6	-	-	●	●	-	●	301206/...STx150		
16	25	6	-	-	●	●	-	●	301606/...STx150		
16	25	8	-	-	●	●	-	●	301608/...STx150		
20	25	6	-	-	●	●	-	●	302006/...STx150		
20	25	8	-	-	●	●	-	●	302008/...STx150		
6	18	6	-	-	●	●	-	●	310606/...x150	Form - Shape WRC	Ident. 31
8	20	6	-	-	●	●	-	●	310806/...x150		
10	20	6	-	-	●	●	-	●	311006/...x150		
12	25	6	-	-	●	●	-	●	311206/...x150		
16	25	6	-	-	●	●	-	●	311606/...x150		
16	25	8	-	-	●	●	-	●	311608/...x150		
20	25	6	-	-	●	●	-	●	312006/...x150		
20	25	8	-	-	●	●	-	●	312008/...x150		
6	20	6	-	-	●	●	-	●	320606/...x150	Form - Shape KEL-14°	Ident. 32
8	20	6	-	-	●	●	-	●	320806/...x150		
10	20	6	-	-	●	●	-	●	321006/...x150		
12	30	6	-	-	●	●	-	●	321206/...x150		
16	30	6	-	-	●	●	-	●	321606/...x150		
16	30	8	-	-	●	●	-	●	321608/...x150		
20	42	6	-	-	●	●	-	●	322006/...x150		
20	42	8	-	-	●	●	-	●	322008/...x150		

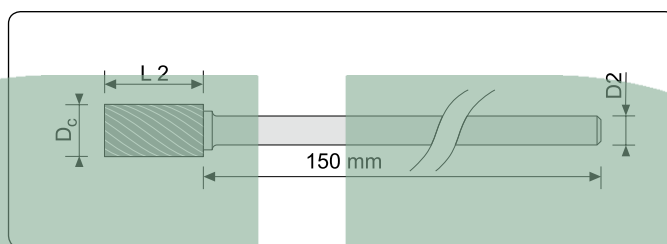
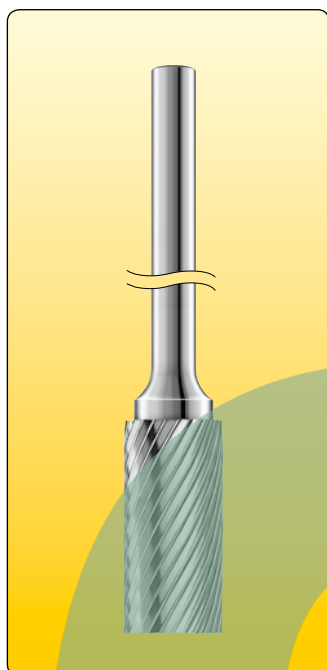
... Zahnung immer mit angeben (zum Beispiel: 2015/4)

... Please always indicate cut type (example: 2015/4)



Frässtifte - Schaftlänge 150 mm Rotary burs shank length 150 mm

1.
02



HM
CK 30 M
Medium

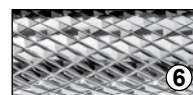
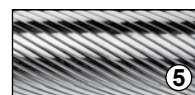
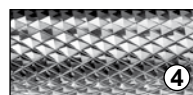
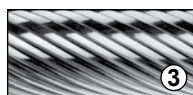
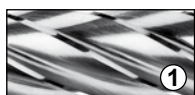
WN



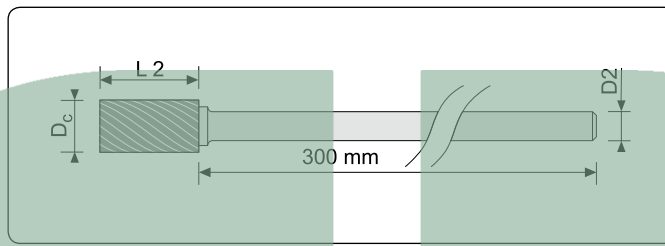
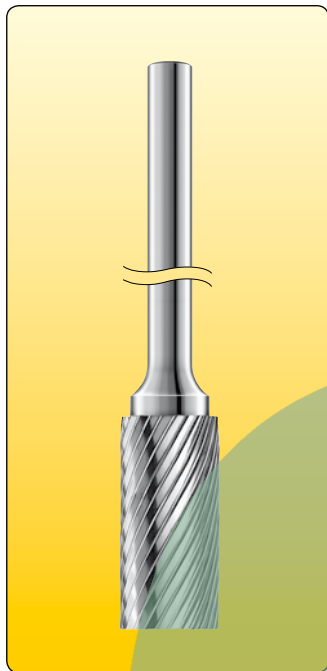
D _c	L2	D2	Zahnung / Cut type						Bestell - Nummer Order code	Ausführung Design	Ident.
			1	2	3	4	5	6			
6	18	6	-	-	●	●	-	●	330606/...x150	Form - Shape RBF	Ident. 33
8	20	6	-	-	●	●	-	●	330806/...x150		
10	20	6	-	-	●	●	-	●	331006/...x150		
12	25	6	-	-	●	●	-	●	331206/...x150		
16	30	6	-	-	●	●	-	●	331606/...x150		
16	30	8	-	-	●	●	-	●	331608/...x150		
20	35	6	-	-	●	●	-	●	332006/...x150		
20	35	8	-	-	●	●	-	●	332008/...x150		
6	18	6	-	-	●	●	-	●	344606/...x150	Form - Shape SPG	Ident. 34
8	20	6	-	-	●	●	-	●	344806/...x150		
10	20	6	-	-	●	●	-	●	341006/...x150		
12	25	6	-	-	●	●	-	●	341206/...x150		
16	30	6	-	-	●	●	-	●	341606/...x150		
16	30	8	-	-	●	●	-	●	341608/...x150		
20	40	6	-	-	●	●	-	●	342006/...x150		
20	40	8	-	-	●	●	-	●	342008/...x150		
6	20	6	-	-	●	●	-	●	370606/...x150	Form - Shape TRE	Ident. 37
8	13	6	-	-	●	●	-	●	370806/...x150		
10	16	6	-	-	●	●	-	●	371006/...x150		
12	20	6	-	-	●	●	-	●	371206/...x150		
16	25	6	-	-	●	●	-	●	371606/...x150		
16	25	8	-	-	●	●	-	●	371608/...x150		
20	25	6	-	-	●	●	-	●	372006/...x150		
20	25	8	-	-	●	●	-	●	372008/...x150		
6	5,4	6	-	-	●	●	-	●	380606/...x150	Form - Shape KUD	Ident. 38
8	7,2	6	-	-	●	●	-	●	380806/...x150		
10	9	6	-	-	●	●	-	●	381006/...x150		
12	10,8	6	-	-	●	●	-	●	381206/...x150		
16	14,4	6	-	-	●	●	-	●	381606/...x150		
16	14,4	8	-	-	●	●	-	●	381608/...x150		
20	18	6	-	-	●	●	-	●	382006/...x150		
20	18	8	-	-	●	●	-	●	382008/...x150		

... Zahnung immer mit angeben (zum Beispiel: 2015/4)

... Please always indicate cut type (example: 2015/4)



Frässtifte - Schaftlänge 300 mm Rotary burs shank length 300 mm



HM
CK 30 M
Medium

WN



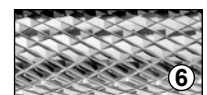
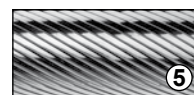
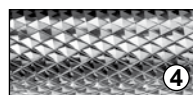
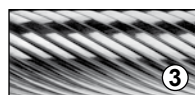
Vc
-30%

1.
02

D _c	L2	D2	Zahnung / Cut type						Bestell - Nummer Order code	Ausführung Design
			1	2	3	4	5	6		
6	18	6	-	-	●	●	-	●	300606/...x300	Form - Shape ZYA Ident. 30
8	20	6	-	-	●	●	-	●	300806/...x300	
10	20	6	-	-	●	●	-	●	301006/...x300	
12	25	6	-	-	●	●	-	●	301206/...x300	
16	25	6	-	-	●	●	-	●	301606/...x300	
16	25	8	-	-	●	●	-	●	301608/...x300	
20	25	6	-	-	●	●	-	●	302006/...x300	
20	25	8	-	-	●	●	-	●	302008/...x300	
6	18	6	-	-	●	●	-	●	300606/...STx300	Form - Shape ZYA-ST Ident. 30-ST
8	20	6	-	-	●	●	-	●	300806/...STx300	
10	20	6	-	-	●	●	-	●	301006/...STx300	
12	25	6	-	-	●	●	-	●	301206/...STx300	
16	25	6	-	-	●	●	-	●	301606/...STx300	
16	25	8	-	-	●	●	-	●	301608/...STx300	
20	25	6	-	-	●	●	-	●	302006/...STx300	
20	25	8	-	-	●	●	-	●	302008/...STx300	
6	18	6	-	-	●	●	-	●	310606/...x300	Form - Shape WRC Ident. 31
8	20	6	-	-	●	●	-	●	310806/...x300	
10	20	6	-	-	●	●	-	●	311006/...x300	
12	25	6	-	-	●	●	-	●	311206/...x300	
16	25	6	-	-	●	●	-	●	311606/...x300	
16	25	8	-	-	●	●	-	●	311608/...x300	
20	25	6	-	-	●	●	-	●	312006/...x300	
20	25	8	-	-	●	●	-	●	312008/...x300	
6	20	6	-	-	●	●	-	●	320606/...x300	Form - Shape KEL-14° Ident. 32
8	20	6	-	-	●	●	-	●	320806/...x300	
10	20	6	-	-	●	●	-	●	321006/...x300	
12	30	6	-	-	●	●	-	●	321206/...x300	
16	30	6	-	-	●	●	-	●	321606/...x300	
16	30	8	-	-	●	●	-	●	321608/...x300	
20	42	6	-	-	●	●	-	●	322006/...x300	
20	42	8	-	-	●	●	-	●	322008/...x300	

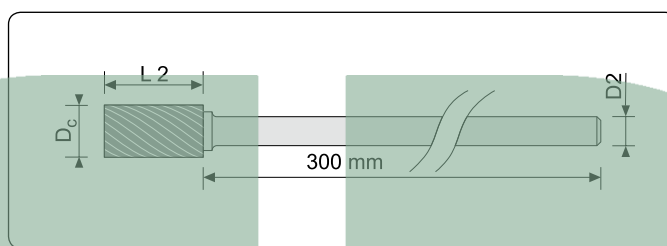
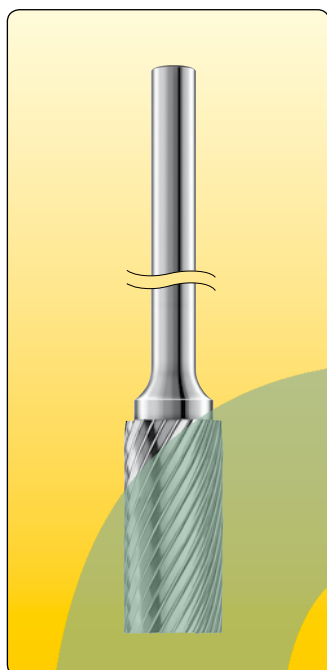
... Zahnung immer mit angeben (zum Beispiel: 2015/4)

... Please always indicate cut type (example: 2015/4)



Frässtifte - Schaftlänge 300 mm Rotary burs shank length 300 mm

1.
02



HM
CK 30 M
Medium

WN

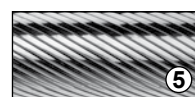
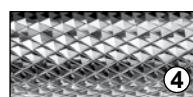


Vc
-30%

D _c	L2	D2	Zahnung / Cut type						Bestell - Nummer Order code	Ausführung Design	
			1	2	3	4	5	6			
6	18	6	-	-	•	•	-	•	330606/...x300	Form - Shape RBF	Ident. 33
8	20	6	-	-	•	•	-	•	330806/...x300		
10	20	6	-	-	•	•	-	•	331006/...x300		
12	25	6	-	-	•	•	-	•	331206/...x300		
16	30	6	-	-	•	•	-	•	331606/...x300		
16	30	8	-	-	•	•	-	•	331608/...x300		
20	35	6	-	-	•	•	-	•	332006/...x300	Form - Shape SPG	Ident. 34
20	35	8	-	-	•	•	-	•	332008/...x300		
6	18	6	-	-	•	•	-	•	340606/...x300		
8	20	6	-	-	•	•	-	•	340806/...x300		
10	20	6	-	-	•	•	-	•	341006/...x300		
12	25	6	-	-	•	•	-	•	341206/...x300		
16	30	6	-	-	•	•	-	•	341606/...x300	Form - Shape TRE	Ident. 37
16	30	8	-	-	•	•	-	•	341608/...x300		
20	40	6	-	-	•	•	-	•	342006/...x300		
20	40	8	-	-	•	•	-	•	342008/...x300		
6	20	6	-	-	•	•	-	•	370606/...x300		
8	13	6	-	-	•	•	-	•	370806/...x300	Form - Shape KUD	Ident. 38
10	16	6	-	-	•	•	-	•	371006/...x300		
12	20	6	-	-	•	•	-	•	371206/...x300		
16	25	6	-	-	•	•	-	•	371606/...x300		
16	25	8	-	-	•	•	-	•	371608/...x300		
20	25	6	-	-	•	•	-	•	372006/...x300		
20	25	8	-	-	•	•	-	•	372008/...x300	Form - Shape RBF	Ident. 33
6	5,4	6	-	-	•	•	-	•	380606/...x300		
8	7,2	6	-	-	•	•	-	•	380806/...x300		
10	9	6	-	-	•	•	-	•	381006/...x300		
12	10,8	6	-	-	•	•	-	•	381206/...x300		
16	14,4	6	-	-	•	•	-	•	381606/...x300		
16	14,4	8	-	-	•	•	-	•	381608/...x300	Form - Shape SPG	Ident. 34
20	18	6	-	-	•	•	-	•	382006/...x300		
20	18	8	-	-	•	•	-	•	382008/...x300	Form - Shape TRE	Ident. 37
6	5,4	6	-	-	•	•	-	•	380606/...x300		
8	7,2	6	-	-	•	•	-	•	380806/...x300	Form - Shape KUD	Ident. 38
10	9	6	-	-	•	•	-	•	381006/...x300		
12	10,8	6	-	-	•	•	-	•	381206/...x300	Form - Shape SPG	Ident. 34
16	14,4	6	-	-	•	•	-	•	381606/...x300		
16	14,4	8	-	-	•	•	-	•	381608/...x300	Form - Shape TRE	Ident. 37
20	18	6	-	-	•	•	-	•	382006/...x300		
20	18	8	-	-	•	•	-	•	382008/...x300	Form - Shape KUD	Ident. 38
6	5,4	6	-	-	•	•	-	•	380606/...x300		

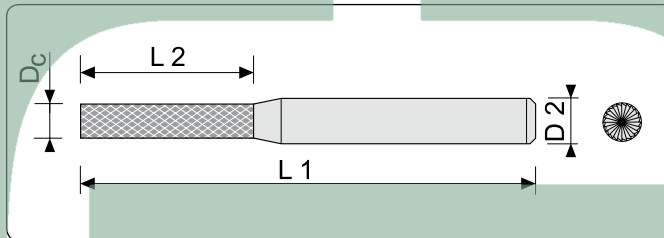
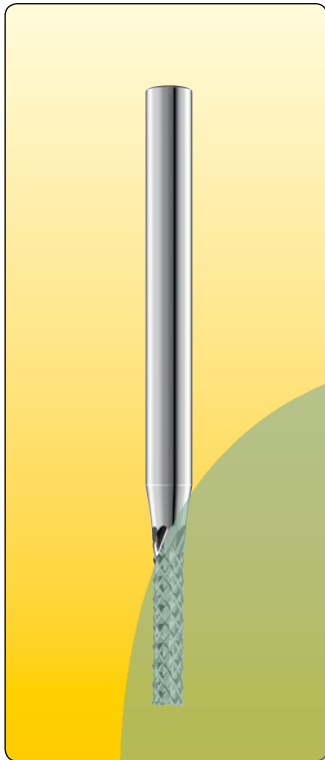
... Zahnung immer mit angeben (zum Beispiel: 2015/4)

... Please always indicate cut type (example: 2015/4)



Matrizenfrässtifte mit Stirnverzahnung Mould, tool and die making rotary burs with end cut

Auf Anfrage auch mit Cer-T Beschichtung lieferbar
Cer-T coating upon request



1.
03

HM
CK10-20-MG
Micrograin

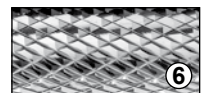
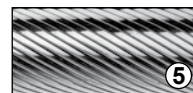
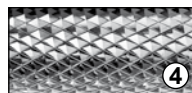
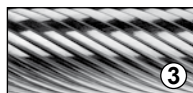
WN



D _c	L2	L1	D2	Zahnung / Cut type						Zahnung 4 Cut type 4	Zahnung 6 Cut type 6
				1	2	3	4	5	6		
1	6	50	3,00	-	-	-	●	-	●	4010/4STx050	4010/6STx050
1	6	65	3,00	-	-	-	●	-	●	4010/4STx065	4010/6STx065
1	6	70	3,00	-	-	-	●	-	●	4010/4STx070	4010/6STx070
1	6	80	3,00	-	-	-	●	-	●	4010/4STx080	4010/6STx080
1	6	90	3,00	-	-	-	●	-	●	4010/4STx090	4010/6STx090
1	6	100	3,00	-	-	-	●	-	●	4010/4STx100	4010/6STx100
1,5	8	50	3,00	-	-	-	●	-	●	4015/4STx050	4015/6STx050
1,5	8	65	3,00	-	-	-	●	-	●	4015/4STx065	4015/6STx065
1,5	8	70	3,00	-	-	-	●	-	●	4015/4STx070	4015/6STx070
1,5	8	80	3,00	-	-	-	●	-	●	4015/4STx080	4015/6STx080
1,5	8	90	3,00	-	-	-	●	-	●	4015/4STx090	4015/6STx090
1,5	8	100	3,00	-	-	-	●	-	●	4015/4STx100	4015/6STx100
2	10	50	3,00	-	-	-	●	-	●	4020/4STx050	4020/6STx050
2	10	65	3,00	-	-	-	●	-	●	4020/4STx065	4020/6STx065
2	10	70	3,00	-	-	-	●	-	●	4020/4STx070	4020/6STx070
2	10	80	3,00	-	-	-	●	-	●	4020/4STx080	4020/6STx080
2	10	90	3,00	-	-	-	●	-	●	4020/4STx090	4020/6STx090
2	10	100	3,00	-	-	-	●	-	●	4020/4STx100	4020/6STx100

... Zahnung immer mit angeben (zum Beispiel: 2015/4)

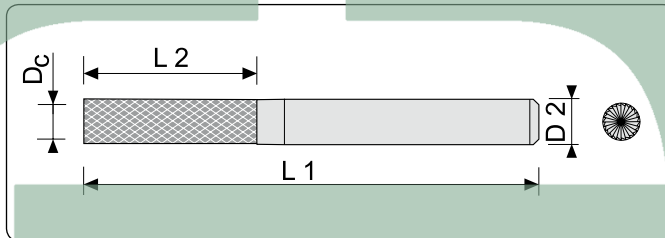
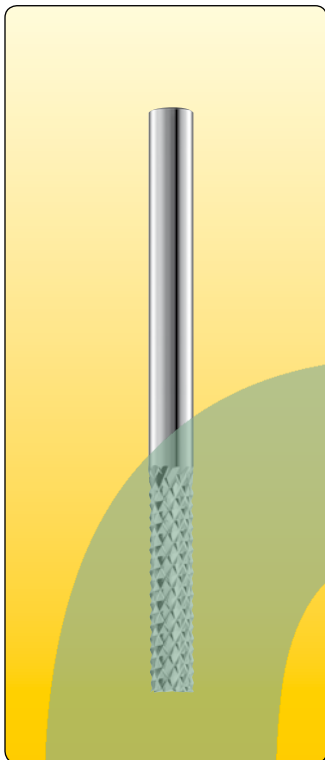
... Please always indicate cut type (example: 2015/4)



Matrizenfrässtifte mit Stirnverzahnung Mould, tool and die making rotary burs with end cut

Auf Anfrage auch mit Cer-T Beschichtung lieferbar
Cer-T coating upon request

1.
03



HM
CK10-20-MG
Micrograin

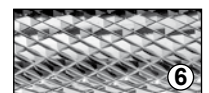
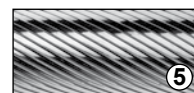
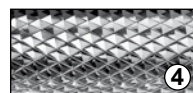
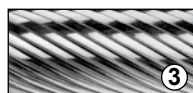
WN



Dc	L2	L1	D2	Zahnung / Cut type						Zahnung 4 Cut type 4	Zahnung 6 Cut type 6
				1	2	3	4	5	6		
2,5	12	50	3,00	-	-	-	●	-	●	4025/4STx050	4025/6STx050
2,5	12	65	3,00	-	-	-	●	-	●	4025/4STx065	4025/6STx065
2,5	12	70	3,00	-	-	-	●	-	●	4025/4STx070	4025/6STx070
2,5	12	80	3,00	-	-	-	●	-	●	4025/4STx080	4025/6STx080
2,5	12	90	3,00	-	-	-	●	-	●	4025/4STx090	4025/6STx090
2,5	12	100	3,00	-	-	-	●	-	●	4025/4STx100	4025/6STx100
3	14	50	3,00	-	-	-	●	-	●	4033/4STx050	4033/6STx050
3	14	65	3,00	-	-	-	●	-	●	4033/4STx065	4033/6STx065
3	14	70	3,00	-	-	-	●	-	●	4033/4STx070	4033/6STx070
3	14	80	3,00	-	-	-	●	-	●	4033/4STx080	4033/6STx080
3	14	90	3,00	-	-	-	●	-	●	4033/4STx090	4033/6STx090
3	14	100	3,00	-	-	-	●	-	●	4033/4STx100	4033/6STx100

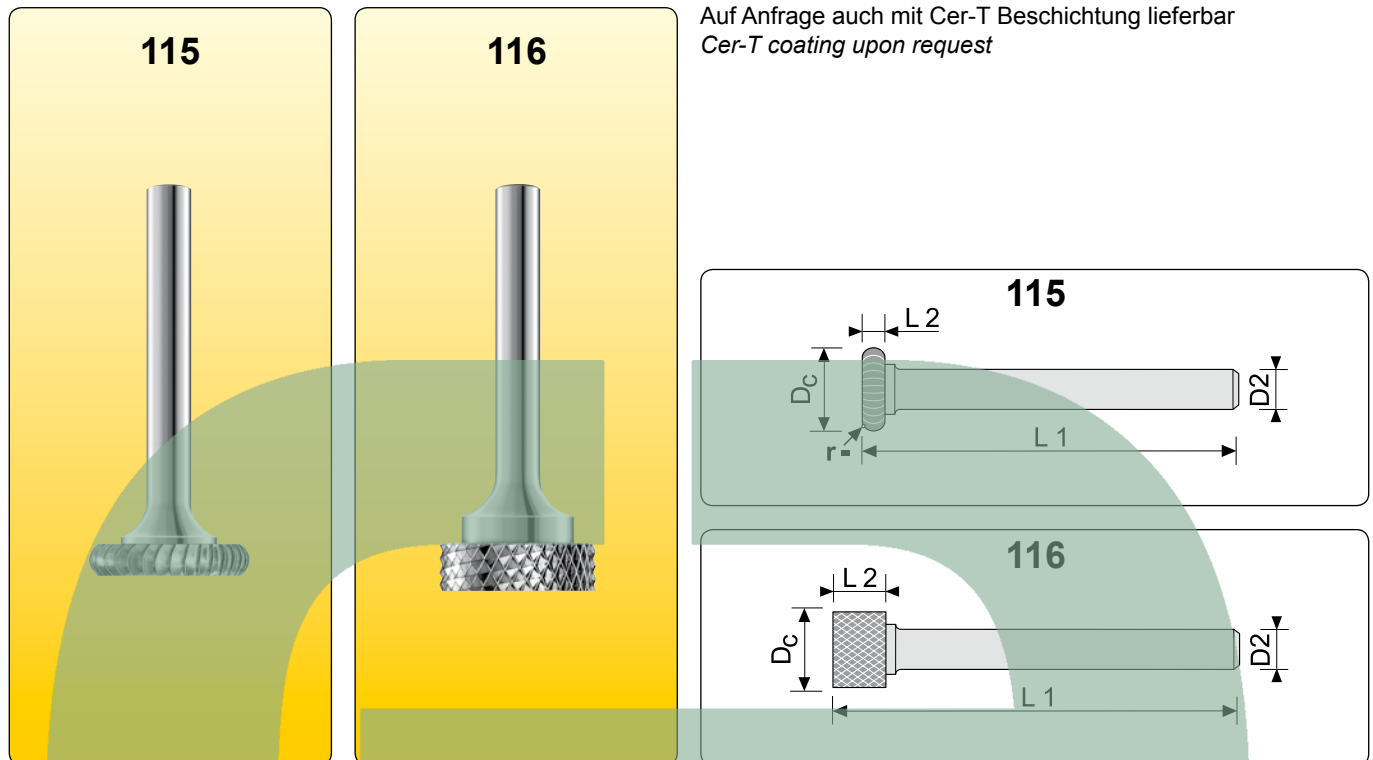
... Zahnung immer mit angeben (zum Beispiel: 2015/4)

... Please always indicate cut type (example: 2015/4)

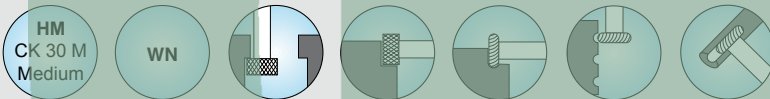


Scheibenfräser abgerundet und zylindrisch
Disc cutters straight or with radius

Auf Anfrage auch mit Cer-T Beschichtung lieferbar
 Cer-T coating upon request

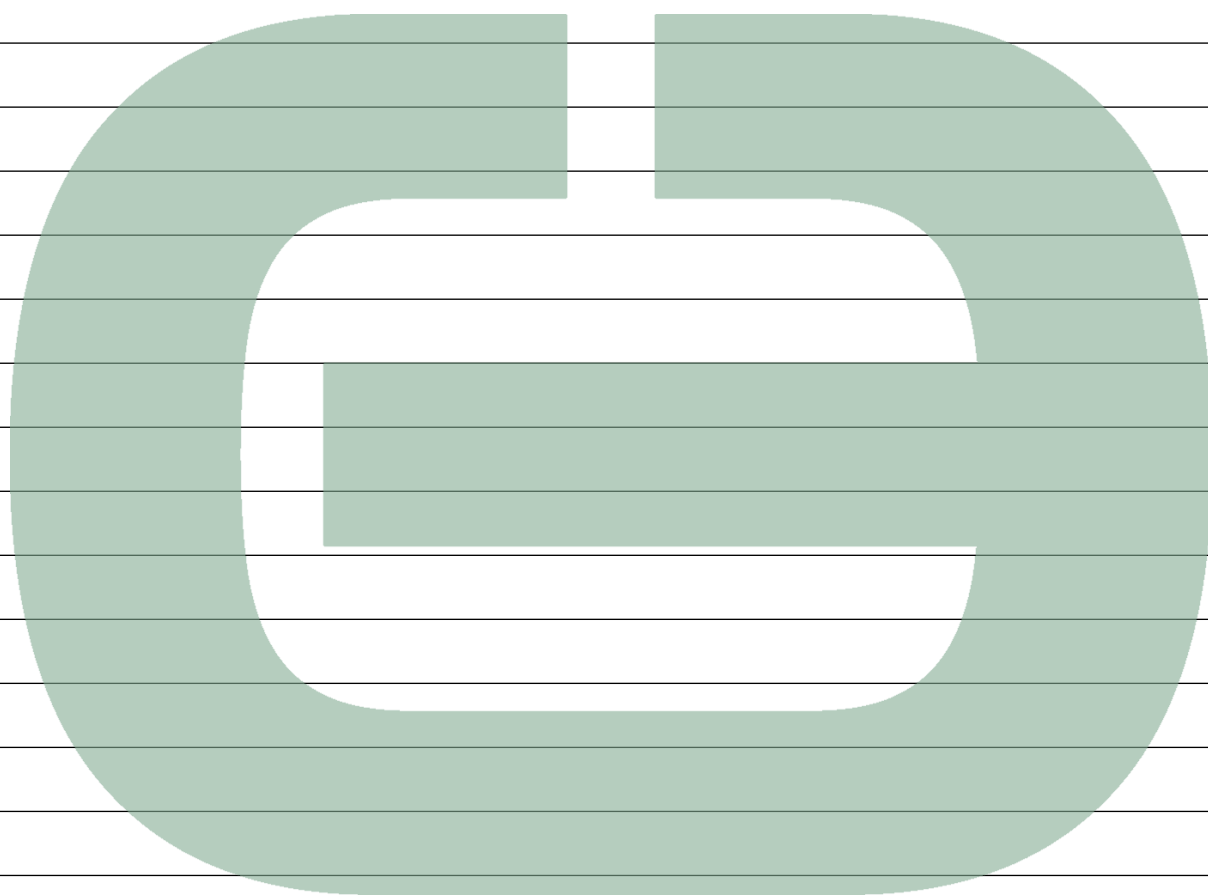


**1.
04**

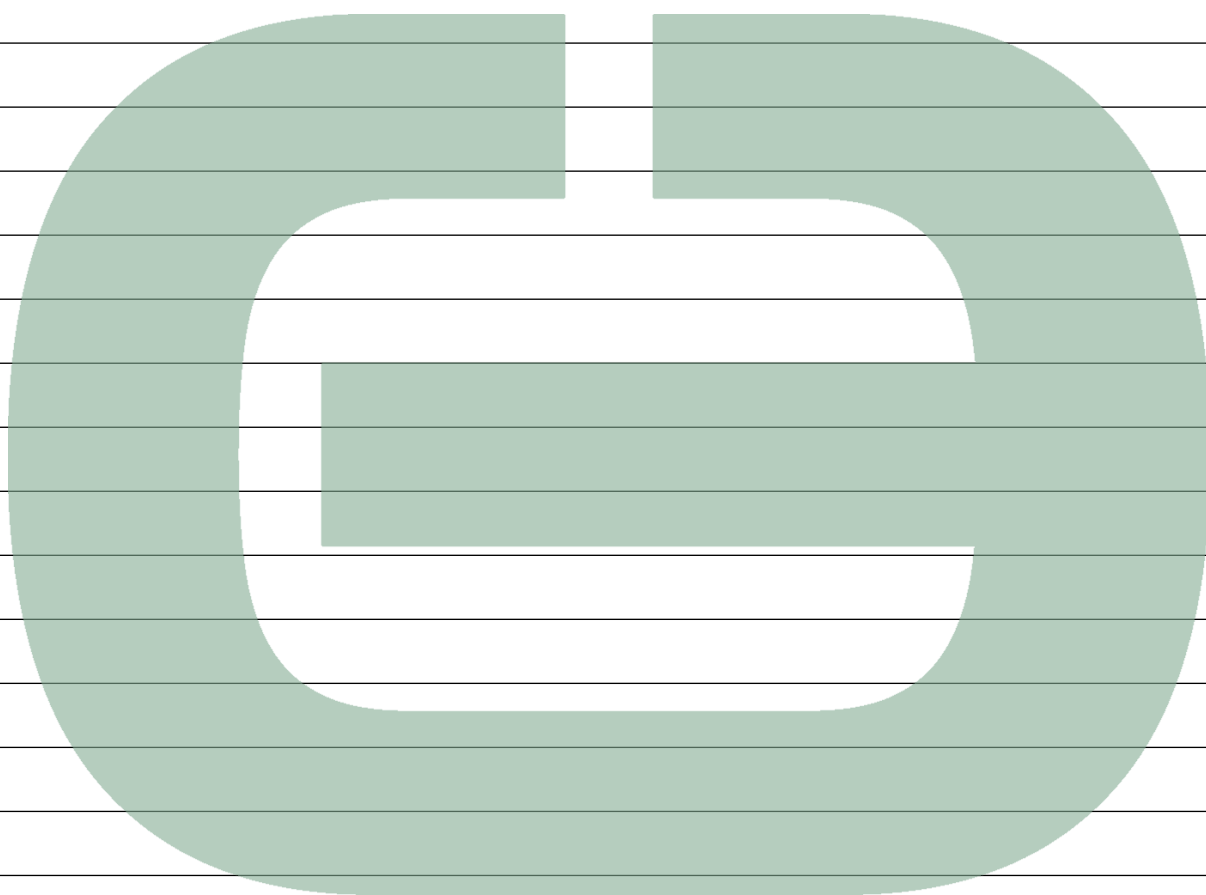


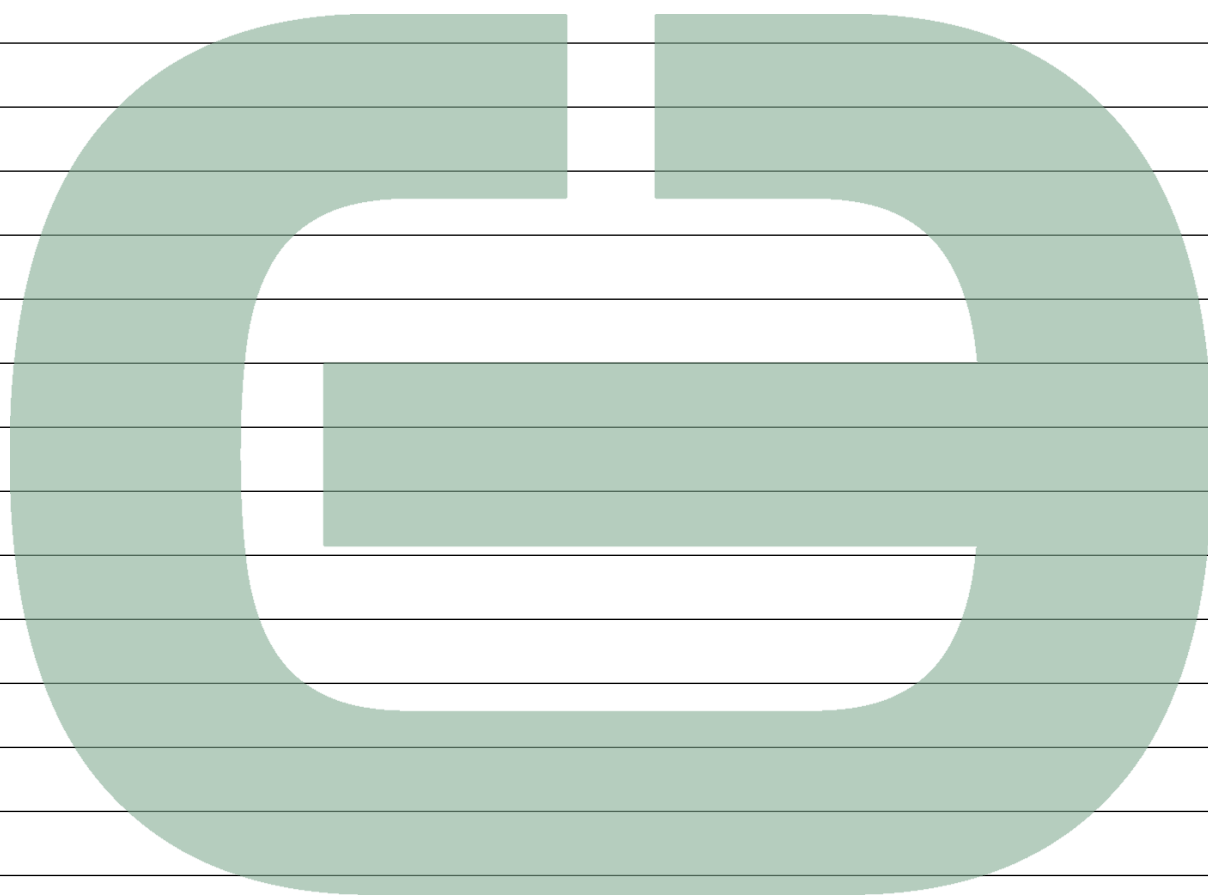
D _c	L2	L1	D2	r 115	115	116
10	2	47	6	20	1151006/3x2	1161006/4x2
10	3	48	6	20	1151006/3x3	1161006/4x3
10	4	49	6	20	1151006/3x4	1161006/4x4
10	6	51	6	20	1151006/3x6	1161006/4x6
12	2	47	6	24	1151206/3x2	1161206/4x2
12	3	48	6	24	1151206/3x3	1161206/4x3
12	4	49	6	24	1151206/3x4	1161206/4x4
12	6	51	6	24	1151206/3x6	1161206/4x4
16	2	47	6	30	1151606/3x2	1161606/4x2
16	3	48	6	30	1151606/3x3	1161606/4x3
16	4	49	6	30	1151606/3x4	1161606/4x4
16	6	51	6	30	1151606/3x6	1161606/4x6
16	8	53	6	30	1151606/3x8	1161606/4x8
20	2	47	6	35	1152006/3x2	1162006/4x2
20	4	49	6	35	1152006/3x4	1162006/4x4
20	6	51	6	35	1152006/3x6	1162006/4x6
20	8	53	6	35	1152006/3x8	1162006/4x8
20	10	55	6	35	1152006/3x10	1162006/4x10





1.
04





1.
04





Cerin[®] Spa

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www.cerin.it

45°33'53.28" N - 10°45'58.14" E





Cerini[®]

CUTTING TOOLS MANUFACTURING



Standard endmills

HPC endmills

Endmills for tempered steels

T-slot cutters

Steel
Milling



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*We develop products and processes
to propose advanced solutions*

Since 1971 Cerin has been among the Italian leaders in precision engineering. For more than 50 years of activity the company has been closely involved in solid carbide technological development as well as its many fields of application, both traditional and highly innovative.

Today, Cerin provides its customers with the benefit of a long experience by offering a complete range of high performance cutters dedicated to the machining of ferrous materials.

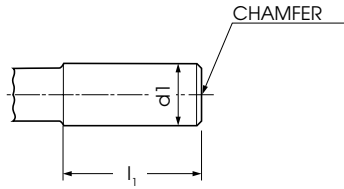


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Shank design (for drilling and milling tools) DIN 6535

Straight cylindrical shank - Shape HA

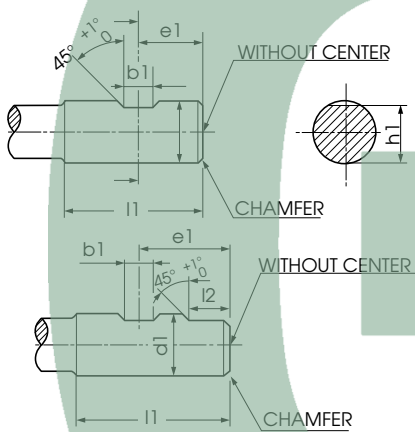


d_1	l_1	d_1	l_1	d_1	l_1
h6	+2/0	h6	+2/0	h6	+2/0
2	28	8	36	18	48
3	28	10	40	20	50
4	28	12	45	25	56
5	28	14	45	32	60
6	36	16	48		

Cylindrical shank - Shape HB

one Weldon flat - $d_1 = 6$ to 20 mm

two Weldon flats - $d_1 = 25$ to 32 mm

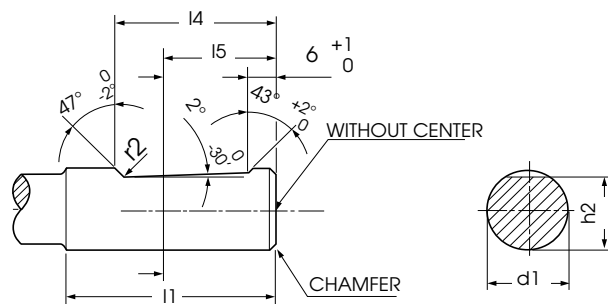


d_1	b_1	e_1	h_1	l_1	l_2
h6	+0,05/0	0/-1	h11	+2/0	+1/0
6	4,2	18	5,1	36	
8	5,5	18	6,9	36	
10	7	20	8,5	40	
12	8	22,5	10,4	45	
14	8	22,5	12,7	45	
16	10	24	14,2	48	
18	10	24	16,2	48	
20	11	25	18,2	50	
25	12	32	23	56	17
32	14	36	32	60	19

Cylindrical shank - Shape HE

one slope flat - $d_1 = 6$ to 20 mm

one slope flat - $d_1 = 25$ to 32 mm



d_1	(b_2)	(b_3)	h_2	(h_3)	l_1	l_4	l_5	r_2
h6			h11		+2 / 0	0 / -1	Nominal size	min.
6	4,3		5,1		36	25	18	1,2
8	5,5		6,9		36	25	18	1,2
10	7,1		8,5		40	28	20	1,2
12	8,2		10,4		45	33	22,5	1,2
14	8,1		12,7		45	33	22,5	1,2
16	10,1		14,2		48	36	24	1,6
18	10,8		16,2		48	36	24	1,6
20	11,4		18,2		50	38	25	1,6
25	13,8	9,3	23	24,1	56	44	32	1,6
32	15,5	9,9	30	31,2	60	48	35	1,6

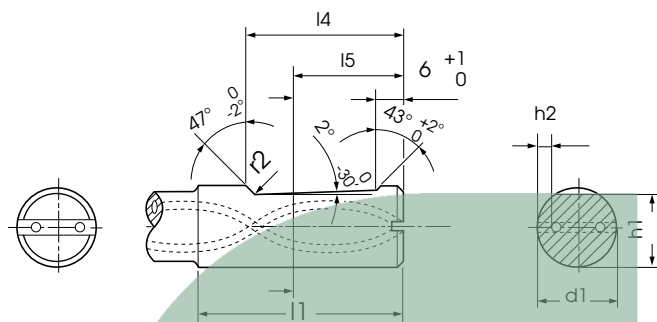


Shank design (for drilling and milling tools) similar to DIN 6535

Cylindrical shank - Shape HEK

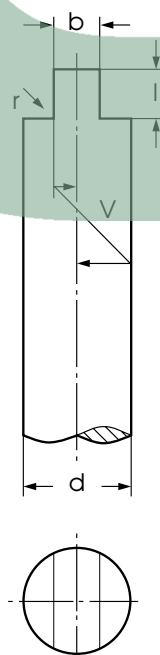
one slope flat - d1 = 6 to 20 mm

one slope flat - d1 = 25 to 32 mm



d ₁	l ₁	l ₄	l ₅	h ₁	r ₂	h ₂
h6	+2/0	0/-1	Nominal size	h11		min.
6	36	25	18	5,3	1,2	1,3
8	36	25	18	7,1	1,2	1,5
10	40	28	20	8,9	1,2	1,8
12	45	33	22,5	10,9	1,2	2
14	45	33	22,5	12,4	1,2	2,5
16	48	36	24	14,5	1,6	2,5
18	48	36	24	16,2	1,6	2,8
20	50	38	25	18,2	1,6	3
25	56	44	32	23	1,6	3,7
32	60	48	35	30	1,6	4,5

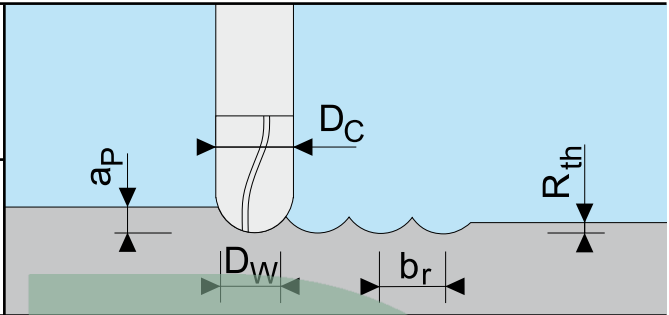
Shank with drive tenon DIN 1809



d		b	l	r	v
from	up to	h12	± IT16 ¹		
3	3,5	1,6	2,2	0,2	0,05
3,5	4	2	2,2	0,2	0,05
4	4,5	2,2	2,5	0,2	0,05
4,5	5,5	2,5	2,5	0,2	0,05
5,5	6,5	3	3	0,2	0,05
6,5	8	3,5	3,5	0,2	0,06
8	9,5	4,5	4,5	0,4	0,06
9,5	11	5	5	0,4	0,06
11	13	6	6	0,4	0,06
13	15	7	7	0,4	0,08
15	18	8	8	0,4	0,08
18	21	10	10	0,4	0,08
21	24	11	11	0,6	0,1
24	27	13	13	0,6	0,1
27	30	14	14	0,6	0,1
30	34	16	16	0,6	0,1
34	38	18	18	0,6	0,1
38	42	20	19	0,6	0,15
42	46	22	20	1	0,15
46	50	24	22	1	0,15

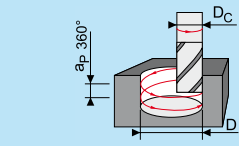
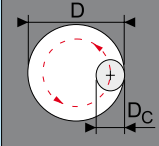
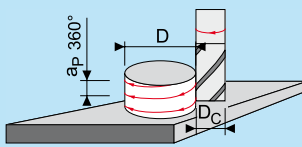
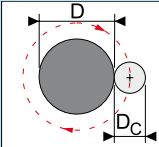


Formulae of calculation

End mills - Tours cutters - Ball nose cutters		Trace milling	
Revolution per minute	$n = \frac{V_c \times 1000}{D_c \times 3,14}$	 R_{th} Surface roughness b_r Line offset D_w Working diameter	
Cutting speed	$V_c = \frac{D_c \times 3,14 \times n}{1000}$		
Feed per tooth	$f_z = \frac{V_f}{Z_n \times n}$		
Feed for revolution	$f = f_z \times Z_n$	Roughness	$R_{th} = \frac{D_c - \sqrt{D_c^2 - b_r^2}}{2}$
Feed per minute	$V_f = f_z \times Z_n \times n$	Line offset	$b_r = 2\sqrt{R_{th} (D_c - R_{th})}$
Average chip thickness	$h_m = f_z \times \sqrt{\frac{a_p}{D_c}}$	Working diameter	$D_w = 2\sqrt{a_p (D_c - a_p)}$

Formulae of calculation

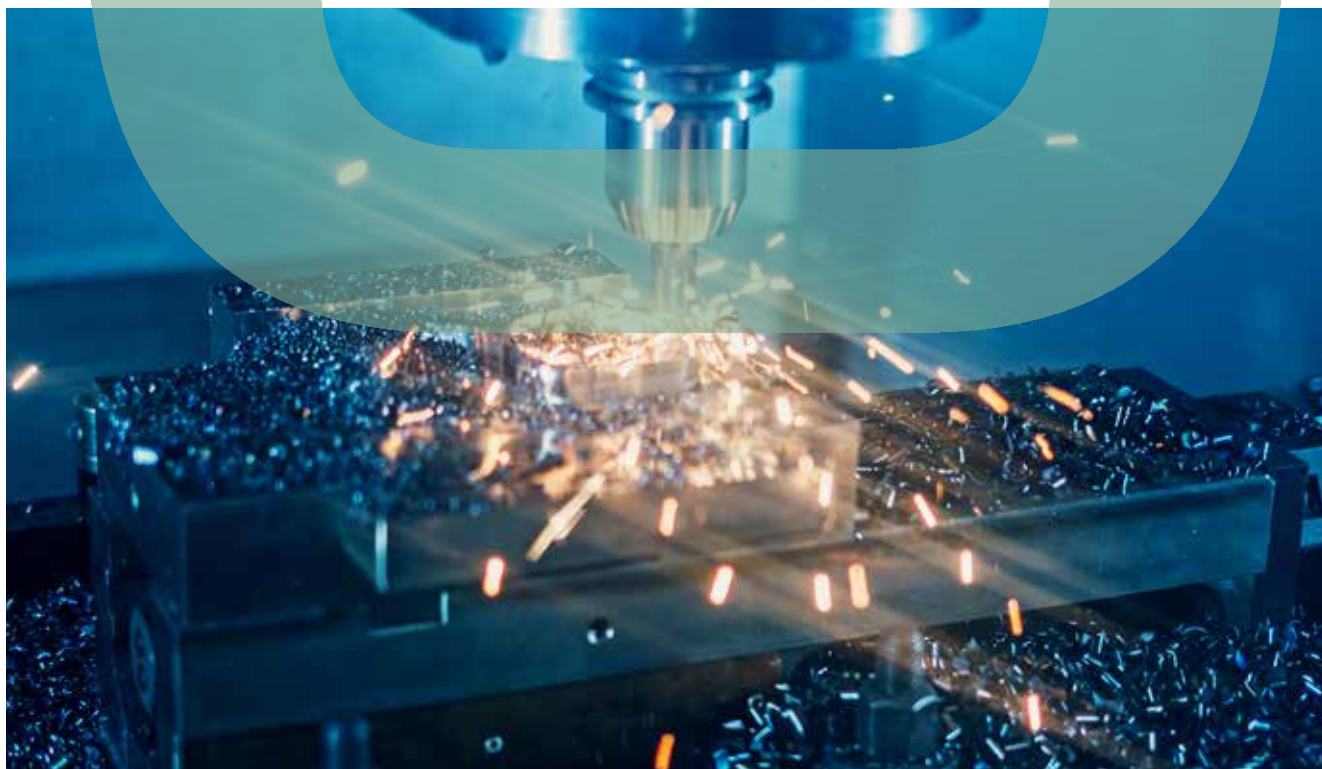
Circular milling - Drill milling - Feed based on movement of the cutter axis VfM (mm/min.)

		Internal profile	$V_{fM} = \frac{V_f \times (D - D_c)}{D}$
		External profile	$V_{fM} = \frac{V_f \times (D + D_c)}{D}$



Steel Milling

		Pag
	Standard endmills	7
	HPC endmills	21
	Endmills for tempered steel	29
	Deburring endmills	33
	T-slot cutters	36





Standard Endmills



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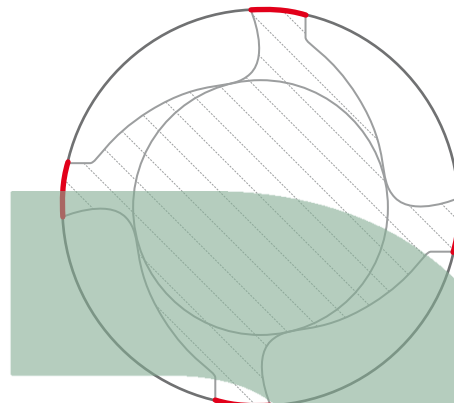


Tools features

Radial relief:

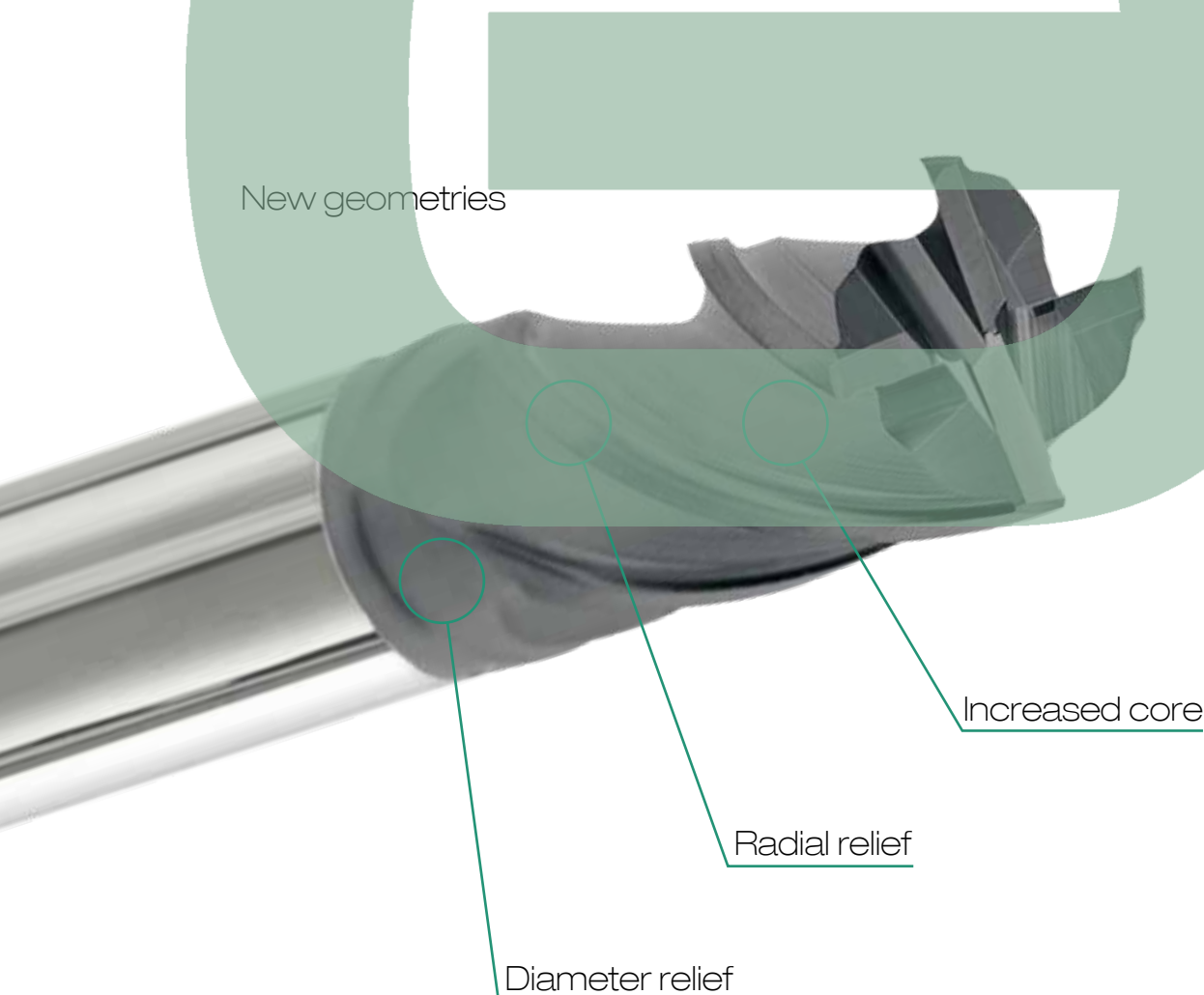
Cutting edge strength suitable for machining medium-hard metals (55 HRC)

Increased core diameter (> 60%) to withstand high bending stresses



TiAlN based coating

New geometries



Test Report

Steel 1.2738

Tool: 64.060061357A

Z=4, Dia. 6, radial relief

Cutting data:

$a_p = 1 \times D$ (6 mm), $a_e = 0,1 \times D$ (0,6 mm)

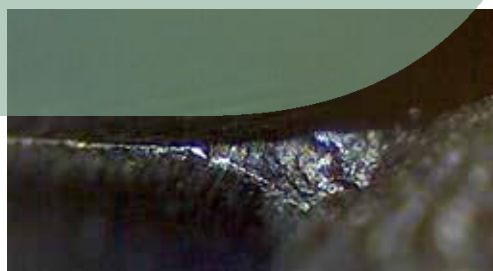
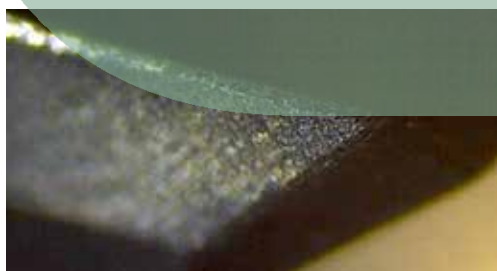
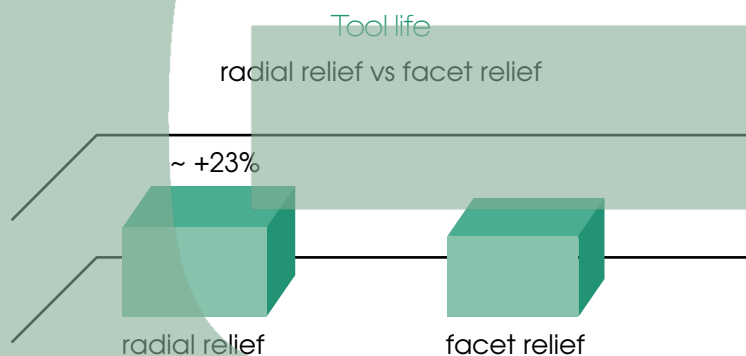
$V_c = 200$ m/min

$f_z = 0,1$ mm

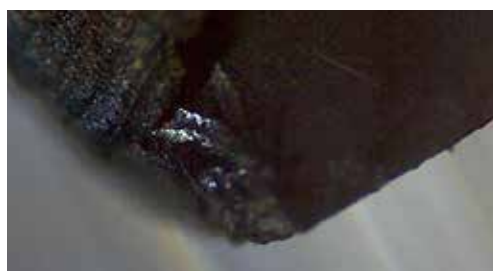
Tool life: 340 meters

Tempered K110 (1.2379)

Tool: Z=4, radial relief vs facet relief



(64.060061357A vs 640W.060061357Y)

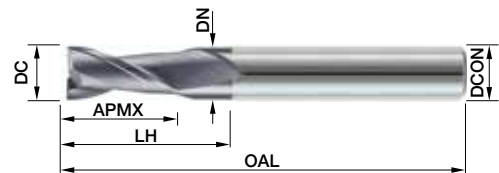


STANDARD MILLING

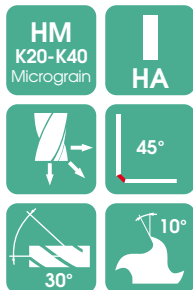
2 flutes endmill

PVD TiAlN Cer-T

Also available without coating



62



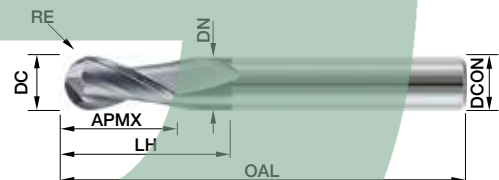
Cod.		DC	APMX	LH	OAL	DCON	DN
Coated	Uncoated	h10	0/+2	0/+2	0/+2	h6	0/-0,05
62.020020640A	62.020020640	2	6	10	40	2	1,9
62.020060350A	62.020060350	2	3	6,5	50	6	1,9
62.030030840A	62.030030840	3	8	11	40	3	2,9
62.030060757A	62.030060757	3	7	10,5	57	6	2,9
62.040041040A	62.040041040	4	10	13	40	4	3,9
62.040060857A	62.040060857	4	8	11	57	6	3,9
62.050051250A	62.050051250	5	12	15	50	5	4,9
62.060061057A	62.060061057	6	10	13	57	6	5,9
62.060061450A	62.060061450	6	14	17	50	6	5,9
62.080081663A	62.080081663	8	16	23	63	8	7,9
62.100101972A	62.100101972	10	19	26	72	10	9,8
62.120122283A	62.120122283	12	22	30	83	12	11,8
62.140142283A	62.140142283	14	22	30	83	14	13,8
62.160162692A	62.160162692	16	26	34	92	16	15,8
62.2002032104A	62.2002032104	20	32	45	104	20	19,6
62.2502545120A	62.2502545120	25	45	58	120	25	24,6

STANDARD MILLING

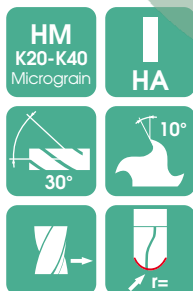
2 flutes ball nose endmill

PVD TiAlN Cer-T

Also available without coating



62R



Cod.		DC	APMX	LH	OAL	DCON	RE	DN
Coated	Uncoated	h10	0/+2	0/+2	0/+2	h6	0/-0,02	0/-0,05
62R.020020640A	62R.020020640	2	6	10	40	2	1	1,9
62R.030030840A	62R.030030840	3	8	11	40	3	1,5	2,9
62R.030060757A	62R.030060757	3	7	10,5	57	6	1,5	2,9
62R.040041040A	62R.040041040	4	10	13	40	4	2	3,9
62R.040060857A	62R.040060857	4	8	11	57	6	2	3,9
62R.050051250A	62R.050051250	5	12	15	50	5	2,5	4,9
62R.060061057A	62R.060061057	6	10	13	57	6	3	5,9
62R.060061450A	62R.060061450	6	14	17	50	6	3	5,9
62R.080081663A	62R.080081663	8	16	23	63	8	4	7,9
62R.100101972A	62R.100101972	10	19	26	72	10	5	9,8
62R.120122283A	62R.120122283	12	22	30	83	12	6	11,8
62R.140142283A	62R.140142283	14	22	30	83	14	7	13,8
62R.160162692A	62R.160162692	16	26	34	92	16	8	15,8
62R.2002032104A	62R.2002032104	20	32	45	104	20	10	19,6
62R.2502545120A	62R.2502545120	25	45	58	120	25	12,5	24,6

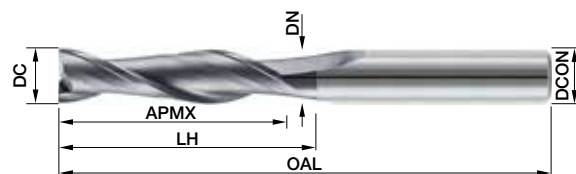


STANDARD MILLING

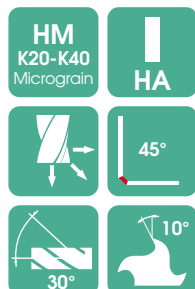
2 flutes long endmill

PVD TiAlN Cer-T

Also available without coating



62L



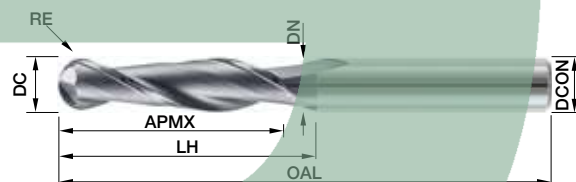
Cod.		DC	APMX	LH	OAL	DCON	DN
Coated	Uncoated	h10	0/+2	0/+2	0/+2	h6	0/-0,05
62L.030A	62L.030	3	18	23	60	3	2,9
62L.040A	62L.040	4	20	25	60	4	3,9
62L.050A	62L.050	5	25	29	62	5	4,9
62L.060A	62L.060	6	30	34	70	6	5,9
62L.080A	62L.080	8	35	42	79	8	7,9
62L.100A	62L.100	10	40	47	89	10	9,8
62L.120A	62L.120	12	50	55	100	12	11,8
62L.140A	62L.140	14	58	76	125	14	13,8
62L.160A	62L.160	16	58	76	125	16	15,8
62L.200A	62L.200	20	60	73	125	20	19,6

STANDARD MILLING

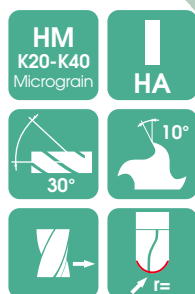
2 flutes ball nose long endmill

PVD TiAlN Cer-T

Also available without coating



62RL



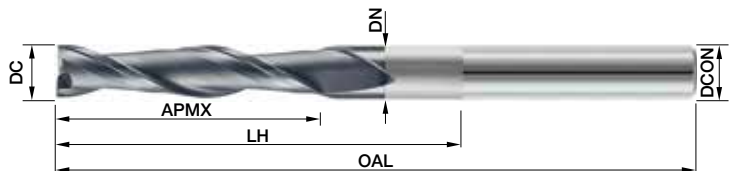
Cod.		DC	APMX	LH	OAL	DCON	RE	DN
Coated	Uncoated	h10	0/+2	0/+2	0/+2	h6	0/-0,02	0/-0,05
62RL.030A	62RL.030	3	18	23	60	3	1,5	2,9
62RL.040A	62RL.040	4	20	25	60	4	2	3,9
62RL.050A	62RL.050	5	25	29	62	5	2,5	4,9
62RL.060A	62RL.060	6	30	34	70	6	3	5,9
62RL.080A	62RL.080	8	35	42	79	8	4	7,9
62RL.100A	62RL.100	10	40	47	89	10	5	9,8
62RL.120A	62RL.120	12	50	55	100	12	6	11,8
62RL.140A	62RL.140	14	58	76	125	14	7	13,8
62RL.160A	62RL.160	16	58	76	125	16	8	15,8
62RL.200A	62RL.200	20	60	73	125	20	10	19,6



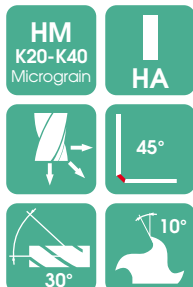
STANDARD MILLING

2 flutes extra long endmill

PVD TiAlN Cer-T
Also available without coating



62XL

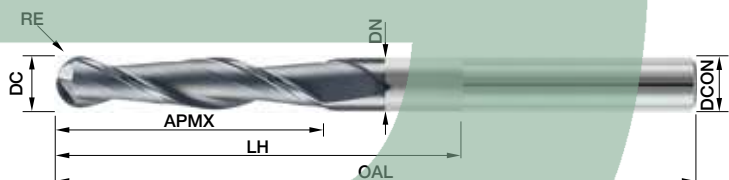


Cod.		DC	APMX	LH	OAL	DCON	DN
Coated	Uncoated	h10	0/+2	0/+2	0/+2	h6	0/-0,05
62XL.030A	62XL.030	3	25	37	75	3	2,9
62XL.040A	62XL.040	4	32	39	75	4	3,9
62XL.050A	62XL.050	5	38	58	100	5	4,9
62XL.060A	62XL.060	6	40	60	100	6	5,9
62XL.080A	62XL.080	8	45	63	100	8	7,9
62XL.100A	62XL.100	10	50	75	120	10	9,8
62XL.120A	62XL.120	12	60	100	150	12	11,8
62XL.140A	62XL.140	14	75	103	150	14	13,8
62XL.160A	62XL.160	16	75	100	150	16	15,8
62XL.200A	62XL.200	20	75	98	150	20	19,6

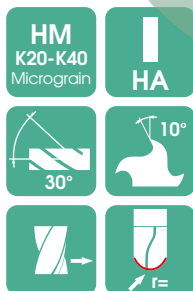
STANDARD MILLING

2 flutes ball nose extra long endmill

PVD TiAlN Cer-T
Also available without coating



62RXL



Cod.		DC	APMX	LH	OAL	DCON	RE	DN
Coated	Uncoated	h10	0/+2	0/+2	0/+2	h6	0/-0,02	0/-0,05
62RXL.030A	62RXL.030	3	25	37	75	3	1,5	2,9
62RXL.040A	62RXL.040	4	32	39	75	4	2	3,9
62RXL.050A	62RXL.050	5	38	58	100	5	2,5	4,9
62RXL.060A	62RXL.060	6	40	60	100	6	3	5,9
62RXL.080A	62RXL.080	8	45	63	100	8	4	7,9
62RXL.100A	62RXL.100	10	50	75	120	10	5	9,8
62RXL.120A	62RXL.120	12	60	100	150	12	6	11,8
62RXL.140A	62RXL.140	14	75	103	150	14	7	13,8
62RXL.160A	62RXL.160	16	75	100	150	16	8	15,8
62RXL.200A	62RXL.200	20	75	98	150	20	10	19,6

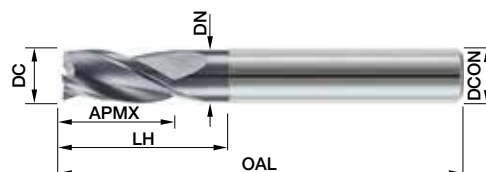


STANDARD MILLING

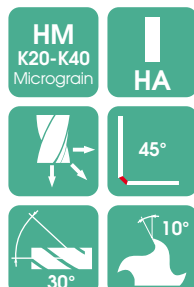
3 flutes endmill

PVD TiAlN Cer-T

Also available without coating



63



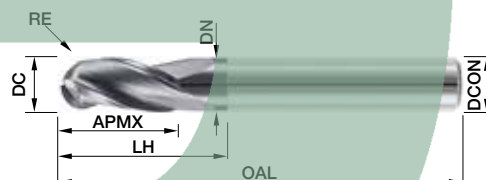
Cod.		DC	APMX	LH	OAL	DCON	DN
Coated	Uncoated	h10	0/+2	0/+2	0/+2	h6	0/-0,05
63.020020640A	63.020020640	2	6	10	40	2	1,9
63.020060350A	63.020060350	2	3	6,5	50	6	1,9
63.030031040A	63.030031040	3	10	12	40	3	2,9
63.030060757A	63.030060757	3	7	10,5	57	6	2,9
63.040041140A	63.040041140	4	11	12,5	40	4	3,9
63.040060857A	63.040060857	4	8	11	57	6	3,9
63.050051350A	63.050051350	5	13	19	50	5	4,9
63.060061057A	63.060061057	6	10	19	57	6	5,9
63.060061650A	63.060061650	6	16	16	50	6	5,9
63.080081663A	63.080081663	8	16	23	63	8	7,9
63.100101972A	63.100101972	10	19	26	72	10	9,8
63.120122283A	63.120122283	12	22	34	83	12	11,8
63.140142283A	63.140142283	14	22	36	83	14	13,8
63.160162692A	63.160162692	16	26	42	92	16	15,8
63.2002032104A	63.2002032104	20	32	52	104	20	19,6
63.2502545120A	63.2502545120	25	45	58	120	25	24,6

STANDARD MILLING

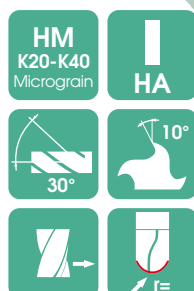
3 flutes ball nose endmill

PVD TiAlN Cer-T

Also available without coating



63R



Cod.		DC	APMX	LH	OAL	DCON	RE	DN
Coated	Uncoated	h10	0/+2	0/+2	0/+2	h6	0/-0,02	0/-0,05
63R.020020640A	63R.020020640	2	6	10	40	2	1	1,9
63R.030031040A	63R.030031040	3	10	12	40	3	1,5	2,9
63R.030060757A	63R.030060757	3	7	10	57	6	1,5	2,9
63R.040041140A	63R.040041140	4	11	12,5	40	4	2	3,9
63R.040060857A	63R.040060857	4	8	11	57	6	2	3,9
63R.050051350A	63R.050051350	5	13	19	50	5	2,5	4,9
63R.060061057A	63R.060061057	6	10	19	57	6	3	5,9
63R.060061650A	63R.060061650	6	16	16	50	6	3	5,9
63R.080081663A	63R.080081663	8	16	23	63	8	4	7,9
63R.100101972A	63R.100101972	10	19	26	72	10	5	9,8
63R.120122283A	63R.120122283	12	22	34	83	12	6	11,8
63R.140142283A	63R.140142283	14	22	36	83	14	7	13,8
63R.160162692A	63R.160162692	16	26	42	92	16	8	15,8
63R.2002032104A	63R.2002032104	20	32	52	104	20	10	19,6
63R.2502545120A	63R.2502545120	25	45	58	120	25	12,5	24,6

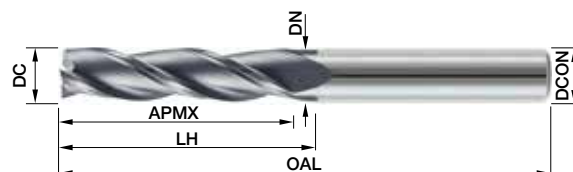


STANDARD MILLING

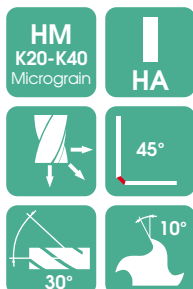
3 flutes long endmill

PVD TiAlN Cer-T

Also available without coating



63L



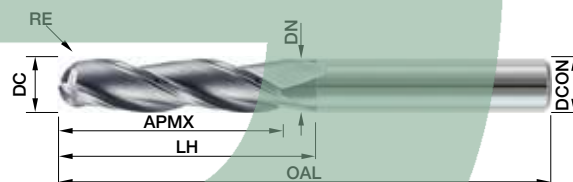
Cod.		DC	APMX	LH	OAL	DCON	DN
Coated	Uncoated	h10	0/+2	0/+2	0/+2	h6	0/-0,05
63L.030A	63L.030	3	18	23	60	3	2,9
63L.040A	63L.040	4	20	25	60	4	3,9
63L.050A	63L.050	5	25	29	62	5	4,9
63L.060A	63L.060	6	30	34	70	6	5,9
63L.080A	63L.080	8	35	42	79	8	7,9
63L.100A	63L.100	10	40	47	89	10	9,8
63L.120A	63L.120	12	50	55	100	12	11,8
63L.140A	63L.140	14	58	76	125	14	13,8
63L.160A	63L.160	16	58	76	125	16	15,8
63L.200A	63L.200	20	60	73	125	20	19,6

STANDARD MILLING

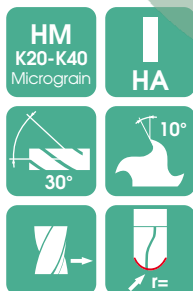
3 flutes ball nose long endmill

PVD TiAlN Cer-T

Also available without coating



63RL



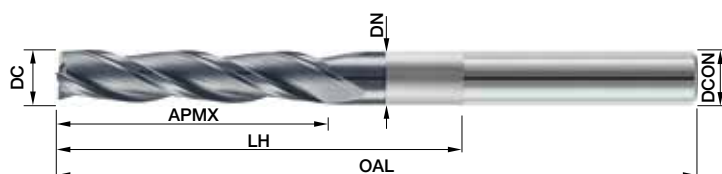
Cod.		DC	APMX	LH	OAL	DCON	RE	DN
Coated	Uncoated	h10	0/+2	0/+2	0/+2	h6	0/-0,02	0/-0,05
63RL.030A	63RL.030	3	18	23	60	3	1,5	2,9
63RL.040A	63RL.040	4	20	25	60	4	2	3,9
63RL.050A	63RL.050	5	25	29	62	5	2,5	4,9
63RL.060A	63RL.060	6	30	34	70	6	3	5,9
63RL.080A	63RL.080	8	35	42	79	8	4	7,9
63RL.100A	63RL.100	10	40	47	89	10	5	9,8
63RL.120A	63RL.120	12	50	55	100	12	6	11,8
63RL.140A	63RL.140	14	58	76	125	14	7	13,8
63RL.160A	63RL.160	16	58	76	125	16	8	15,8
63RL.200A	63RL.200	20	60	73	125	20	10	19,6



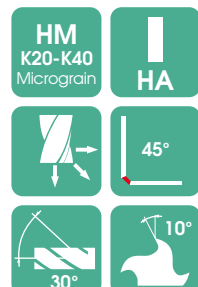
STANDARD MILLING

3 flutes extra long endmill

PVD TiAlN Cer-T
Also available without coating



63XL

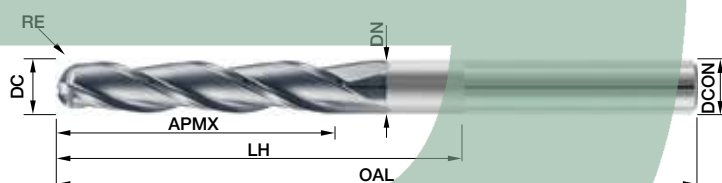


Cod.		DC	APMX	LH	OAL	DCON	DN
Coated	Uncoated	h10	0/+2	0/+2	0/+2	h6	0/-0,05
63XL.030A	63XL.030	3	25	37	75	3	2,9
63XL.040A	63XL.040	4	32	39	75	4	3,9
63XL.050A	63XL.050	5	38	58	100	5	4,9
63XL.060A	63XL.060	6	40	60	100	6	5,9
63XL.080A	63XL.080	8	45	63	100	8	7,9
63XL.100A	63XL.100	10	50	75	120	10	9,8
63XL.120A	63XL.120	12	60	100	150	12	11,8
63XL.140A	63XL.140	14	75	103	150	14	13,8
63XL.160A	63XL.160	16	75	100	150	16	15,8
63XL.200A	63XL.200	20	75	98	150	20	19,6

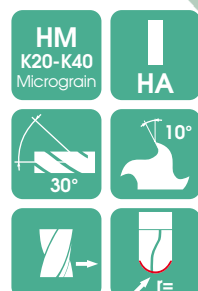
STANDARD MILLING

3 flutes ball nose extra long endmill

PVD TiAlN Cer-T
Also available without coating



63RXL



Cod.		DC	APMX	LH	OAL	DCON	RE	DN
Coated	Uncoated	h10	0/+2	0/+2	0/+2	h6	0/-0,02	0/-0,05
63RXL.030A	63RXL.030	3	25	37	75	3	1,5	2,9
63RXL.040A	63RXL.040	4	32	39	75	4	2	3,9
63RXL.050A	63RXL.050	5	38	58	100	5	2,5	4,9
63RXL.060A	63RXL.060	6	40	60	100	6	3	5,9
63RXL.080A	63RXL.080	8	45	63	100	8	4	7,9
63RXL.100A	63RXL.100	10	50	75	120	10	5	9,8
63RXL.120A	63RXL.120	12	60	100	150	12	6	11,8
63RXL.140A	63RXL.140	14	75	103	150	14	7	13,8
63RXL.160A	63RXL.160	16	75	100	150	16	8	15,8
63RXL.200A	63RXL.200	20	75	98	150	20	10	19,6

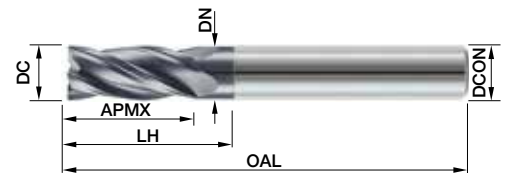


STANDARD MILLING

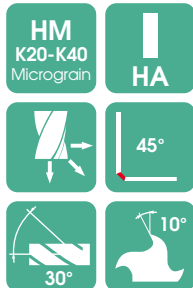
4 flutes endmill

PVD TiAlN Cer-T

Also available without coating



64



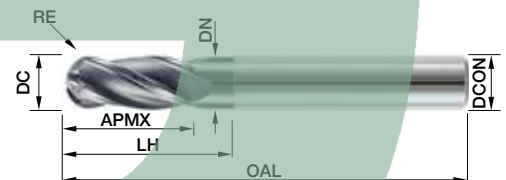
Cod.		DC	APMX	LH	OAL	DCON	DN
Coated	Uncoated	h10	0/+2	0/+2	0/+2	h6	0/-0,05
64.020020640A	64.020020640	2	6	10	40	2	1,9
64.020060450A	64.020060450	2	4	7	50	6	1,9
64.030031040A	64.030031040	3	10	12	40	3	2,9
64.030060857A	64.030060857	3	8	11,5	57	6	2,9
64.040041140A	64.040041140	4	11	12,5	40	4	3,9
64.040061157A	64.040061157	4	11	13	57	6	3,9
64.050051350A	64.050051350	5	13	19	50	5	4,9
64.060061357A	64.060061357	6	13	19	57	6	5,9
64.060061650A	64.060061650	6	16	16	50	6	5,9
64.080081963A	64.080081963	8	19	26	63	8	7,9
64.100102272A	64.100102272	10	22	29	72	10	9,8
64.120122683A	64.120122683	12	26	37	83	12	11,8
64.140142683A	64.140142683	14	26	36	83	14	13,8
64.160163292A	64.160163292	16	32	42	92	16	15,8
64.2002038104A	64.2002038104	20	38	52	104	20	19,6
64.2502545120A	64.2502545120	25	45	63	120	25	24,6

STANDARD MILLING

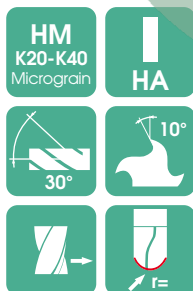
4 flutes ball nose endmill

PVD TiAlN Cer-T

Also available without coating



64R



Cod.		DC	APMX	LH	OAL	DCON	RE	DN
Coated	Uncoated	h10	0/+2	0/+2	0/+2	h6	0/-0,02	0/-0,05
64R.020020640A	64R.020020640	2	6	6	40	2	1	1,9
64R.030031040A	64R.030031040	3	10	12	40	3	1,5	2,9
64R.030060857A	64R.030060857	3	8	11,5	57	6	2	2,9
64R.040041140A	64R.040041140	4	11	12,5	40	4	2	3,9
64R.040061157A	64R.040061157	4	11	13	57	6	2,5	3,9
64R.050051350A	64R.050051350	5	13	19	50	5	2,5	4,9
64R.060061357A	64R.060061357	6	13	19	57	6	3	5,9
64R.060061650A	64R.060061650	6	16	16	50	6	3	5,9
64R.080081963A	64R.080081963	8	19	26	63	8	4	7,9
64R.100102272A	64R.100102272	10	22	29	72	10	5	9,8
64R.120122683A	64R.120122683	12	26	37	83	12	6	11,8
64R.140142683A	64R.140142683	14	26	36	83	14	7	13,8
64R.160163292A	64R.160163292	16	32	42	92	16	8	15,8
64R.2002038104A	64R.2002038104	20	38	52	104	20	10	19,6
64R.2502545120A	64R.2502545120	25	45	63	120	25	12,5	24,6

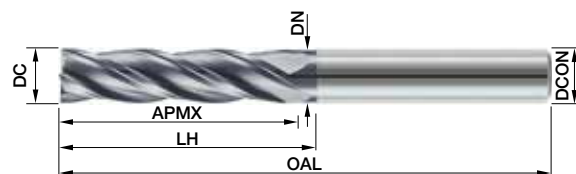


STANDARD MILLING

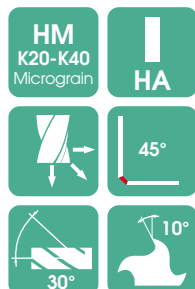
4 flutes long endmill

PVD TiAlN Cer-T

Also available without coating



64L



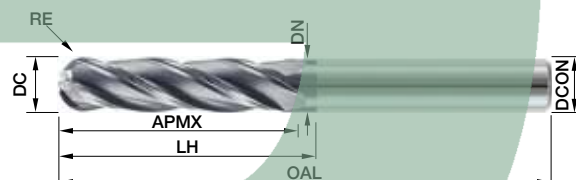
Cod.		DC	APMX	LH	OAL	DCON	DN
Coated	Uncoated	h10	0/+2	0/+2	0/+2	h6	0/-0,05
64L.030A	64L.030	3	18	23	60	3	2,9
64L.040A	64L.040	4	20	25	60	4	3,9
64L.050A	64L.050	5	25	27,5	62	5	4,9
64L.060A	64L.060	6	30	34	70	6	5,9
64L.080A	64L.080	8	35	42	79	8	7,9
64L.100A	64L.100	10	40	47	89	10	9,8
64L.120A	64L.120	12	50	55	100	12	11,8
64L.140A	64L.140	14	58	76	125	14	13,8
64L.160A	64L.160	16	58	76	125	16	15,8
64L.200A	64L.200	20	60	73	125	20	19,6

STANDARD MILLING

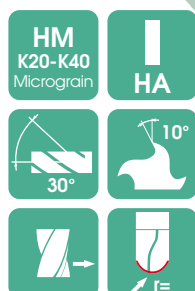
4 flutes ball nose long endmill

PVD TiAlN Cer-T

Also available without coating



64RL



Cod.		DC	APMX	LH	OAL	DCON	RE	DN
Coated	Uncoated	h10	0/+2	0/+2	0/+2	h6	0/-0,02	0/-0,05
64RL.030A	64RL.030	3	18	23	60	3	1,5	2,9
64RL.040A	64RL.040	4	20	25	60	4	2	3,9
64RL.050A	64RL.050	5	25	27,5	62	5	2,5	4,9
64RL.060A	64RL.060	6	30	34	70	6	3	5,9
64RL.080A	64RL.080	8	35	42	79	8	4	7,9
64RL.100A	64RL.100	10	40	47	89	10	5	9,8
64RL.120A	64RL.120	12	50	55	100	12	6	11,8
64RL.140A	64RL.140	14	58	76	125	14	7	13,8
64RL.160A	64RL.160	16	58	76	125	16	8	15,8
64RL.200A	64RL.200	20	60	73	125	20	10	19,6



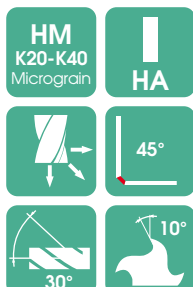
STANDARD MILLING

4 flutes extra long endmill

PVD TiAlN Cer-T
Also available without coating



64XL

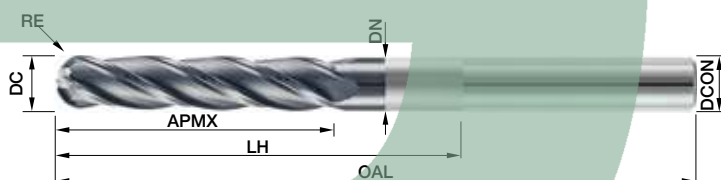


Cod.		DC	APMX	LH	OAL	DCON	DN
Coated	Uncoated	h10	0/+2	0/+2	0/+2	h6	0/-0,05
64XL.030A	64XL.030	3	25	37	75	3	2,9
64XL.040A	64XL.040	4	32	39	75	4	3,9
64XL.050A	64XL.050	5	38	58	100	5	4,9
64XL.060A	64XL.060	6	40	60	100	6	5,9
64XL.080A	64XL.080	8	45	63	100	8	7,9
64XL.100A	64XL.100	10	50	75	120	10	9,8
64XL.120A	64XL.120	12	60	100	150	12	11,8
64XL.140A	64XL.140	14	75	103	150	14	13,8
64XL.160A	64XL.160	16	75	100	150	16	15,8
64XL.200A	64XL.200	20	75	98	150	20	19,6

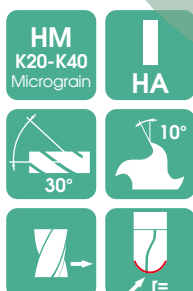
STANDARD MILLING

4 flutes ball nose extra long endmill

PVD TiAlN Cer-T
Also available without coating

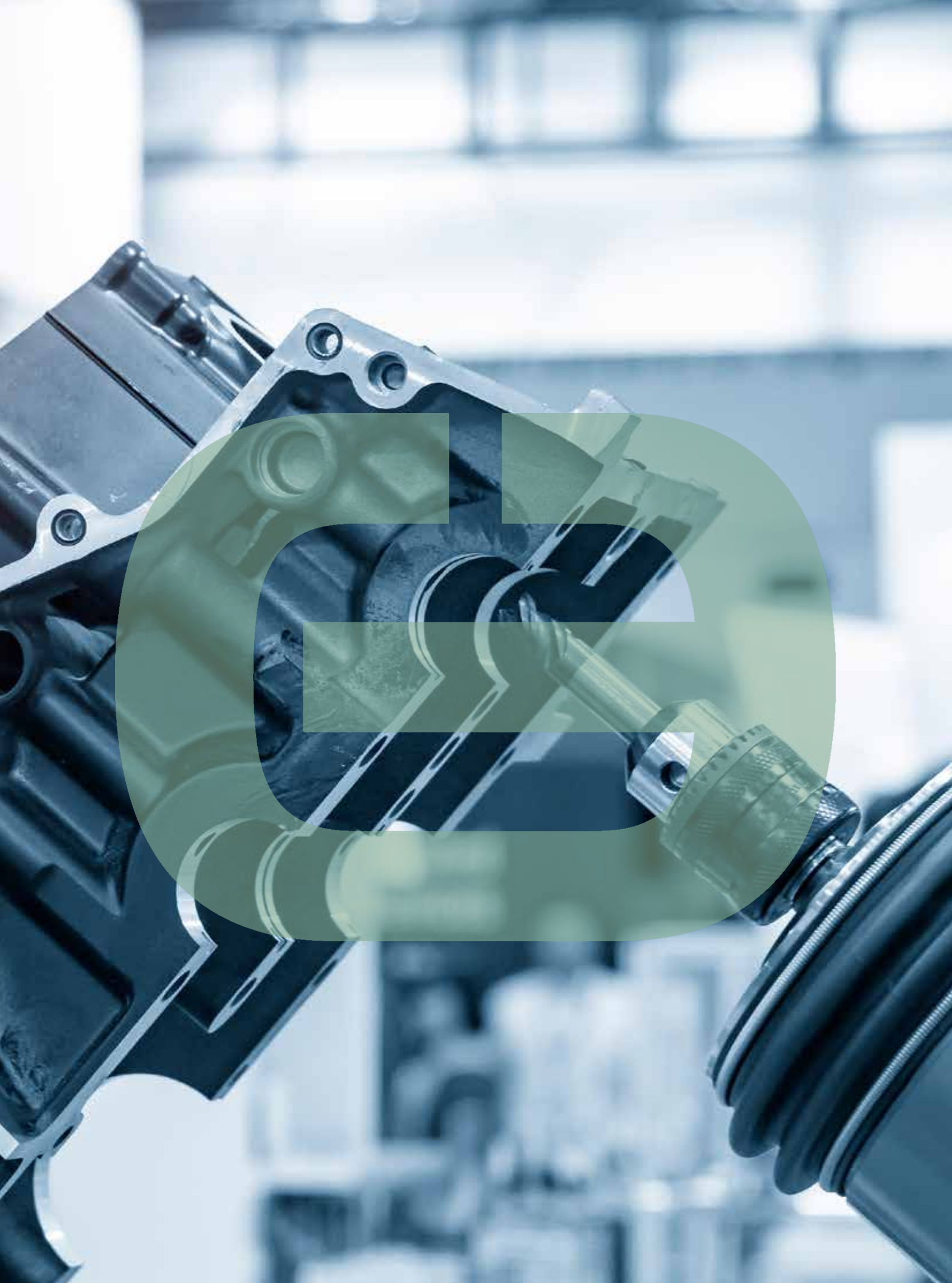


64RXL



Cod.		DC	APMX	LH	OAL	DCON	RE	DN
Coated	Uncoated	h10	0/+2	0/+2	0/+2	h6	0/-0,02	0/-0,05
64RXL.030A	64RXL.030	3	25	37	75	3	1,5	2,9
64RXL.040A	64RXL.040	4	32	39	75	4	2	3,9
64RXL.050A	64RXL.050	5	38	58	100	5	2,5	4,9
64RXL.060A	64RXL.060	6	40	60	100	6	3	5,9
64RXL.080A	64RXL.080	8	45	63	100	8	4	7,9
64RXL.100A	64RXL.100	10	50	75	120	10	5	9,8
64RXL.120A	64RXL.120	12	60	100	150	12	6	11,8
64RXL.140A	64RXL.140	14	75	103	150	14	7	13,8
64RXL.160A	64RXL.160	16	75	100	150	16	8	15,8
64RXL.200A	64RXL.200	20	75	98	150	20	10	19,6





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HPC Endmills



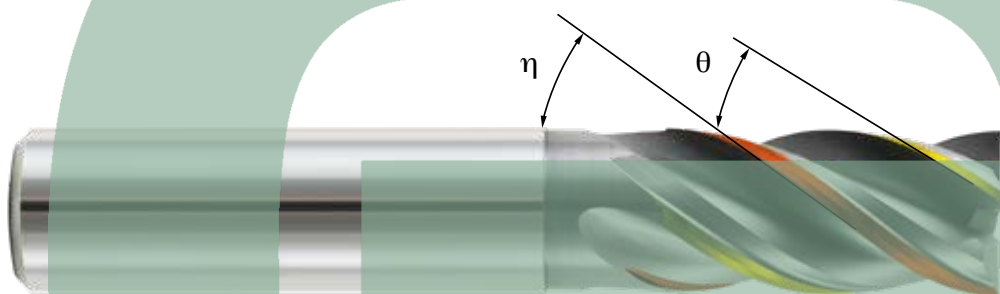
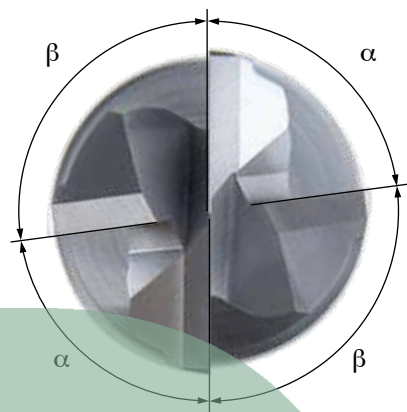
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Tools features

- ▶ Irregular division and uneven helix;
- ▶ Suitable for high feed and high Material Removal Rate;
- ▶ Vibration free;
- ▶ Roughing and finishing with the same tool;
- ▶ Excellent chips evacuation thanks to flute geometry.



Multilayer AlTiN based coating

Geometries, base material, coatings are specifically developed for a wide range of ferrous materials.



Test Report

AISI 304 stainless steel

Tool: 640.080081963Y

Z=4, Dia. 8, facet relief

Cutting data:

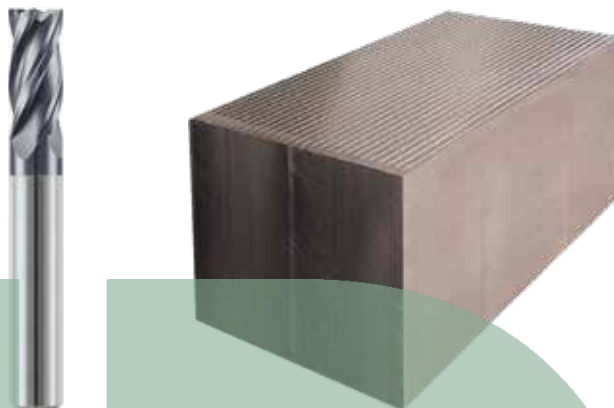
$a_p = 1 \times D$ (8 mm), $a_e = 0,6 \times D$ (4,8 mm)

$V_c = 70$ m/min

$f_z = 0,03$ (up to 0,04)

Tool life: 46 meters

Facet relief sharpness reduces
typical chip sticking

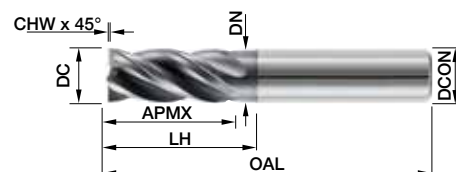


640

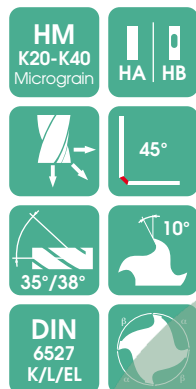
HPC STEEL MILLING

HPC 4 flutes endmill

PVD TiAlCrN Cer-Y



640



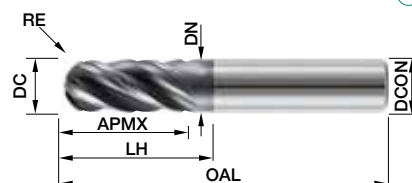
Cod.		DC	APMX	LH	OAL	DCON	DN	CHW
HA shank	HB shank	h10	0/+2	0/+2	0/+2	h6	0/-0,05	+/-0,05
640.030060550Y	640W.030060550Y	3	5		50	6		0,15
640.030060857Y	640W.030060857Y	3	8	12	57	6	2,8	0,15
640.030060870Y	640W.030060870Y	3	8	15	70	6	2,8	0,15
640.040060854Y	640W.040060854Y	4	8		54	6		0,15
640.040061157Y	640W.040061157Y	4	11	15	57	6	3,8	0,15
640.040061170Y	640W.040061170Y	4	11	20	70	6	3,8	0,15
640.050060954Y	640W.050060954Y	5	9		54	6		0,15
640.050061357Y	640W.050061357Y	5	13	17	57	6	4,8	0,15
640.050061370Y	640W.050061370Y	5	13	25	70	6	4,8	0,15
640.060061054Y	640W.060061054Y	6	10		54	6		0,15
640.060061357Y	640W.060061357Y	6	13	21	57	6	5,8	0,15
640.060061370Y	640W.060061370Y	6	13	30	70	6	5,8	0,15
640.080081258Y	640W.080081258Y	8	12		58	8		0,25
640.080081963Y	640W.080081963Y	8	19	27	63	8	7,7	0,25
640.080081980Y	640W.080081980Y	8	19	40	80	8	7,7	0,25
640.100101466Y	640W.100101466Y	10	14		66	10		0,25
640.100102272Y	640W.100102272Y	10	22	32	72	10	9,7	0,25
640.100102294Y	640W.100102294Y	10	22	50	94	10	9,7	0,25
640.120121673Y	640W.120121673Y	12	16		73	12		0,35
640.120122683Y	640W.120122683Y	12	26	38	83	12	11,6	0,35
640.1201226109Y	640W.1201226109Y	12	26	64	109	12	11,6	0,35
640.160162282Y	640W.160162282Y	16	22		82	16		0,35
640.160163292Y	640W.160163292Y	16	32	44	92	16	15,5	0,35
640.1601632132Y	640W.1601632132Y	16	32	80	132	16	15,5	0,35
640.200202692Y	640W.200202692Y	20	26		92	20		0,35
640.2002038104Y	640W.2002038104Y	20	38	54	104	20	19,5	0,35
640.2002038154Y	640W.2002038154Y	20	38	100	154	20	19,5	0,35



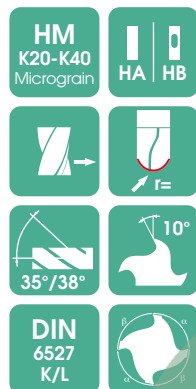
HPC STEEL MILLING

HPC 4 flutes ball nose endmill

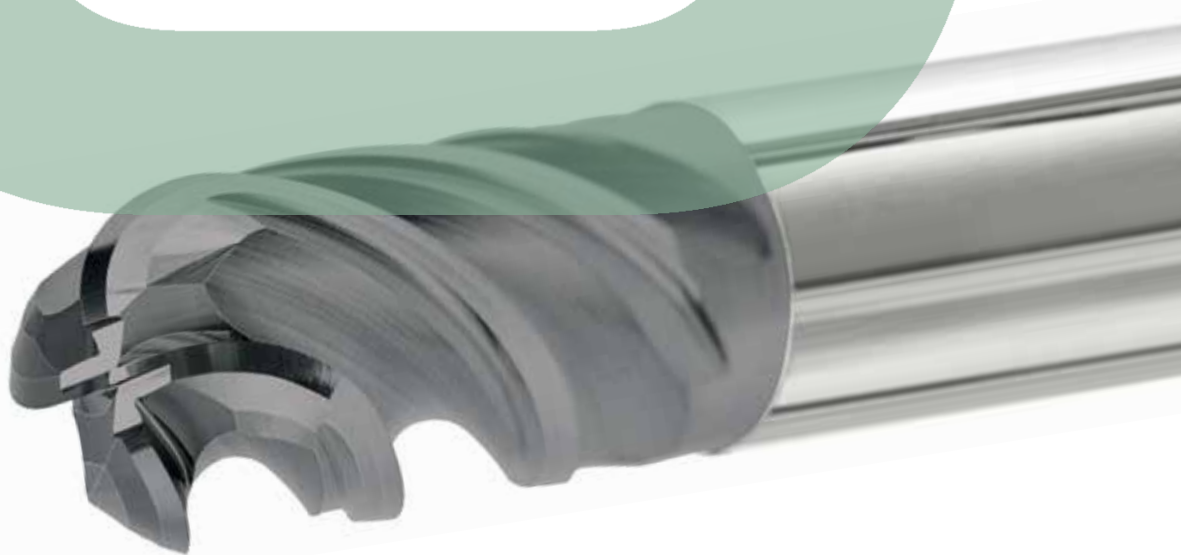
PVD TiAlCrN Cer-Y



640R



Cod.		DC	APMX	LH	OAL	DCON	DN	RE
HA shank	HB shank	h10	0/+2	0/+2	0/+2	h6	0/-0,05	+/-0,05
640R.030060550Y	640WR.030060550Y	3	5		50	6		1,5
640R.030060857Y	640WR.030060857Y	3	8	12	57	6	2,8	1,5
640R.040060854Y	640WR.040060854Y	4	8		54	6		2
640R.040061157Y	640WR.040061157Y	4	11	15	57	6	3,8	2
640R.050060954Y	640WR.050060954Y	5	9		54	6		2,5
640R.050061357Y	640WR.050061357Y	5	13	17	57	6	4,8	2,5
640R.060061054Y	640WR.060061054Y	6	10		54	6		3
640R.060061357Y	640WR.060061357Y	6	13	21	57	6	5,8	3
640R.080081258Y	640WR.080081258Y	8	12		58	8		4
640R.080081963Y	640WR.080081963Y	8	19	27	63	8	7,7	4
640R.100101466Y	640WR.100101466Y	10	14		66	10		5
640R.100102272Y	640WR.100102272Y	10	22	32	72	10	9,7	5
640R.120121673Y	640WR.120121673Y	12	16		73	12		6
640R.120122683Y	640WR.120122683Y	12	26	38	83	12	11,6	6
640R.160162282Y	640WR.160162282Y	16	22		82	16		8
640R.160163292Y	640WR.160163292Y	16	32	44	92	16	15,5	8
640R.200202692Y	640WR.200202692Y	20	26		92	20		10
640R.2002038104Y	640WR.2002038104Y	20	38	54	104	20	19,5	10

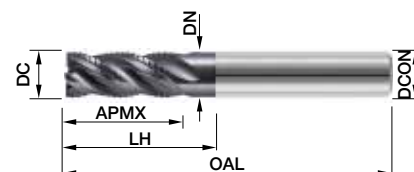


640

HPC STEEL MILLING

HPC 4 flutes roughing endmill

PVD TiAlCrN Cer-Y



640SP



Cod.		DC	APMX	LH	OAL	DCON	DN
HA shank	HB shank	h10	0/+2	0/+2	0/+2	h6	0/-0,05
640SP.030060550Y	640WSP.030060550Y	3	5		50	6	
640SP.030060857Y	640WSP.030060857Y	3	8	12	57	6	2,8
640SP.030060870Y	640WSP.030060870Y	3	8	15	70	6	2,8
640SP.040060854Y	640WSP.040060854Y	4	8		54	6	
640SP.040061157Y	640WSP.040061157Y	4	11	15	57	6	3,8
640SP.040061170Y	640WSP.040061170Y	4	11	20	70	6	3,8
640SP.050060954Y	640WSP.050060954Y	5	9		54	6	
640SP.050061357Y	640WSP.050061357Y	5	13	17	57	6	4,8
640SP.050061370Y	640WSP.050061370Y	5	13	25	70	6	4,8
640SP.060061054Y	640WSP.060061054Y	6	10		54	6	
640SP.060061357Y	640WSP.060061357Y	6	13	21	57	6	5,8
640SP.060061370Y	640WSP.060061370Y	6	13	30	70	6	5,8
640SP.080081258Y	640WSP.080081258Y	8	12		58	8	
640SP.080081963Y	640WSP.080081963Y	8	19	27	63	8	7,7
640SP.080081980Y	640WSP.080081980Y	8	19	40	80	8	7,7
640SP.100101466Y	640WSP.100101466Y	10	14		66	10	
640SP.100102272Y	640WSP.100102272Y	10	22	32	72	10	9,7
640SP.100102294Y	640WSP.100102294Y	10	22	50	94	10	9,7
640SP.120121673Y	640WSP.120121673Y	12	16		73	12	
640SP.120122683Y	640WSP.120122683Y	12	26	38	83	12	11,6
640SP.1201226109Y	640WSP.1201226109Y	12	26	64	109	12	11,6
640SP.160162282Y	640WSP.160162282Y	16	22		82	16	
640SP.160163292Y	640WSP.160163292Y	16	32	44	92	16	15,5
640SP.1601632132Y	640WSP.1601632132Y	16	32	80	132	16	15,5
640SP.200202692Y	640WSP.200202692Y	20	26		92	20	
640SP.2002038104Y	640WSP.2002038104Y	20	38	54	104	20	19,5
640SP.2002038154Y	640WSP.2002038154Y	20	38	100	154	20	19,5





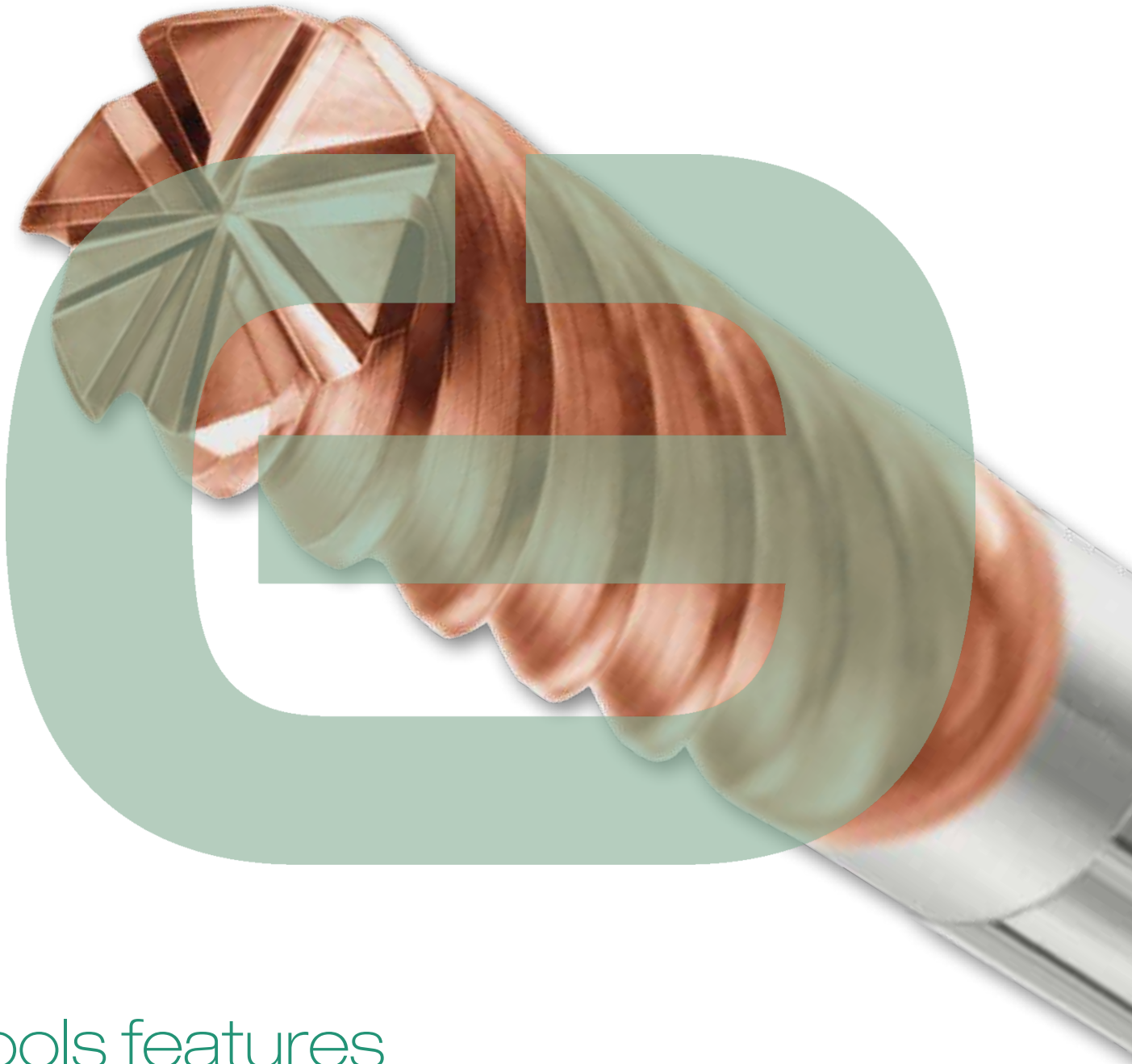
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Endmill for tempered steel



Tools features

- ▶ Ultrafine micrograin carbide;
- ▶ Coating highly resistant to abrasive wear;
- ▶ h5 shank tolerance to assure tool-spindle precise coupling;
- ▶ Negative cutting angle;
- ▶ Core up to 80% of the diameter to assure stability and vibrations reduction.



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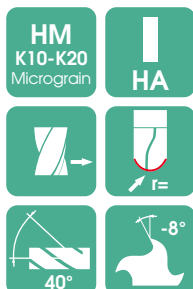
62RHR

TEMPERED STEEL MILLING
2 flutes ball nose endmill

PVD TiAlN/TiSiN Cer-SA



62RHR



Cod.	DC	APMX	OAL	LH	DCON	DN	RE
	0/-0,02	0/+2	0/+2	0/+2	h5	0/-0,05	+/- 0.01
62RHR.010060257SA	1	2	57	4	6	0,9	0,5
62RHR.010060280SA	1	2	80	7	6	0,9	0,5
62RHR.015062557SA	1,5	2,5	57	5,5	6	1,4	0,75
62RHR.015062580SA	1,5	2,5	80	10	6	1,4	0,75
62RHR.020060357SA	2	3	57	7	6	1,9	1
62RHR.020060380SA	2	3	80	13	6	1,9	1
62RHR.030060457SA	3	4	57	10	6	2,8	1,5
62RHR.030060480SA	3	4	80	19	6	2,8	1,5
62RHR.040060557SA	4	5	57	13	6	3,7	2
62RHR.040060580SA	4	5	80	25	6	3,7	2
62RHR.050060657SA	5	6	57	16	6	4,6	2,5
62RHR.050060680SA	5	6	80	31	6	4,6	2,5
62RHR.060060757SA	6	7	57	19	6	5,5	3
62RHR.060060780SA	6	7	80	37	6	5,5	3
62RHR.080080963SA	8	9	63	25	8	7,4	4
62RHR.0800809100SA	8	9	100	49	8	7,4	4
62RHR.100101172SA	10	11	72	31	10	9,2	5
62RHR.1001011100SA	10	11	100	61	10	9,2	5
62RHR.120121383SA	12	13	83	37	12	11	6
62RHR.1201213120SA	12	13	120	73	12	11	6



66THR

TEMPERED STEEL MILLING

Multiflute torus radius endmill

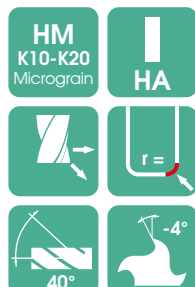
PVD TiAlN/TiSiN Cer-SA

Cerini[®]
CUTTING TOOLS MANUFACTURING

Steel Milling



66THR



Cod.	DC	APMX	OAL	LH	DCON	DN	RE	ZEFP
	+/-0,02	0/+2	0/+2	0/+2	h5	0/-0,05	0/+0,015	
66THR.02006035705SA	2	3	57	7	6	1,9	0,2	4
66THR.02006035710SA	2	3	57	7	6	1,9	0,4	4
66THR.02006038005SA	2	3	80	13	6	1,9	0,2	4
66THR.02006038010SA	2	3	80	13	6	1,9	0,4	4
66THR.03006045705SA	3	4	57	10	6	2,8	0,3	4
66THR.03006045710SA	3	4	57	10	6	2,8	0,6	4
66THR.03006048005SA	3	4	80	19	6	2,8	0,3	4
66THR.03006048010SA	3	4	80	19	6	2,8	0,6	4
66THR.04006055705SA	4	5	57	13	6	3,7	0,4	4
66THR.04006055710SA	4	5	57	13	6	3,7	0,8	4
66THR.04006058005SA	4	5	80	25	6	3,7	0,4	4
66THR.04006058010SA	4	5	80	25	6	3,7	0,8	4
66THR.05006065705SA	5	6	57	16	6	4,6	0,5	4
66THR.05006075710SA	5	6	57	16	6	4,6	1	4
66THR.05006068005SA	5	6	80	31	6	4,6	0,5	4
66THR.05006078010SA	5	6	80	31	6	4,6	1	4
66THR.06006075705SA	6	7	57	19	6	5,5	0,5	6
66THR.06006075710SA	6	7	57	19	6	5,5	1	6
66THR.06006078005SA	6	7	80	37	6	5,5	0,5	6
66THR.06006078010SA	6	7	80	37	6	5,5	1	6
66THR.08008096305SA	8	9	63	25	8	7,4	0,5	6
66THR.08008096310SA	8	9	63	25	8	7,4	1	6
66THR.080080910005SA	8	9	100	49	8	7,4	0,5	6
66THR.080080910010SA	8	9	100	49	8	7,4	1	6
66THR.10010117205SA	10	11	72	31	10	9,2	0,5	6
66THR.10010117210SA	10	11	72	31	10	9,2	1	6
66THR.100101110005SA	10	11	100	61	10	9,2	0,5	6
66THR.100101110010SA	10	11	100	61	10	9,2	1	6
66THR.12012138305SA	12	13	83	37	12	11	0,5	6
66THR.12012138310SA	12	13	83	37	12	11	1	6
66THR.120121312005SA	12	13	120	73	12	11	0,5	6
66THR.120121312010SA	12	13	120	73	12	11	1	6





Deburring Endmills



Tools features

- ▶ CNC deburring tool;
- ▶ Negative rake to strengthen cutting edge;
- ▶ Crossed cut to dissipate machining heat;
- ▶ Also available with TiAlN based coating.



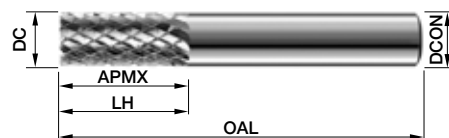
66M

DEBURRING ENDMILLS

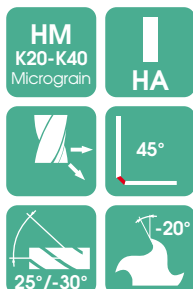
Double cut endmill

PVD TiAlN Cer-T

Also available without coating



66M



Cod.		DC	APMX	LH	OAL	DCON
Coated	Uncoated	h10	0/+2	0/+2	0/+2	h6
66M.030A	66M.030	3	10	10	40	3
66M.040A	66M.040	4	11	11	40	4
66M.050A	66M.050	5	13	13	50	5
66M.060A	66M.060	6	16	16	50	6
66M.080A	66M.080	8	19	19	63	8
66M.100A	66M.100	10	22	22	72	10
66M.120A	66M.120	12	26	26	83	12
66M.160A	66M.160	16	32	32	92	16
66M.180A	66M.180	18	32	32	92	18
66M.200A	66M.200	20	38	38	104	20



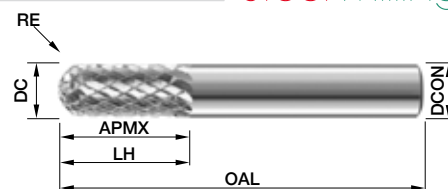
66MR

DEBURRING ENDMILLS Ball nose double cut endmill

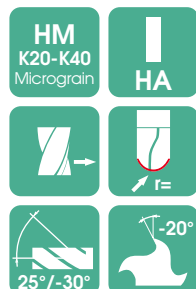
PVD TiAlN Cer-T
Also available without coating

Cerini[®]
CUTTING TOOLS MANUFACTURING

Steel Milling

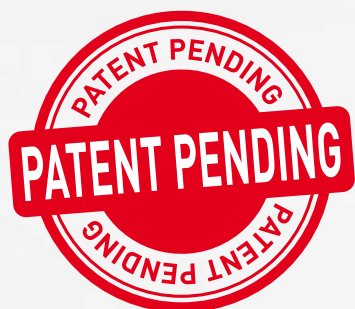


66MR



Cod.		DC	APMX	LH	OAL	DCON	RE
Coated	Uncoated	h10	0/+2	0/+2	0/+2	h6	0/-0,04
66MR.030A	66MR.030	3	10	10	40	3	1,5
66MR.040A	66MR.040	4	11	11	40	4	2
66MR.050A	66MR.050	5	13	13	50	5	2,5
66MR.060A	66MR.060	6	16	16	50	6	3
66MR.080A	66MR.080	8	19	19	63	8	4
66MR.100A	66MR.100	10	22	22	72	10	5
66MR.120A	66MR.120	12	26	26	83	12	6
66MR.160A	66MR.160	16	32	32	92	16	8
66MR.180A	66MR.180	18	32	32	92	18	9
66MR.200A	66MR.200	20	38	38	104	20	10





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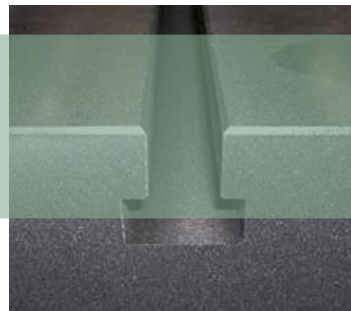
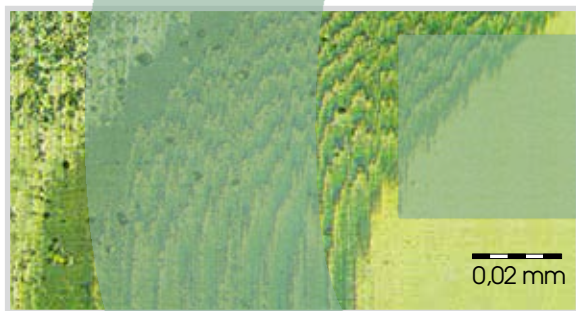
T-slot cutters

Tools features

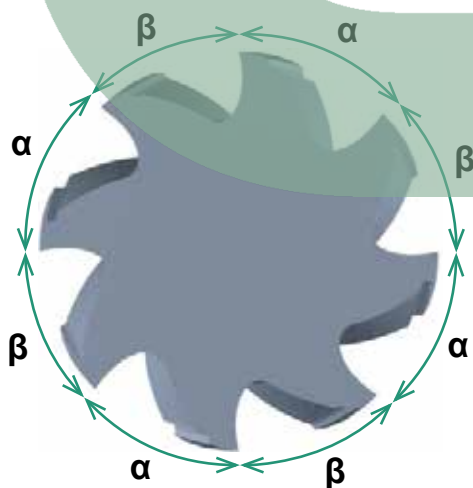
Endmill according to DIN 650 standard



Multilayer AlTiN based coating



Solid carbide head brazing and steel shank allow a combination of performance and tool's economy



- Irregular division and uneven helix;
- Vibration free;
- Roughing and finishing with the same tool;
- Excellent chips evacuation thanks to flute geometry.

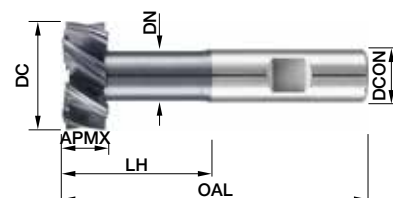
Collects or bushings with slots for improved intake of cooling lubricant are highly recommended



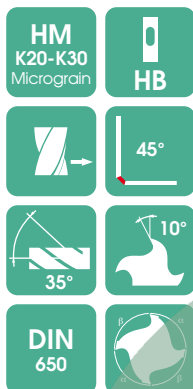
T-SLOT CUTTER

Z6/Z10 right helix endmill

PVD TiAlCrN Cer-Y

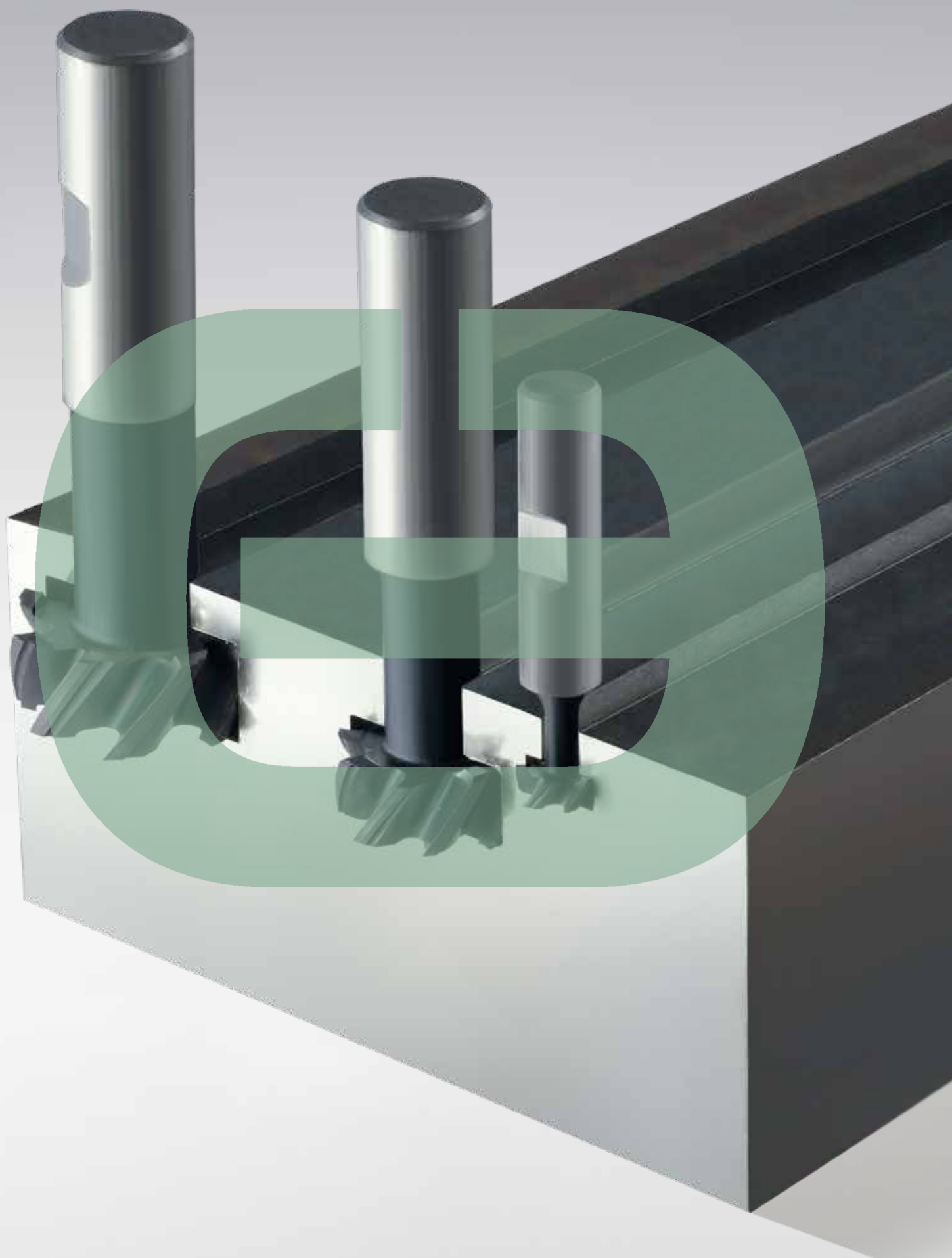


78



Cod.	DC	APMX	APMX TOL.	LH	OAL	DCON	DN	ZEFP
	e8			0/+2	0/+2	h6	0/+0,05	
78.110100453,5Y	11	4	-0,105/-0,030	10,5	53,5	10	4	6
78.125100657Y	12,5	6	-0,105/-0,030	13	57	10	5	6
78.160100862Y	16	8	-0,130/-0,040	18	62	10	7	6
78.180120870Y	18	8	-0,130/-0,040	21	70	12	8	6
78.190120971Y	19	9	-0,130/-0,040	22	71	12	8	6
78.210120974Y	21	9	-0,130/-0,040	25	74	12	10	6
78.220121075Y	22	10	-0,130/-0,040	26	75	12	10	6
78.250161182Y	25	11	-0,160/-0,050	28	82	16	12	8
78.280161285Y	28	12	-0,160/-0,050	32	85	16	13	8
78.320161490Y	32	14	-0,160/-0,050	36	90	25	15	8
78.3602516103Y	36	16	-0,160/-0,050	42	103	25	17	8
78.4002518108Y	40	18	-0,160/-0,050	49	108	25	19	10





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Milling - Working parameters

						Short/long version	Extralong version	Short/long version	Extralong version	DC = 2 mm			DC = 3 mm			
										ae 0,1-0,2 x DC	ae 0,3-0,4 x DC	ae 0,6-1,0 x DC	ae 0,1-0,2 x DC	ae 0,3-0,4 x DC	ae 0,6-1,0 x DC	ae 0,1-0,2 x DC
Tool	ISO	Material	Streght [MPa]	N.	Designation	Vc [m/min]	ap max x DC		fz [mm]			fz [mm]				
640(W) 640(W)R* 640(W)SP	P	General construction steel	< 800	1.0037	St37-2	200	160	1,0	0,5				0,024	0,019	0,014	0,029
		Automatic steel	< 800	1.0719	9SMnPb28	210	170	1,0	0,5				0,024	0,019	0,014	0,029
		Unalloyed case hardened steel	< 800	1.0401	C15	180	140	1,0	0,5				0,017	0,013	0,010	0,029
		Alloyed case hardened steel	< 1000	1.7331	16MnCr5 (EC80)	160	130	1,0	0,5				0,012	0,009	0,007	0,029
		Unalloyed annealed steel	< 850	1.0503	C45	170	135	1,0	0,5				0,017	0,013	0,010	0,029
		Unalloyed annealed steel	< 1000	1.0601	C60	160	130	1,0	0,5				0,018	0,014	0,010	0,029
		Alloyed annealed steel	< 800	1.5131	50MnS14	160	130	1,0	0,5				0,018	0,014	0,010	0,029
		Alloyed annealed steel	< 1300	1.5755	31NiCr14	140	115	1,0	0,5				0,012	0,009	0,007	0,029
		Cast steel	< 850	0.9650	G-X260Cr27	140	110	1,0	0,5				0,018	0,014	0,010	0,029
		Nitriding steel	< 1000	1.8504	34CrAl6	160	130	1,0	0,5				0,018	0,014	0,010	0,029
		Nitriding steel	< 1200	1.8515	31CrMo12	140	115	1,0	0,5				0,012	0,009	0,007	0,022
		Bearing steel	< 1200	1.3505	100Cr6 (W3)	160	130	1,0	0,5				0,018	0,014	0,010	0,029
	Tool steel (cold working)	< 1300	1.2312	40CrMnMoS8 6	150	120	1,0	0,5				0,017	0,013	0,010	0,029	
	Tool steel (hot working)	< 1300	1.2343	X38CrMoV 51	130	100	1,0	0,5				0,017	0,013	0,010	0,029	
	M	Sulphured stainless steel	< 850	1.4305	X8CrNiS18-9	110	90	1,0	0,5				0,012	0,009	0,007	0,018
		Ferritic stainless steel	< 750	1.4510	X3CrTi17	100	80	1,0	0,5				0,012	0,009	0,007	0,018
		Martensitic stainless steel	< 900	1.4034	X46Cr13	85	70	1,0	0,5				0,012	0,009	0,007	0,018
		Ferritic martensitic stainless steel	< 1100	1.4313	X3CrNi13.4	100	80	1,0	0,5				0,012	0,009	0,007	0,018
		Austenitic/ferritic martensitic stainless steel	< 850	1.4460	X8CrNiMo27 5	100	80	1,0	0,5				0,012	0,009	0,007	0,018
		Austenitic stainless steel	< 750	1.4301	X5CrNi18-10	100	80	1,0	0,5				0,012	0,009	0,007	0,018
	K	Lamellar graphite cast iron	100-350	0.6010	GG10	170	135	1,0	0,5				0,024	0,019	0,014	0,036
		Grey graphite cast iron	300-1000	0.6030	GG30	140	110	1,0	0,5				0,018	0,014	0,010	0,036
		Spheroidal cast iron	300-500	0.7040	GGG40	160	130	1,0	0,5				0,018	0,014	0,010	0,029
		Spheroidal cast iron	550-800	0.7060	GGG60	130	100	1,0	0,5				0,018	0,014	0,010	0,029
		Tempered white cast iron	350-450	0.8035	GTW35	150	120	1,0	0,5				0,018	0,014	0,010	0,029
		Tempered white cast iron	500-650	0.8055	GTW55	140	110	1,0	0,5				0,018	0,014	0,010	0,029
		Tempered black cast iron	350-450	0.8135	GTS35	150	120	1,0	0,5				0,018	0,014	0,010	0,029
		Tempered black cast iron	500-700	0.8155	GTS55	135	110	1,0	0,5				0,018	0,014	0,010	0,029
64(R)*	P	General construction steel	< 800	1.0037	St37-2	200	160	1,0	0,5	0,012	0,009	0,007	0,020	0,015	0,011	0,023
		Automatic steel	< 800	1.0719	9SMnPb28	210	170	1,0	0,5	0,012	0,009	0,007	0,020	0,015	0,011	0,023
		Unalloyed case hardened steel	< 800	1.0401	C15	180	140	1,0	0,5	0,010	0,008	0,006	0,014	0,011	0,008	0,023
		Alloyed case hardened steel	< 1000	1.7331	16MnCr5 (EC80)	160	130	1,0	0,5	0,009	0,007	0,005	0,010	0,008	0,005	0,023
		Unalloyed annealed steel	< 850	1.0503	C45	170	135	1,0	0,5	0,010	0,008	0,006	0,014	0,011	0,008	0,023
		Unalloyed annealed steel	< 1000	1.0601	C60	160	130	1,0	0,5	0,011	0,008	0,006	0,015	0,011	0,008	0,023
		Alloyed annealed steel	< 800	1.5131	50MnS14	160	130	1,0	0,5	0,011	0,008	0,006	0,015	0,011	0,008	0,023
		Alloyed annealed steel	< 1300	1.5755	31 NiCr14	140	115	1,0	0,5	0,009	0,007	0,005	0,010	0,008	0,005	0,023
		Nitriding steel	< 1000	1.8504	34CrAl6	160	130	1,0	0,5	0,011	0,008	0,006	0,015	0,011	0,008	0,023
		Nitriding steel	< 1200	1.8515	31CrV1012	140	115	1,0	0,5	0,011	0,008	0,006	0,015	0,011	0,008	0,023
		Cast steel	< 850	0.9650	G-X260Cr27	140	110	1,0	0,5	0,008	0,006	0,004	0,010	0,008	0,005	0,017
		Bearing steel	< 1200	1.3505	100Cr6 (W3)	160	130	1,0	0,5	0,011	0,008	0,006	0,015	0,011	0,008	0,023
	Tool steel (cold working)	< 1300	1.2312	40CrMnMoS8 6	150	120	1,0	0,5	0,010	0,008	0,006	0,014	0,011	0,008	0,023	
	Tool steel (hot working)	< 1300	1.2343	X38CrMoV 51	130	100	1,0	0,5	0,010	0,008	0,006	0,014	0,011	0,008	0,023	
	M	Sulphured stainless steel	< 850	1.4305	X8CrNiS18 9	110	90	1,0	0,5	0,007	0,005	0,004	0,010	0,008	0,005	0,015
		Ferritic stainless steel	< 750	1.4510	X3CrTi17	100	80	1,0	0,5	0,007	0,005	0,004	0,010	0,008	0,005	0,015
		Martensitic stainless steel	< 900	1.4034	X46Cr13	85	70	1,0	0,5	0,007	0,005	0,004	0,010	0,008	0,005	0,015
		Ferritic/Martensitic stainless steel	< 1100	1.4313	X3CrNi13.4	100	80	1,0	0,5	0,007	0,005	0,004	0,010	0,008	0,005	0,015
		Ferritic/Martensitic stainless steel	< 850	1.4460	X8CrNiMo27 5	100	80	1,0	0,5	0,007	0,005	0,004	0,010	0,008	0,005	0,015
		Austenitic stainless steel	< 750	1.4301	X5CrNi18-10	100	80	1,0	0,5	0,007	0,005	0,004	0,010	0,008	0,005	0,015
	K	Lamellar graphite cast iron	100-350	0.6010	GG10	170	135	1,0	0,5	0,014	0,011	0,008	0,020	0,015	0,011	0,029
		Grey graphite cast iron	300-1000	0.6030	GG30	140	110	1,0	0,5	0,012	0,009	0,007	0,015	0,011	0,008	0,029
		Spheroidal cast iron	300-500	0.7040	GGG40	160	130	1,0	0,5	0,011	0,008	0,006	0,015	0,011	0,008	0,023
		Spheroidal cast iron	550-800	0.7060	GGG60	130	100	1,0	0,5	0,011	0,008	0,006	0,015	0,011	0,008	0,023
		Tempered white cast iron	350-450	0.8035	GTW35	150	120	1,0	0,5	0,011	0,008	0,006	0,015	0,011	0,008	0,023
		Tempered white cast iron	500-650	0.8055	GTW55	140	110	1,0	0,5	0,011	0,008	0,006	0,015	0,011	0,008	0,023
		Tempered black cast iron	350-450	0.8135	GTS35	150	120	1,0	0,5	0,011	0,008	0,006	0,015	0,011	0,008	0,023
		Tempered black cast iron	500-700	0.8155	GTS55	135	110	1,0	0,5	0,011	0,008	0,006	0,015	0,011	0,008	0,023

* Ball nose end mills: calculate n[rpm] as per Tab.K pag. 46



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Milling - Working parameters

						Short/long version	Extralong version	Short/long version	Extralong version	DC = 2 mm			DC = 3 mm			
										ae 0,1-0,2 x DC	ae 0,3-0,4 x DC	ae 0,6-1,0 x DC	ae 0,1-0,2 x DC	ae 0,3-0,4 x DC	ae 0,6-1,0 x DC	
Tool	ISO	Material	Streght [MPa]	N.	Designation	Vc [m/min]	ap max x DC		fz [mm]			fz [mm]				
62(R)* 63(R)*	P	General construction steel	< 800	1.0037	St37-2	200	160	1,0	0,5	0,012	0,009	0,007	0,020	0,015	0,011	0,023
		Automatic steel	< 800	1.0719	9SMnPb28	210	170	1,0	0,5	0,012	0,009	0,007	0,020	0,015	0,011	0,023
		Unalloyed case hardened steel	< 800	1.0401	C15	180	140	1,0	0,5	0,010	0,008	0,006	0,014	0,011	0,008	0,023
		Alloyed case hardened steel	< 1000	1.7331	16MnCr5 (EC80)	160	130	1,0	0,5	0,009	0,007	0,005	0,010	0,008	0,005	0,023
		Unalloyed annealed steel	< 850	1.0503	C45	150	135	1,0	0,5	0,010	0,008	0,006	0,014	0,011	0,008	0,023
		Unalloyed annealed steel	< 1000	1.0601	C60	160	130	1,0	0,5	0,011	0,008	0,006	0,015	0,011	0,008	0,023
		Alloyed annealed steel	< 800	1.5131	50MnS14	160	130	1,0	0,5	0,011	0,008	0,006	0,015	0,011	0,008	0,023
		Alloyed annealed steel	< 1300	1.5755	31NiCr14	140	115	1,0	0,5	0,009	0,007	0,005	0,010	0,008	0,005	0,023
		Cast steel	< 850	0.9650	G-X260Cr27	140	110	1,0	0,5	0,011	0,008	0,006	0,015	0,011	0,008	0,023
		Nitriding steel	< 1000	1.8504	34CrA16	160	130	1,0	0,5	0,011	0,008	0,006	0,015	0,011	0,008	0,023
		Nitriding steel	< 1200	1.8515	31CrMo12	140	115	1,0	0,5	0,008	0,006	0,004	0,010	0,008	0,005	0,017
		Bearing steel	< 1200	1.3505	100Cr6 (W3)	160	130	1,0	0,5	0,011	0,008	0,006	0,015	0,011	0,008	0,023
		Tool steel (cold working)	< 1300	1.2312	40CrMnMoS8 6	150	120	1,0	0,5	0,010	0,008	0,006	0,014	0,011	0,008	0,023
		Tool steel (hot working)	< 1300	1.2343	X38CrMoV 51	130	100	1,0	0,5	0,010	0,008	0,006	0,014	0,011	0,008	0,023
	M	Sulphured stainless steel	< 850	1.4305	X8CrNiS18-9	110	90	1,0	0,5	0,007	0,005	0,004	0,010	0,008	0,005	0,015
		Ferritic stainless steel	< 750	1.4510	X3CrTi17	100	80	1,0	0,5	0,007	0,005	0,004	0,010	0,008	0,005	0,015
		Martensitic stainless steel	< 900	1.4034	X46Cr13	85	70	1,0	0,5	0,007	0,005	0,004	0,010	0,008	0,005	0,015
		Ferritic martensitic stainless steel	< 1100	1.4313	X3CrNi113.4	100	80	1,0	0,5	0,007	0,005	0,004	0,010	0,008	0,005	0,015
		Austenitic/ferritic martensitic stainless steel	< 850	1.4460	X8CrNiMo27 5	100	80	1,0	0,5	0,007	0,005	0,004	0,010	0,008	0,005	0,015
		Austenitic stainless steel	< 750	1.4301	X5CrNi18-10	100	80	1,0	0,5	0,007	0,005	0,004	0,010	0,008	0,005	0,015
	K	Lamellar graphite cast iron	100-350	0.6010	GG10	170	135	1,0	0,5	0,014	0,011	0,008	0,020	0,015	0,011	0,029
		Grey graphite cast iron	300-1000	0.6030	GG30	140	110	1,0	0,5	0,012	0,009	0,007	0,015	0,011	0,008	0,029
		Spheroidal cast iron	300-500	0.7040	GGG40	160	130	1,0	0,5	0,011	0,008	0,006	0,015	0,011	0,008	0,023
		Spheroidal cast iron	550-800	0.7060	GGG60	130	100	1,0	0,5	0,011	0,008	0,006	0,015	0,011	0,008	0,023
		Tempered white cast iron	350-450	0.8035	GTW35	150	120	1,0	0,5	0,011	0,008	0,006	0,015	0,011	0,008	0,023
		Tempered white cast iron	500-650	0.8055	GTW55	140	110	1,0	0,5	0,011	0,008	0,006	0,015	0,011	0,008	0,023
		Tempered black cast iron	350-450	0.8135	GTS35	150	120	1,0	0,5	0,011	0,008	0,006	0,015	0,011	0,008	0,023
		Tempered black cast iron	500-700	0.8155	GTS55	135	110	1,0	0,5	0,011	0,008	0,006	0,015	0,011	0,008	0,023

* Ball nose end mills: calculate n[rpm] as per Tab.K pag. 46





Milling - Working parameters

								DC = 1 mm
								ae max = 0,1 x DC
Tool	ISO	Material	Hardness [HRC]	N.	Designation	Vc [m/min]	ap max x DC	fz [mm]
62RHR*	P	Unalloyed annealed steel		1,0503	C45	120	0,1	0,002
		Annealed tool steel	59-61	1.2080 (K100)	X210Cr12	70	0,1	0,002
		Annealed tool steel	60-62	1.2379 (K110)	X155CrVMo121	70	0,1	0,002
		Anneal steel	58-60	1.2842	90MnVCr8	70	0,1	0,003
		Annealed stainless steel	52-54	12083	X40Cr14	100	0,1	0,002

* Ball nose end mills: calculate n[rpm] as per Tab.K pag. 46

								DC = 2 mm
								ae max = 0,1 x DC
Tool	ISO	Material	Hardness [HRC]	N.	Designation	Vc [m/min]	ap max x DC	fz [mm]
66THR	P	Unalloyed annealed steel		1,0503	C45	120	0,1	0,004
		Annealed tool steel	59-61	1.2080 (K100)	X210Cr12	70	0,1	0,005
		Annealed tool steel	60-62	1.2379 (K110)	X155CrVMo121	70	0,1	0,005
		Anneal steel	58-60	1.2842	90MnVCr8	70	0,1	0,006
		Annealed stainless steel	52-54	12083	X40Cr14	100	0,1	0,004

								DC = 3 mm			DC = 4 mm			
								ae 0.1-0.2 x DC	ae 0.3-0.4 x DC	ae 0.6-1.0 x DC	ae 0.1-0.2 x DC	ae 0.3-0.4 x DC	ae 0.6-1.0 x DC	ae 0.1-0.2 x DC
Tool	ISO	Material	Streght [MPa]	N.	Designation	Vc [m/min]	ap max x DC	fz [mm]			fz [mm]			
66M(R)*	P	General construction steel	< 800	1,0037	St37-2	200	1,0	0,014	0,011	0,008	0,016	0,013	0,009	0,025
		Automatic steel	< 800	1,0719	9SMnPb28	210	1,0	0,014	0,011	0,008	0,016	0,013	0,009	0,025
		Unalloyed case hardened steel	< 800	1,0401	C15	180	1,0	0,010	0,008	0,005	0,016	0,013	0,009	0,025
		Alloyed case hardened steel	< 1000	1,7331	16MnCr5 (EC80)	160	1,0	0,007	0,005	0,004	0,016	0,013	0,009	0,025
		Unalloyed annealed steel	< 850	1,0503	C45	170	1,0	0,010	0,008	0,005	0,016	0,013	0,009	0,025
		Unalloyed annealed steel	< 1000	1,0601	C60	160	1,0	0,010	0,008	0,006	0,016	0,013	0,009	0,025
		Alloyed annealed steel	< 800	1,5131	50MnS14	160	1,0	0,010	0,008	0,006	0,016	0,013	0,009	0,025
		Alloyed annealed steel	< 1300	1,5755	31NiCr14	140	1,0	0,007	0,005	0,004	0,016	0,013	0,009	0,025
		Cast steel	< 850	0,9650	G-X260Cr27	140	1,0	0,010	0,008	0,006	0,016	0,013	0,009	0,025
		Nitriding steel	< 1000	1,8504	34CrA16	160	1,0	0,010	0,008	0,006	0,016	0,013	0,009	0,025
		Nitriding steel	< 1200	1,8515	31CrMo12	140	1,0	0,007	0,005	0,004	0,012	0,009	0,007	0,018
		Bearing steel	< 1200	1,3505	100Cr6 (W3)	160	1,0	0,010	0,008	0,006	0,016	0,013	0,009	0,025
		Tool steel (cold working)	< 1300	1,2312	40CrMnMoS8 6	150	1,0	0,010	0,008	0,005	0,016	0,013	0,009	0,025
		Tool steel (hot working)	< 1300	1,2343	X38CrMoV 51	130	1,0	0,010	0,008	0,005	0,016	0,013	0,009	0,025
	M	Sulphured stainless steel	< 850	1,4305	X8CrNiS18-9	110	1,0	0,007	0,005	0,004	0,010	0,008	0,006	0,015
		Ferritic stainless steel	< 750	1,4510	X3CrTi17	100	1,0	0,007	0,005	0,004	0,010	0,008	0,006	0,015
		Martensitic stainless steel	< 900	1,4034	X46Cr13	85	1,0	0,007	0,005	0,004	0,010	0,008	0,006	0,015
		Ferritic martensitic stainless steel	< 1100	1,4313	X3CrNi113.4	100	1,0	0,007	0,005	0,004	0,010	0,008	0,006	0,015
		Austenitic/ferritic martensitic stainless steel	< 850	1,4460	X8CrNiMo27 5	100	1,0	0,007	0,005	0,004	0,010	0,008	0,006	0,015
		Austenitic stainless steel	< 750	1,4301	X5CrNi18-10	100	1,0	0,007	0,005	0,004	0,010	0,008	0,006	0,015
	K	Lamellar graphite cast iron	100-350	0,6010	GG10	170	1,0	0,014	0,011	0,008	0,020	0,016	0,011	0,029
		Grey graphite cast iron	300-1000	0,6030	GG30	140	1,0	0,010	0,008	0,006	0,020	0,016	0,011	0,029
		Spheroidal cast iron	300-500	0,7040	GGG40	160	1,0	0,010	0,008	0,006	0,016	0,013	0,009	0,025
		Spheroidal cast iron	550-800	0,7060	GGG60	130	1,0	0,010	0,008	0,006	0,016	0,013	0,009	0,025
		Tempered white cast iron	350-450	0,8035	GTW35	150	1,0	0,010	0,008	0,006	0,016	0,013	0,009	0,025
		Tempered white cast iron	500-650	0,8055	GTW55	140	1,0	0,010	0,008	0,006	0,016	0,013	0,009	0,025
		Tempered black cast iron	350-450	0,8135	GTS35	150	1,0	0,010	0,008	0,006	0,016	0,013	0,009	0,025
		Tempered black cast iron	500-700	0,8155	GTS55	135	1,0	0,010	0,008	0,006	0,016	0,013	0,009	0,025

* Ball nose end mills: calculate n[rpm] as per Tab.K pag. 46



Milling - Working parameters

							DC = 11 mm	DC = 12,5 mm	DC = 16 mm
Tool	ISO	Material	Streght [MPa]	N.	Designation	Vc [m/min]	fz [mm]	fz [mm]	fz [mm]
78°	P	General construction steel	< 800	1,0037	S137-2	80	0,015	0,018	0,021
		Automatic steel	< 800	1,0719	9SMnPb28	84	0,015	0,018	0,021
		Unalloyed case hardened steel	< 800	1,0401	C15	72	0,015	0,018	0,021
		Alloyed case hardened steel	< 1000	1,7331	16MnCr5 (EC80)	64	0,015	0,018	0,021
		Unalloyed annealed steel	< 850	1,0503	C45	68	0,015	0,018	0,021
		Unalloyed annealed steel	< 1000	1,0601	C60	64	0,015	0,018	0,021
		Alloyed annealed steel	< 800	1,5131	50MnS14	64	0,015	0,018	0,021
		Alloyed annealed steel	< 1300	1,5755	31NiCr14	56	0,015	0,018	0,021
		Cast steel	< 850	0,9650	G-X260Cr27	56	0,015	0,018	0,021
		Nitriding steel	< 1000	1,8504	34CrA16	64	0,015	0,018	0,021
		Nitriding steel	< 1200	1,8515	31CrMo12	56	0,011	0,014	0,016
		Bearing steel	< 1200	1,3505	100Cr6 (W3)	64	0,015	0,018	0,021
		Tool steel (cold working)	< 1300	1,2312	40CrMnMoS8 6	60	0,015	0,018	0,021
		Tool steel (hot working)	< 1300	1,2343	X38CrMoV 51	60	0,015	0,018	0,021
	M	Sulphured stainless steel	< 850	1,4305	X8CrNiS18-9	44	0,010	0,012	0,014
		Ferritic stainless steel	< 750	1,451	X3CrTi17	40	0,010	0,012	0,014
		Martensitic stainless steel	< 900	1,4034	X46Cr13	34	0,015	0,018	0,021
		Ferritic martensitic stainless steel	< 1100	1,4313	X3CrNi113.4	40	0,015	0,018	0,021
		Austenitic/ferritic martensitic stainless steel	< 850	1,446	X8CrNiMo27 5	40	0,015	0,018	0,021
		Austenitic stainless steel	< 750	1,4301	X5CrNi18-10	40	0,015	0,018	0,021
	K	Lamellar graphite cast iron	100-350	0,601	GG10	68	0,028	0,034	0,040
		Grey graphite cast iron	300-1000	0,603	GG30	56	0,028	0,034	0,040
		Spheroidal cast iron	300-500	0,704	GGG40	64	0,012	0,014	0,017
		Spheroidal cast iron	550-800	0,706	GGG60	52	0,012	0,014	0,017
		Tempered white cast iron	350-450	0,8035	GTW35	60	0,015	0,018	0,021
		Tempered white cast iron	500-650	0,8055	GTW55	56	0,015	0,018	0,021
		Tempered black cast iron	350-450	0,8135	GTS35	60	0,015	0,018	0,021
		Tempered black cast iron	500-700	0,8155	GTS55	54	0,015	0,018	0,021

* Reduce fz by 50% while approaching the workpiece

Tab. K

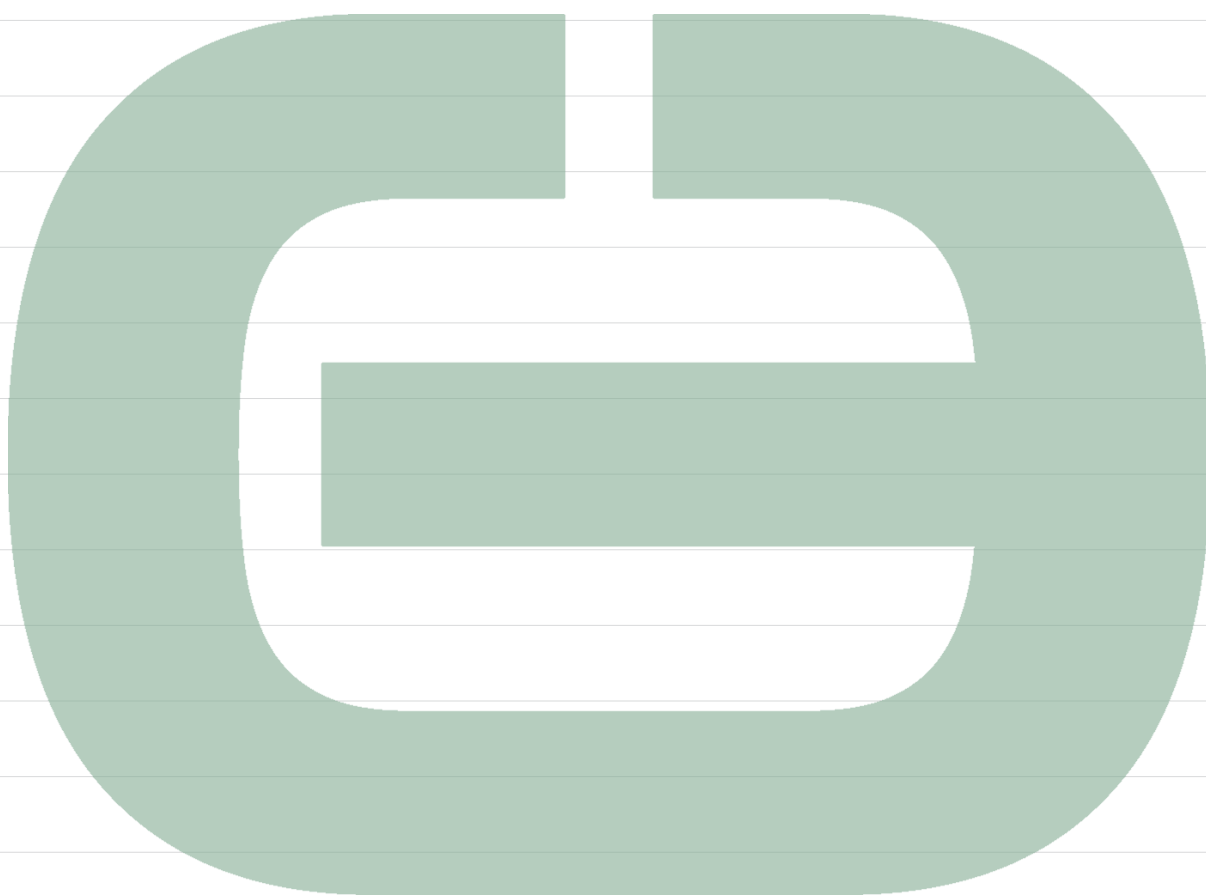
Tab. K								
ap	DC x 0,05	DC x 0,1	DC x 0,15	DC x 0,2	DC x 0,25	DC x 0,3	DC x 0,4	DC x 0,5
K	2,3	1,7	1,4	1,3	1,2	1,1	1,0	1,0

$$n[\text{rpm}] = K \times Vc[\text{m/min}] \times 1000 / (Dc[\text{mm}] \times 3,14)$$



DC = 18 mm	DC = 19 mm	DC = 21 mm	DC = 22 mm	DC = 25 mm	DC = 28 mm	DC = 32 mm	DC = 36 mm	DC = 40 mm
fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]
0,025	0,028	0,030	0,030	0,030	0,035	0,040	0,045	0,045
0,025	0,028	0,030	0,030	0,030	0,035	0,040	0,045	0,045
0,025	0,028	0,030	0,030	0,030	0,035	0,040	0,045	0,045
0,025	0,028	0,030	0,030	0,030	0,035	0,040	0,045	0,045
0,025	0,028	0,030	0,030	0,030	0,035	0,040	0,045	0,045
0,025	0,028	0,030	0,030	0,030	0,035	0,040	0,045	0,045
0,025	0,028	0,030	0,030	0,030	0,035	0,040	0,045	0,045
0,025	0,028	0,030	0,030	0,030	0,035	0,040	0,045	0,045
0,025	0,028	0,030	0,030	0,030	0,035	0,040	0,045	0,045
0,019	0,021	0,023	0,023	0,023	0,026	0,030	0,034	0,034
0,025	0,028	0,030	0,030	0,030	0,035	0,040	0,045	0,045
0,025	0,028	0,030	0,030	0,030	0,035	0,040	0,045	0,045
0,025	0,028	0,030	0,030	0,030	0,035	0,040	0,045	0,045
0,017	0,019	0,020	0,020	0,020	0,023	0,027	0,030	0,030
0,017	0,019	0,020	0,020	0,020	0,023	0,027	0,030	0,030
0,025	0,028	0,030	0,030	0,030	0,035	0,040	0,045	0,045
0,025	0,028	0,030	0,030	0,030	0,035	0,040	0,045	0,045
0,025	0,028	0,030	0,030	0,030	0,035	0,040	0,045	0,045
0,025	0,028	0,030	0,030	0,030	0,035	0,040	0,045	0,045
0,047	0,053	0,056	0,056	0,056	0,066	0,075	0,085	0,085
0,047	0,053	0,056	0,056	0,056	0,066	0,075	0,085	0,085
0,020	0,022	0,024	0,024	0,024	0,028	0,032	0,036	0,036
0,020	0,022	0,024	0,024	0,024	0,028	0,032	0,036	0,036
0,025	0,028	0,030	0,030	0,030	0,035	0,040	0,045	0,045
0,025	0,028	0,030	0,030	0,030	0,035	0,040	0,045	0,045
0,025	0,028	0,030	0,030	0,030	0,035	0,040	0,045	0,045
0,025	0,028	0,030	0,030	0,030	0,035	0,040	0,045	0,045







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