



MILLING TOOLS

SUPER F-UT

ISO-CODES



P	Steel, high-alloyed steel
M	Stainless steel
K	Grey cast iron, spheroidal and malleable cast iron
N	Aluminium and other non-ferrous metals
S	Special-, super- and Ti-alloys
H	Hardened steel and hard cast iron

Recommendations regarding tool suitability for the following application groups can be found on the following program pages:

- optimal suitability
- limited suitability

PICTOGRAMS



TOOL MATERIAL	VHM
	Solid carbide
SURFACE FINISH	bright AlTiN nano TiAl-SiN TiAlN Al-TiN+
Ø TOLERANCE	h10 e8
MILLING STRATEGY	HPC
CUTTING DIRECTION	R
	right-hand
SHANK FORM	HB HA
HELIX ANGLE	36° 38° 37° 35° 38° 37° 30° 32° 32° 41° 43° 45° 45° 45° 45° 36° 38° 38° 40° 42° 42° 30° 29° 31° 39° 40° 41° 44° 45° 46°
STANDARD	DIN 6527L DIN 6527K WN
	to Stock standard
TYPE	N NX N-F N-3 N-5 Ti H VA VA-X VA-X IK VA-XF VA-IK AI AL-F AL-3 FS

P	M	K	N	S	H	Type	Shank form	Helix angle °	Tool material	Surface	Standard	d1/mm	Catalog no.	Progr. page
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SuperF-UT end mills NX

	•	•	•	•	•	SuperF-UT NX	HA	36/38/37	Solid carbide	TiAlSiN	DIN 6527L	4.000 - 20.000	54590	518
	•	•	•	•	•	SuperF-UT NX	HB	36/38/37	Solid carbide	TiAlSiN	DIN 6527L	4.000 - 20.000	54591	519

SuperF-UT end mills N

	•	•	•	•	•	SuperF-UT N	HB	35/38	Solid carbide	TiAlN	DIN 6527K	6.000 - 20.000	64550	520
	•	•	•	•	•	SuperF-UT N	HA	35/38	Solid carbide	TiAlN	DIN 6527L	4.000 - 20.000	54551	521
	•	•	•	•	•	SuperF-UT N	HB	35/38	Solid carbide	TiAlN	DIN 6527L	4.000 - 25.000	64551	522
	•	•	•	•	•	SuperF-UT N	HA	35/38	Solid carbide	TiAlN	Company std.	6.000 - 20.000	54562	523
	•	•	•	•	•	SuperF-UT N	HB	35/38	Solid carbide	TiAlN	Company std.	6.000 - 20.000	54563	524
	•	•	•	•	•	SuperF-UT N	HA	35/38	Solid carbide	TiAlN	Company std.	10.000 - 25.000	54552	525
	•	•	•	•	•	SuperF-UT N-F	HA	30/32	Solid carbide	TiAlN	DIN 6527L	6.000 - 25.000	54566	526
	•	•	•	•	•	SuperF-UT N-F	HB	30/32	Solid carbide	TiAlN	DIN 6527L	6.000 - 25.000	54567	527
	•	•	•	•	•	SuperF-UT N-3	HA	41/43/45	Solid carbide	TiAlN	Company std.	3.000 - 20.000	54564	528
	•	•	•	•	•	SuperF-UT N-3	HB	41/43/45	Solid carbide	TiAlN	Company std.	3.000 - 20.000	54565	529
	•	•	•	•	•	SuperF-UT N-5	HA	45	Solid carbide	TiAlN	Company std.	4.000 - 20.000	54579	530
	•	•	•	•	•	SuperF-UT N-5	HB	45	Solid carbide	TiAlN	Company std.	4.000 - 20.000	54580	531

P	M	K	N	S	H	Type	Shank form	Helix angle °	Tool material	Surface	Standard	d1/mm	Catalog no.	Progr. page
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SuperF-UT end mills FS

	•	•	•	•	•	•	SuperF-UT FS	HA	44/45/46	Solid carbide	TiAlN	Company std.	8.000 - 25.000	64558	552
	•	•	•	•	•	•	SuperF-UT FS	HB	44/45/46	Solid carbide	TiAlN	Company std.	8.000 - 25.000	64559	553

SuperF-UT end mills Ti

	•	•	•	•	•	•	SuperF-UT Ti	HA	35/38	Solid carbide	AlTiN+	DIN 6527L	6.000 - 20.000	54560	532
	•	•	•	•	•	•	SuperF-UT Ti	HB	35/38	Solid carbide	AlTiN+	DIN 6527L	6.000 - 20.000	54561	533

SuperF-UT end mills H

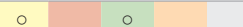
	•	•	•	•	•	•	SuperF-UT H	HA	40/42	Solid carbide	TiAlSiN	DIN 6527L	6.000 - 20.000	54572	550
	•	•	•	•	•	•	SuperF-UT H	HB	40/42	Solid carbide	TiAlSiN	DIN 6527L	6.000 - 20.000	54573	551

SuperF-UT end mills VA-X

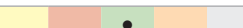
	•	•	•	•	•	•	SuperF-UT VA-X	HB	36/38	Solid carbide	AlTiN nano	DIN 6527K	4.000 - 20.000	54576	534
	•	•	•	•	•	•	SuperF-UT VA-X	HA	36/38	Solid carbide	AlTiN nano	DIN 6527L	3.000 - 25.000	54558	535
	•	•	•	•	•	•	SuperF-UT VA-X	HB	36/38	Solid carbide	AlTiN nano	DIN 6527L	3.000 - 25.000	54559	536
	•	•	•	•	•	•	SuperF-UT VA-X IK	HA	36/38	Solid carbide	AlTiN nano	DIN 6527L	6.000 - 25.000	54574	537
	•	•	•	•	•	•	SuperF-UT VA-X IK	HB	36/38	Solid carbide	AlTiN nano	DIN 6527L	6.000 - 25.000	54575	538
	•	•	•	•	•	•	SuperF-UT VA-XF	HA	36/38	Solid carbide	AlTiN nano	DIN 6527L	6.000 - 25.000	54568	539

P	M	K	N	S	H	Type	Shank form	Helix angle °	Tool material	Surface	Standard	d1/mm	Catalog no.	Progr. page
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SuperF-UT end mills VA-X

		SuperF-UT VA-XF	HB	36/38	Solid carbide	AlTiN nano	DIN 6527L	6.000 - 25.000	54569	540
		SuperF-UT S	HA	40/42	Solid carbide	AlTiN nano	DIN 6527L	4.000 - 20.000	54556	541
		SuperF-UT VA	HB	40/42	Solid carbide	TiAlN	DIN 6527L	4.000 - 20.000	64557	542
		SuperF-UT VA-IK	HB	40/42	Solid carbide	TiAlN	DIN 6527L	6.000 - 20.000	64567	543

SuperF-UT end mills Al

		SuperF-UT Al	HA	40/42	Solid carbide	bright	DIN 6527L	4.000 - 20.000	74554	544
		SuperF-UT Al	HB	40/42	Solid carbide	bright	DIN 6527L	4.000 - 20.000	74555	545
		SuperF-UT Al-F	HA	29/30/31	Solid carbide	bright	Company std.	6.000 - 25.000	54570	546
		SuperF-UT Al-F	HB	29/30/31	Solid carbide	bright	Company std.	6.000 - 25.000	54571	547
		SuperF-UT Al-3	HA	39/40/41	Solid carbide	bright	Company std.	3.000 - 20.000	74552	548
		SuperF-UT Al-3	HB	39/40/41	Solid carbide	bright	Company std.	3.000 - 20.000	74553	549

Application

by materials

Type	Catalog no.	Application	Non-ferrous metals, Aluminium	Steels	Cast iron	Stainless and acid- resistant steels	Nickel, Ti-alloys	Hardened steels
SuperF-UT NX	54590 54591	Slot drilling						
		Roughing						
		Finishing						
SuperF-UT N	64550 54551 54562 54563 54552	Slot drilling						
		Roughing						
		Finishing						
		Finishing						
SuperF-UT N-F	54566 54567	Slot drilling						
		Roughing						
		Finishing						
SuperF-UT N-3	54564 54565	Slot drilling						
		Roughing						
		Finishing						
SuperF-UT N-5	54579 54580	Slot drilling						
		Roughing						
		Finishing						
SuperF-UT FS	64558 64559	Slot drilling						
		Roughing						
		Finishing						
SuperF-UT Ti	54560 54561	Slot drilling						
		Roughing						
		Finishing						
SuperF-UT H	54572 54573	Slot drilling						
		Roughing						
		Finishing						
SuperF-UT VA-X	54576 54558 54559	Slot drilling						
		Roughing						
		Finishing						
SuperF-UT VA-X IK	54574 54575	Slot drilling						
		Roughing						
		Finishing						
SuperF-UT VA-XF	54568 54569	Slot drilling						
		Roughing						
		Finishing						
SuperF-UT VA	54556 64557 64567	Slot drilling						
		Roughing						
		Finishing						
SuperF-UT Al-3	74552 74553	Slot drilling						
		Roughing						
		Fine finishing						
SuperF-UT Al-F	54570 54571	Slot drilling						
		Roughing						
		Finishing						
SuperF-UT Al	74554 74555	Slot drilling						
		Roughing						
		Fine finishing						

optimal well suited

by tensile strength



General recommendations

Stock SuperF-UT end mills are designed for application under optimal machining conditions, i.e.:

- high machine performance
- sufficient coolant supply
- rigid workpiece and tool clamping

If these conditions are not available, we advise the use of SuperF-UT end mills with roughing and finishing profile. HPC- and HSC-machining are possible. More information on the following pages.

To machine steel materials (typically SuperF-UT type N) with a corner-radius end mill we suggest the SuperF-UT Ti, catalog no. 54560 or 54561.
We recommend climb milling.

for drilling:

- reduce feed rate v_f (mm/min.)
- additional pecking for drilling depths $> 0.5 \times D$ or transition to radial machining

Attention: Danger of breakage through abrupt load increase!

Oblique plunging up to 15° (preferred):

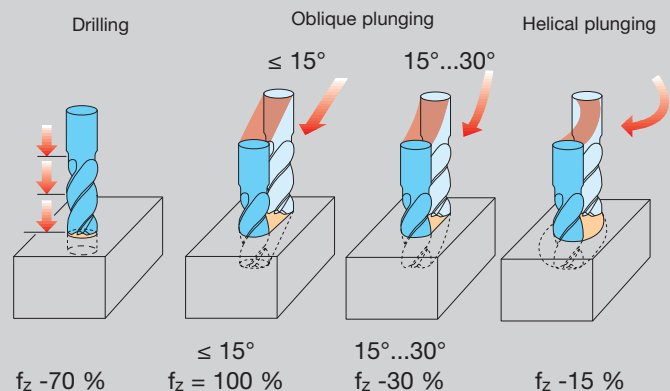
- reduction of feed rate v_f (mm/min.) not required

Oblique plunging between 15° and 30°:

- reduce feed rate v_f (mm/min.) in accordance with the illustration on the right

Helical plunging:

- for helical plunging on a milling cycle, we recommend a feed of 0.1 to 0.2 per cycle
- reduce feed rate v_f (mm/min.) in accordance with the illustration on the right
- select preferred hole diameter $1.8 \times D$



Formulae:

Revolution per min. n [min^{-1}]

$$n = \frac{v_c \cdot 1000}{\pi \cdot D}$$

Feed per min. v_f [mm/min]

$$v_f = f_z \cdot n \cdot Z_c$$

f_z = feed per tooth [mm/Z]

Z_c = effective no. of teeth

D = tool diameter [mm]

Chip volume Q [mm^3/min]

$$Q = \frac{a_p \cdot a_e \cdot v_f}{1000}$$

Torque M_c [Nm]

$$M_c = \frac{P_c \cdot 30 \cdot 10^3}{\pi \cdot n}$$

P_c = cutting force [kW]

v_c = cutting speed [m/min]

a_p = cutting depth [mm]

a_e = cutting width [mm]

π = Pi



SUPER F-UT NX



RAMPING

With extremely steep plunge angle up to 45°
Very good chip removal

DRILLING

Very good drilling characteristics to 2xD
No separate pilot tool necessary
Ideal for pre-drilling tool for reamers

SLOTING

High feed rate for plunging and slotting
High metal removal rate and undersize diameter
for precision slots
High process reliability with smooth operation

ROUGHING

Thanks to low power consumption also suitable
on less rigid machines
Up to 100% increased cutting speed in steel
High metal removal rate

FINISHING

Contours with high surface quality
Up to 100% increased tool life
High cutting parameters also in alloyed
heat-treatable steels

Strategy of HPC-Milling

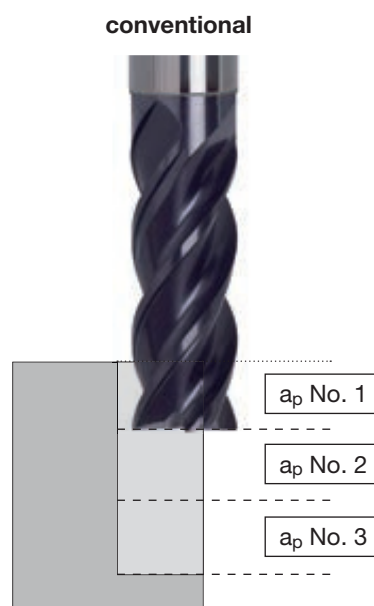
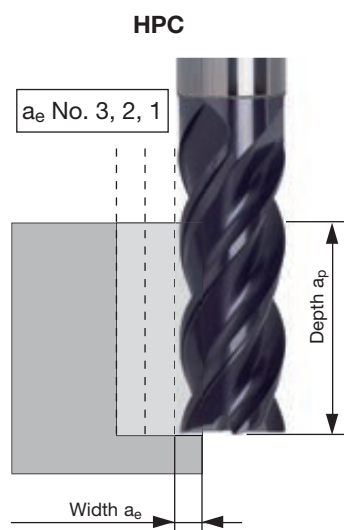
High Performance Cutting (HPC) is a milling strategy with increased feed and speed rates and generally larger milling depth, compared to regular milling processes.

Pros:

- less stress on tool and machine tool due to small cutting width
- less temperatures while milling
- use of entire length of cut possible
- thus, higher tool life

Cons:

- dynamic control on machine tool required when milling complex contours



Conversion chart for HPC-Milling

a_e	factor f_z	factor v_c	Q in %
100%	1.00	1.00	100
50%	1.00	1.20	59
40%	1.08	1.25	54
30%	1.20	1.30	45
20%	1.48	1.35	39
10%	2.00	1.50	27

Remarks:

The basis for all cutting data converted to HPC-Milling are those for slotting with SuperF-UT!

Example:

Tool: SuperF-UT N Ø12, No. 54551

Material: 42CrMo4

Cutting data „HPC Basis“:

$v_c = 135 \text{ m/min}$

$f_z = 0.065 \text{ mm/Z}$

Formula for HPC Application:

HPC-Cutting Data calculated on a_e 10 % of dia.:

$v_c = 135 \text{ m/min} \times 1,5 = 203 \text{ m/min}$

$f_z = 0.065 \text{ mm/Z} \times 2 = 0.13 \text{ mm/Z}$



F-UT HPC-Milling Basic Cutting Data



Stable conditions:
- good cooling
- sufficient performance
- short-chipping

Unstable conditions:
- standard cooling
- average performance
- medium- to long-chipping

Calculation for HPC-milling			
ae	factor fz	factor Vc	Q in %
100%	1.00	1.00	100
50%	1.00	1.20	59
40%	1.08	1.25	54
30%	1.20	1.30	45
20%	1.48	1.35	39
10%	2.00	1.50	27

Material	Hardness / tensile strength	recommended F-UT Type	Type of conditions	v _c [m/min]	Feed fz [mm/z] with nom. Ø							
					3	6	8	10	12	16	20	25
P Struct. + free-cutting steels, unalloyed heat-treat. + case hard. steels 1.0035 S185, 1.0486 P275N, 1.0345 P235GH, 1.0050, 1.0070, 1.8937 1.0718 11SMnPb30, 1.0736 11SMn37 1.0402 C22, 1.1178 C30E, 1.0503 C45, 1.1191 C30E 1.0301 C10, 1.1121 C10E, 1.1750 C75W, 1.2076 102Cr6, 1.2307 29CrMoV9	up to 850 N/mm ²	N	stable conditions	180	0.018	0.035	0.045	0.060	0.070	0.090	0.100	0.150
		N-F	unstable conditions	180	0.013	0.025	0.032	0.042	0.049	0.063	0.070	0.105
P Free-cutting steels, unalloyed case hardened steels, nitriding steels 1.0727 46 S20, 1.0728 60 S20, 1.0757 46SPb20 1.0601 C60, 1.1221 C60E, 1.7043 38Cr4 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5 1.8504 34CrAl6, 1.8519 31CrMoV9, 1.8550 34CrAlNi7	850-1.200 N/mm ²	N	stable conditions	160	0.018	0.035	0.045	0.060	0.070	0.090	0.100	0.150
		N-F	unstable conditions	160	0.013	0.025	0.032	0.042	0.049	0.063	0.070	0.105
P Alloyed heat-treatable, tool and high speed steels 1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4, 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4, 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2379 X155CrVMo12-1, 1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3 Federstahl = 1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4	850-1.400 N/mm ²	N	stable conditions	135	0.016	0.030	0.040	0.055	0.065	0.080	0.095	0.140
		N-F	unstable conditions	135	0.011	0.021	0.028	0.039	0.046	0.056	0.067	0.098
H Hardened steel Tool steel, heat-treatable steel, spring steel, high-speed steel, case hardened steel, etc. e.g.: 1.2344 X40CrMoV5-1; 1.2767 X45NiCrMo4; 1.2379 X155CrVMo12-1; 1.2080 X210Cr12 1.3343 S 6-5-2	up to 54 HRC	N	stable conditions	70	0.012	0.025	0.030	0.040	0.045	0.060	0.070	0.100
		N-F	unstable conditions	70	0.008	0.018	0.021	0.028	0.032	0.042	0.049	0.070
M Stainless steel 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X10CrNiS18-9 USA = 303, 410, 420F, 430, 430F	up to 750 N/mm ²	VA-X	stable conditions	120	0.015	0.030	0.040	0.050	0.060	0.070	0.090	0.130
		VA-XF	unstable conditions	120	0.011	0.021	0.028	0.035	0.042	0.049	0.063	0.091
M Stainless steel 1.4301X5CrNi18-10, 1.4303 X5CrNi18-12 1.4310 XCrNi18-8 USA = 304, 304L, 420	750-850 N/mm ²	VA-X	stable conditions	80	0.015	0.025	0.035	0.045	0.050	0.065	0.080	0.120
		VA-XF	unstable conditions	80	0.011	0.018	0.025	0.032	0.035	0.046	0.056	0.084
M Stainless steel 1.4438 X2CrNiMo18-15-4, 1.4404 X2CrNiMo17-12-2, 1.4571 X6CrNiTi18-10 USA = 310, 316, 316B, 316L, 317	above 850 N/mm ²	VA-X	stable conditions	70	0.012	0.025	0.030	0.040	0.045	0.060	0.070	0.100
		VA-XF	unstable conditions	70	0.008	0.018	0.021	0.028	0.032	0.042	0.049	0.070
S Special alloys (nickel based "Ni") Nimonic, Inconel, Monel, Hastelloy	up to 1.300 N/mm ²	Ti	stable conditions	30	0.010	0.015	0.020	0.025	0.030	0.040	0.050	0.060
		N-F	unstable conditions	30	0.007	0.011	0.014	0.018	0.021	0.028	0.035	0.042
Ti Titanium alloys ("Ti") 3.7024 Ti99.5, 3.7114 TiAl5Sn2.5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7164 TiAl6V4, 3.7184 TiAl4Mo4Sn2.5	up to 1.300 N/mm ²	Ti	stable conditions	60	0.015	0.025	0.035	0.045	0.050	0.065	0.080	0.120
		N-F	unstable conditions	60	0.011	0.018	0.025	0.032	0.035	0.046	0.056	0.084
K Cast iron, grey cast iron, spheroidal graphite and malleable cast iron 0.6010 EN-GL100 (GG10), 0.6020 EN-GJL-200 (GG20), 0.7050 EN-GJS-500-7 (GGG50), 0.8535 EN-GJMW-350-4 (GTW35)	up to 240 HB 30	N	stable conditions	160	0.020	0.040	0.050	0.065	0.080	0.095	0.110	0.160
		N-F	unstable conditions	160	0.014	0.028	0.035	0.046	0.056	0.067	0.077	0.112
K Cast iron, grey cast iron, spheroidal graphite and malleable cast iron 0.6025 EN-GL250 (GG25), 0.6035 EN-GJL-350 (GG35), 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)	above 240 HB 30	N	stable conditions	140	0.016	0.030	0.040	0.055	0.065	0.080	0.095	0.140
		N-F	unstable conditions	140	0.011	0.021	0.028	0.039	0.046	0.056	0.067	0.098
N Aluminium, Al-wrought alloys, Al-alloys 3.0255 Al99.5, 3.2315 AlMgSi1, 3.3515 AlMg1 3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1.5	up to 3% Si	Al	stable conditions	500	0.020	0.040	0.050	0.065	0.080	0.095	0.110	0.160
		Al-F	unstable conditions	500	0.014	0.028	0.035	0.046	0.056	0.067	0.077	0.112
N Aluminium-cast alloys 3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9 3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	above 3% Si	Al	stable conditions	230	0.016	0.030	0.040	0.055	0.065	0.080	0.095	0.140
		Al-F	unstable conditions	230	0.011	0.021	0.028	0.039	0.046	0.056	0.067	0.098
N Magnesium-alloys MgMn2, G-MgAl8Zn1, G-MgAl6Zn3		Al	stable conditions	180	0.016	0.030	0.040	0.055	0.065	0.080	0.095	0.140
		Al-F	unstable conditions	180	0.011	0.021	0.028	0.039	0.046	0.056	0.067	0.098
N Non-ferrous metals (copper, short- or long-chipping brass) 2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb, 2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2, 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0.5, 2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn, 2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	up to 850 N/mm ²	Al	stable conditions	250	0.015	0.025	0.035	0.045	0.050	0.065	0.080	0.120
		Al-F	unstable conditions	250	0.011	0.018	0.025	0.032	0.035	0.046	0.056	0.084

$$a_p = 1 \times D - 3 \times D$$

$$a_e = 0.1 \times D - 0.5 \times D$$

F-UT Type NX for Universal Milling Operations



Peripheral cooling recommended for optimal chip evacuation and tool life

PLUNGING AND RAMPING

Material	Hardness / tensile strength	Ramping depth (ap max.)	Ramping max. angle in °	v _c [m/min]	Feed fz [mm/z] with nom. Ø							
					4	6	8	10	12	14	16	20
P Struct. + free-cutting steels, unalloyed heat-treat. + case hard. steels 1.0345 P235GH, 1.0050, 1.0503 C45, 1.2076 102Cr6	up to 850 N/mm²	1xD	45°	270	0,015	0,020	0,030	0,040	0,045	0,050	0,055	0,060
P Free-cutting steels, unalloyed case hardened steels, nitriding steels 1.1221 C60E, 1.7043 38Cr4, 1.7131 16MnCr5, 1.8550 34CrAlNi7	850-1.200 N/mm²	1xD	45°	240	0,010	0,015	0,020	0,030	0,035	0,040	0,045	0,050
P Alloyed heat-treatable, tool and high speed steels 1.7003 38Cr2, 1.5710 36NiCr6, 1.7225 42CrMo4, 1.2419 105WCr6	850-1.400 N/mm²	1xD	30°	200	0,007	0,010	0,015	0,020	0,025	0,030	0,035	0,040
M Stainless steel 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X10CrNiS18-9	up to 750 N/mm²	1xD	10°	60	0,007	0,010	0,015	0,020	0,025	0,030	0,035	0,040
M Stainless steel 1.4301X5CrNi18-10, 1.4571 X6CrNi18-10, 1.4404 X2CrNiMo17-12-2	750-950 N/mm²	0,5xD	5°	50	0,005	0,008	0,012	0,018	0,023	0,026	0,030	0,035
Ti Titanium alloys ("Ti") 3.7114 TiAl5Sn2,5, 3.7124 TiCu2, 3.7154 TiAl6Zr5, 3.7164 TiAl6V4	up to 1.300 N/mm²	0,5xD	10°	45	0,005	0,008	0,012	0,018	0,023	0,026	0,030	0,035
K Cast iron, grey cast iron, spheroidal graphite and malleable cast iron 0.6025 EN-GL250 (GG25), 0.7070 EN-GJS-700-2 (GGG70)	above 240 HB	1xD	45°	150	0,015	0,020	0,030	0,040	0,045	0,050	0,055	0,060
N Aluminium, Al-wrought alloys, Al-alloys 3.0255 Al99,5, 3.2315 AlMgSi1, 3.1325 AlCuMg1, 3.3245 AlMg3Si	up to 3% Si	1xD	30°	180	0,010	0,015	0,020	0,030	0,035	0,040	0,045	0,050
N Aluminium-cast alloys 3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	above 3% Si	1xD	45°	140	0,015	0,020	0,030	0,040	0,045	0,050	0,055	0,060

SLOTING

Material	Hardness / tensile strength	Cutting depth (ap max.)	Cutting width (ae max.)	v _c [m/min]	Feed fz [mm/z] with nom. Ø							
					4	6	8	10	12	14	16	20
P Struct. + free-cutting steels, unalloyed heat-treat. + case hard. steels 1.0345 P235GH, 1.0050, 1.0503 C45, 1.2076 102Cr6	up to 850 N/mm²	1xD	1xD	270	0.015	0.025	0.035	0.050	0.055	0.060	0.080	0.100
P Free-cutting steels, unalloyed case hardened steels, nitriding steels 1.1221 C60E, 1.7043 38Cr4, 1.7131 16MnCr5, 1.8550 34CrAlNi7	850-1.200 N/mm²	1xD	1xD	240	0.015	0.025	0.035	0.050	0.055	0.060	0.080	0.100
P Alloyed heat-treatable, tool and high speed steels 1.7003 38Cr2, 1.5710 36NiCr6, 1.7225 42CrMo4, 1.2419 105WCr6	850-1.400 N/mm²	1xD	1xD	200	0.015	0.025	0.030	0.045	0.050	0.055	0.070	0.085
M Stainless steel 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X10CrNiS18-9	up to 750 N/mm²	1xD	1xD	120	0.015	0.020	0.030	0.045	0.055	0.060	0.065	0.075
M Stainless steel 1.4301X5CrNi18-10, 1.4571 X6CrNi18-10, 1.4404 X2CrNiMo17-12-2	750-950 N/mm²	1xD	1xD	80	0.015	0.020	0.025	0.030	0.040	0.050	0.060	0.070
Ti Titanium alloys ("Ti") 3.7114 TiAl5Sn2,5, 3.7124 TiCu2, 3.7154 TiAl6Zr5, 3.7164 TiAl6V4	up to 1.300 N/mm²	1xD	1xD	60	0.015	0.020	0.025	0.030	0.040	0.050	0.060	0.070
K Cast iron, grey cast iron, spheroidal graphite and malleable cast iron 0.6025 EN-GL250 (GG25), 0.7070 EN-GJS-700-2 (GGG70)	above 240 HB	1xD	1xD	160	0.015	0.025	0.035	0.050	0.055	0.060	0.080	0.100
N Aluminium, Al-wrought alloys, Al-alloys 3.0255 Al99,5, 3.2315 AlMgSi1, 3.1325 AlCuMg1, 3.3245 AlMg3Si	up to 3% Si	1xD	1xD	500	0.025	0.030	0.040	0.065	0.080	0.085	0.095	0.110
N Aluminium-cast alloys 3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	above 3% Si	1xD	1xD	340	0.015	0.020	0.030	0.055	0.065	0.07w0	0.080	0.100

* for HSC machining the cutting speed can be increased by 50%, feed rate fz can be reduced depending on surface requirements.
**for trochoidal milling and machining with ae = 0,1 - 0.2xD the cutting speed vc and the feed rate can be increased by 50%

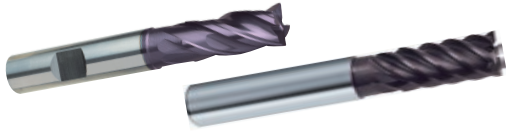
HPC-ROUGHING AND HSC-FINISHING

Material	Hardness / tensile strength	Cutting depth (ap max.)	Cutting width (ae max.)	v _c [m/min]	Feed fz [mm/z] with nom. Ø							
					4	6	8	10	12	14	16	20
P Struct. + free-cutting steels, unalloyed heat-treat. + case hard. steels 1.0345 P235GH, 1.0050, 1.0503 C45, 1.2076 102Cr6	up to 850 N/mm²	2xD	0.4xD	350	0.020	0.030	0.045	0.060	0.075	0.080	0.090	0.110
P Free-cutting steels, unalloyed case hardened steels, nitriding steels 1.1221 C60E, 1.7043 38Cr4, 1.7131 16MnCr5, 1.8550 34CrAlNi7	850-1.200 N/mm²	2xD	0.4xD	290	0.020	0.030	0.045	0.060	0.075	0.080	0.090	0.110
P Alloyed heat-treatable, tool and high speed steels 1.7003 38Cr2, 1.5710 36NiCr6, 1.7225 42CrMo4, 1.2419 105WCr6	850-1.400 N/mm²	2xD	0.3xD	240	0.015	0.025	0.030	0.050	0.065	0.075	0.085	0.100
M Stainless steel 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X10CrNiS18-9	up to 750 N/mm²	2xD	0.3xD	140	0.020	0.025	0.035	0.055	0.065	0.070	0.080	0.090
M Stainless steel 1.4301X5CrNi18-10, 1.4571 X6CrNi18-10, 1.4404 X2CrNiMo17-12-2	750-950 N/mm²	2xD	0.25xD	120	0.015	0.020	0.030	0.040	0.050	0.060	0.065	0.075
Ti Titanium alloys ("Ti") 3.7114 TiAl5Sn2,5, 3.7124 TiCu2, 3.7154 TiAl6Zr5, 3.7164 TiAl6V4	up to 1.300 N/mm²	2xD	0.4xD	120	0.015	0.020	0.030	0.040	0.050	0.060	0.065	0.075
K Cast iron, grey cast iron, spheroidal graphite and malleable cast iron 0.6025 EN-GL250 (GG25), 0.7070 EN-GJS-700-2 (GGG70)	above 240 HB	2xD	0.4xD	180	0.020	0.030	0.045	0.060	0.075	0.080	0.090	0.110
N Aluminium, Al-wrought alloys, Al-alloys 3.0255 Al99,5, 3.2315 AlMgSi1, 3.1325 AlCuMg1, 3.3245 AlMg3Si	up to 3% Si	2xD	0.5xD	600	0.025	0.040	0.060	0.080	0.100	0.110	0.120	0.150
N Aluminium-cast alloys 3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	above 3% Si	2xD	0.4xD	420	0.020	0.030	0.045	0.060	0.075	0.080	0.090	0.110

DRILLING

Material	Hardness / tensile strength	Drilling depth (ap max.)	Pecking from 1xD	v _c [m/min]	Feed fz [mm/z] with nom. Ø							
					4	6	8	10	12	14	16	20
P Struct. + free-cutting steels, unalloyed heat-treat. + case hard. steels 1.0345 P235GH, 1.0050, 1.0503 C45, 1.2076 102Cr6	up to 850 N/mm²	2xD	Yes	270	0,015	0,020	0,030	0,040	0,045	0,045	0,050	0,060
P Free-cutting steels, unalloyed case hardened steels, nitriding steels 1.1221 C60E, 1.7043 38Cr4, 1.7131 16MnCr5, 1.8550 34CrAlNi7	850-1.200 N/mm²	2xD	Yes	240	0,010	0,015	0,020	0,035	0,040	0,040	0,045	0,050
P Alloyed heat-treatable, tool and high speed steels 1.7003 38Cr2, 1.5710 36NiCr6, 1.7225 42CrMo4, 1.2419 105WCr6	850-1.400 N/mm²	1xD	-	200	0,005	0,010	0,015	0,025	0,030	0,030	0,035	0,040
K Cast iron, grey cast iron, spheroidal graphite and malleable cast iron 0.6025 EN-GL250 (GG25), 0.7070 EN-GJS-700-2 (GGG70)	above 240 HB	2xD	Yes	150	0,015	0,020	0,030	0,040	0,045	0,045	0,050	0,060
N Aluminium, Al-wrought alloys, Al-alloys 3.0255 Al99,5, 3.2315 AlMgSi1, 3.1325 AlCuMg1, 3.3245 AlMg3Si	up to 3% Si	1xD	-	180	0,010	0,015	0,020	0,035	0,040	0,040	0,045	0,050
N Aluminium-cast alloys 3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	above 3% Si	1xD	-	140	0,015	0,020	0,030	0,040	0,045	0,045	0,050	0,060

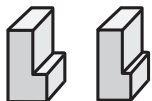
F-UT Finishing / Fine finishing



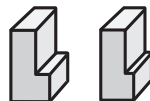
Stable conditions:
 - good cooling
 - sufficient performance
 - short-chipping

* Milling cutters #54207, #54227 for fine finishing in hardened steels > 54 HRC

Material	Hardness / tensile strength	recommended F-UT Type	Type of conditions	v _c [m/min]	Feed fz [mm/z] with nom. Ø							
					3	6	8	10	12	16	20	25
P Struct. + free-cutting steels, unalloyed heat-treat. + case hard. steels 1.0035 S185, 1.0486 P275N, 1.0345 P235GH, 1.0050, 1.0070, 1.8937 1.0718 11SMnPb30, 1.0736 11SMn37 1.0402 C22, 1.1178 C30E, 1.0503 C45, 1.1191 C30E 1.0301 C10, 1.1121 C10E, 1.1750 C75W, 1.2076 102Cr6, 1.2307 29CrMoV9	up to 850 N/mm ²	N / FS	stable conditions	280	0.016	0.030	0.040	0.055	0.065	0.080	0.095	0.140
			unstable conditions	-								
P Free-cutting steels, unalloyed case hardened steels, nitriding steels 1.0727 46 S20, 1.0728 60 S20, 1.0757 46SPb20 1.0601 C60, 1.1221 C60E, 1.7043 38Cr4 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5 1.8504 34CrAl6, 1.8519 31CrMoV9, 1.8550 34CrAlNi7	850-1.200 N/mm ²	N / FS	stable conditions	220	0.016	0.030	0.040	0.055	0.065	0.080	0.095	0.140
			unstable conditions	-								
P Alloyed heat-treatable, tool and high speed steels 1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4, 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4, 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2379 X155CrVMo12-1, 1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3 Federstahl = 1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4	850-1.400 N/mm ²	N / FS	stable conditions	200	0.015	0.030	0.040	0.050	0.060	0.070	0.090	0.130
			unstable conditions	-								
H Hardened steel Tool steel, heat-treatable steel, spring steel, high-speed steel, case hardened steel, etc. e.g.: 1.2344 X40CrMoV5-1; 1.2767 X45NiCrMo4; 1.2379 X155CrVMo12-1 ;1.2080 X210Cr12 1.3343 S 6-5-2	up to 54 HRC	N / FS	stable conditions	150	0.015	0.030	0.040	0.050	0.060	0.070	0.090	0.130
		- / H*	unstable conditions	110	0.007	0.017	0.024	0.030	0.036	0.045	0.057	0.065
M Stainless steel 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X10CrNiS18-9 USA = 303, 410, 420F, 430, 430F	up to 750 N/mm ²	VA-X / FS	stable conditions	180	0.016	0.030	0.040	0.055	0.065	0.080	0.095	0.140
			unstable conditions	-								
M Stainless steel 1.4301X5CrNi18-10, 1.4303 X5CrNi18-12 1.4310 XCrNi18-8 USA = 304, 304L, 420	750-850 N/mm ²	VA-X / FS	stable conditions	140	0.015	0.030	0.040	0.050	0.060	0.070	0.090	0.130
			unstable conditions	-								
M Stainless steel 1.4438 X2CrNiMo18-15-4, 1.4404 X2CrNiMo17-12-2, 1.4571 X6CrNiTi18-10 USA = 310, 316, 316B, 316L, 317	above 850 N/mm ²	VA-X / FS	stable conditions	120	0.015	0.025	0.035	0.045	0.050	0.065	0.080	0.120
			unstable conditions	-								
S Special alloys (nickel based "Ni") Nimonic, Inconel, Monel, Hastelloy	up to 1.300 N/mm ²	N / FS	stable conditions	45	0.015	0.025	0.035	0.045	0.050	0.065	0.080	0.120
			unstable conditions	-								
Ti Titanium alloys ("Ti") 3.7024 Ti99.5, 3.7114 TiAl5Sn2.5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7164 TiAl6V4, 3.7184 TiAl4Mo4Sn2.5	up to 1.300 N/mm ²	N / FS	stable conditions	130	0.016	0.030	0.040	0.055	0.065	0.080	0.095	0.140
			unstable conditions	-								
K Cast iron, grey cast iron, spheroidal graphite and malleable cast iron 0.6010 EN-GL100 (GG10), 0.6020 EN-GJL-200 (GG20), 0.7050 EN-GJS-500-7 (GGG50), 0.8535 EN-GJMW-350-4 (GTW35)	up to 240 HB 30	N / FS	stable conditions	220	0.018	0.035	0.045	0.060	0.070	0.090	0.100	0.150
			unstable conditions	-								
K Cast iron, grey cast iron, spheroidal graphite and malleable cast iron 0.6025 EN-GL250 (GG25), 0.6035 EN-GJL-350 (GG35), 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)	above 240 HB 30	N / FS	stable conditions	200	0.018	0.035	0.045	0.060	0.070	0.090	0.100	0.150
			unstable conditions	-								
N Aluminium, Al-wrought alloys, Al-alloys 3.0255 Al99.5, 3.2315 AlMgSi1, 3.3515 AlMg1 3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1.5	up to 3% Si	Al / FS	stable conditions	1000	0.018	0.035	0.045	0.060	0.070	0.090	0.100	0.150
			unstable conditions	-								
N Aluminium-cast alloys 3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9 3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	above 3% Si	Al / FS	stable conditions	350	0.018	0.035	0.045	0.060	0.070	0.090	0.100	0.150
			unstable conditions	-								
N Magnesium-alloys MgMn2, G-MgAl8Zn1, G-MgAl6Zn3	-	Al / FS	stable conditions	280	0.018	0.035	0.045	0.060	0.070	0.090	0.100	0.150
			unstable conditions	-								
N Non-ferrous metals (copper, short- or long-chipping brass) 2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnNb, 2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2, 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0.5, 2.1090 CuSn7ZnNb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn, 2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	up to 850 N/mm ²	N / FS	stable conditions	400	0.016	0.030	0.040	0.055	0.065	0.080	0.095	0.140
			unstable conditions	-								

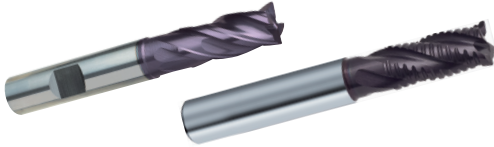


Finishing:
 $a_p = 1 \times D - 2 \times D$
 $a_e = 0.1 \times D - 0.3 \times D$



Fine finishing:
 $a_p = 1 \times D - 3 \times D$
 $a_e = 0.05 \times D - 0.1 \times D$

F-UT Roughing



Stable conditions:
 - good cooling
 - sufficient performance
 - short-chipping

Unstable conditions:
 - standard cooling
 - average performance
 - medium- to long-chipping

Material	Hardness / tensile strength	recom- mended F-UT Type	Type of conditions	v _c [m/min]	Feed fz [mm/z] with nom. Ø							
					3	6	8	10	12	16	20	25
P Struct. + free-cutting steels, unalloyed heat-treat. + case hard. steels 1.0035 S185, 1.0486 P275N, 1.0345 P235GH, 1.0050, 1.0070, 1.8937 1.0718 11SMnPb30, 1.0736 11SMn37 1.0402 C22, 1.1178 C30E, 1.0503 C45, 1.1191 C30E 1.0301 C10, 1.1121 C10E, 1.1750 C75W, 1.2076 102Cr6, 1.2307 29CrMoV9	up to 850 N/mm ²	N	stable conditions	200	0.020	0.040	0.055	0.070	0.085	0.100	0.120	0.170
		N-F	unstable conditions	200	0.014	0.028	0.039	0.049	0.060	0.070	0.084	0.119
P Free-cutting steels, unalloyed case hardened steels, nitriding steels 1.0727 46 S20, 1.0728 60 S20, 1.0757 46SPb20 1.0601 C60, 1.1221 C60E, 1.7043 38Cr4 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5 1.8504 34CrAl6, 1.8519 31CrMoV9, 1.8550 34CrAlNi7	850- 1.200 N/mm ²	N	stable conditions	180	0.020	0.040	0.055	0.070	0.085	0.100	0.120	0.170
		N-F	unstable conditions	180	0.014	0.028	0.039	0.049	0.060	0.070	0.084	0.119
P Alloyed heat-treatable, tool and high speed steels 1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4, 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4, 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2379 X155CrVMo12-1, 1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3 Federstahl = 1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4	850- 1.400 N/mm ²	N	stable conditions	160	0.020	0.040	0.050	0.065	0.080	0.095	0.110	0.160
		N-F	unstable conditions	160	0.014	0.028	0.035	0.046	0.056	0.067	0.077	0.112
H Hardened steel Tool steel, heat-treatable steel, spring steel, high-speed steel, case hardened steel, etc. e.g.: 1.2344 X40CrMoV5-1; 1.2767 X45NiCrMo4; 1.2379 X155CrVMo12-1; 1.2080 X210Cr12 1.3343 S 6-5-2	up to 54 HRC	N	stable conditions	110	0.015	0.025	0.035	0.045	0.050	0.065	0.080	0.120
		N-F	unstable conditions	110	0.011	0.018	0.025	0.032	0.035	0.046	0.056	0.084
M Stainless steel 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X10CrNiS18-9 USA = 303, 410, 420F, 430, 430F	up to 750 N/mm ²	VA-X	stable conditions	140	0.018	0.035	0.045	0.060	0.070	0.090	0.100	0.150
		VA-XF	unstable conditions	140	0.013	0.025	0.032	0.042	0.049	0.063	0.070	0.105
M Stainless steel 1.4301X5CrNi18-10, 1.4303 X5CrNi18-12 1.4310 XCrNi18-8 USA = 304, 304L, 420	750-850 N/mm ²	VA-X	stable conditions	120	0.016	0.030	0.040	0.055	0.065	0.080	0.095	0.140
		VA-XF	unstable conditions	120	0.011	0.021	0.028	0.039	0.046	0.056	0.067	0.098
M Stainless steel 1.4438 X2CrNiMo18-15-4, 1.4404 X2CrNiMo17-12-2, 1.4571 X6CrNiTi18-10 USA = 310, 316, 316B, 316L, 317	above 850 N/mm ²	VA-X	stable conditions	100	0.015	0.025	0.035	0.045	0.050	0.065	0.080	0.120
		VA-XF	unstable conditions	100	0.011	0.018	0.025	0.032	0.035	0.046	0.056	0.084
S Special alloys (nickel based "Ni") Nimonic, Inconel, Monel, Hastelloy	up to 1.300 N/mm ²	Ti	stable conditions	35	0.010	0.020	0.030	0.035	0.040	0.055	0.065	0.080
		N-F	unstable conditions	35	0.007	0.014	0.021	0.025	0.028	0.039	0.046	0.056
Ti Titanium alloys ("Ti") 3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7164 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5	up to 1.300 N/mm ²	Ti	stable conditions	90	0.016	0.030	0.040	0.055	0.065	0.080	0.095	0.140
		N-F	unstable conditions	90	0.011	0.021	0.028	0.039	0.046	0.056	0.067	0.098
K Cast iron, grey cast iron, spheroidal graphite and malleable cast iron 0.6010 EN-GL100 (GG10), 0.6020 EN-GJL-200 (GG20), 0.7050 EN-GJS-500-7 (GGG50), 0.8535 EN-GJMW-350-4 (GTW35)	up to 240 HB 30	N	stable conditions	180	0.020	0.040	0.055	0.070	0.085	0.100	0.120	0.170
		N-F	unstable conditions	180	0.014	0.028	0.039	0.049	0.060	0.070	0.084	0.119
K Cast iron, grey cast iron, spheroidal graphite and malleable cast iron 0.6025 EN-GL250 (GG25), 0.6035 EN-GJL-350 (GG35), 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)	above 240 HB 30	N	stable conditions	160	0.020	0.040	0.050	0.065	0.080	0.095	0.110	0.160
		N-F	unstable conditions	160	0.014	0.028	0.035	0.046	0.056	0.067	0.077	0.112
N Aluminium, Al-wrought alloys, Al-alloys 3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1 3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	up to 3% Si	Al	stable conditions	600	0.020	0.040	0.055	0.070	0.085	0.100	0.120	0.170
		Al-F	unstable conditions	600	0.014	0.028	0.039	0.049	0.060	0.070	0.084	0.119
N Aluminium-cast alloys 3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9 3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	above 3% Si	Al	stable conditions	280	0.020	0.040	0.050	0.065	0.080	0.095	0.110	0.160
		Al-F	unstable conditions	280	0.014	0.028	0.035	0.046	0.056	0.067	0.077	0.112
N Magnesium-alloys MgMn2, G-MgAl8Zn1, G-MgAl6Zn3	-	Al	stable conditions	220	0.020	0.040	0.050	0.065	0.080	0.095	0.110	0.160
		Al-F	unstable conditions	220	0.014	0.028	0.035	0.046	0.056	0.067	0.077	0.112
N Non-ferrous metals (copper, short- or long-chipping brass) 2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb, 2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2, 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5, 2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn, 2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	up to 850 N/mm ²	Al	stable conditions	300	0.016	0.030	0.040	0.055	0.065	0.080	0.095	0.140
		Al-F	unstable conditions	300	0.011	0.021	0.028	0.039	0.046	0.056	0.067	0.098



$$a_p = \leq 1 \times D$$

$$a_e = 0.5 - 0.9 \times D$$

$$a_p = 1 \times D - 2 \times D$$

$$f_z = 70\%$$

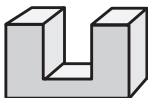
F-UT Slotting



Stable conditions:
 - good cooling
 - sufficient performance
 - short-chipping

Unstable conditions:
 - standard cooling
 - average performance
 - medium- to long-chipping

Material	Hardness / tensile strength	recom- mended F-UT Type	Type of conditions	v _c [m/min]	Feed fz [mm/z] with nom. Ø							
					3	6	8	10	12	16	20	25
P Struct. + free-cutting steels, unalloyed heat-treat. + case hard. steels 1.0035 S185, 1.0486 P275N, 1.0345 P235GH, 1.0050, 1.0070, 1.8937 1.0718 11SMnPb30, 1.0736 11SMn37 1.0402 C22, 1.1178 C30E, 1.0503 C45, 1.1191 C30E 1.0301 C10, 1.1121 C10E, 1.1750 C75W, 1.2076 102Cr6, 1.2307 29CrMoV9	up to 850 N/mm ²	N-3	stable conditions	180	0.018	0.035	0.045	0.060	0.070	0.090	0.100	0.150
		N-F	unstable conditions	180	0.013	0.025	0.032	0.042	0.049	0.063	0.070	0.105
P Free-cutting steels, unalloyed case hardened steels, nitriding steels 1.0727 46 S20, 1.0728 60 S20, 1.0757 46SPb20 1.0601 C60, 1.1221 C60E, 1.7043 38Cr4 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5 1.8504 34CrAl6, 1.8519 31CrMoV9, 1.8550 34CrAlNi7	850-1.200 N/mm ²	N-3	stable conditions	160	0.018	0.035	0.045	0.060	0.070	0.090	0.100	0.150
		N-F	unstable conditions	160	0.013	0.025	0.032	0.042	0.049	0.063	0.070	0.105
P Alloyed heat-treatable, tool and high speed steels 1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4, 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4, 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2379 X155CrVMo12-1, 1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3 Federstahl = 1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4	850-1.400 N/mm ²	N-3	stable conditions	135	0.016	0.030	0.040	0.055	0.065	0.080	0.095	0.140
		N-F	unstable conditions	135	0.011	0.021	0.028	0.039	0.046	0.056	0.067	0.098
H Hardened steel Tool steel, heat-treatable steel, spring steel, high-speed steel, case hardened steel, etc. e.g.: 1.2344 X40CrMoV5-1; 1.2767 X45NiCrMo4; 1.2379 X155CrVMo12-1; 1.2080 X210Cr12 1.3343 S 6-5-2	up to 54 HRC	N-3	stable conditions	70	0.012	0.025	0.030	0.040	0.045	0.060	0.070	0.100
		N-F	unstable conditions	70	0.008	0.018	0.021	0.028	0.032	0.042	0.049	0.070
M Stainless steel 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X10CrNiS18-9 USA = 303, 410, 420F, 430, 430F	up to 750 N/mm ²	VA-X	stable conditions	120	0.015	0.030	0.040	0.050	0.060	0.070	0.090	0.130
		VA-XF	unstable conditions	120	0.011	0.021	0.028	0.035	0.042	0.049	0.063	0.091
M Stainless steel 1.4301X5CrNi18-10, 1.4303 X5CrNi18-12 1.4310 XCrNi18-8 USA = 304, 304L, 420	750-850 N/mm ²	VA-X	stable conditions	80	0.015	0.025	0.035	0.045	0.050	0.065	0.080	0.120
		VA-XF	unstable conditions	80	0.011	0.018	0.025	0.032	0.035	0.046	0.056	0.084
M Stainless steel 1.4438 X2CrNiMo18-15-4, 1.4404 X2CrNiMo17-12-2, 1.4571 X6CrNiTi18-10 USA = 310, 316, 316B, 316L, 317	above 850 N/mm ²	VA-X	stable conditions	70	0.012	0.025	0.030	0.040	0.045	0.060	0.070	0.100
		VA-XF	unstable conditions	70	0.008	0.018	0.021	0.028	0.032	0.042	0.049	0.070
S Special alloys (nickel based "Ni") Nimonic, Inconel, Monel, Hastelloy	up to 1.300 N/mm ²	Ti	stable conditions	30	0.010	0.015	0.020	0.025	0.030	0.040	0.050	0.060
		N-F	unstable conditions	30	0.007	0.011	0.014	0.018	0.021	0.028	0.035	0.042
Ti Titanium alloys ("Ti") 3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7164 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5	up to 1.300 N/mm ²	Ti	stable conditions	60	0.015	0.025	0.035	0.045	0.050	0.065	0.080	0.120
		N-F	unstable conditions	60	0.011	0.018	0.025	0.032	0.035	0.046	0.056	0.084
K Cast iron, grey cast iron, spheroidal graphite and malleable cast iron 0.6010 EN-GL100 (GG10), 0.6020 EN-GJL-200 (GG20), 0.7050 EN-GJS-500-7 (GGG50), 0.8535 EN-GJMW-350-4 (GTW35)	up to 240 HB 30	N	stable conditions	160	0.020	0.040	0.050	0.065	0.080	0.095	0.110	0.160
		N-F	unstable conditions	160	0.014	0.028	0.035	0.046	0.056	0.067	0.077	0.112
K Cast iron, grey cast iron, spheroidal graphite and malleable cast iron 0.6025 EN-GL250 (GG25), 0.6035 EN-GJL-350 (GG35), 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)	above 240 HB 30	N	stable conditions	140	0.016	0.030	0.040	0.055	0.065	0.080	0.095	0.140
		N-F	unstable conditions	140	0.011	0.021	0.028	0.039	0.046	0.056	0.067	0.098
N Aluminium, Al-wrought alloys, Al-alloys 3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1 3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	up to 3% Si	Al-3	stable conditions	500	0.020	0.040	0.050	0.065	0.080	0.095	0.110	0.160
		Al-F	unstable conditions	500	0.014	0.028	0.035	0.046	0.056	0.067	0.077	0.112
N Aluminium-cast alloys 3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9 3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	above 3% Si	Al-3	stable conditions	230	0.016	0.030	0.040	0.055	0.065	0.080	0.095	0.140
		Al-F	unstable conditions	230	0.011	0.021	0.028	0.039	0.046	0.056	0.067	0.098
N Magnesium-alloys MgMn2, G-MgAl8Zn1, G-MgAl6Zn3	-	Al-3	stable conditions	180	0.016	0.030	0.040	0.055	0.065	0.080	0.095	0.140
		Al-F	unstable conditions	180	0.011	0.021	0.028	0.039	0.046	0.056	0.067	0.098
N Non-ferrous metals (copper, short- or long-chipping brass) 2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnSnPb, 2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2, 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5, 2.1090 CuSn7ZnSnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn, 2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	up to 850 N/mm ²	Al-3	stable conditions	250	0.015	0.025	0.035	0.045	0.050	0.065	0.080	0.120
		Al-F	unstable conditions	250	0.011	0.018	0.025	0.032	0.035	0.046	0.056	0.084



$$a_p = 0.5 \times D - 1 \times D \quad a_p = 1 \times D - 2 \times D$$

$$a_e = 1 \times D \quad f_z = 70\%$$

SuperF-UT end mills

SuperF-UT end mills NX



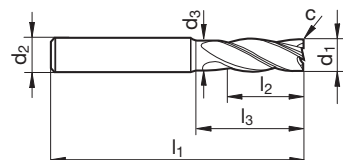
Catalog no. 54590



P	M	K	N	S	H
•	•	•	•	•	

Application
recomm. p. 513-
517

- adapted face and flute geometry for maximum cutting rates and very good chip evacuation
- ramping up to 45° is possible
- long tool life thanks to extremely hard coating
- high process reliability with simultaneous reduction of machining times
- up to 1400 N/mm²
- micro-corner protection
- neck clearance
- centre cutting
- the unequal helix achieves smooth, chatter-free operation



d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
4.000	6.000	3.700	57.000	11.000	18.000	0.040	4	4.000
5.000	6.000	4.700	57.000	13.000	18.000	0.050	4	5.000
5.700	6.000	5.400	57.000	13.000	20.000	0.060	4	5.700
6.000	6.000	5.500	57.000	13.000	20.000	0.060	4	6.000
7.700	8.000	7.200	63.000	19.000	26.000	0.080	4	7.700
8.000	8.000	7.500	63.000	19.000	26.000	0.080	4	8.000
9.700	10.000	9.200	72.000	22.000	31.000	0.100	4	9.700
10.000	10.000	9.200	72.000	22.000	30.000	0.100	4	10.000
11.700	12.000	10.900	83.000	26.000	35.500	0.120	4	11.700
12.000	12.000	11.200	83.000	26.000	36.000	0.120	4	12.000
13.700	14.000	12.900	83.000	26.000	35.500	0.140	4	13.700
14.000	14.000	13.200	83.000	26.000	36.000	0.140	4	14.000
15.600	16.000	14.800	92.000	32.000	41.400	0.160	4	15.600
16.000	16.000	15.000	92.000	32.000	42.000	0.160	4	16.000
19.500	20.000	18.500	104.000	38.000	51.300	0.200	4	19.500
20.000	20.000	19.000	104.000	38.000	52.000	0.200	4	20.000

SuperF-UT end mills

SuperF-UT end mills NX



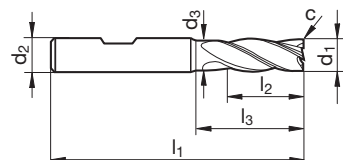
Catalog no. 54591



P	M	K	N	S	H
•	•	•	•	•	

Application
recomm. p. 513-
517

- adapted face and flute geometry for maximum cutting rates and very good chip evacuation
- ramping up to 45° is possible
- long tool life thanks to extremely hard coating
- high process reliability with simultaneous reduction of machining times
- up to 1400 N/mm²
- micro-corner protection
- neck clearance
- centre cutting
- the unequal helix achieves smooth, chatter-free operation



d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
4.000	6.000	3.700	57.000	11.000	18.000	0.040	4	4.000
5.000	6.000	4.700	57.000	13.000	18.000	0.050	4	5.000
5.700	6.000	5.400	57.000	13.000	20.000	0.060	4	5.700
6.000	6.000	5.500	57.000	13.000	20.000	0.060	4	6.000
7.700	8.000	7.200	63.000	19.000	26.000	0.080	4	7.700
8.000	8.000	7.500	63.000	19.000	26.000	0.080	4	8.000
9.700	10.000	9.200	72.000	22.000	31.000	0.100	4	9.700
10.000	10.000	9.200	72.000	22.000	30.000	0.100	4	10.000
11.700	12.000	10.900	83.000	26.000	35.500	0.120	4	11.700
12.000	12.000	11.200	83.000	26.000	36.000	0.120	4	12.000
13.700	14.000	12.900	83.000	26.000	35.500	0.140	4	13.700
14.000	14.000	13.200	83.000	26.000	36.000	0.140	4	14.000
15.600	16.000	14.800	92.000	32.000	41.400	0.160	4	15.600
16.000	16.000	15.000	92.000	32.000	42.000	0.160	4	16.000
19.500	20.000	18.500	104.000	38.000	51.300	0.200	4	19.500
20.000	20.000	19.000	104.000	38.000	52.000	0.200	4	20.000

SuperF-UT end mills

SuperF-UT end mills N



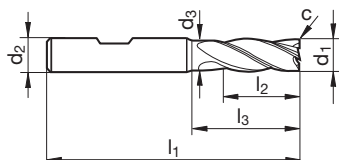
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P	M	K	N	S	H
•		•			

Application
recomm. p. 513-
517

- universal application
- short stable design
- up to 1600 N/mm²
- micro-corner protection
- neck clearance
- centre cutting
- the unequal helix achieves smooth, chatter-free operation



d1 mm	d2 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
6.000	6.000	5.500	54.000	10.000	17.000	0.150	4	6.000
8.000	8.000	7.500	58.000	12.000	21.000	0.150	4	8.000
10.000	10.000	9.200	66.000	14.000	24.000	0.200	4	10.000
12.000	12.000	11.200	73.000	16.000	26.000	0.200	4	12.000
14.000	14.000	13.200	75.000	18.000	28.000	0.250	4	14.000
16.000	16.000	15.000	82.000	22.000	32.000	0.350	4	16.000
18.000	18.000	17.000	84.000	24.000	34.000	0.400	4	18.000
20.000	20.000	19.000	92.000	26.000	40.000	0.450	4	20.000

SuperF-UT end mills

SuperF-UT end mills N



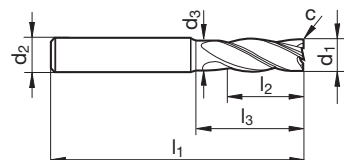
Catalog no. 54551



P	M	K	N	S	H
•		•			

Application
recomm. p. 513-
517

- universal application
- up to 1600 N/mm²
- micro-corner protection
- neck clearance
- centre cutting
- the unequal helix achieves smooth, chatter-free operation



d1 mm	d2 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
4.000	6.000	3.700	57.000	11.000	18.000	0.100	4	4.000
5.000	6.000	4.700	57.000	13.000	18.000	0.100	4	5.000
6.000	6.000	5.500	57.000	13.000	20.000	0.150	4	6.000
8.000	8.000	7.500	63.000	19.000	26.000	0.150	4	8.000
10.000	10.000	9.200	72.000	22.000	30.000	0.200	4	10.000
12.000	12.000	11.200	83.000	26.000	36.000	0.200	4	12.000
14.000	14.000	13.200	83.000	26.000	36.000	0.250	4	14.000
16.000	16.000	15.000	92.000	32.000	42.000	0.350	4	16.000
18.000	18.000	17.000	92.000	32.000	42.000	0.400	4	18.000
20.000	20.000	19.000	104.000	38.000	52.000	0.450	4	20.000

SuperF-UT end mills

SuperF-UT end mills N



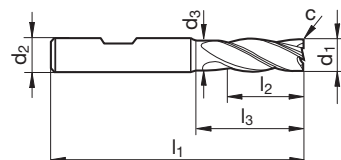
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P	M	K	N	S	H
•		•			

Application
recomm. p. 513-
517

- universal application
- up to 1600 N/mm²
- micro-corner protection
- neck clearance
- centre cutting
- the unequal helix achieves smooth, chatter-free operation



d1 mm	d2 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
4.000	6.000	3.700	57.000	11.000	18.000	0.100	4	4.000
5.000	6.000	4.700	57.000	13.000	18.000	0.100	4	5.000
6.000	6.000	5.500	57.000	13.000	20.000	0.150	4	6.000
8.000	8.000	7.500	63.000	19.000	26.000	0.150	4	8.000
10.000	10.000	9.200	72.000	22.000	30.000	0.200	4	10.000
12.000	12.000	11.200	83.000	26.000	36.000	0.200	4	12.000
14.000	14.000	13.200	83.000	26.000	36.000	0.250	4	14.000
16.000	16.000	15.000	92.000	32.000	42.000	0.350	4	16.000
18.000	18.000	17.000	92.000	32.000	42.000	0.400	4	18.000
20.000	20.000	19.000	104.000	38.000	52.000	0.450	4	20.000
25.000	25.000	23.500	121.000	45.000	63.000	0.600	4	25.000

SuperF-UT end mills

SuperF-UT end mills N



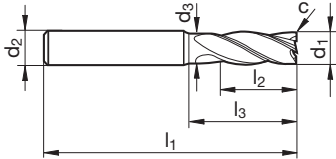
Catalog no. 54562



P	M	K	N	S	H
•		•			

Application
recomm. p. 513-
517

- universal application
- up to 1600 N/mm²
- micro-corner protection
- neck clearance
- centre cutting
- the unequal helix achieves smooth, chatter-free operation



d1 mm	d2 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
6.000	6.000	5.500	65.000	18.000	28.000	0.150	4	6.000
8.000	8.000	7.500	75.000	24.000	38.000	0.150	4	8.000
10.000	10.000	9.200	80.000	30.000	38.000	0.200	4	10.000
12.000	12.000	11.200	93.000	36.000	46.000	0.200	4	12.000
16.000	16.000	15.000	108.000	48.000	58.000	0.350	4	16.000
20.000	20.000	19.000	126.000	60.000	74.000	0.450	4	20.000

SuperF-UT end mills

SuperF-UT end mills N



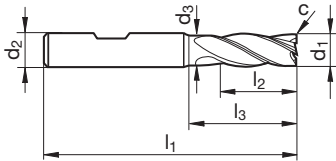
Catalog no. 54563



P	M	K	N	S	H
•		•			

Application
recomm. p. 513-
517

- universal application
- up to 1600 N/mm²
- micro-corner protection
- neck clearance
- centre cutting
- the unequal helix achieves smooth, chatter-free operation



d1 mm	d2 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
6.000	6.000	5.500	65.000	18.000	28.000	0.150	4	6.000
8.000	8.000	7.500	75.000	24.000	38.000	0.150	4	8.000
10.000	10.000	9.200	80.000	30.000	38.000	0.200	4	10.000
12.000	12.000	11.200	93.000	36.000	46.000	0.200	4	12.000
16.000	16.000	15.000	108.000	48.000	58.000	0.350	4	16.000
20.000	20.000	19.000	126.000	60.000	74.000	0.450	4	20.000

SuperF-UT end mills

SuperF-UT end mills N



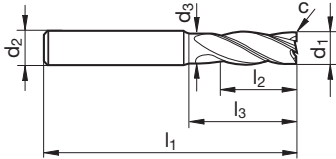
Catalog no. 54552



P	M	K	N	S	H
•		•			

Application
recomm. p. 513-
517

- universal application
- up to 1600 N/mm²
- micro-corner protection
- neck clearance
- centre cutting
- the unequal helix achieves smooth, chatter-free operation



d1 mm	d2 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
10.000	10.000	9.200	100.000	40.000	48.000	0.200	4	10.000
12.000	12.000	11.200	150.000	45.000	58.000	0.200	4	12.000
14.000	14.000	13.200	150.000	45.000	58.000	0.250	4	14.000
16.000	16.000	15.000	150.000	65.000	78.000	0.350	4	16.000
18.000	18.000	17.000	150.000	65.000	78.000	0.400	4	18.000
20.000	20.000	19.000	150.000	65.000	78.000	0.450	4	20.000
25.000	25.000	23.500	150.000	75.000	92.000	0.600	4	25.000

SuperF-UT end mills

SuperF-UT end mills N-F



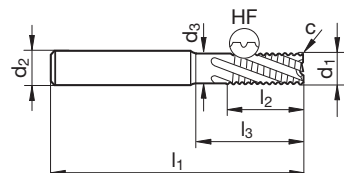
Catalog no. 54566

N-F	DIN 6527L	VHM	TiAlN	h10	R	HA	30° 32°
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P	M	K	N	S	H
●		○		○	

Application
recomm. p. 513-
517

- up to 48 HRC, titanium- and nickel alloys
- also suitable for unstable and difficult machining conditions
- achievable surface finish $R_a = 2$ to $3 \mu m$
- micro-corner protection
- neck clearance
- centre cutting
- the unequal helix achieves smooth, chatter-free operation



d1 mm	d2 mm	d3 mm	l1 mm	l2 mm	l3 mm x 45°	c mm	Z	Code no.
6.000	6.000	5.500	57.000	13.000	20.000	0.300	4	6.000
8.000	8.000	7.500	63.000	19.000	26.000	0.300	4	8.000
10.000	10.000	9.200	72.000	22.000	30.000	0.300	4	10.000
12.000	12.000	11.200	83.000	26.000	36.000	0.500	4	12.000
16.000	16.000	15.000	92.000	32.000	42.000	0.500	4	16.000
20.000	20.000	19.000	104.000	38.000	52.000	0.500	4	20.000
25.000	25.000	23.500	121.000	45.000	63.000	0.600	4	25.000

SuperF-UT end mills

SuperF-UT end mills N-F



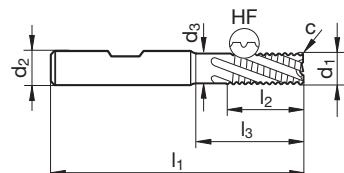
Catalog no. 54567



P	M	K	N	S	H
●		○		○	

Application
recomm. p. 513-
517

- up to 48 HRC, titanium- and nickel alloys
- also suitable for unstable and difficult machining conditions
- achievable surface finish $R_a = 2$ to $3 \mu m$
- micro-corner protection
- neck clearance
- centre cutting
- the unequal helix achieves smooth, chatter-free operation



d1 mm	d2 mm	d3 mm	l1 mm	l2 mm	l3 mm x 45°	c mm	Z	Code no.
6.000	6.000	5.500	57.000	13.000	20.000	0.300	4	6.000
8.000	8.000	7.500	63.000	19.000	26.000	0.300	4	8.000
10.000	10.000	9.200	72.000	22.000	30.000	0.300	4	10.000
12.000	12.000	11.200	83.000	26.000	36.000	0.500	4	12.000
16.000	16.000	15.000	92.000	32.000	42.000	0.500	4	16.000
20.000	20.000	19.000	104.000	38.000	52.000	0.500	4	20.000
25.000	25.000	23.500	121.000	45.000	63.000	0.600	4	25.000

SuperF-UT end mills

SuperF-UT end mills N-3



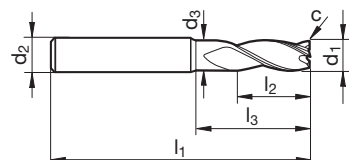
Catalog no. 54564



P	M	K	N	S	H
●	○	●	○		

Application
recomm. p. 513-
517

- 3-flute with increased flute space
- for the production of keyways
- up to 1400 N/mm²
- micro-corner protection
- neck clearance
- centre cutting
- the unequal helix achieves smooth, chatter-free operation



d1 mm	d2 mm	d3 mm	l1 mm	l2 mm	l3 mm x 45°	c mm	Z	Code no.
3.000	6.000	2.700	57.000	8.000	15.000	0.050	3	3.000
3.500	6.000	3.200	57.000	10.000	15.000	0.050	3	3.500
3.700	6.000	3.400	57.000	11.000	15.000	0.050	3	3.700
4.000	6.000	3.700	57.000	11.000	18.000	0.050	3	4.000
4.500	6.000	4.200	57.000	11.000	18.000	0.050	3	4.500
4.700	6.000	4.400	57.000	13.000	18.000	0.050	3	4.700
5.000	6.000	4.700	57.000	13.000	18.000	0.050	3	5.000
5.500	6.000	5.200	57.000	13.000	19.300	0.050	3	5.500
5.700	6.000	5.400	57.000	13.000	19.500	0.050	3	5.700
6.000	6.000	5.500	57.000	13.000	20.000	0.050	3	6.000
6.500	8.000	6.000	63.000	16.000	24.300	0.100	3	6.500
7.000	8.000	6.500	63.000	16.000	24.700	0.100	3	7.000
7.500	8.000	7.000	63.000	19.000	25.100	0.100	3	7.500
8.000	8.000	7.500	63.000	19.000	26.000	0.100	3	8.000
8.500	10.000	8.000	72.000	19.000	29.300	0.100	3	8.500
9.000	10.000	8.500	72.000	19.000	29.700	0.100	3	9.000
9.500	10.000	9.000	72.000	22.000	30.100	0.100	3	9.500
10.000	10.000	9.200	72.000	22.000	30.000	0.100	3	10.000
12.000	12.000	11.200	83.000	26.000	36.000	0.100	3	12.000
16.000	16.000	15.000	92.000	32.000	42.000	0.150	3	16.000
20.000	20.000	19.000	104.000	38.000	52.000	0.150	3	20.000

SuperF-UT end mills

SuperF-UT end mills N-3



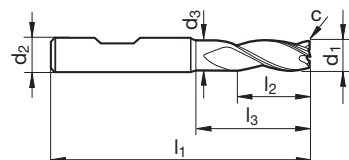
Catalog no. 54565



P	M	K	N	S	H
●	○	●	○		

Application
recomm. p. 513-
517

- 3-flute with increased flute space
- for the production of keyways
- up to 1400 N/mm²
- micro-corner protection
- neck clearance
- centre cutting
- the unequal helix achieves smooth, chatter-free operation



d1 mm	d2 mm	d3 mm	l1 mm	l2 mm	l3 mm x 45°	c mm	Z	Code no.
3.000	6.000	2.700	57.000	8.000	15.000	0.050	3	3.000
3.500	6.000	3.200	57.000	10.000	15.000	0.050	3	3.500
3.700	6.000	3.400	57.000	11.000	15.000	0.060	3	3.700
4.000	6.000	3.700	57.000	11.000	18.000	0.060	3	4.000
4.500	6.000	4.200	57.000	11.000	18.000	0.070	3	4.500
4.700	6.000	4.400	57.000	13.000	18.000	0.070	3	4.700
5.000	6.000	4.700	57.000	13.000	18.000	0.080	3	5.000
5.500	6.000	5.200	57.000	13.000	20.000	0.080	3	5.500
5.700	6.000	5.400	57.000	13.000	20.000	0.090	3	5.700
6.000	6.000	5.500	57.000	13.000	20.000	0.090	3	6.000
6.500	8.000	6.000	63.000	16.000	26.000	0.100	3	6.500
7.000	8.000	6.500	63.000	16.000	26.000	0.110	3	7.000
7.500	8.000	7.000	63.000	19.000	26.000	0.110	3	7.500
8.000	8.000	7.500	63.000	19.000	26.000	0.120	3	8.000
8.500	10.000	8.000	72.000	19.000	31.000	0.130	3	8.500
9.000	10.000	8.500	72.000	19.000	31.000	0.140	3	9.000
9.500	10.000	9.000	72.000	22.000	31.000	0.140	3	9.500
10.000	10.000	9.200	72.000	22.000	30.000	0.150	3	10.000
12.000	12.000	11.200	83.000	26.000	36.000	0.180	3	12.000
16.000	16.000	15.000	92.000	32.000	42.000	0.190	3	16.000
20.000	20.000	19.000	104.000	38.000	52.000	0.240	3	20.000

SuperF-UT end mills

SuperF-UT end mills N-5



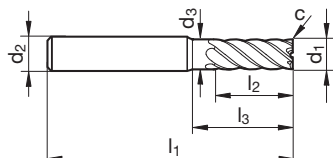
Catalog no. 54579



P	M	K	N	S	H
•	•	•	•	•	

Application
recomm. p. 513-
517

- greatest possible advantages with finishing and semi-roughing operations specially under HPC conditions
- unequal flute spacing
- shorter dimension see F-UT FS with 6 teeth
- up to 1600 N/mm²
- micro-corner protection
- neck clearance
- centre cutting



d1 mm	d2 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
4.000	6.000	3.700	65.000	12.000	26.000	0.050	5	4.000
5.000	6.000	4.700	65.000	15.000	26.000	0.050	5	5.000
6.000	6.000	5.500	65.000	18.000	28.000	0.050	5	6.000
8.000	8.000	7.500	75.000	24.000	38.000	0.100	5	8.000
10.000	10.000	9.200	80.000	30.000	38.000	0.100	5	10.000
12.000	12.000	11.200	93.000	36.000	46.000	0.100	5	12.000
16.000	16.000	15.000	108.000	48.000	58.000	0.150	5	16.000
20.000	20.000	19.000	126.000	60.000	74.000	0.150	5	20.000

SuperF-UT end mills

SuperF-UT end mills N-5



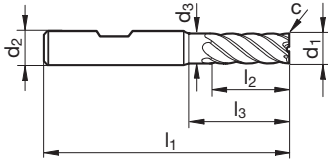
Catalog no. 54580



P	M	K	N	S	H
•	•	•	•	•	

Application
recomm. p. 513-
517

- greatest possible advantages with finishing and semi-roughing operations specially under HPC conditions
- unequal flute spacing
- shorter dimension see F-UT FS with 6 teeth
- up to 1600 N/mm²
- micro-corner protection
- neck clearance
- centre cutting



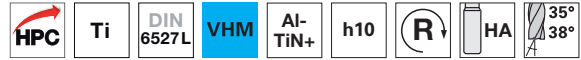
d1 mm	d2 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
4.000	6.000	3.700	65.000	12.000	26.000	0.050	5	4.000
5.000	6.000	4.700	65.000	15.000	26.000	0.050	5	5.000
6.000	6.000	5.500	65.000	18.000	28.000	0.050	5	6.000
8.000	8.000	7.500	75.000	24.000	38.000	0.100	5	8.000
10.000	10.000	9.200	80.000	30.000	38.000	0.100	5	10.000
12.000	12.000	11.200	93.000	36.000	46.000	0.100	5	12.000
16.000	16.000	15.000	108.000	48.000	58.000	0.150	5	16.000
20.000	20.000	19.000	126.000	60.000	74.000	0.150	5	20.000

SuperF-UT end mills

SuperF-UT end mills Ti



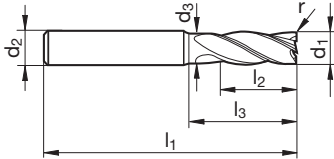
Catalog no. 54560



P	M	K	N	S	H
●		○		●	

Application
recomm. p. 513-
517

- optimised cutting edge design for high-strength titanium-alloys and special alloys
- can also be applied as SuperF-UT type N with corner radius
- with defined corner radii
- neck clearance
- centre cutting
- the unequal helix achieves smooth, chatter-free operation



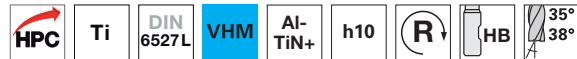
d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	r	Z	Code no.
6.000	6.000	5.500	57.000	13.000	20.000	0.500	4	6.005
6.000	6.000	5.500	57.000	13.000	20.000	0.800	4	6.008
6.000	6.000	5.500	57.000	13.000	20.000	1.000	4	6.010
6.000	6.000	5.500	57.000	13.000	20.000	1.500	4	6.015
6.000	6.000	5.500	57.000	13.000	20.000	2.000	4	6.020
8.000	8.000	7.500	63.000	19.000	26.000	0.500	4	8.005
8.000	8.000	7.500	63.000	19.000	26.000	0.800	4	8.008
8.000	8.000	7.500	63.000	19.000	26.000	1.000	4	8.010
8.000	8.000	7.500	63.000	19.000	26.000	1.500	4	8.015
8.000	8.000	7.500	63.000	19.000	26.000	2.000	4	8.020
10.000	10.000	9.200	72.000	22.000	30.000	0.500	4	10.005
10.000	10.000	9.200	72.000	22.000	30.000	0.800	4	10.008
10.000	10.000	9.200	72.000	22.000	30.000	1.000	4	10.010
10.000	10.000	9.200	72.000	22.000	30.000	1.500	4	10.015
10.000	10.000	9.200	72.000	22.000	30.000	2.000	4	10.020
12.000	12.000	11.200	83.000	26.000	36.000	0.500	4	12.005
12.000	12.000	11.200	83.000	26.000	36.000	0.800	4	12.008
12.000	12.000	11.200	83.000	26.000	36.000	1.000	4	12.010
12.000	12.000	11.200	83.000	26.000	36.000	1.500	4	12.015
12.000	12.000	11.200	83.000	26.000	36.000	2.000	4	12.020
12.000	12.000	11.200	83.000	26.000	36.000	2.500	4	12.025
12.000	12.000	11.200	83.000	26.000	36.000	3.000	4	12.030
12.000	12.000	11.200	83.000	26.000	36.000	4.000	4	12.040
16.000	16.000	15.000	92.000	32.000	42.000	0.500	4	16.005
16.000	16.000	15.000	92.000	32.000	42.000	0.800	4	16.008
16.000	16.000	15.000	92.000	32.000	42.000	1.000	4	16.010
16.000	16.000	15.000	92.000	32.000	42.000	1.500	4	16.015
16.000	16.000	15.000	92.000	32.000	42.000	2.000	4	16.020
16.000	16.000	15.000	92.000	32.000	42.000	2.500	4	16.025
16.000	16.000	15.000	92.000	32.000	42.000	3.000	4	16.030
16.000	16.000	15.000	92.000	32.000	42.000	4.000	4	16.040
20.000	20.000	19.000	104.000	38.000	52.000	1.000	4	20.010
20.000	20.000	19.000	104.000	38.000	52.000	2.000	4	20.020
20.000	20.000	19.000	104.000	38.000	52.000	4.000	4	20.040

SuperF-UT end mills

SuperF-UT end mills Ti



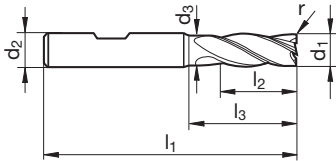
Catalog no. 54561



P	M	K	N	S	H
●		○		●	

Application
recomm. p. 513-
517

- optimised cutting edge design for high-strength titanium-alloys and special alloys
- can also be applied as SuperF-UT type N with corner radius
- with defined corner radii
- neck clearance
- centre cutting
- the unequal helix achieves smooth, chatter-free operation



d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	r	Z	Code no.
6.000	6.000	5.500	57.000	13.000	20.000	0.500	4	6.005
6.000	6.000	5.500	57.000	13.000	20.000	0.800	4	6.008
6.000	6.000	5.500	57.000	13.000	20.000	1.000	4	6.010
6.000	6.000	5.500	57.000	13.000	20.000	1.500	4	6.015
6.000	6.000	5.500	57.000	13.000	20.000	2.000	4	6.020
8.000	8.000	7.500	63.000	19.000	26.000	0.500	4	8.005
8.000	8.000	7.500	63.000	19.000	26.000	0.800	4	8.008
8.000	8.000	7.500	63.000	19.000	26.000	1.000	4	8.010
8.000	8.000	7.500	63.000	19.000	26.000	1.500	4	8.015
8.000	8.000	7.500	63.000	19.000	26.000	2.000	4	8.020
10.000	10.000	9.200	72.000	22.000	30.000	0.500	4	10.005
10.000	10.000	9.200	72.000	22.000	30.000	0.800	4	10.008
10.000	10.000	9.200	72.000	22.000	30.000	1.000	4	10.010
10.000	10.000	9.200	72.000	22.000	30.000	1.500	4	10.015
10.000	10.000	9.200	72.000	22.000	30.000	2.000	4	10.020
12.000	12.000	11.200	83.000	26.000	36.000	0.500	4	12.005
12.000	12.000	11.200	83.000	26.000	36.000	0.800	4	12.008
12.000	12.000	11.200	83.000	26.000	36.000	1.000	4	12.010
12.000	12.000	11.200	83.000	26.000	36.000	1.500	4	12.015
12.000	12.000	11.200	83.000	26.000	36.000	2.000	4	12.020
12.000	12.000	11.200	83.000	26.000	36.000	2.500	4	12.025
12.000	12.000	11.200	83.000	26.000	36.000	3.000	4	12.030
12.000	12.000	11.200	83.000	26.000	36.000	4.000	4	12.040
16.000	16.000	15.000	92.000	32.000	42.000	0.500	4	16.005
16.000	16.000	15.000	92.000	32.000	42.000	0.800	4	16.008
16.000	16.000	15.000	92.000	32.000	42.000	1.000	4	16.010
16.000	16.000	15.000	92.000	32.000	42.000	1.500	4	16.015
16.000	16.000	15.000	92.000	32.000	42.000	2.000	4	16.020
16.000	16.000	15.000	92.000	32.000	42.000	2.500	4	16.025
16.000	16.000	15.000	92.000	32.000	42.000	3.000	4	16.030
16.000	16.000	15.000	92.000	32.000	42.000	4.000	4	16.040
20.000	20.000	19.000	104.000	38.000	52.000	1.000	4	20.010
20.000	20.000	19.000	104.000	38.000	52.000	2.000	4	20.020
20.000	20.000	19.000	104.000	38.000	52.000	4.000	4	20.040

SuperF-UT end mills

SuperF-UT end mills VA-X



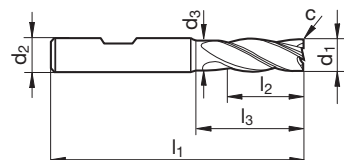
Catalog no. 54576



P	M	K	N	S	H
	•			•	

Application
recomm. p. 513-
517

- adapted cutting edge geometry and coating
- for the machining of stainless and acid-resistant steels as well as nickel-based alloys
- short stable design
- micro-corner protection
- neck clearance
- centre cutting
- the unequal helix achieves smooth, chatter-free operation



d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
4.000	6.000	3.700	54.000	8.000	15.000	0.150	4	4.000
5.000	6.000	4.700	54.000	9.000	15.000	0.150	4	5.000
6.000	6.000	5.500	54.000	10.000	17.000	0.200	4	6.000
8.000	8.000	7.500	58.000	12.000	21.000	0.250	4	8.000
10.000	10.000	9.200	66.000	14.000	24.000	0.300	4	10.000
12.000	12.000	11.200	73.000	16.000	26.000	0.350	4	12.000
16.000	16.000	15.000	82.000	22.000	32.000	0.500	4	16.000
20.000	20.000	19.000	92.000	26.000	40.000	0.600	4	20.000

SuperF-UT end mills

SuperF-UT end mills VA-X



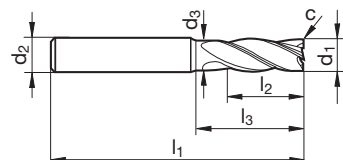
Catalog no. 54558



P	M	K	N	S	H
	•			•	

Application
recomm. p. 513-
517

- adapted cutting edge geometry and coating
- for the machining of stainless and acid-resistant steels as well as nickel-based alloys
- micro-corner protection
- neck clearance
- centre cutting
- the unequal helix achieves smooth, chatter-free operation



d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
3.000	6.000	2.700	57.000	8.000	15.000	0.100	4	3.000
4.000	6.000	3.700	57.000	11.000	18.000	0.150	4	4.000
5.000	6.000	4.700	57.000	13.000	18.000	0.150	4	5.000
6.000	6.000	5.500	57.000	13.000	20.000	0.200	4	6.000
8.000	8.000	7.500	63.000	19.000	26.000	0.250	4	8.000
10.000	10.000	9.200	72.000	22.000	30.000	0.300	4	10.000
12.000	12.000	11.200	83.000	26.000	36.000	0.350	4	12.000
14.000	14.000	13.200	83.000	26.000	36.000	0.400	4	14.000
16.000	16.000	15.000	92.000	32.000	42.000	0.500	4	16.000
18.000	18.000	17.000	92.000	32.000	42.000	0.600	4	18.000
20.000	20.000	19.000	104.000	38.000	52.000	0.600	4	20.000
25.000	25.000	23.500	121.000	45.000	63.000	0.750	4	25.000

SuperF-UT end mills

SuperF-UT end mills VA-X



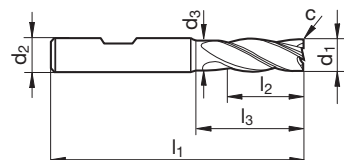
Catalog no. 54559



P	M	K	N	S	H
	•			•	

Application
recomm. p. 513-
517

- adapted cutting edge geometry and coating
- for the machining of stainless and acid-resistant steels as well as nickel-based alloys
- micro-corner protection
- neck clearance
- centre cutting
- the unequal helix achieves smooth, chatter-free operation



d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
3.000	6.000	2.700	57.000	8.000	15.000	0.100	4	3.000
4.000	6.000	3.700	57.000	11.000	18.000	0.150	4	4.000
5.000	6.000	4.700	57.000	13.000	18.000	0.150	4	5.000
6.000	6.000	5.500	57.000	13.000	20.000	0.200	4	6.000
8.000	8.000	7.500	63.000	19.000	26.000	0.250	4	8.000
10.000	10.000	9.200	72.000	22.000	30.000	0.300	4	10.000
12.000	12.000	11.200	83.000	26.000	36.000	0.350	4	12.000
14.000	14.000	13.200	83.000	26.000	36.000	0.400	4	14.000
16.000	16.000	15.000	92.000	32.000	42.000	0.500	4	16.000
18.000	18.000	17.000	92.000	32.000	42.000	0.600	4	18.000
20.000	20.000	19.000	104.000	38.000	52.000	0.600	4	20.000
25.000	25.000	23.500	121.000	45.000	63.000	0.750	4	25.000

SuperF-UT end mills

SuperF-UT end mills VA-X IK



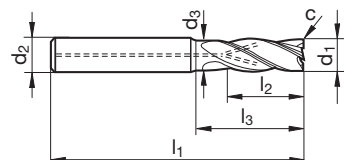
Catalog no. 54574



P	M	K	N	S	H
	•			•	

Application
recomm. p. 513-
517

- adapted cutting edge geometry and coating
- for the machining of stainless and acid-resistant steels as well as nickel-based alloys
- with internal cooling for longer tool life and optimal chip evacuation
- micro-corner protection
- neck clearance
- centre cutting
- the unequal helix achieves smooth, chatter-free operation



d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
6.000	6.000	5.500	57.000	13.000	20.000	0.200	4	6.000
8.000	8.000	7.500	63.000	19.000	26.000	0.250	4	8.000
10.000	10.000	9.200	72.000	22.000	30.000	0.300	4	10.000
12.000	12.000	11.200	83.000	26.000	36.000	0.350	4	12.000
16.000	16.000	15.000	92.000	32.000	42.000	0.500	4	16.000
20.000	20.000	19.000	104.000	38.000	52.000	0.600	4	20.000
25.000	25.000	23.500	121.000	45.000	63.000	0.750	4	25.000

SuperF-UT end mills

SuperF-UT end mills VA-X IK



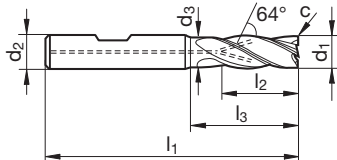
Catalog no. 54575



P	M	K	N	S	H
	•			•	

Application
recomm. p. 513-
517

- adapted cutting edge geometry and coating
- for the machining of stainless and acid-resistant steels as well as nickel-based alloys
- with internal cooling for longer tool life and optimal chip evacuation
- micro-corner protection
- neck clearance
- centre cutting
- the unequal helix achieves smooth, chatter-free operation



d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
6.000	6.000	5.500	57.000	13.000	20.000	0.200	4	6.000
8.000	8.000	7.500	63.000	19.000	26.000	0.250	4	8.000
10.000	10.000	9.200	72.000	22.000	30.000	0.300	4	10.000
12.000	12.000	11.200	83.000	26.000	36.000	0.350	4	12.000
16.000	16.000	15.000	92.000	32.000	42.000	0.500	4	16.000
20.000	20.000	19.000	104.000	38.000	52.000	0.600	4	20.000
25.000	25.000	23.500	121.000	45.000	63.000	0.750	4	25.000

SuperF-UT end mills

SuperF-UT end mills VA-XF



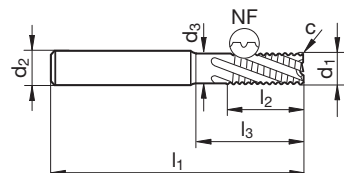
Catalog no. 54568



P	M	K	N	S	H
	•			•	

Application
recomm. p. 513-
517

- adapted cutting edge geometry and coating
- for the machining of stainless and acid-resistant steels as well as nickel-based alloys
- also suitable for unstable and difficult machining conditions
- achievable surface finish $R_a = 2$ to $3 \mu m$
- micro-corner protection
- neck clearance
- centre cutting
- the unequal helix achieves smooth, chatter-free operation



d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm x 45°	c mm	Z	Code no.
6.000	6.000	5.500	57.000	13.000	20.000	0.300	4	6.000
8.000	8.000	7.500	63.000	19.000	26.000	0.300	4	8.000
10.000	10.000	9.200	72.000	22.000	30.000	0.300	4	10.000
12.000	12.000	11.200	83.000	26.000	36.000	0.500	4	12.000
14.000	14.000	13.200	83.000	26.000	36.000	0.500	4	14.000
16.000	16.000	15.000	92.000	32.000	42.000	0.500	4	16.000
18.000	18.000	17.000	92.000	32.000	42.000	0.500	4	18.000
20.000	20.000	19.000	104.000	38.000	52.000	0.500	4	20.000
25.000	25.000	23.500	121.000	45.000	63.000	0.600	4	25.000

SuperF-UT end mills

SuperF-UT end mills VA-XF



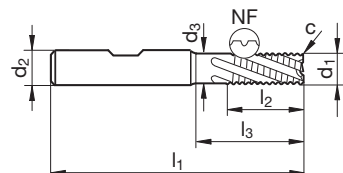
Catalog no. 54569



P	M	K	N	S	H
	•			•	

Application
recomm. p. 513-
517

- adapted cutting edge geometry and coating
- for the machining of stainless and acid-resistant steels as well as nickel-based alloys
- also suitable for unstable and difficult machining conditions
- achievable surface finish $R_a = 2$ to $3 \mu m$
- micro-corner protection
- neck clearance
- centre cutting
- the unequal helix achieves smooth, chatter-free operation



d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm x 45°	c mm	Z	Code no.
6.000	6.000	5.500	57.000	13.000	20.000	0.300	4	6.000
8.000	8.000	7.500	63.000	19.000	26.000	0.300	4	8.000
10.000	10.000	9.200	72.000	22.000	30.000	0.300	4	10.000
12.000	12.000	11.200	83.000	26.000	36.000	0.500	4	12.000
14.000	14.000	13.200	83.000	26.000	36.000	0.500	4	14.000
16.000	16.000	15.000	92.000	32.000	42.000	0.500	4	16.000
18.000	20.000	17.000	92.000	32.000	42.000	0.500	4	18.000
20.000	20.000	19.000	104.000	38.000	52.000	0.500	4	20.000
25.000	25.000	23.500	121.000	45.000	63.000	0.600	4	25.000

SuperF-UT end mills

SuperF-UT end mills VA



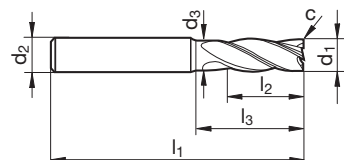
Catalog no. 54556



P	M	K	N	S	H
●	○		○		

Application
recomm. p. 513-
517

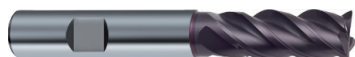
- adapted cutting edge geometry and coating
- soft, long chipping materials
- micro-corner protection
- neck clearance
- centre cutting
- the unequal helix achieves smooth, chatter-free operation



d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
4.000	6.000	3.700	57.000	11.000	18.000	0.100	4	4.000
5.000	6.000	4.700	57.000	13.000	18.000	0.100	4	5.000
6.000	6.000	5.500	57.000	13.000	20.000	0.150	4	6.000
8.000	8.000	7.500	63.000	19.000	26.000	0.150	4	8.000
10.000	10.000	9.200	72.000	22.000	30.000	0.200	4	10.000
12.000	12.000	11.200	83.000	26.000	36.000	0.200	4	12.000
16.000	16.000	15.000	92.000	32.000	42.000	0.350	4	16.000
20.000	20.000	19.000	104.000	38.000	52.000	0.450	4	20.000

SuperF-UT end mills

SuperF-UT end mills VA



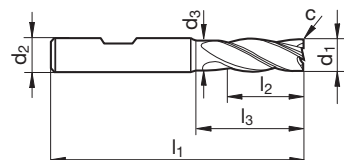
Catalog no. 64557



P	M	K	N	S	H
●	○		○		

Application
recomm. p. 513-
517

- adapted cutting edge geometry and coating
- soft, long chipping materials
- micro-corner protection
- neck clearance
- centre cutting
- the unequal helix achieves smooth, chatter-free operation



d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
4.000	6.000	3.700	57.000	11.000	18.000	0.100	4	4.000
5.000	6.000	4.700	57.000	13.000	18.000	0.100	4	5.000
6.000	6.000	5.500	57.000	13.000	20.000	0.150	4	6.000
8.000	8.000	7.500	63.000	19.000	26.000	0.150	4	8.000
10.000	10.000	9.200	72.000	22.000	30.000	0.200	4	10.000
12.000	12.000	11.200	83.000	26.000	36.000	0.200	4	12.000
16.000	16.000	15.000	92.000	32.000	42.000	0.350	4	16.000
20.000	20.000	19.000	104.000	38.000	52.000	0.450	4	20.000

SuperF-UT end mills

SuperF-UT end mills VA-IK



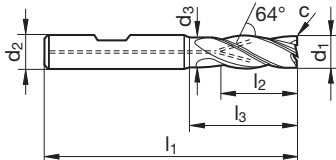
Catalog no. 64567



P	M	K	N	S	H
●	○		○		

Application
recomm. p. 513-
517

- adapted cutting edge geometry and coating
- soft, long chipping materials
- with internal cooling for longer tool life and optimal chip evacuation
- micro-corner protection
- neck clearance
- centre cutting
- the unequal helix achieves smooth, chatter-free operation



d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
6.000	6.000	5.500	57.000	13.000	20.000	0.150	4	6.000
8.000	8.000	7.500	63.000	19.000	26.000	0.150	4	8.000
10.000	10.000	9.200	72.000	22.000	30.000	0.200	4	10.000
12.000	12.000	11.200	83.000	26.000	36.000	0.200	4	12.000
16.000	16.000	15.000	92.000	32.000	42.000	0.350	4	16.000
20.000	20.000	19.000	104.000	38.000	52.000	0.450	4	20.000

SuperF-UT end mills

SuperF-UT end mills Al



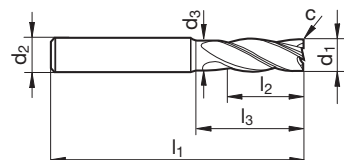
Catalog no. 74554



P	M	K	N	S	H
			•		

Application
recomm. p. 513-
517

- aluminium and aluminium-alloys as well as non-ferrous metals
- outstanding surface finish with fine finishing operations
- micro-corner protection
- neck clearance
- centre cutting
- the unequal helix achieves smooth, chatter-free operation



d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm x 45°	c mm	Z	Code no.
4.000	6.000	3.700	57.000	11.000	18.000	0.100	4	4.000
5.000	6.000	4.700	57.000	13.000	18.000	0.100	4	5.000
6.000	6.000	5.500	57.000	13.000	20.000	0.150	4	6.000
8.000	8.000	7.500	63.000	19.000	26.000	0.150	4	8.000
10.000	10.000	9.200	72.000	22.000	30.000	0.200	4	10.000
12.000	12.000	11.200	83.000	26.000	36.000	0.200	4	12.000
16.000	16.000	15.000	92.000	32.000	42.000	0.350	4	16.000
20.000	20.000	19.000	104.000	38.000	52.000	0.450	4	20.000

SuperF-UT end mills

SuperF-UT end mills Al



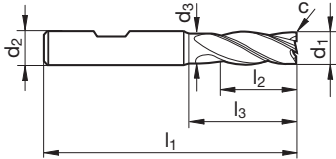
Catalog no. 74555



P	M	K	N	S	H
			•		

Application
recomm. p. 513-
517

- aluminium and aluminium-alloys as well as non-ferrous metals
- outstanding surface finish with fine finishing operations
- micro-corner protection
- neck clearance
- centre cutting
- the unequal helix achieves smooth, chatter-free operation



d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm x 45°	c mm	Z	Code no.
4.000	6.000	3.700	57.000	11.000	18.000	0.100	4	4.000
5.000	6.000	4.700	57.000	13.000	18.000	0.100	4	5.000
6.000	6.000	5.500	57.000	13.000	20.000	0.150	4	6.000
8.000	8.000	7.500	63.000	19.000	26.000	0.150	4	8.000
10.000	10.000	9.200	72.000	22.000	30.000	0.200	4	10.000
12.000	12.000	11.200	83.000	26.000	36.000	0.200	4	12.000
16.000	16.000	15.000	92.000	32.000	42.000	0.350	4	16.000
20.000	20.000	19.000	104.000	38.000	52.000	0.450	4	20.000

SuperF-UT end mills

SuperF-UT end mills Al-F



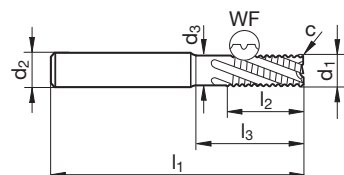
Catalog no. 54570



P	M	K	N	S	H
			●		

Application
recomm. p. 513-
517

- 3-flute with increased flute space
- also suitable for unstable and difficult machining conditions
- achievable surface finish $R_a = 2$ to $3 \mu m$
- aluminium and aluminium-alloys as well as other long-chipping non-ferrous metals
- micro-corner protection
- neck clearance
- centre cutting
- the unequal helix achieves smooth, chatter-free operation



d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm x 45°	c mm	Z	Code no.
6.000	6.000	5.500	57.000	13.000	20.000	0.300	3	6.000
8.000	8.000	7.500	63.000	19.000	26.000	0.300	3	8.000
10.000	10.000	9.200	72.000	22.000	30.000	0.300	3	10.000
12.000	12.000	11.200	83.000	26.000	36.000	0.500	3	12.000
16.000	16.000	15.000	92.000	32.000	42.000	0.500	3	16.000
20.000	20.000	19.000	104.000	38.000	52.000	0.500	3	20.000
25.000	25.000	23.500	121.000	45.000	63.000	0.600	3	25.000

SuperF-UT end mills

SuperF-UT end mills Al-F



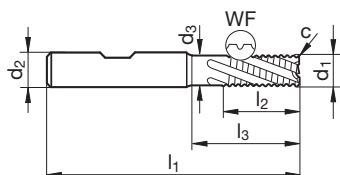
Catalog no. 54571



P	M	K	N	S	H
			●		

Application
recomm. p. 513-
517

- 3-flute with increased flute space
- also suitable for unstable and difficult machining conditions
- achievable surface finish $R_a = 2$ to $3 \mu m$
- aluminium and aluminium-alloys as well as other long-chipping non-ferrous metals
- micro-corner protection
- neck clearance
- centre cutting
- the unequal helix achieves smooth, chatter-free operation



d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm x 45°	c mm	Z	Code no.
6.000	6.000	5.500	57.000	13.000	20.000	0.300	3	6.000
8.000	8.000	7.500	63.000	19.000	26.000	0.300	3	8.000
10.000	10.000	9.200	72.000	22.000	30.000	0.300	3	10.000
12.000	12.000	11.200	83.000	26.000	36.000	0.500	3	12.000
16.000	16.000	15.000	92.000	32.000	42.000	0.500	3	16.000
20.000	20.000	19.000	104.000	38.000	52.000	0.500	3	20.000
25.000	25.000	23.500	121.000	45.000	63.000	0.600	3	25.000

SuperF-UT end mills

SuperF-UT end mills Al-3



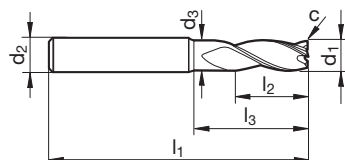
Catalog no. 74552



P	M	K	N	S	H
			•		

Application
recomm. p. 513-
517

- 3-flute with increased flute space
- mirror finish for optimal chip evacuation
- aluminium and aluminium-alloys as well as other long-chipping non-ferrous metals
- micro-corner protection
- neck clearance
- centre cutting
- the unequal helix achieves smooth, chatter-free operation



d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm x 45°	c mm	Z	Code no.
3.000	6.000	2.700	57.000	8.000	15.000	0.030	3	3.000
4.000	6.000	3.700	57.000	11.000	18.000	0.040	3	4.000
5.000	6.000	4.700	57.000	13.000	18.000	0.050	3	5.000
6.000	6.000	5.500	57.000	13.000	20.000	0.060	3	6.000
8.000	8.000	7.500	63.000	19.000	26.000	0.080	3	8.000
10.000	10.000	9.200	72.000	22.000	30.000	0.100	3	10.000
12.000	12.000	11.200	83.000	26.000	36.000	0.120	3	12.000
16.000	16.000	15.000	92.000	32.000	42.000	0.160	3	16.000
20.000	20.000	19.000	104.000	38.000	52.000	0.200	3	20.000

SuperF-UT end mills

SuperF-UT end mills Al-3



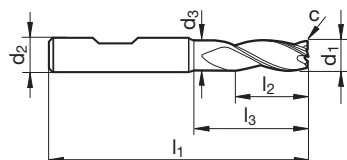
Catalog no. 74553



P	M	K	N	S	H
			•		

Application
recomm. p. 513-
517

- 3-flute with increased flute space
- mirror finish for optimal chip evacuation
- aluminium and aluminium-alloys as well as other long-chipping non-ferrous metals
- micro-corner protection
- neck clearance
- centre cutting
- the unequal helix achieves smooth, chatter-free operation



d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm x 45°	c mm	Z	Code no.
3.000	6.000	2.700	57.000	8.000	15.000	0.030	3	3.000
4.000	6.000	3.700	57.000	11.000	18.000	0.040	3	4.000
5.000	6.000	4.700	57.000	13.000	18.000	0.050	3	5.000
6.000	6.000	5.500	57.000	13.000	20.000	0.060	3	6.000
8.000	8.000	7.500	63.000	19.000	26.000	0.080	3	8.000
10.000	10.000	9.200	72.000	22.000	30.000	0.100	3	10.000
12.000	12.000	11.200	83.000	26.000	36.000	0.120	3	12.000
16.000	16.000	15.000	92.000	32.000	42.000	0.160	3	16.000
20.000	20.000	19.000	104.000	38.000	52.000	0.200	3	20.000

SuperF-UT end mills

SuperF-UT end mills H



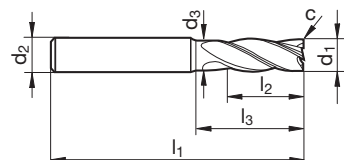
Catalog no. 54572



P	M	K	N	S	H
•		•			•

Application
recomm. p. 513-
517

- roughing up to 1xD of materials up to 54 HRC
- finishing up to 2.5xD of materials up to 63 HRC
- long tool life thanks to extremely hard coating
- particularly stable thanks to re-inforced core
- micro-corner protection
- neck clearance
- centre cutting
- the unequal helix achieves smooth, chatter-free operation



d1 mm	d2 mm	d3 mm	l1 mm	l2 mm	l3 mm x 45°	c mm	Z	Code no.
6.000	6.000	5.500	57.000	13.000	20.000	0.150	4	6.000
8.000	8.000	7.500	63.000	19.000	26.000	0.150	4	8.000
10.000	10.000	9.200	72.000	22.000	30.000	0.200	4	10.000
12.000	12.000	11.200	83.000	26.000	36.000	0.200	4	12.000
16.000	16.000	15.000	92.000	32.000	42.000	0.350	4	16.000
20.000	20.000	19.000	104.000	38.000	52.000	0.450	4	20.000

SuperF-UT end mills

SuperF-UT end mills H



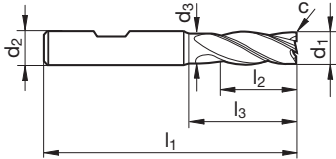
Catalog no. 54573



P	M	K	N	S	H
•		•			•

Application
recomm. p. 513-
517

- roughing up to 1xD of materials up to 54 HRC
- finishing up to 2.5xD of materials up to 63 HRC
- long tool life thanks to extremely hard coating
- particularly stable thanks to re-inforced core
- micro-corner protection
- neck clearance
- centre cutting
- the unequal helix achieves smooth, chatter-free operation



d1 mm	d2 mm	d3 mm	l1 mm	l2 mm	l3 mm x 45°	c mm	Z	Code no.
6.000	6.000	5.500	57.000	13.000	20.000	0.150	4	6.000
8.000	8.000	7.500	63.000	19.000	26.000	0.150	4	8.000
10.000	10.000	9.200	72.000	22.000	30.000	0.200	4	10.000
12.000	12.000	11.200	83.000	26.000	36.000	0.200	4	12.000
16.000	16.000	15.000	92.000	32.000	42.000	0.350	4	16.000
20.000	20.000	19.000	104.000	38.000	52.000	0.450	4	20.000

SuperF-UT end mills

SuperF-UT end mills FS



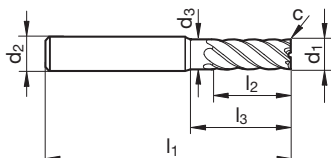
Catalog no. 64558



P	M	K	N	S	H
•	•	•	•	•	•

Application
recomm. p. 513-
517

- greatest possible advantages with finishing and semi-roughing operations specially under HPC conditions
- for fine finishing in materials up to 50 HRC
- longer dimension see F-UT N-5 with 5 teeth
- micro-corner protection
- neck clearance
- centre cutting
- the unequal helix achieves smooth, chatter-free operation



d1 mm	d2 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
8.000	8.000	7.500	63.000	19.000	26.000	0.100	6	8.000
10.000	10.000	9.200	72.000	22.000	30.000	0.100	6	10.000
12.000	12.000	11.200	83.000	26.000	36.000	0.100	6	12.000
16.000	16.000	15.000	92.000	32.000	42.000	0.150	6	16.000
20.000	20.000	19.000	104.000	38.000	52.000	0.150	6	20.000
25.000	25.000	23.500	121.000	45.000	63.000	0.200	6	25.000

SuperF-UT end mills

SuperF-UT end mills FS



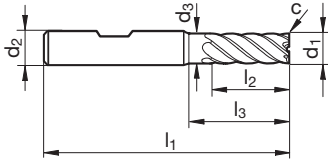
Catalog no. 64559



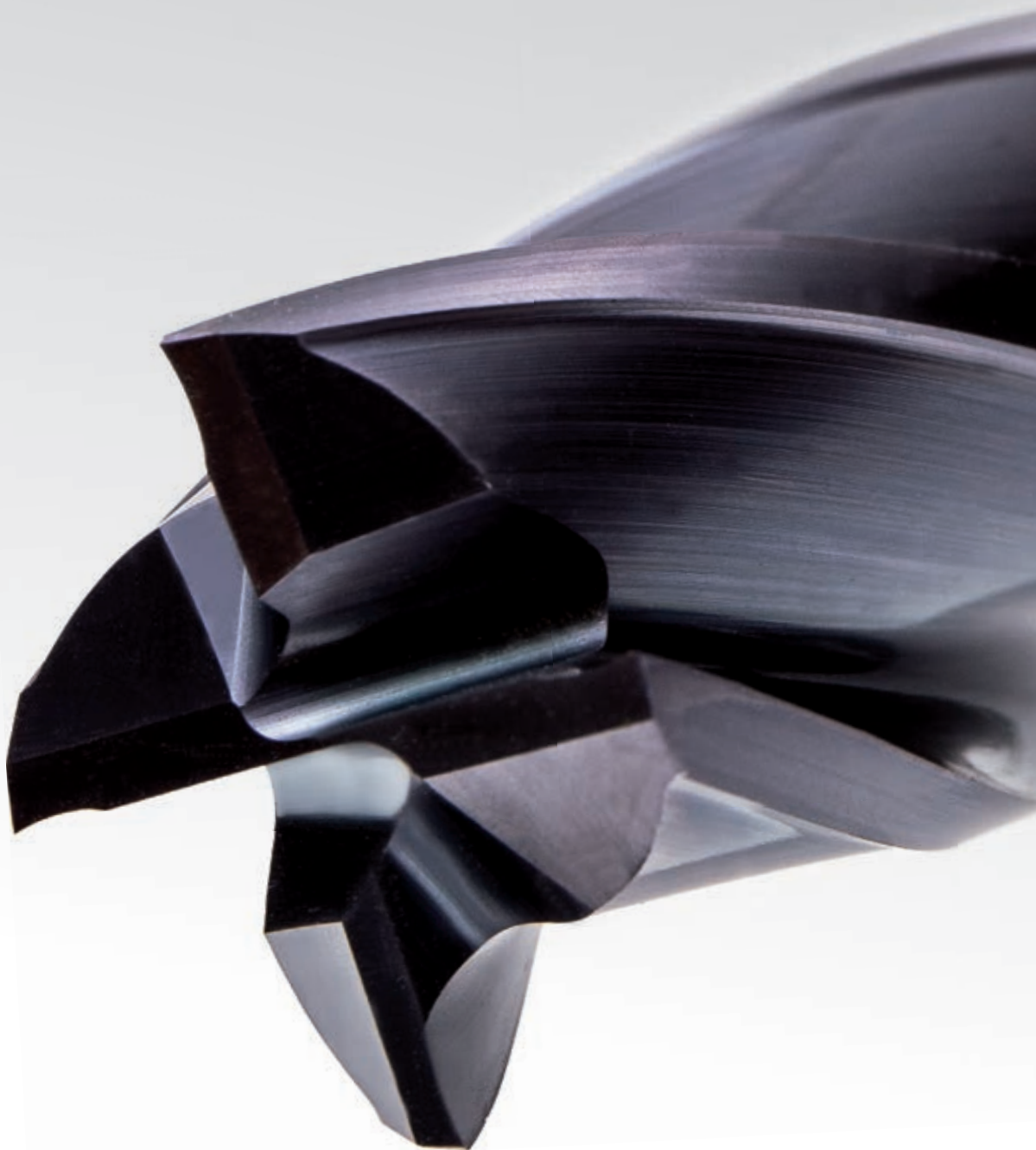
P	M	K	N	S	H
•	•	•	•	•	•

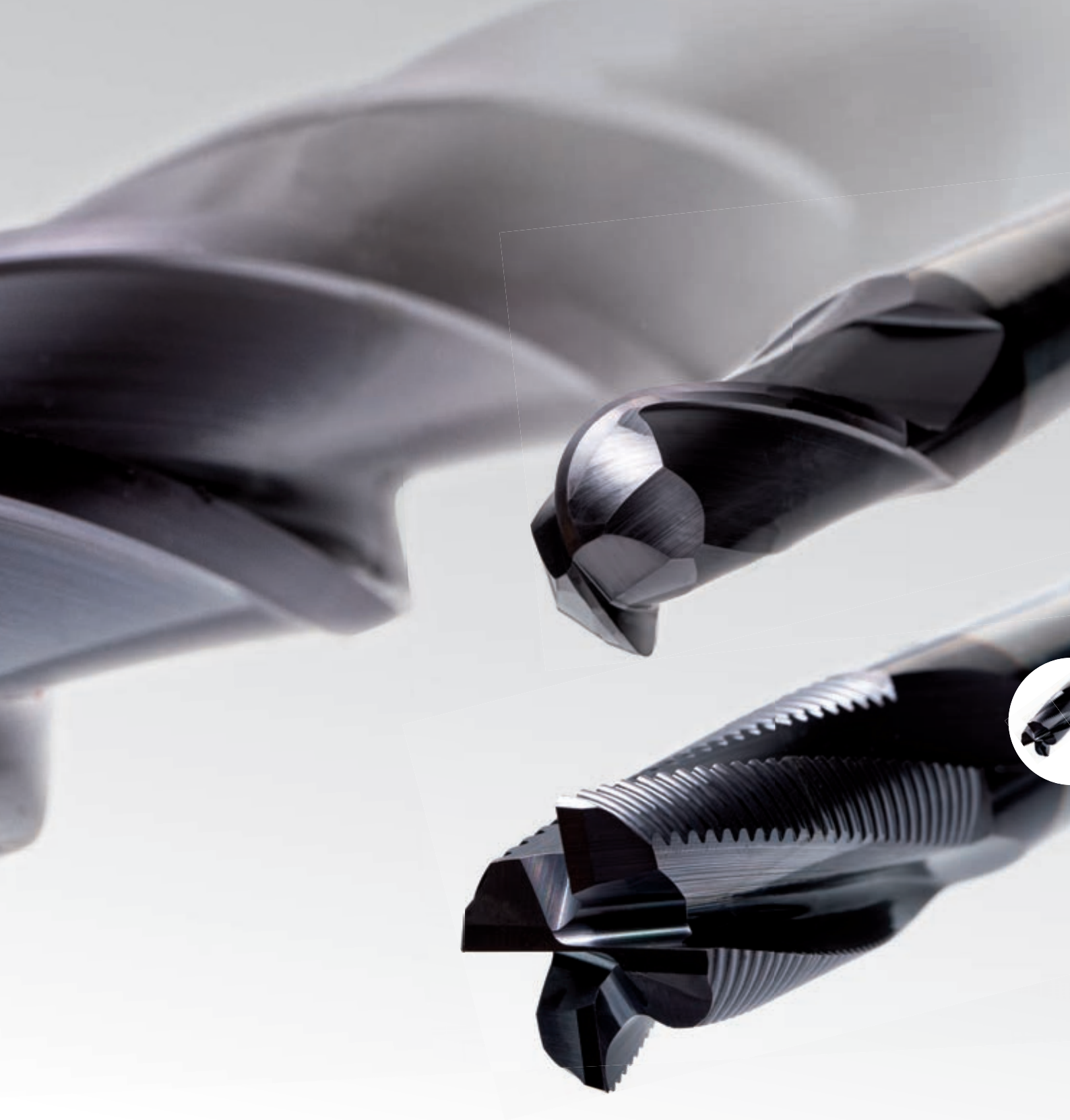
Application
recomm. p. 513-
517

- greatest possible advantages with finishing and semi-roughing operations specially under HPC conditions
- for fine finishing in materials up to 50 HRC
- longer dimension see F-UT N-5 with 5 teeth
- micro-corner protection
- neck clearance
- centre cutting
- the unequal helix achieves smooth, chatter-free operation



d1 mm	d2 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
8.000	8.000	7.500	63.000	19.000	26.000	0.300	6	8.000
10.000	10.000	9.200	72.000	22.000	30.000	0.300	6	10.000
12.000	12.000	11.200	83.000	26.000	36.000	0.500	6	12.000
16.000	16.000	15.000	92.000	32.000	42.000	0.500	6	16.000
20.000	20.000	19.000	104.000	38.000	52.000	0.500	6	20.000
25.000	25.000	23.500	121.000	45.000	63.000	0.600	6	25.000





MILLING TOOLS

ISO-CODES



P	Steel, high-alloyed steel
M	Stainless steel
K	Grey cast iron, spheroidal and malleable cast iron
N	Aluminium and other non-ferrous metals
S	Special-, super- and Ti-alloys
H	Hardened steel and hard cast iron

Recommendations regarding tool suitability for the following application groups can be found on the following program pages:

- optimal suitability
- limited suitability

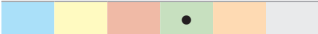
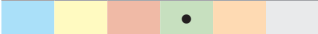
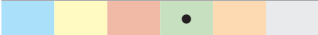
PICTOGRAMS



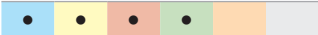
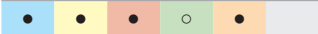
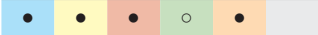
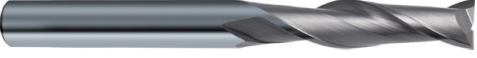
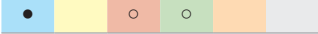
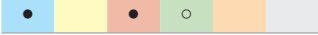
TOOL MATERIAL	VHM			M42	HSS-E-PM					
	Solid carbide									
SURFACE FINISH	bright	TiAlN	TiAl-SiN	Al-TiN	AlTiN nano	Al-TiN+				
Ø TOLERANCE	e8	e8/h10	h8	h10	m8	js9	k10	js12	k12	
CUTTING DIRECTION										
	right-hand									
SHANK FORM	 HA	 HB	 B							
HELIX ANGLE	 20°	 30°	 45°	 55°						
STANDARD	 DIN 6527K	 DIN 6527L	 DIN 6528	 DIN 327	 DIN 844K	 DIN 844L				
	to Stock standard									
TYPE	W	N	NH	H	NF	WR	NRf	HR	NR	
	 Super AF-60	 Super AF-90	 Super AF-120	 Super AD-90						

P	M	K	N	S	H	Type	Shank form	Helix angle °	Tool material	Surface	Standard	d1/mm	Catalog no.	Progr. page
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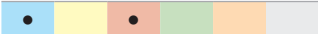
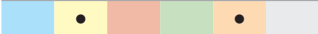
Slot drills Alu

		W	HB	45	Solid carbide	bright	DIN 6527K	3.000 - 20.000	74204	584
		W	HB	45	Solid carbide	bright	DIN 6527L	3.000 - 20.000	74202	585
		W	HA	45	Solid carbide	bright	Company std.	5.000 - 16.000	74206	586
		W	HA	45	Solid carbide	bright	Company std.	6.000 - 20.000	74479	587

Slot drills (2-fluted)

		N	HB	30	Solid carbide	bright	DIN 6527K	2.000 - 20.000	74520	588
		N	HB	30	Solid carbide	TiAIN	DIN 6527K	2.000 - 20.000	54520	589
		N	HA	30	Solid carbide	TiAIN	DIN 6527L	2.000 - 20.000	54519	590
		N	HB	30	Solid carbide	bright	DIN 6527L	2.000 - 20.000	74521	591
		N	HB	30	Solid carbide	TiAIN	DIN 6527L	2.000 - 20.000	54521	592
		N	HA	30	Solid carbide	bright	Company std.	3.000 - 20.000	74404	593
		N	HA	30	Solid carbide	TiAIN	Company std.	5.000 - 20.000	54404	594

Mini slot drills (3-fluted)

		N	HA/HB	30	Solid carbide	TiAIN	Company std.	0.300 - 20.000	64080	595
		NH	HA/HB	45	Solid carbide	TiAIN	Company std.	1.000 - 10.000	64180	596

P	M	K	N	S	H	Type	Shank form	Helix angle °	Tool material	Surface	Standard	d1/mm	Catalog no.	Progr. page
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Slot drills (3-fluted)

	•	•	•	•	•	N	HB	30	Solid carbide	bright	DIN 6527K	2.000 - 20.000	74522	597
	•	•	•	•	•	N	HB	30	Solid carbide	TiAIN	DIN 6527K	2.000 - 20.000	64522	598
	•	•	•	•	•	N	HA	30	Solid carbide	TiAIN	DIN 6527L	2.000 - 20.000	54523	599
	•	•	•	•	•	N	HB	30	Solid carbide	bright	DIN 6527L	2.000 - 20.000	74523	600
	•	•	•	•	•	N	HB	30	Solid carbide	TiAIN	DIN 6527L	2.000 - 20.000	64523	601
	•	•	•	•	•	N	HA	30	Solid carbide	bright	Company std.	3.000 - 20.000	74424	602
	•	•	•	•	•	N	HA	30	Solid carbide	TiAIN	Company std.	3.000 - 20.000	54424	603

Slot drills NH (3-fluted)

	•	•	•	•	•	NH	HB	45	Solid carbide	TiAIN	DIN 6527K	3.000 - 20.000	64570	604
	•	•	•	•	•	NH	HA	45	Solid carbide	bright	DIN 6527L	3.000 - 20.000	74478	605
	•	•	•	•	•	NH	HA	45	Solid carbide	TiAIN	DIN 6527L	1.000 - 20.000	64478	606
	•	•	•	•	•	NH	HB	45	Solid carbide	TiAIN	DIN 6527L	3.000 - 20.000	64571	607

End mills (4-fluted)

	•	•	•	•	•	N	HA	30	Solid carbide	TiAIN	DIN 6527L	2.000 - 20.000	54524	608
	•	•	•	•	•	N	HB	30	Solid carbide	bright	DIN 6527L	3.000 - 20.000	74525	609

P	M	K	N	S	H	Type	Shank form	Helix angle °	Tool material	Surface	Standard	d1/mm	Catalog no.	Progr. page
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End mills (4-fluted)



•	○	•	○	○	○	N	HB	30	Solid carbide	TiAIN	DIN 6527L	2.000 - 20.000	64525	610
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•	○	•	○	○	○	N	HA	30	Solid carbide	TiAIN	Company std.	3.000 - 20.000	54444	611
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End mills with corner radius



•	•	•	○	•	○	N	HA	30	Solid carbide	TiAIN	DIN 6527L	6.000 - 16.000	54522	612
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•	•	•	○	•	○	N	HA	30	Solid carbide	TiAIN	DIN 6527L	6.000 - 20.000	54526	613
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•	•	•	○	•	○	NH	HA	45	Solid carbide	TiAIN	DIN 6527L	6.000 - 20.000	54206	614
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Finishing end mills (multiple fluted)



•	•	•	○	•	○	NH	HA	45	Solid carbide	TiAIN	Company std.	3.000 - 20.000	54205	615
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•	•	•	○	•	○	NH	HB	45	Solid carbide	TiAIN	Company std.	6.000 - 20.000	54201	616
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•	•	•	○	•	○	NH	HA	45	Solid carbide	TiAIN	Company std.	6.000 - 20.000	54225	617
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•	•	•	○	•	○	NH	HB	45	Solid carbide	TiAIN	Company std.	6.000 - 20.000	54221	618
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Hard milling cutters (multi-fluted)



•	•	•	○	•	○	H	HA	55	Solid carbide	TiAlSiN	Company std.	3.000 - 20.000	54207	619
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•	•	•	○	•	○	H	HA	55	Solid carbide	TiAlSiN	Company std.	6.000 - 20.000	54227	620
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P	M	K	N	S	H	Type	Shank form	Helix angle °	Tool material	Surface	Standard	d1/mm	Catalog no.	Progr. page
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Roughing end mills

	•	○	•	○		NF	HB	30	Solid carbide	TiAIN	DIN 6527L	6.000 - 25.000	54496	621
	•	○	•	○		NF	HB	45	Solid carbide	TiAIN	DIN 6527L	6.000 - 25.000	54497	622
				•		WR	HB	30	Solid carbide	bright	DIN 6527L	6.000 - 20.000	74203	623
				•		WR	HB	30	Solid carbide	bright	DIN 6527L	6.000 - 20.000	74303	624
	•	•	•			NRf	HB	30	Solid carbide	TiAIN	DIN 6527L	6.000 - 20.000	64495	625
	•		•		•	HR	HB	20	Solid carbide	TiAlSiN	DIN 6527L	6.000 - 20.000	64497	626

Ball nose end mills

	•	•	•	○		N	HA	30	Solid carbide	bright	DIN 6527L	3.000 - 20.000	74543	627
	•	•	•	○	○	N	HA	30	Solid carbide	TiAIN	DIN 6527L	0.500 - 20.000	54541	628
	•	•	•	○	○	N	HB	30	Solid carbide	TiAIN	DIN 6527L	1.000 - 20.000	64542	629
	•	○	•	○		N	HA	30	Solid carbide	bright	Company std.	3.000 - 12.000	74545	630
	•	•	•	○	○	N	HA	30	Solid carbide	TiAIN	Company std.	3.000 - 12.000	64545	631
	•	•	•	○		N	HA	30	Solid carbide	bright	DIN 6528	4.000 - 16.000	74531	632
	•	•	•	○	○	N	HA	30	Solid carbide	TiAIN	DIN 6528	4.000 - 20.000	54531	633
	•	•	•	○	○	N	HB	30	Solid carbide	TiAIN	DIN 6527L	3.000 - 20.000	64532	634

P	M	K	N	S	H	Type	Shank form	Helix angle °	Tool material	Surface	Standard	d1/mm	Catalog no.	Progr. page
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Ball nose end mills



•	•	•	○	○		N	HA	30	Solid carbide	TiAlN	Company std.	3.000 - 12.000	64535	635
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Torus end mills



•	•	•	○	•		H	HA	30	Solid carbide	TiAlSiN	Company std.	3.000 - 16.000	54304	636
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•	•	•	○	•		H	HA	30	Solid carbide	TiAlSiN	Company std.	6.000 - 16.000	54305	637
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•	•	•	○	•		N	HA	30	Solid carbide	TiAlSiN	Company std.	2.000 - 12.000	54302	638
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•	•	•	○	•		N	HA	30	Solid carbide	TiAlSiN	Company std.	2.000 - 12.000	54303	639
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Ball nose end mills



•	•	•	○	•		H	HA	30	Solid carbide	TiAlSiN	Company std.	0.500 - 16.000	54306	640
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•	•	•	○	•		H	HA	30	Solid carbide	TiAlSiN	Company std.	3.000 - 16.000	54307	641
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•	•	•	○	•		N	HA	30	Solid carbide	TiAlSiN	Company std.	2.000 - 12.000	54300	642
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•	•	•	○	•		N	HA	30	Solid carbide	TiAlSiN	Company std.	2.000 - 12.000	54301	643
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Pilot end mills



•	•	•	○	•		N	HA	30	Solid carbide	AlTiN+	DIN 6527L	1.400 - 12.000	54700	644
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Deburring end mills 60°



•	•	•	○	•		SuperAF-60	HA	0	Solid carbide	AlTiN	Company std.	4.000 - 12.000	53393	645
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P	M	K	N	S	H	Type	Shank form	Helix angle °	Tool material	Surface	Standard	d1/mm	Catalog no.	Progr. page
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Deburring end mills 60°



•	•	•	•	•		SuperAF-60	HB	0	Solid carbide	AlTiN	Company std.	6.000 - 12.000	53394	646
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Deburring end mills 90°



•	•	•	•	•		SuperAF-90	HA	0	Solid carbide	AlTiN	Company std.	4.000 - 12.000	53395	647
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•	•	•	•	•		SuperAF-90	HB	0	Solid carbide	AlTiN	Company std.	4.000 - 12.000	53396	648
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Deburring end mills 120°



•	•	•	•	•		Super-AF-120	HA	0	Solid carbide	AlTiN	Company std.	4.000 - 12.000	53397	649
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•	•	•	•	•		Super-AF-120	HB	0	Solid carbide	AlTiN	Company std.	6.000 - 12.000	53398	650
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Front/back deburrer 90°



•	•	•	•	•		SuperAD-90	HA	0	Solid carbide	AlTiN nano	Company std.	3.000 - 12.000	52365	651
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P	M	K	N	S	H	Type	Shank form	Helix angle °	Tool material	Surface	Standard	d1/mm	Catalog no.	Progr. page
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Slot drills (2-fluted)

	•	•	•	•		N	B	30	M42	bright	DIN 327	1.000 - 25.000	74231	652
	•	•	•	○		N	B	30	M42	TiAlN	DIN 327	1.000 - 20.000	64640	653
	•	•	•	•		N	B	30	M42	bright	DIN 844K	3.000 - 20.000	74243	654
	•	•	•	○		N	B	30	M42	TiAlN	DIN 844K	3.000 - 20.000	64670	655
	•	•	•	•		N	B	30	M42	bright	DIN 844L	3.000 - 20.000	74244	656
	•	•	•	•		N	B	30	M42	TiAlN	DIN 844L	4.000 - 20.000	64671	657

Slot drills (3-fluted)

	•	•	•	•		N	B	30	M42	bright	DIN 327	2.800 - 25.000	74280	658
	•	•	•	○		N	B	30	M42	TiAlN	DIN 327	2.800 - 25.000	64604	659
	•	•	•	•		N	B	30	M42	bright	DIN 844K	3.000 - 20.000	74282	660
	•	•	•	○		N	B	30	M42	TiAlN	DIN 844K	3.000 - 20.000	64641	661
	•	•	•	•		N	B	30	M42	bright	DIN 844L	3.000 - 20.000	74294	663
	•	•	•	•		N	B	30	M42	TiAlN	DIN 844L	4.000 - 18.000	54294	662

Mini slot drills (3-fluted)

	○	•	•	•	○	N		30	M42	TiAlN	Company std.	3.000 - 10.000	54080	664
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P	M	K	N	S	H	Type	Shank form	Helix angle °	Tool material	Surface	Standard	d1/mm	Catalog no.	Progr. page
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Mini slot drills (3-fluted)



○	●	●	●	○		N		30	M42	TiAlN	Company std.	3.000 - 10.000	54180	665
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End mills (multiple fluted)



●	●	○	○			N	B	30	M42	bright	DIN 844K	2.000 - 25.000	74617	666
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●	●	●	○			N	B	30	M42	TiAlN	DIN 844K	3.000 - 25.000	64667	667
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●	○	●	○			N	B	30	M42	bright	DIN 844L	3.000 - 25.000	74847	668
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●	●	●	○			N	B	30	M42	TiAlN	DIN 844L	3.000 - 32.000	54847	669
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●	○					N	B	30	M42	bright	Company std.	6.000 - 20.000	74800	670
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Roughing/finishing end mills



●	●	●				NF	B	30	M42	TiAlN	DIN 844K	6.000 - 25.000	54815	671
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Roughing end mills (3-fluted)



●	●	●				NRf	B	30	HSS-E-PM	bright	DIN 844K	6.000 - 20.000	74825	672
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●	●	●				NRf	B	30	HSS-E-PM	TiAlN	DIN 844K	6.000 - 20.000	54825	673
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Roughing end mills (4-fluted)



●	●	●				NR	B	30	M42	bright	DIN 844K	6.000 - 30.000	74816	674
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●	●	●				NR	B	30	M42	TiAlN	DIN 844K	6.000 - 32.000	54816	675
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P	M	K	N	S	H	Type	Shank form	Helix angle °	Tool material	Surface	Standard	d1/mm	Catalog no.	Progr. page
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Roughing end mills (4-fluted)



•	•	•	•	•	•	NRf	B	30	HSS-E-PM	bright	DIN 844K	6.000 - 25.000	74845	676
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•	•	•	•	•	•	NRf	B	30	HSS-E-PM	TiAIN	DIN 844K	6.000 - 25.000	54845	677
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•	•	•	•	•	•	NR	B	30	M42	bright	DIN 844L	6.000 - 25.000	74836	678
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•	•	•	•	•	•	NR	B	30	M42	TiAIN	DIN 844L	6.000 - 25.000	54836	679
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Ball nose end mills



•	•	•	•	•	•	N	B	30	M42	TiAIN	DIN 327	2.000 - 20.000	54275	680
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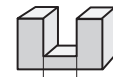


•	•	•	•	•	•	N	B	30	M42	TiAIN	Company std.	3.000 - 20.000	54276	681
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Application recommendations for Carbide Slot Drills

		Feed column															
Code-letter		H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
tool-Ø mm	2.00	0.001	0.001	0.001	0.002	0.002	0.004	0.005	0.006	0.007	0.008	0.010	0.012	0.014	0.016	0.018	0.020
	3.00	0.002	0.002	0.003	0.003	0.004	0.007	0.010	0.010	0.010	0.015	0.016	0.013	0.019	0.022	0.024	0.030
	5.00	0.005	0.006	0.007	0.009	0.010	0.014	0.020	0.020	0.022	0.025	0.026	0.026	0.028	0.030	0.032	0.038
	6.00	0.006	0.008	0.009	0.011	0.013	0.017	0.024	0.025	0.027	0.031	0.029	0.033	0.039	0.036	0.041	0.047
	8.00	0.010	0.012	0.014	0.016	0.019	0.024	0.032	0.032	0.035	0.042	0.042	0.047	0.053	0.052	0.058	0.064
	10.00	0.013	0.015	0.018	0.021	0.025	0.030	0.038	0.039	0.044	0.050	0.053	0.059	0.065	0.066	0.073	0.080
	12.00	0.010	0.018	0.022	0.026	0.030	0.036	0.046	0.048	0.052	0.059	0.063	0.072	0.079	0.085	0.090	0.100
	16.00	0.020	0.023	0.027	0.032	0.038	0.045	0.054	0.058	0.063	0.071	0.079	0.088	0.095	0.100	0.110	0.120
	20.00	0.023	0.028	0.033	0.038	0.045	0.057	0.066	0.073	0.080	0.090	0.097	0.100	0.110	0.120	0.130	0.140
	25.00	0.030	0.035	0.040	0.045	0.055	0.065	0.075	0.100	0.120	0.130	0.140	0.150	0.165	0.170	0.180	0.190

a_e = Width of cut
a_p = Cutting depth



$$a_e = 1.0 \times D$$

Feed rate codes in bold are the preferred choice for the respective material group.

Oblique plunging and slot milling

For oblique plunging the feed rate (v_f = mm/min) should be reduced as illustrated.

In addition, chip evacuation is required for drilling depths in excess of $1 \times D$. This also applies to the transition to radial machining.

slot milling

a_p = cut. depth $0.5 \times D = f_z$ 100%

a_p = cut. depth $1.0 \times D = f_z$ 75%

Drilling

For drilling the feed rate (v_f = mm/min) should be reduced as illustrated.

In addition, chip evacuation is required for larger drilling depths in excess of $0.5 \times D$.



Lubricants:

cutting oil, highly activated ■
soluble oil (emulsion) ■
air only □

Material group	Materials examples, new designations (old designation in brackets) Figures in bold = material no. to DIN EN	Tensile strength MPa (N/mm ²)	Hardness	Coolant
General purpose steels	1.0035 S185(S133), 1.0486 P275N(S1E285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850		■
Free-cutting steels	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000		■
Unalloyed tempering steels	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000		■
Alloyed tempering steels	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-≤1000 1000-1200		■
Unalloyed case hardened steels	1.0301 (C10), 1.1121 C10E (Ck10)	≤750		■
Alloyed case hardened steels	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850-≤1000 1000-1200		■
Nitriding steels	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850-≤1000 >1000-1200		■
Tool steels	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000		■
High speed steels	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000		■
Spring steels	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤330 HB	■
Hardened steels	-		≤40-48 HRC >48-60 HRC	■
Stainless steels, sulphured	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤850		■
austenitic	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤850		■
martensitic	1.4057 X20CrNi 17 2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850		■
Cast iron	0.6010 EN-GJL-100(GG10), 0.6020 EN-GJL-200(GG20) 0.6025 EN-GJL-250(GG25), 0.6035 EN-GJL-350(GG35)	850-≤1000 1000-1200		■
Spheroidal graphite iron and malleable cast iron	0.7050 EN-GJS-500-7(GGG50), 0.8035 EN-GJMW-350-4(GTW35) 0.7070 EN-GJS-700-2(GGG70), 0.8170 EN-GJMB-700-2(GTS70)		≤240 HB <300 HB	■
Chilled cast iron	-		≤350 HB	■
New Cast iron GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo6			■
New Cast iron ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		■
Special alloys	Nimonic, Inconel, Monel, Hastelloy	≤1200		■
Ti and Ti-alloys	3.7024 Ti99.5, 3.7114 TiAl5Sn2.5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2.5, - TiAl8Mo1V1	≤850 >850-1200		■
Aluminium and Al-alloys	3.0255 Al99.5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		■
Al wrought alloys	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1.5	≤450		■
Al cast alloys ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		■
> 10 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		■
Magnesium alloys	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450		■
Copper, low alloyed	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnNb	≤400		■
Brass, short-chipping	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		■
long-chipping	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0.5	≤600		■
Bronze, short-chipping	2.1090 CuSn7ZnNb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn	≤600		■
long-chipping	2.0790 CuNi18Zn19Pb	>600-850		■
Bronze, long-chipping	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000		■
Duroplastics	Epoxy resin, Resopal, Pertinax, Moltopren	-		■
Thermoplastics	Plexiglas, Hostalen, Novodur, Makralon	-		■
Kevlar	Kevlar	-		■
Glass/carbon-concentr. plastics	GFK/CFK	-		■

Slot drilling

Catalog no.	74204	74202	74479	74520	74522	54520 54522	64522	74521	74523	74478
Tool mat.	Solid carbide		Solid carbide	Solid carbide		Solid carbide		Solid carbide		Solid carbide
Std.	6527 K	6527 L	Stock std.	6527 K		6527 K		6527 L		6527 L
Type	W		W	N		N		N		NH
Page	584	585	587	588	597	589/612	598	591	600	605

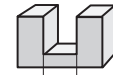


V _C m/min	Feed col.	V _C m/min	Feed col.	V _C m/min	Feed col.	V _C m/min	Feed col.	V _C m/min	Feed col.	V _C m/min	Feed col.
				73	O	120	O	63	N	63	N
				69	M	115	N	60	L	60	L
				73	M	120	N	63	L	63	L
				53	N	90	O	47	M	47	M
				73	M	120	N	63	L	63	L
				65	M	108	N	57	L	57	L
				53	N	90	O	47	M	47	M
				65	N	108	O	57	M	57	M
				53	N	90	O	47	M	47	M
				76	M	127	N	66	L	66	L
				65	M	108	N	57	L	57	L
				46	N	76	O	40	M	40	M
				73	M	120	N	63	L	63	L
				65	L	108	M	57	L	57	L
				65	M	108	N	57	L	57	L
				53	L	90	M	47	L	47	L
				39	N	64	O	33	M	33	M
						64	M				
						64	M				
				39	N	64	O	33	M	33	M
				35	L	58	M	30	L	30	L
				31	M	51	N	27	L	27	L
				92	M	152	N	80	L	80	L
				84	L	140	M	73	L	73	L
				76	M	127	N	66	L	66	L
				69	L	115	M	60	L	60	L
				46	L	76	M	40	L	40	L
						39	M				
				39	L	64	M	33	L	33	L
				31	L	51	M	27	L	27	L
363	R	436	T	343	O	570	P	297	N	297	N
440	R	528	T	418	O	697	P	363	N	363	N
176	Q	212	S	168	N	279	O	146	M	146	M
143	R	172	T	137	O	228	P	119	N	119	N
209	S	251	T	191	P	317	Q	165	O	165	O
99	R	119	T	92	O	152	P	80	N	80	N
88	R	106	T	76	O	127	P	66	N	66	N
83	Q	99	S	69	N	115	O	60	M	60	M
88	Q	106	S	76	N	127	O	66	M	66	M
77	P	93	S	61	M	102	N	53	L	53	L
77	Q	93	S	61	N	102	O	53	M	53	
66	O	80	R	53	L	90	M	47	L	47	
99	O	119	R	92	L	152	M	80	L	80	
88	O	106	R	84	L	140	M	73	L	73	

Application recommendations for Carbide Slot Drills

Feed column																	
Code-letter	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	
tool-Ø mm	2.00	0.001	0.001	0.001	0.002	0.002	0.004	0.005	0.006	0.007	0.008	0.010	0.012	0.014	0.016	0.018	0.020
	3.00	0.002	0.002	0.003	0.003	0.004	0.007	0.010	0.010	0.010	0.015	0.016	0.013	0.019	0.022	0.024	0.030
	5.00	0.005	0.006	0.007	0.009	0.010	0.014	0.020	0.020	0.022	0.025	0.026	0.026	0.028	0.030	0.032	0.038
	6.00	0.006	0.008	0.009	0.011	0.013	0.017	0.024	0.025	0.027	0.031	0.029	0.033	0.039	0.036	0.041	0.047
	8.00	0.010	0.012	0.014	0.016	0.019	0.024	0.032	0.032	0.035	0.042	0.042	0.047	0.053	0.052	0.058	0.064
	10.00	0.013	0.015	0.018	0.021	0.025	0.030	0.038	0.039	0.044	0.050	0.053	0.059	0.065	0.066	0.073	0.080
	12.00	0.010	0.018	0.022	0.026	0.030	0.036	0.046	0.048	0.052	0.059	0.063	0.072	0.079	0.085	0.090	0.100
	16.00	0.020	0.023	0.027	0.032	0.038	0.045	0.054	0.058	0.063	0.071	0.079	0.088	0.095	0.100	0.110	0.120
	20.00	0.023	0.028	0.033	0.038	0.045	0.057	0.066	0.073	0.080	0.090	0.097	0.100	0.110	0.120	0.130	0.140
	25.00	0.030	0.035	0.040	0.045	0.055	0.065	0.075	0.100	0.120	0.130	0.140	0.150	0.165	0.170	0.180	0.190

a_e = Width of cut
a_p = Cutting depth



$$a_e = 1.0 \times D$$

Feed rate codes in bold are the preferred choice for the respective material group.

Oblique plunging and slot milling

For oblique plunging the feed rate (v_f = mm/min) should be reduced as illustrated.

In addition, chip evacuation is required for drilling depths in excess of $1 \times D$. This also applies to the transition to radial machining.

slot milling

a_p = cut. depth $0.5 \times D = f_z$ 100%

a_p = cut. depth $1.0 \times D = f_z$ 75%

Drilling

For drilling the feed rate (v_f = mm/min) should be reduced as illustrated.

In addition, chip evacuation is required for larger drilling depths in excess of $0.5 \times D$.



Lubricants:

cutting oil, highly activated ■
soluble oil (emulsion) ■
air only □

Material group	Materials examples, new designations (old designation in brackets) Figures in bold = material no. to DIN EN	Tensile strength MPa (N/mm ²)	Hardness	Coolant
General purpose steels	1.0035 S185(S133), 1.0486 P275N(S1E285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850		■
Free-cutting steels	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000		■
Unalloyed tempering steels	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000		■
Alloyed tempering steels	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-≤1000 1000-1200		■
Unalloyed case hardened steels	1.0301 (C10), 1.1121 C10E (Ck10)	≤750		■
Alloyed case hardened steels	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850-≤1000 1000-1200		■
Nitriding steels	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850-≤1000 >1000-1200		■
Tool steels	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000		■
High speed steels	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000		■
Spring steels	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤330 HB	■
Hardened steels	-		≤40-48 HRC >48-60 HRC	■
Stainless steels, sulphured	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤850		■
austenitic	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤850		■
martensitic	1.4057 X20CrNi 17 2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850		■
Cast iron	0.6010 EN-GJL-100(GG10), 0.6020 EN-GJL-200(GG20) 0.6025 EN-GJL-250(GG25), 0.6035 EN-GJL-350(GG35)	850-≤1000 1000-1200		■ □
Spheroidal graphite iron and malleable cast iron	0.7050 EN-GJS-500-7(GGG50), 0.8035 EN-GJMW-350-4(GTW35) 0.7070 EN-GJS-700-2(GGG70), 0.8170 EN-GJMB-700-2(GTS70)		≤240 HB <300 HB	■
Chilled cast iron	-		≤350 HB	■
New Cast iron GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo6			■ □
New Cast iron ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		■ □
Special alloys	Nimonic, Inconel, Monel, Hastelloy	≤1200		■
Ti and Ti-alloys	3.7024 Ti99.5, 3.7114 TiAl5Sn2.5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2.5, - TiAl8Mo1V1	≤850 >850-1200		■
Aluminium and Al-alloys	3.0255 Al99.5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		■
Al wrought alloys	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1.5	≤450		■
Al cast alloys ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		■
> 10 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		■
Magnesium alloys	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450		□
Copper, low alloyed	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnNb	≤400		■
Brass, short-chipping	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		■
long-chipping	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0.5	≤600		■
Bronze, short-chipping	2.1090 CuSn7ZnNb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn	≤600		■
long-chipping	2.0790 CuNi18Zn19Pb	>600-850		■
Bronze, long-chipping	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000		■
Duroplastics	Epoxy resin, Resopal, Pertinax, Moltopren		-	□
Thermoplastics	Plexiglas, Hostalen, Novodur, Makralon		-	■ □
Kevlar	Kevlar		-	□
Glass/carbon-concentr. plastics	GFK/CFK		-	□

Slot drilling

Catalog no.	54521 54519	54523 64523	64478	64570 64571	74404	74424	54404	54424	64080	64180
Tool mat.	Solid carbide		Solid carbide		Solid carbide		Solid carbide		Solid carbide	
Std.	6527 L		6527 L	6527 K/L	Stock std.		Stock std.		Stock std.	
Type	N		NH		N		N		N	
Page	592/590	599/601	606	604/607	593	602	594	603	595	596

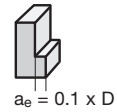


V _c m/min	Feed col.	V _c m/min	Feed col.	V _c m/min	Feed col.	V _c m/min	Feed col.	V _c m/min	Feed col.	V _c m/min	Feed col.
105	N	105	N	50	J	80	J	95	M	105	N
99	M	99	M	45	H	75	I	90	L	100	M
105	M	105	M	50	H	80	I	95	L	105	M
77	N	77	N	35	I	60	J	70	M	75	N
105	M	105	M	50	H	80	I	95	L	105	M
94	M	94	M	40	H	70	I	85	L	95	M
77	N	77	N	35	I	60	J	70	M	75	N
94	N	94	N	40	I	70	J	85	M	95	N
77	N	77	N	35	I	60	J				
110	M	110	M	45	H	75	I	100	L	110	M
94	M	94	M	40	H	70	I	85	L	95	M
66	N	66	N	30	I	50	J				
105	M	105	M	50	H	80	I	95	L	105	M
94	L	94	L	40	H	70	H				
94	M	94	M	40	H	70	I	85	L	95	M
77	L	77	L	35	H	60	H	70	K	75	L
55	N	55	N	38	I	45	J	50	M	55	N
55	L	55	L								
55	N	55	N					50	M	55	N
50	L	50	L					45	K	50	L
44	M	44	M					40	L	45	M
132	M	132	M	60	H	105	I	120	L	130	M
121	L	121	L	55	H	95	H	110	K	120	L
110	M	110	M	55	H	90	I	100	L	110	M
99	L	99	L	45	H	75	H	90	K	100	L
66	L	66	L					60	K	65	L
33	L	33	L							35	L
55	L	55	L	40	H	65	H	50	K	55	L
44	L	44	L	20	H	35	H	40	K	45	L
495	O	495	O					330	Q	330	Q
605	O	605	O					400	Q	400	Q
242	N	242	N					160	P	245	N
198	O	198	O					130	Q	200	O
275	P	275	P					185	R	185	R
132	O	132	O					90	Q	130	O
110	O	110	O					80	Q	110	O
99	N	99	N					70	P	75	P
110	N	110	N					80	P	110	N
88	M	88	M					70	O	90	M
88	N	88	N					70	P	70	P
77	L	77	L					60	N	60	N
132	L	132	L					90	N	90	N
121	L	121	L					80	N	80	N

Application recommendations for Carbide Slot Drills and End Mills

Feed column																		
Code-letter	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W		
tool-Ø mm	2.00	0.001	0.001	0.001	0.002	0.002	0.004	0.005	0.006	0.007	0.008	0.010	0.012	0.014	0.016	0.018	0.020	f (mm/tooth) Feed
	3.00	0.002	0.002	0.003	0.003	0.004	0.007	0.010	0.010	0.010	0.015	0.016	0.013	0.019	0.022	0.024	0.030	
	5.00	0.005	0.006	0.007	0.009	0.010	0.014	0.020	0.020	0.022	0.025	0.026	0.026	0.028	0.030	0.032	0.038	
	6.00	0.006	0.008	0.009	0.011	0.013	0.017	0.024	0.025	0.027	0.031	0.029	0.033	0.039	0.036	0.041	0.047	
	8.00	0.010	0.012	0.014	0.016	0.019	0.024	0.032	0.032	0.035	0.042	0.042	0.047	0.053	0.052	0.058	0.064	
	10.00	0.013	0.015	0.018	0.021	0.025	0.030	0.038	0.039	0.044	0.050	0.053	0.059	0.065	0.066	0.073	0.080	
	12.00	0.010	0.018	0.022	0.026	0.030	0.036	0.046	0.048	0.052	0.059	0.063	0.072	0.079	0.085	0.090	0.100	
	16.00	0.020	0.023	0.027	0.032	0.038	0.045	0.054	0.058	0.063	0.071	0.079	0.088	0.095	0.100	0.110	0.120	
	20.00	0.023	0.028	0.033	0.038	0.045	0.057	0.066	0.073	0.080	0.090	0.097	0.100	0.110	0.120	0.130	0.140	
	25.00	0.030	0.035	0.040	0.045	0.055	0.065	0.075	0.100	0.120	0.130	0.140	0.150	0.165	0.170	0.180	0.190	

a_e = Width of cut
a_p = Cutting depth



Feed rate codes in bold are the preferred choice for the respective material group.

Oblique plunging and slot milling

For oblique plunging the feed rate (v_f = mm/min) should be reduced as illustrated.

In addition, chip evacuation is required for drilling depths in excess of 1 x D. This also applies to the transition to radial machining.

slot milling

a_p = cut. depth 0.5 x D = f_z 100%

a_p = cut. depth 1.0 x D = f_z 75%

Drilling

For drilling the feed rate (v_f = mm/min) should be reduced as illustrated.

In addition, chip evacuation is required for larger drilling depths in excess of 0.5 x D.



Lubricants:

cutting oil, highly activated ■
soluble oil (emulsion) ■
air only □

Material group	Materials examples, new designations (old designation in brackets) Figures in bold = material no. to DIN EN	Tensile strength MPa (N/mm ²)	Hardness	Coolant
General purpose steels	1.0035 S185(S133), 1.0486 P275N(S1E285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850		■
Free-cutting steels	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000		■
Unalloyed tempering steels	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000		■
Alloyed tempering steels	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-≤1000 1000-1200		■
Unalloyed case hardened steels	1.0301 (C10), 1.1121 C10E (Ck10)	≤750		■
Alloyed case hardened steels	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850-≤1000 1000-1200		■
Nitriding steels	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850-≤1000 >1000-1200		■
Tool steels	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000		■
High speed steels	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000		■
Spring steels	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤330 HB	■
Hardened steels	-		≤40-48 HRC >48-60 HRC	■
Stainless steels, sulphured	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤850		■
austenitic	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤850		■
martensitic	1.4057 X20CrNi 17 2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850		■
Cast iron	0.6010 EN-GJL-100(GG10), 0.6020 EN-GJL-200(GG20) 0.6025 EN-GJL-250(GG25), 0.6035 EN-GJL-350(GG35)	850-≤1000 1000-1200		■
Spheroidal graphite iron and malleable cast iron	0.7050 EN-GJS-500-7(GGG50), 0.8035 EN-GJMW-350-4(GTW35) 0.7070 EN-GJS-700-2(GGG70), 0.8170 EN-GJMB-700-2(GTS70)		≤240 HB <300 HB	■
Chilled cast iron	-		≤350 HB	■
New Cast iron GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo6			■
New Cast iron ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		■
Special alloys	Nimonic, Inconel, Monel, Hastelloy	≤1200		■
Ti and Ti-alloys	3.7024 Ti99.5, 3.7114 TiAl5Sn2.5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2.5, - TiAl8Mo1V1	≤850 >850-1200		■
Aluminium and Al-alloys	3.0255 Al99.5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		■
Al wrought alloys	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1.5	≤450		■
Al cast alloys ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		■
> 10 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		■
Magnesium alloys	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450		■
Copper, low alloyed	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤400		■
Brass, short-chipping	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		■
long-chipping	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0.5	≤600		■
Bronze, short-chipping	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn	≤600		■
long-chipping	2.0790 CuNi18Zn19Pb	>600-850		■
Bronze, long-chipping	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000		■
Duroplastics	Epoxy resin, Resopal, Pertinax, Moltopren	-		■
Thermoplastics	Plexiglas, Hostalen, Novodur, Makralon	-		■
Kevlar	Kevlar	-		■
Glass/carbon-concentr. plastics	GFK/CFK	-		■

Fine finishing

Catalog no.	74525	54526	64525 54524	74424	54444	74204	74202	74206	74479
Tool mat.	Solid carbide	Solid carbide	Solid carbide	Solid carbide	Solid carbide	Solid carbide	Solid carbide	Solid carbide	Solid carbide
Std.	6527 L	6527 L	Stock std.	Stock std.	6527 K	6527 L	Stock std.	Stock std.	Stock std.
Type	N	N	N	N	W	W	W	W	W
Page	609	613	610/608	602	611	584	585	586	587



V _c m/min	Feed col.	V _c m/min	Feed col.	V _c m/min	Feed col.	V _c m/min	Feed col.	V _c m/min	Feed col.	V _c m/min	Feed col.	V _c m/min	Feed col.
116	S	193	S	76	N	127	O						
106	R	176	S	70	M	116	N						
116	R	193	S	76	M	127	N						
86	Q	143	R	60	L	99	M						
116	R	193	S	76	M	127	N						
106	R	176	S	66	M	110	N						
86	Q	143	R	57	L	94	M						
103	Q	171	R	66	L	110	M						
86	P	143	Q	57	L	94	L						
129	R	215	S	73	M	121	N						
103	R	171	S	66	M	110	N						
76	Q	127	R	50	L	83	M						
116	R	193	S	76	M	127	N						
106	P	176	Q	66	L	110	N						
103	R	171	S	66	M	110	N						
86	P	143	Q	57	L	94	L						
66	Q	110	R	43	L	72	M						
66	P	110	Q										
39	N	55	O										
66	Q	110	R										
57	P	94	Q										
53	Q	88	R										
139	R	231	S	99	M	165	N						
139	Q	231	R	90	L	149	M						
126	R	209	S	83	M	138	N						
106	Q	176	R	70	L	116	M						
73	O	121	P										
40	P	66	Q										
66	P	110	Q	43	L	72	L						
53	O	88	P	33	K	55	L						
561	T	935	T	330	P	550	Q	418	U	330	P	523	U
528	S	880	T	396	O	660	P	506	T	396	O	633	T
274	S	457	S	165	N	275	O	203	T	165	N	253	T
225	S	374	T	132	O	220	P	165	T	132	P	207	T
317	T	528	T	198	P	330	Q	241	U	198	U	302	U
146	S	242	T	99	O	165	P	115	T	99	P	143	T
132	S	220	S	80	N	132	O	102	T	80	N	127	T
106	S	176	S	66	N	110	O	95	T	66	N	119	T
132	S	220	S	80	N	132	O	102	T	80	N	127	T
99	R	165	S					90	S			112	S
99	R	165	S					90	S			112	S
86	Q	143	R					76	S			95	S
146	Q	242	R					115	S			143	S
132	Q	220	R					102	S			127	S

Application recommendations for Carbide Slot Drills and End Mills

Feed column																		
Code-letter	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W		
tool-Ø mm	2.00	0.001	0.001	0.001	0.002	0.002	0.004	0.005	0.006	0.007	0.008	0.010	0.012	0.014	0.016	0.018	0.020	f (mm/tooth) Feed
	3.00	0.002	0.002	0.003	0.003	0.004	0.007	0.010	0.010	0.010	0.015	0.016	0.013	0.019	0.022	0.024	0.030	
	5.00	0.005	0.006	0.007	0.009	0.010	0.014	0.020	0.020	0.022	0.025	0.026	0.026	0.028	0.030	0.032	0.038	
	6.00	0.006	0.008	0.009	0.011	0.013	0.017	0.024	0.025	0.027	0.031	0.029	0.033	0.039	0.036	0.041	0.047	
	8.00	0.010	0.012	0.014	0.016	0.019	0.024	0.032	0.032	0.035	0.042	0.042	0.047	0.053	0.052	0.058	0.064	
	10.00	0.013	0.015	0.018	0.021	0.025	0.030	0.038	0.039	0.044	0.050	0.053	0.059	0.065	0.066	0.073	0.080	
	12.00	0.010	0.018	0.022	0.026	0.030	0.036	0.046	0.048	0.052	0.059	0.063	0.072	0.079	0.085	0.090	0.100	
	16.00	0.020	0.023	0.027	0.032	0.038	0.045	0.054	0.058	0.063	0.071	0.079	0.088	0.095	0.100	0.110	0.120	
	20.00	0.023	0.028	0.033	0.038	0.045	0.057	0.066	0.073	0.080	0.090	0.097	0.100	0.110	0.120	0.130	0.140	
	25.00	0.030	0.035	0.040	0.045	0.055	0.065	0.075	0.100	0.120	0.130	0.140	0.150	0.165	0.170	0.180	0.190	

a_e = Width of cut
a_p = Cutting depth



$$a_e = 0.5 \times D$$

Feed rate codes in bold are the preferred choice for the respective material group.

Oblique plunging and slot milling

For oblique plunging the feed rate (v_f = mm/min) should be reduced as illustrated.

In addition, chip evacuation is required for drilling depths in excess of $1 \times D$. This also applies to the transition to radial machining.

slot milling

a_p = cut. depth $0.5 \times D = f_z$ 100%

a_p = cut. depth $1.0 \times D = f_z$ 75%

Drilling

For drilling the feed rate (v_f = mm/min) should be reduced as illustrated.

In addition, chip evacuation is required for larger drilling depths in excess of $0.5 \times D$.



Lubricants:

cutting oil, highly activated ■

soluble oil (emulsion) ■

air only □

Material group	Materials examples, new designations (old designation in brackets) Figures in bold = material no. to DIN EN	Tensile strength MPa (N/mm ²)	Hardness	Coolant
General purpose steels	1.0035 S185(S133), 1.0486 P275N(S1E285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850		■
Free-cutting steels	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000		■
Unalloyed tempering steels	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000		■
Alloyed tempering steels	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-≤1000 1000-1200		■
Unalloyed case hardened steels	1.0301 (C10), 1.1121 C10E (Ck10)	≤750		■
Alloyed case hardened steels	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850-≤1000 1000-1200		■
Nitriding steels	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850-≤1000 >1000-1200		■
Tool steels	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000		■
High speed steels	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000		■
Spring steels	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤330 HB	■
Hardened steels	-		≤40-48 HRC >48-60 HRC	■
Stainless steels, sulphured	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤850		■
austenitic	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤850		■
martensitic	1.4057 X20CrNi 17 2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850		■
Cast iron	0.6010 EN-GJL-100(GG10), 0.6020 EN-GJL-200(GG20) 0.6025 EN-GJL-250(GG25), 0.6035 EN-GJL-350(GG35)	850-≤1000 1000-1200		■ □
Spheroidal graphite iron and malleable cast iron	0.7050 EN-GJS-500-7(GGG50), 0.8035 EN-GJMW-350-4(GTW35) 0.7070 EN-GJS-700-2(GGG70), 0.8170 EN-GJMB-700-2(GTS70)		≤240 HB <300 HB	■
Chilled cast iron	-		≤350 HB	■
New Cast iron GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo6			■ □
New Cast iron ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		■ □
Special alloys	Nimonic, Inconel, Monel, Hastelloy	≤1200		■
Ti and Ti-alloys	3.7024 Ti99.5, 3.7114 TiAl5Sn2.5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2.5, - TiAl8Mo1V1	≤850 >850-1200		■
Aluminium and Al-alloys	3.0255 Al99.5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		■
Al wrought alloys	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1.5	≤450		■
Al cast alloys ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		■
> 10 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		■
Magnesium alloys	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450		□
Copper, low alloyed	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤400		■
Brass, short-chipping	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		■
long-chipping	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0.5	≤600		■
Bronze, short-chipping	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn	≤600		■
long-chipping	2.0790 CuNi18Zn19Pb	>600-850		■
Bronze, long-chipping	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000		■
Duroplastics	Epoxy resin, Resopal, Pertinax, Moltopren		-	□
Thermoplastics	Plexiglas, Hostalen, Novodur, Makralon		-	■ □
Kevlar	Kevlar		-	□
Glass/carbon-concentr. plastics	GFK/CFK		-	□

Roughing

Catalog no.	74478	64478	64570 64571	74204	74202	74479	74203	74303	54496	54497	64495	64497
Tool mat.	Solid carbide	Solid carbide		Solid carbide		Solid carbide	Solid carbide		Solid carbide		Sol.carb.	Sol.carb.
Std.	6527 L	6527 L	6527 K/L	6527 K	6527 L	Stock std.	6527 L		6527 L		6527 L	6527 L
Type	NH	NH		W		W	WR		NF		Nrf	HR
Page	605	606	604/607	584	585	587	623	624	621	622	625	626

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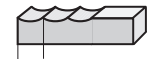
Application recommend. for Carb. Slot Drills, End Mills, Ball Nose End Mills

Feed column																		
Code-letter	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W		
tool-Ø mm	2.00	0.001	0.001	0.001	0.002	0.002	0.004	0.005	0.006	0.007	0.008	0.010	0.012	0.014	0.016	0.018	0.020	f (mm/tooth)
	3.00	0.002	0.002	0.003	0.003	0.004	0.007	0.010	0.010	0.010	0.015	0.016	0.013	0.019	0.022	0.024	0.030	
	5.00	0.005	0.006	0.007	0.009	0.010	0.014	0.020	0.020	0.022	0.025	0.026	0.026	0.028	0.030	0.032	0.038	
	6.00	0.006	0.008	0.009	0.011	0.013	0.017	0.024	0.025	0.027	0.031	0.029	0.033	0.039	0.036	0.041	0.047	
	8.00	0.010	0.012	0.014	0.016	0.019	0.024	0.032	0.032	0.035	0.042	0.042	0.047	0.053	0.052	0.058	0.064	
	10.00	0.013	0.015	0.018	0.021	0.025	0.030	0.038	0.039	0.044	0.050	0.053	0.059	0.065	0.066	0.073	0.080	
	12.00	0.010	0.018	0.022	0.026	0.030	0.036	0.046	0.048	0.052	0.059	0.063	0.072	0.079	0.085	0.090	0.100	
	16.00	0.020	0.023	0.027	0.032	0.038	0.045	0.054	0.058	0.063	0.071	0.079	0.088	0.095	0.100	0.110	0.120	
	20.00	0.023	0.028	0.033	0.038	0.045	0.057	0.066	0.073	0.080	0.090	0.097	0.100	0.110	0.120	0.130	0.140	
	25.00	0.030	0.035	0.040	0.045	0.055	0.065	0.075	0.100	0.120	0.130	0.140	0.150	0.165	0.170	0.180	0.190	

a_e = Width of cut
a_p = Cutting depth



a_e = 0.02 - 0.05 x D



a_e = 0.02 - 0.05 x D

Feed rate codes in bold are the preferred choice for the respective material group.

Oblique plunging and slot milling

For oblique plunging the feed rate (v_f = mm/min) should be reduced as illustrated.

In addition, chip evacuation is required for drilling depths in excess of 1 x D. This also applies to the transition to radial machining.

slot milling

a_p = cut. depth 0.5 x D = f_z 100%

a_p = cut. depth 1.0 x D = f_z 75%

Drilling

For drilling the feed rate (v_f = mm/min) should be reduced as illustrated.

In addition, chip evacuation is required for larger drilling depths in excess of 0.5 x D.



Lubricants:

cutting oil, highly activated ■

soluble oil (emulsion) ■

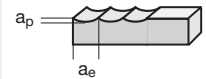
air only □

Material group	Materials examples, new designations (old designation in brackets) Figures in bold = material no. to DIN EN	Tensile strength MPa (N/mm ²)	Hardness	Coolant
General purpose steels	1.0035 S185(S133), 1.0486 P275N(S1E285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850		■
Free-cutting steels	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000		■
Unalloyed tempering steels	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000		■
Alloyed tempering steels	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-≤1000 1000-1200		■
Unalloyed case hardened steels	1.0301 (C10), 1.1121 C10E (Ck10)	≤750		■
Alloyed case hardened steels	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850-≤1000 1000-1200		■
Nitriding steels	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850-≤1000 >1000-1200		■
Tool steels	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000		■
High speed steels	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000		■
Spring steels	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤330 HB	■
Hardened steels	-		≤40-48 HRC >48-60 HRC	■
Stainless steels, sulphured	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤850		■
austenitic	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤850		■
martensitic	1.4057 X20CrNi17 2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850		■
Cast iron	0.6010 EN-GJL-100(GG10), 0.6020 EN-GJL-200(GG20) 0.6025 EN-GJL-250(GG25), 0.6035 EN-GJL-350(GG35)	850-≤1000 1000-1200		■
Spheroidal graphite iron and malleable cast iron	0.7050 EN-GJS-500-7(GGG50), 0.8035 EN-GJMW-350-4(GTW35) 0.7070 EN-GJS-700-2(GGG70), 0.8170 EN-GJMB-700-2(GTS70)		≤240 HB <300 HB	■
Chilled cast iron	-		≤350 HB	■
New Cast iron GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo6			■
New Cast iron ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		■
Special alloys	Nimonic, Inconel, Monel, Hastelloy	≤1200		■
Ti and Ti-alloys	3.7024 Ti99.5, 3.7114 TiAl5Sn2.5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2.5, - TiAl8Mo1V1	≤850 >850-1200		■
Aluminium and Al-alloys	3.0255 Al99.5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		■
Al wrought alloys	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1.5	≤450		■
Al cast alloys ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		■
> 10 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		■
Magnesium alloys	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450		■
Copper, low alloyed	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnNb	≤400		■
Brass, short-chipping	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		■
long-chipping	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0.5	≤600		■
Bronze, short-chipping	2.1090 CuSn7ZnNb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn	≤600		■
long-chipping	2.0790 CuNi18Zn19Pb	>600-850		■
Bronze, long-chipping	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000		■
Duroplastics	Epoxy resin, Resopal, Pertinax, Moltopren	-		■
Thermoplastics	Plexiglas, Hostalen, Novodur, Makralon	-		■
Kevlar	Kevlar	-		■
Glass/carbon-concentr. plastics	GFK/CFK	-		■

Application recommendations for Carbide Contour End Mills

Feed column																	
Code-letter	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	
tool-Ø mm	2.00	0.001	0.001	0.001	0.002	0.002	0.004	0.005	0.006	0.007	0.008	0.010	0.012	0.014	0.016	0.018	0.020
	3.00	0.002	0.002	0.003	0.003	0.004	0.007	0.010	0.010	0.010	0.015	0.016	0.013	0.019	0.022	0.024	0.030
	5.00	0.005	0.006	0.007	0.009	0.010	0.014	0.020	0.020	0.022	0.025	0.026	0.026	0.028	0.030	0.032	0.038
	6.00	0.006	0.008	0.009	0.011	0.013	0.017	0.024	0.025	0.027	0.031	0.029	0.033	0.039	0.036	0.041	0.047
	8.00	0.010	0.012	0.014	0.016	0.019	0.024	0.032	0.032	0.035	0.042	0.042	0.047	0.053	0.052	0.058	0.064
	10.00	0.013	0.015	0.018	0.021	0.025	0.030	0.038	0.039	0.044	0.050	0.053	0.059	0.065	0.066	0.073	0.080
	12.00	0.010	0.018	0.022	0.026	0.030	0.036	0.046	0.048	0.052	0.059	0.063	0.072	0.079	0.085	0.090	0.100
	16.00	0.020	0.023	0.027	0.032	0.038	0.045	0.054	0.058	0.063	0.071	0.079	0.088	0.095	0.100	0.110	0.120
	20.00	0.023	0.028	0.033	0.038	0.045	0.057	0.066	0.073	0.080	0.090	0.097	0.100	0.110	0.120	0.130	0.140
	25.00	0.030	0.035	0.040	0.045	0.055	0.065	0.075	0.100	0.120	0.130	0.140	0.150	0.165	0.170	0.180	0.190

a_e = Width of cut
a_p = Cutting depth



The new european-wide definitions according to DIN EN for steel and cast are applied for our material examples.

Lubricants:

cutting oil, highly activated ■
soluble oil (emulsion) ■
air only □

Material group	Materials examples, new designations (old designation in brackets) Figures in bold = material no. to DIN EN	Tensile strength MPa (N/mm ²)	Hardness	Coolant
General purpose steels	1.0035 S185 (St33), 1.0486 P275N (StE285), 1.0345 P235GH (H1), 1.0425 P265GH (H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850		■
Free-cutting steels	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000		■
Unalloyed tempering steels	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000		■
Alloyed tempering steels	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-≤1000 1000-1200		■
Unalloyed case hardened steels	1.0301 (C10), 1.1121 C10E (Ck10)	≤750		■
Alloyed case hardened steels	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850-≤1000 1000-1200		■
Nitriding steels	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850-≤1000 >1000-1200		■
Tool steels	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000		■
High speed steels	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000		■
Spring steels	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤330 HB	■
Hardened steels	-		≤40-48 HRC >48-60 HRC	■
Stainless steels, sulphured	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤850		■
austenitic	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤850		■
martensitic	1.4057 X20CrNi 17 2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850		■
Cast iron	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20) 0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)	850-≤1000 1000-1200		■
Spheroidal graphite iron and malleable cast iron	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35) 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤240 HB <300 HB	■
Chilled cast iron	-		≤350 HB	■
New Cast iron GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo6			■
New Cast iron ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		■
Special alloys	Nimonic, Inconel, Monel, Hastelloy	≤1200		■
Ti and Ti-alloys	3.7024 Ti99.5, 3.7114 TiAl5Sn2.5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2.5, - TiAl8Mo1V1	≤850 >850-1200		■
Aluminium and Al-alloys	3.0255 Al99.5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		■
Al wrought alloys	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1.5	≤450		■
Al cast alloys ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		■
> 10 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		■
Magnesium alloys	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450		■
Copper, low alloyed	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnNb	≤400		■
Brass, short-chipping	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		■
long-chipping	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0.5	≤600		■
Bronze, short-chipping	2.1090 CuSn7ZnNb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn	≤600		■
long-chipping	2.0790 CuNi18Zn19Pb	>600-850		■
Bronze, long-chipping	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000		■
Duroplastics	Epoxy resin, Resopal, Pertinax, Moltopren	-		■
Thermoplastics	Plexiglas, Hostalen, Novodur, Makralon	-		■
Kevlar	Kevlar	-		■
Glass/carbon-concentr. plastics	GFK/CFK	-		■

High Speed Cutting

Catalog no.	54300 54301
Tool mat.	Solid carbide
Std.	Stock std.
Type	N
Page	642/643



Catalog no.	54302 54303
Tool mat.	Solid carbide
Std.	Stock std.
Type	N
Page	638/639

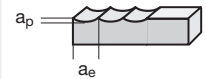


Ø 2/3 4 6 8 10 12								Ø 4 6 8 10 12							
Roughing								Roughing							
eff. Ø *	-	1.74	2.99	4.21	5.27	6.63		eff. Ø *	-	-	-	-	-		
a _p mm	0.10	0.20	0.40	0.60	0.75	1.00		a _p mm	0.20	0.40	0.60	0.75	1.00		
a _e mm	0.15	0.30	0.50	0.75	1.00	1.50		a _e mm	0.30	0.50	0.75	1.00	1.50		
Fine finishing								Fine finishing							
eff. Ø *	-	1.25	1.81	2.24	2.66	3.07		eff. Ø *	-	-	-	-	-		
a _p mm	0.07	0.10	0.14	0.16	0.18	0.20		a _p mm	0.10	0.14	0.16	0.18	0.20		
a _e mm	0.05	0.07	0.10	0.15	0.20	0.25		a _e mm	0.07	0.10	0.15	0.20	0.25		
v _c m/min	v _c m/min	fz (mm)	fz (mm)	fz (mm)	fz (mm)	fz (mm)	fz (mm)	v _c m/min	v _c m/min	fz (mm)	fz (mm)	fz (mm)	fz (mm)	fz (mm)	fz (mm)
225	310	0,03	0,03	0,05	0,06	0,08	0,1	225	310	0,03	0,05	0,06	0,08	0,1	
170	240	0,02	0,02	0,04	0,05	0,08	0,1	170	240	0,02	0,04	0,05	0,08	0,1	
170	240	0,02	0,02	0,04	0,05	0,08	0,1	170	240	0,02	0,04	0,05	0,08	0,1	
150	190	0,02	0,02	0,04	0,05	0,08	0,1	150	190	0,02	0,04	0,05	0,08	0,1	
190	240	0,02	0,02	0,04	0,05	0,08	0,1	190	240	0,02	0,04	0,05	0,08	0,1	
190	240	0,02	0,02	0,04	0,05	0,08	0,1	190	240	0,02	0,04	0,05	0,08	0,1	
150	190	0,02	0,02	0,04	0,05	0,08	0,1	150	190	0,02	0,04	0,05	0,08	0,1	
150	190	0,02	0,02	0,04	0,05	0,08	0,1	150	190	0,02	0,04	0,05	0,08	0,1	
105	140	0,02	0,02	0,04	0,05	0,08	0,1	105	140	0,02	0,04	0,05	0,08	0,1	
225	310	0,03	0,03	0,05	0,06	0,08	0,1	225	310	0,03	0,05	0,06	0,08	0,1	
150	190	0,02	0,02	0,04	0,05	0,08	0,1	150	190	0,02	0,04	0,05	0,08	0,1	
105	140	0,02	0,02	0,04	0,05	0,08	0,1	105	140	0,02	0,04	0,05	0,08	0,1	
150	190	0,02	0,02	0,04	0,05	0,08	0,1	150	190	0,02	0,04	0,05	0,08	0,1	
105	140	0,02	0,02	0,04	0,05	0,08	0,1	105	140	0,02	0,04	0,05	0,08	0,1	
150	190	0,02	0,02	0,04	0,05	0,08	0,1	150	190	0,02	0,04	0,05	0,08	0,1	
105	140	0,02	0,02	0,04	0,05	0,08	0,1	105	140	0,02	0,04	0,05	0,08	0,1	
80	125	0,02	0,02	0,04	0,05	0,06	0,08	80	125	0,02	0,04	0,05	0,08	0,1	
80	125	0,02	0,02	0,04	0,05	0,06	0,08	80	125	0,02	0,04	0,05	0,08	0,1	
300	450	0,04	0,04	0,06	0,08	0,1	0,13	300	450	0,04	0,06	0,08	0,1	0,13	
225	310	0,03	0,03	0,05	0,06	0,08	0,1	225	310	0,03	0,05	0,06	0,08	0,1	
105	140	0,02	0,02	0,04	0,05	0,08	0,1	105	140	0,02	0,04	0,05	0,08	0,1	
80	125	0,02	0,02	0,04	0,05	0,06	0,08	80	125	0,02	0,04	0,05	0,06	0,08	
300	400	0,06	0,06	0,1	0,15	0,2	0,25	300	400	0,06	0,1	0,15	0,2	0,25	
300	400	0,05	0,05	0,08	0,1	0,15	0,2	300	400	0,05	0,08	0,1	0,15	0,2	
225	325	0,05	0,05	0,08	0,1	0,12	0,15	225	325	0,05	0,08	0,1	0,12	0,15	
225	275	0,04	0,04	0,06	0,08	0,1	0,12	225	275	0,04	0,06	0,08	0,1	0,12	
65	80	0,02	0,02	0,04	0,05	0,06	0,08	65	80	0,02	0,04	0,05	0,06	0,08	
80	125	0,02	0,02	0,04	0,05	0,08	0,1	80	125	0,02	0,04	0,05	0,08	0,1	
75	100	0,02	0,02	0,04	0,05	0,06	0,08	75	100	0,02	0,04	0,05	0,06	0,08	
375	500	0,04	0,04	0,06	0,08	0,1	0,15	375	500	0,04	0,06	0,08	0,1	0,15	
500	900	0,04	0,04	0,06	0,08	0,1	0,15	500	900	0,04	0,06	0,08	0,1	0,15	
300	450	0,04	0,04	0,06	0,08	0,1	0,13	300	450	0,04	0,06	0,08	0,1	0,13	
225	310	0,03	0,03	0,05	0,06	0,08	0,1	225	310	0,03	0,05	0,06	0,08	0,1	
225	310	0,03	0,03	0,05	0,06	0,08	0,1	225	310	0,03	0,05	0,06	0,08	0,1	
300	350	0,05	0,05	0,08	0,12	0,15	0,2	300	350	0,05	0,08	0,12	0,15	0,2	
225	300	0,04	0,04	0,06	0,1	0,12	0,15	225	300	0,04	0,06	0,1	0,12	0,15	
225	325	0,05	0,05	0,08	0,1	0,12	0,15	225	325	0,05	0,08	0,1	0,12	0,15	
225	275	0,04	0,04	0,06	0,08	0,1	0,12	225	275	0,04	0,06	0,08	0,1	0,12	
225	275	0,04	0,04	0,06	0,08	0,1	0,12	225	275	0,04	0,06	0,08	0,1	0,12	
150	225	0,03	0,03	0,05	0,08	0,1	0,12	150	225	0,03	0,05	0,08	0,1	0,12	

Application recommendations for Carbide Contour End Mills

Feed column																	
Code-letter	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	
tool-Ø mm	2.00	0.001	0.001	0.001	0.002	0.002	0.004	0.005	0.006	0.007	0.008	0.010	0.012	0.014	0.016	0.018	0.020
	3.00	0.002	0.002	0.003	0.003	0.004	0.007	0.010	0.010	0.010	0.015	0.016	0.013	0.019	0.022	0.024	0.030
	5.00	0.005	0.006	0.007	0.009	0.010	0.014	0.020	0.020	0.022	0.025	0.026	0.026	0.028	0.030	0.032	0.038
	6.00	0.006	0.008	0.009	0.011	0.013	0.017	0.024	0.025	0.027	0.031	0.029	0.033	0.039	0.036	0.041	0.047
	8.00	0.010	0.012	0.014	0.016	0.019	0.024	0.032	0.032	0.035	0.042	0.042	0.047	0.053	0.052	0.058	0.064
	10.00	0.013	0.015	0.018	0.021	0.025	0.030	0.038	0.039	0.044	0.050	0.053	0.059	0.065	0.066	0.073	0.080
	12.00	0.010	0.018	0.022	0.026	0.030	0.036	0.046	0.048	0.052	0.059	0.063	0.072	0.079	0.085	0.090	0.100
	16.00	0.020	0.023	0.027	0.032	0.038	0.045	0.054	0.058	0.063	0.071	0.079	0.088	0.095	0.100	0.110	0.120
	20.00	0.023	0.028	0.033	0.038	0.045	0.057	0.066	0.073	0.080	0.090	0.097	0.100	0.110	0.120	0.130	0.140
	25.00	0.030	0.035	0.040	0.045	0.055	0.065	0.075	0.100	0.120	0.130	0.140	0.150	0.165	0.170	0.180	0.190

a_e = Width of cut
a_p = Cutting depth



The new european-wide definitions according to DIN EN for steel and cast are applied for our material examples.

Lubricants:

cutting oil, highly activated ■
soluble oil (emulsion) ■
air only □

Material group	Materials examples, new designations (old designation in brackets) Figures in bold = material no. to DIN EN	Tensile strength MPa (N/mm ²)	Hardness	Coolant
General purpose steels	1.0035 S185(S133), 1.0486 P275N(S1E285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850		■
Free-cutting steels	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000		■
Unalloyed tempering steels	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000		■
Alloyed tempering steels	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-≤1000 1000-1200		■
Unalloyed case hardened steels	1.0301 (C10), 1.1121 C10E (Ck10)	≤750		■
Alloyed case hardened steels	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850-≤1000 1000-1200		■
Nitriding steels	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850-≤1000 >1000-1200		■
Tool steels	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000		■
High speed steels	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000		■
Spring steels	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤330 HB	■
Hardened steels	-		≤40-48 HRC >48-60 HRC	■
Stainless steels, sulphured	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤850		■
austenitic	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤850		■
martensitic	1.4057 X20CrNi 17 2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850		■
Cast iron	0.6010 EN-GJL-100(GG10), 0.6020 EN-GJL-200(GG20) 0.6025 EN-GJL-250(GG25), 0.6035 EN-GJL-350(GG35)	850-≤1000 1000-1200		■
Spheroidal graphite iron and malleable cast iron	0.7050 EN-GJS-500-7(GGG50), 0.8035 EN-GJMW-350-4(GTW35) 0.7070 EN-GJS-700-2(GGG70), 0.8170 EN-GJMB-700-2(GTS70)		≤240 HB <300 HB	■
Chilled cast iron	-		≤350 HB	■
New Cast iron GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo6			■
New Cast iron ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		■
Special alloys	Nimonic, Inconel, Monel, Hastelloy	≤1200		■
Ti and Ti-alloys	3.7024 Ti99.5, 3.7114 TiAl5Sn2.5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2.5, - TiAl8Mo1V1	≤850 >850-1200		■
Aluminium and Al-alloys	3.0255 Al99.5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		■
Al wrought alloys	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1.5	≤450		■
Al cast alloys ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		■
> 10 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		■
Magnesium alloys	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450		■
Copper, low alloyed	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnNb	≤400		■
Brass, short-chipping	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		■
long-chipping	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0.5	≤600		■
Bronze, short-chipping	2.1090 CuSn7ZnNb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn	≤600		■
long-chipping	2.0790 CuNi18Zn19Pb	>600-850		■
Bronze, long-chipping	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000		■
Duroplastics	Epoxy resin, Resopal, Pertinax, Moltopren	-		■
Thermoplastics	Plexiglas, Hostalen, Novodur, Makralon	-		■
Kevlar	Kevlar	-		■
Glass/carbon-concentr. plastics	GFK/CFK	-		■

High Speed Cutting

Catalog no.	54306 54307
Tool mat.	Solid carbide
Std.	Stock std.
Type	N
Page	640/641



54304
54305
Solid carbide
Stock std.
N
636/637

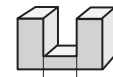


Roughing								Roughing							
eff. Ø *	1.74	2.99	4.21	5.27	6.63	9.33		eff. Ø *	-	-	-	-	-		
a _p mm	0.20	0.40	0.60	0.75	1.00	1.50		a _p mm	0.40	0.60	0.75	1.00	1.50		
a _e mm	0.30	0.50	0.75	1.00	1.50	2.50		a _e mm	3.50	5.50	6.50	8.50	11.50		
Fine finishing								Fine finishing							
eff. Ø *	1.25	1.81	2.24	2.66	3.07	3.97		eff. Ø *	-	-	-	-	-		
a _p mm	0.10	0.14	0.16	0.18	0.20	0.25		a _p mm	0.15	0.20	0.30	0.40	0.50		
a _e mm	0.07	0.10	0.15	0.20	0.25	0.30		a _e mm	0.20	0.30	0.40	0.60	1.00		
v _c m/min	v _c m/min	fz (mm)	fz (mm)	fz (mm)	fz (mm)	fz (mm)	fz (mm)	v _c m/min	v _c m/min	fz (mm)	fz (mm)	fz (mm)	fz (mm)	fz (mm)	
300	350							200	230						
200	300	0,04	0,06	0,08	0,1	0,13	0,15	160	190	0,04	0,05	0,06	0,07	0,08	
150	250	0,03	0,05	0,06	0,08	0,1	0,12	105	125	0,02	0,03	0,04	0,05	0,06	
200	300	0,04	0,06	0,08	0,1	0,13	0,15	150	175	0,05	0,06	0,07	0,08	0,1	
150	180	0,02	0,04	0,05	0,08	0,1	0,12	75	95	0,02	0,03	0,04	0,05	0,06	
300	400							300	400						
300	400	0,06	0,1	0,15	0,2	0,25	0,3	300	400	0,06	0,08	0,1	0,12	0,15	
300	400	0,05	0,08	0,1	0,15	0,2	0,25	300	400	0,06	0,08	0,1	0,12	0,15	
250	325	0,05	0,08	0,1	0,12	0,15	0,2	250	325	0,05	0,06	0,07	0,08	0,1	
250	275	0,04	0,06	0,08	0,1	0,12	0,15	225	275	0,04	0,05	0,06	0,07	0,08	
150	225	0,03	0,05	0,08	0,1	0,12	0,15	150	225	0,02	0,03	0,04	0,05	0,06	
400	475							400	475						
300	350	0,05	0,08	0,12	0,15	0,2	0,3	300	350	0,06	0,08	0,1	0,12	0,15	
275	300	0,04	0,06	0,1	0,12	0,15	0,2	275	300	0,05	0,06	0,07	0,08	0,1	

Application recommendations for HSS End Mills

		Feed column															
Code-letter		H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
tool-Ø mm	2.00	0.001	0.001	0.001	0.002	0.002	0.004	0.005	0.006	0.007	0.008	0.010	0.012	0.014	0.016	0.018	0.020
	3.00	0.002	0.002	0.003	0.003	0.004	0.007	0.010	0.010	0.010	0.015	0.016	0.013	0.019	0.022	0.024	0.030
	5.00	0.005	0.006	0.007	0.009	0.010	0.014	0.020	0.020	0.022	0.025	0.026	0.026	0.028	0.030	0.032	0.038
	6.00	0.006	0.008	0.009	0.011	0.013	0.017	0.024	0.025	0.027	0.031	0.029	0.033	0.039	0.036	0.041	0.047
	8.00	0.010	0.012	0.014	0.016	0.019	0.024	0.032	0.032	0.035	0.042	0.042	0.047	0.053	0.052	0.058	0.064
	10.00	0.013	0.015	0.018	0.021	0.025	0.030	0.038	0.039	0.044	0.050	0.053	0.059	0.065	0.066	0.073	0.080
	12.00	0.010	0.018	0.022	0.026	0.030	0.036	0.046	0.048	0.052	0.059	0.063	0.072	0.079	0.085	0.090	0.100
	16.00	0.020	0.023	0.027	0.032	0.038	0.045	0.054	0.058	0.063	0.071	0.079	0.088	0.095	0.100	0.110	0.120
	20.00	0.023	0.028	0.033	0.038	0.045	0.057	0.066	0.073	0.080	0.090	0.097	0.100	0.110	0.120	0.130	0.140
	25.00	0.030	0.035	0.040	0.045	0.055	0.065	0.075	0.100	0.120	0.130	0.140	0.150	0.165	0.170	0.180	0.190

a_e = Width of cut
a_p = Cutting depth



a_e = 1.0 x D

Feed rate codes in bold are the preferred choice for the respective material group.

Oblique plunging and slot milling

For oblique plunging the feed rate (v_f = mm/min) should be reduced as illustrated.

In addition, chip evacuation is required for drilling depths in excess of 1 x D. This also applies to the transition to radial machining.

slot milling

a_p = cut. depth 0.5 x D = f_z 100%

a_p = cut. depth 1.0 x D = f_z 75%

Drilling

For drilling the feed rate (v_f = mm/min) should be reduced as illustrated.

In addition, chip evacuation is required for larger drilling depths in excess of 0.5 x D.



Lubricants:

cutting oil, highly activated ■

soluble oil (emulsion) ■

air only □

Material group	Materials examples, new designations (old designation in brackets) Figures in bold = material no. to DIN EN	Tensile strength MPa (N/mm ²)	Hardness	Coolant
General purpose steels	1.0035 S185(S133), 1.0486 P275N(S1E285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850		■
Free-cutting steels	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000		■
Unalloyed tempering steels	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000		■
Alloyed tempering steels	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-≤1000 1000-1200		■
Unalloyed case hardened steels	1.0301 (C10), 1.1121 C10E (Ck10)	≤750		■
Alloyed case hardened steels	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850-≤1000 1000-1200		■
Nitriding steels	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850-≤1000 >1000-1200		■
Tool steels	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000		■
High speed steels	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000		■
Spring steels	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤330 HB	■
Hardened steels	-		≤40-48 HRC >48-60 HRC	■
Stainless steels, sulphured	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤850		■
austenitic	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤850		■
martensitic	1.4057 X20CrNi 17 2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850		■
Cast iron	0.6010 EN-GJL-100(GG10), 0.6020 EN-GJL-200(GG20) 0.6025 EN-GJL-250(GG25), 0.6035 EN-GJL-350(GG35)	850-≤1000 1000-1200		■ □
Spheroidal graphite iron and malleable cast iron	0.7050 EN-GJS-500-7(GGG50), 0.8035 EN-GJMW-350-4(GTW35) 0.7070 EN-GJS-700-2(GGG70), 0.8170 EN-GJMB-700-2(GTS70)		≤240 HB <300 HB	■
Chilled cast iron	-		≤350 HB	■
New Cast iron GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo6			■ □
New Cast iron ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		■ □
Special alloys	Nimonic, Inconel, Monel, Hastelloy	≤1200		■
Ti and Ti-alloys	3.7024 Ti99.5, 3.7114 TiAl5Sn2.5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2.5, - TiAl8Mo1V1	≤850 >850-1200		■
Aluminium and Al-alloys	3.0255 Al99.5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		■
Al wrought alloys	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1.5	≤450		■
Al cast alloys ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		■
> 10 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		■
Magnesium alloys	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450		□
Copper, low alloyed	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5Zn5Pb	≤400		■
Brass, short-chipping	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		■
long-chipping	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0.5	≤600		■
Bronze, short-chipping	2.1090 CuSn7Zn5Pb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn	≤600		■
long-chipping	2.0790 CuNi18Zn19Pb	>600-850		■
Bronze, long-chipping	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000		■
Duroplastics	Epoxy resin, Resopal, Pertinax, Moltopren	-		□
Thermoplastics	Plexiglas, Hostalen, Novodur, Makralon	-		■ □
Kevlar	Kevlar	-		□
Glass/carbon-concentr. plastics	GFK/CFK	-		□

Slot drilling

Catalog no.	74231 74280	74243 74282	54275 64640 64604	64670 64641	54080 54180	74244	74294	64671	54294	54276	54825	54845	74816	54816
Tool mat.	M42		M42			M42		M42			HSS-E-PM		M42	M42
Std. Type	327 D N	844 K N	327 D N	844 K N	Stock	844 L N		844 L N	Stock		844 K NRf		844 K NR	844 K NR
Page	652/658	654/660	680/653/659	655/661	664/665	656	663	657	662	681	673	677	674	675



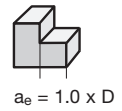
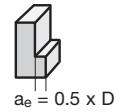
V _c m/min	Feed col.	Feed col.	V _c m/min	Feed col.	Feed col.	V _c m/min	Feed col.	V _c m/min	Feed col.	Feed col.	V _c m/min	Feed col.	V _c m/min	Feed col.	Feed col.
28	M	61	M		22	K	49	K		90	O	34	M	61	N
25	L	55	L		20	K	44	K		80	N	30	K	55	L
25	L	55	L		20	K	44	K		80	N	30	K	55	L
22	M	50	M		18	K	40	K		75	M	28	J	50	K
28	L	61	L		22	K	49	K		90	N	34	K	61	L
26	L	55	L		21	K	44	K		80	N	30	K	55	L
22	M	50	M		18	K	40	K		75	M	28	J	50	K
22	M	50	M		18	K	40	K		75	M	28	J	50	K
17	M	39	M		14	K	31	K		60	L	22	I	39	J
28	L	61	L		22	K	49	K		90	N	34	K	61	L
22	L	50	L		18	K	40	K		75	N	28	K	50	L
17	M	39	M		14	K	31	K		60	M	22	J	39	K
22	L	50	L		18	K	40	K		75	N	28	K	50	L
17	L	39	L		14	K	31	K		60	L	22	I	39	J
28	L	61	L		22	K	49	K		90	N	34	K	61	L
11	L	28	L		9	K	22	K		40	L	15	I	28	J
11	M	28	M		9	K	22	K		40	M	15	J	28	K
11	L	22	L							33	L			22	J
18	M	42	M							65	M	23	J	42	K
14	L	39	L							60	L	21	I	39	J
14	L	39	L							60	M	21	J	39	K
20	L	50	L		16	K	40	K		75	N	28	K	50	L
14	L	42	L		11	K	34	K		65	M			42	K
20	L	50	L		16	K	40	K		75	N	28	K	50	L
14	L	42	L		11	K	34	K		65	M			42	K
11	L	31	L							45	K			31	I
5	L	9	L							14	L			9	J
11	L	25	L							36	L	13	I	25	J
7	L	11	L							17	K			11	I
154	N	220	N												
110	N	198	N												
88	M	132	M												
44	N	121	N												
66	O	143	O												
61	N	99	N												
61	N	99	N												
39	M	94	M												
39	M	94	M												
33	L	72	L												
33	M	72	M												
17	L	44	L												

Application recommendations for HSS End Mills

		Feed column															
Code-letter		H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
tool-Ø mm	2.00	0.001	0.001	0.001	0.002	0.002	0.004	0.005	0.006	0.007	0.008	0.010	0.012	0.014	0.016	0.018	0.020
	3.00	0.002	0.002	0.003	0.003	0.004	0.007	0.010	0.010	0.010	0.015	0.016	0.013	0.019	0.022	0.024	0.030
	5.00	0.005	0.006	0.007	0.009	0.010	0.014	0.020	0.020	0.022	0.025	0.026	0.026	0.028	0.030	0.032	0.038
	6.00	0.006	0.008	0.009	0.011	0.013	0.017	0.024	0.025	0.027	0.031	0.029	0.033	0.039	0.036	0.041	0.047
	8.00	0.010	0.012	0.014	0.016	0.019	0.024	0.032	0.032	0.035	0.042	0.042	0.047	0.053	0.052	0.058	0.064
	10.00	0.013	0.015	0.018	0.021	0.025	0.030	0.038	0.039	0.044	0.050	0.053	0.059	0.065	0.066	0.073	0.080
	12.00	0.010	0.018	0.022	0.026	0.030	0.036	0.046	0.048	0.052	0.059	0.063	0.072	0.079	0.085	0.090	0.100
	16.00	0.020	0.023	0.027	0.032	0.038	0.045	0.054	0.058	0.063	0.071	0.079	0.088	0.095	0.100	0.110	0.120
	20.00	0.023	0.028	0.033	0.038	0.045	0.057	0.066	0.073	0.080	0.090	0.097	0.100	0.110	0.120	0.130	0.140
	25.00	0.030	0.035	0.040	0.045	0.055	0.065	0.075	0.100	0.120	0.130	0.140	0.150	0.165	0.170	0.180	0.190

Feed rate codes in bold are the preferred choice for the respective material group.

a_e = Width of cut
a_p = Cutting depth



Oblique plunging and slot milling

For oblique plunging the feed rate (v_f = mm/min) should be reduced as illustrated.

In addition, chip evacuation is required for drilling depths in excess of 1 x D. This also applies to the transition to radial machining.

slot milling

a_p = cut. depth 0.5 x D = f_z 100%

a_p = cut. depth 1.0 x D = f_z 75%

Drilling

For drilling the feed rate (v_f = mm/min) should be reduced as illustrated.

In addition, chip evacuation is required for larger drilling depths in excess of 0.5 x D.



Lubricants:

cutting oil, highly activated ■
soluble oil (emulsion) ■
air only □

Material group	Materials examples, new designations (old designation in brackets) Figures in bold = material no. to DIN EN	Tensile strength MPa (N/mm ²)	Hardness	Coolant
General purpose steels	1.0035 S185(S133), 1.0486 P275N(S1E285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850		■
Free-cutting steels	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000		■
Unalloyed tempering steels	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000		■
Alloyed tempering steels	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-≤1000 1000-1200		■
Unalloyed case hardened steels	1.0301 (C10), 1.1121 C10E (Ck10)	≤750		■
Alloyed case hardened steels	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850-≤1000 1000-1200		■
Nitriding steels	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850-≤1000 >1000-1200		■
Tool steels	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000		■
High speed steels	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000		■
Spring steels	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤330 HB	■
Hardened steels	-		≤40-48 HRC >48-60 HRC	■
Stainless steels, sulphured	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤850		■
austenitic	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤850		■
martensitic	1.4057 X20CrNi 17 2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850		■
Cast iron	0.6010 EN-GJL-100(GG10), 0.6020 EN-GJL-200(GG20) 0.6025 EN-GJL-250(GG25), 0.6035 EN-GJL-350(GG35)	850-≤1000 1000-1200		■
Spheroidal graphite iron and malleable cast iron	0.7050 EN-GJS-500-7(GGG50), 0.8035 EN-GJMW-350-4(GTW35) 0.7070 EN-GJS-700-2(GGG70), 0.8170 EN-GJMB-700-2(GTS70)		≤240 HB <300 HB	■
Chilled cast iron	-		≤350 HB	■
New Cast iron GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo6			■
New Cast iron ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		■
Special alloys	Nimonic, Inconel, Monel, Hastelloy	≤1200		■
Ti and Ti-alloys	3.7024 Ti99.5, 3.7114 TiAl5Sn2.5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2.5, - TiAl8Mo1V1	≤850 >850-1200		■
Aluminium and Al-alloys	3.0255 Al99.5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		■
Al wrought alloys	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1.5	≤450		■
Al cast alloys ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		■
> 10 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		■
Magnesium alloys	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450		■
Copper, low alloyed	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnNb	≤400		■
Brass, short-chipping	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		■
long-chipping	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0.5	≤600		■
Bronze, short-chipping	2.1090 CuSn7ZnNb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn	≤600		■
long-chipping	2.0790 CuNi18Zn19Pb	>600-850		■
Bronze, long-chipping	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000		■
Duroplastics	Epoxy resin, Resopal, Pertinax, Moltopren	-		■
Thermoplastics	Plexiglas, Hostalen, Novodur, Makralon	-		■
Kevlar	Kevlar	-		■
Glass/carbon-concentr. plastics	GFK/CFK	-		■

Finishing

Roughing

Catalog no.	74617	74847	64667	54847	74800	74825	74845	54825	54845	74816	74836	54816	54836	54815
Tool mat.	M42	M42	M42	M42	M42	HSS-E-PM	HSS-E-PM	HSS-E-PM	HSS-E-PM	M42	M42	M42	M42	M42
Std.	844K	844 L	844 K	844 L	Stock	844 K	844 K	844 K	844 K	844 K/L	844 K/L	844 K/L	844 K/L	844 K/L
Type	N	N	N	N	N	NRf	NRf	NRf	NRf	NR	NR	NR	NR	NR
Page	666	668	667	669	670	672	676	673	677	674/678	675/679	671	671	671



V _c m/min	Feed col.	V _c m/min	Feed col.	V _c m/min	Feed col.	V _c m/min	Feed col.	V _c m/min	Feed col.	V _c m/min	Feed col.	V _c m/min	Feed col.	V _c m/min	Feed col.
28	M	31	N	68	O	19	L	57	O	102	P	38	N	68	O
24	L	27	M	61	N	16	K	51	N	92	O	33	L	61	M
24	L	27	M	61	N	16	K	51	N	92	O	33	L	61	M
22	K	25	L	55	M	15	K	46	M	83	N	31	L	55	L
28	L	31	M	68	N	19	K	57	N	102	O	38	L	68	M
25	L	28	M	61	N	17	K	51	N	92	O	33	L	61	M
22	K	25	L	55	M	15	K	46	M	83	N	31	L	55	L
22	K	25	L	55	M	15	K	46	M	83	N	31	L	55	L
17	J	19	L	43	L	11	K	36	L	65	M	24	K	43	L
28	L	31	M	68	N	19	K	57	N	102	O	38	L	68	M
22	L	25	M	55	N	15	K	46	N	83	O	31	L	55	M
17	K	19	L	43	M	11	K	36	M	65	N	24	L	43	L
22	L	25	M	55	N	15	K	46	N	83	O	31	L	55	M
17	J	19	L	43	L	11	K	36	L	65	M	24	K	43	L
28	L	31	M	68	N	19	K	57	N	102	O	38	L	68	M
11	J	13	L	31	L	8	K	26	L	47	M	17	K	31	L
11	K	13	L	31	M	8	K	26	M	47	N	17	L	31	L
		13	L	25	L			20	L	37	M	14	K	25	L
18	K	20	L	47	M	13	K	39	M	70	N	26	L	47	L
13	J	15	L	43	L	9	K	36	L	65	M	24	K	43	L
13	K	15	L	43	M	9	K	36	M	65	N	24	L	43	L
20	L	22	M	55	N			46	N	83	O	31	L	55	M
		15	L	47	M			39	M	70	N	26	L	47	L
20	L	22	M	55	N			46	N	83	O	31	L	55	M
		15	L	47	M			39	M	70	N	26	L	47	L
11	I	13	K	35	L			29	L	52	L	19	K	35	K
		5	L	10	L			9	L	16	M	6	K	10	L
11	J	13	L	27	L			22	L	40	M	15	K	27	L
		8	K	13	L			10	L	19	L	7	K	13	K
155	O	170	P	242	Q										
110	N	121	O	218	P										
90	M	97	N	146	O										
40	N	49	O	134	P										
65	O	73	P	158	Q										
62	N	68	O	109	P										
62	M	68	N	109	O										
40	M	43	N	104	O										
40	M	43	N	104	O										
33	L	37	M	80	N										
33	L	37	M	80	N										
17	K	19	L	49	M										

Solid carbide end mills

Slot drills Alu



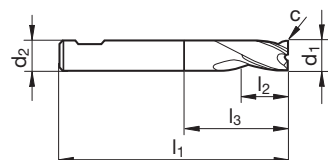
Catalog no. 74204



P	M	K	N	S	H
			•		

Application
recomm. p. 570

- extra short
- centre cutting



d1 e8 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
3.000	6.000	50.000	4.000	8.400	0.030	2	3.000
4.000	6.000	54.000	5.000	10.400	0.030	2	4.000
5.000	6.000	54.000	6.000	12.400	0.030	2	5.000
6.000	6.000	54.000	7.000	18.000	0.030	2	6.000
8.000	8.000	58.000	9.000	22.000	0.050	2	8.000
10.000	10.000	66.000	11.000	26.000	0.050	2	10.000
12.000	12.000	73.000	12.000	28.000	0.100	2	12.000
14.000	14.000	75.000	14.000	30.000	0.100	2	14.000
16.000	16.000	82.000	16.000	34.000	0.100	2	16.000
18.000	18.000	84.000	18.000	36.000	0.100	2	18.000
20.000	20.000	92.000	20.000	42.000	0.100	2	20.000

Solid carbide end mills

Slot drills Alu



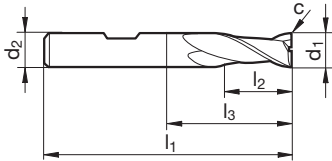
Catalog no. 74202



P	M	K	N	S	H
			•		

Application
recomm. p. 570

• centre cutting



d1 e8 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
3.000	6.000	57.000	7.000	11.400	0.030	2	3.000
4.000	6.000	57.000	8.000	13.900	0.030	2	4.000
5.000	6.000	57.000	10.000	16.900	0.030	2	5.000
6.000	6.000	57.000	10.000	21.000	0.030	2	6.000
8.000	8.000	63.000	16.000	27.000	0.050	2	8.000
10.000	10.000	72.000	19.000	32.000	0.050	2	10.000
12.000	12.000	83.000	22.000	38.000	0.100	2	12.000
14.000	14.000	83.000	22.000	38.000	0.100	2	14.000
16.000	16.000	92.000	26.000	44.000	0.100	2	16.000
18.000	18.000	92.000	26.000	44.000	0.100	2	18.000
20.000	20.000	104.000	32.000	54.000	0.100	2	20.000

Solid carbide end mills

Slot drills Alu



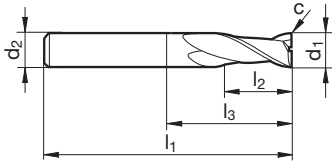
Catalog no. 74206



P	M	K	N	S	H
			•		

Application
recomm. p. 570

- extra long
- centre cutting



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
5.000	5.000	75.000	30.000	47.000	0.030	2	5.000
6.000	6.000	75.000	30.000	39.000	0.030	2	6.000
8.000	8.000	100.000	40.000	64.000	0.050	2	8.000
10.000	10.000	100.000	40.000	60.000	0.050	2	10.000
12.000	12.000	150.000	45.000	105.000	0.100	2	12.000
16.000	16.000	150.000	65.000	102.000	0.100	2	16.000

Solid carbide end mills

Slot drills Alu



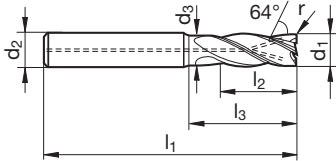
Catalog no. 74479



P	M	K	N	S	H
			•		

Application
recomm. p. 570

- with internal cooling for longer tool life and optimal chip evacuation
- centre cutting



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	r mm x 45°	Z	Code no.
6.000	6.000	57.000	10.000	21.000	1.000	3	6.000
8.000	8.000	63.000	16.000	27.000	1.000	3	8.000
10.000	10.000	72.000	19.000	32.000	1.500	3	10.000
12.000	12.000	83.000	22.000	38.000	1.500	3	12.000
16.000	16.000	92.000	26.000	44.000	2.000	3	16.000
20.000	20.000	104.000	32.000	54.000	2.500	3	20.000

Solid carbide end mills

Slot drills (2-fluted)



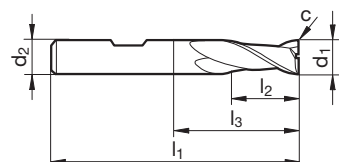
Catalog no. 74520



P	M	K	N	S	H
•	•	•	•		

Application
recomm. p. 566

- extra short
- centre cutting
- universal application



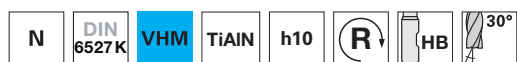
d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
2.000	6.000	50.000	3.000	6.400	0.025	2	2.000
2.500	6.000	50.000	3.000	6.400	0.050	2	2.500
3.000	6.000	50.000	4.000	8.900	0.050	2	3.000
3.500	6.000	50.000	4.000	9.000	0.050	2	3.500
4.000	6.000	54.000	5.000	10.400	0.050	2	4.000
4.500	6.000	54.000	5.000	11.500	0.050	2	4.500
5.000	6.000	54.000	6.000	12.900	0.050	2	5.000
5.500	6.000	54.000	7.000	14.400	0.050	2	5.500
6.000	6.000	54.000	7.000	18.000	0.050	2	6.000
6.500	8.000	58.000	8.000	17.400	0.100	2	6.500
7.000	8.000	58.000	8.000	17.400	0.100	2	7.000
7.500	8.000	58.000	9.000	18.400	0.100	2	7.500
8.000	8.000	58.000	9.000	22.000	0.100	2	8.000
8.500	10.000	66.000	10.000	21.400	0.100	2	8.500
9.000	10.000	66.000	10.000	21.400	0.100	2	9.000
9.500	10.000	66.000	11.000	22.400	0.100	2	9.500
10.000	10.000	66.000	11.000	26.000	0.100	2	10.000
11.000	12.000	73.000	12.000	25.400	0.100	2	11.000
12.000	12.000	73.000	12.000	28.000	0.100	2	12.000
13.000	14.000	75.000	14.000	29.400	0.150	2	13.000
14.000	14.000	75.000	14.000	30.000	0.150	2	14.000
15.000	16.000	82.000	16.000	33.400	0.150	2	15.000
16.000	16.000	82.000	16.000	34.000	0.150	2	16.000
18.000	18.000	84.000	18.000	36.000	0.150	2	18.000
20.000	20.000	92.000	20.000	42.000	0.150	2	20.000

Solid carbide end mills

Slot drills (2-fluted)



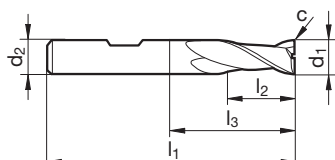
Catalog no. 54520



P	M	K	N	S	H
•	•	•	○	•	

Application
recomm. p. 566

- extra short
- centre cutting
- universal application



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
2.000	6.000	50.000	3.000	7.400	0.025	2	2.000
3.000	6.000	50.000	4.000	8.400	0.050	2	3.000
4.000	6.000	54.000	5.000	10.400	0.050	2	4.000
5.000	6.000	54.000	6.000	12.400	0.050	2	5.000
6.000	6.000	54.000	7.000	18.000	0.050	2	6.000
8.000	8.000	58.000	9.000	22.000	0.100	2	8.000
10.000	10.000	66.000	11.000	26.000	0.100	2	10.000
12.000	12.000	73.000	12.000	28.000	0.100	2	12.000
14.000	14.000	75.000	14.000	30.000	0.150	2	14.000
16.000	16.000	82.000	16.000	34.000	0.150	2	16.000
18.000	18.000	84.000	18.000	36.000	0.150	2	18.000
20.000	20.000	92.000	20.000	42.000	0.150	2	20.000

Solid carbide end mills

Slot drills (2-fluted)



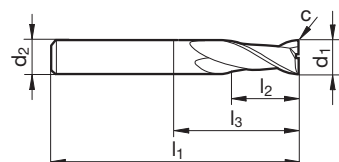
Catalog no. 54519



P	M	K	N	S	H
•	•	•	○	•	

Application
recomm. p. 568

- centre cutting
- universal application



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
2.000	6.000	57.000	6.000	9.400	0.025	2	2.000
2.800	6.000	57.000	7.000	11.900	0.050	2	2.800
3.000	6.000	57.000	7.000	11.900	0.050	2	3.000
3.800	6.000	57.000	8.000	13.400	0.050	2	3.800
4.000	6.000	57.000	8.000	13.400	0.050	2	4.000
4.800	6.000	57.000	10.000	16.900	0.050	2	4.800
5.000	6.000	57.000	10.000	16.900	0.050	2	5.000
5.750	6.000	57.000	10.000	18.400	0.050	2	5.750
6.000	6.000	57.000	10.000	21.000	0.050	2	6.000
6.750	8.000	63.000	13.000	22.400	0.100	2	6.750
7.000	8.000	63.000	13.000	22.400	0.100	2	7.000
7.750	8.000	63.000	16.000	25.400	0.100	2	7.750
8.000	8.000	63.000	16.000	27.000	0.100	2	8.000
8.700	10.000	72.000	16.000	27.400	0.100	2	8.700
9.000	10.000	72.000	16.000	27.400	0.100	2	9.000
9.700	10.000	72.000	19.000	30.400	0.100	2	9.700
10.000	10.000	72.000	19.000	32.000	0.100	2	10.000
11.700	12.000	83.000	22.000	35.400	0.100	2	11.700
12.000	12.000	83.000	22.000	38.000	0.100	2	12.000
14.000	14.000	83.000	22.000	38.000	0.150	2	14.000
15.700	16.000	92.000	26.000	44.000	0.150	2	15.700
18.000	18.000	92.000	26.000	44.000	0.150	2	18.000
20.000	20.000	104.000	32.000	54.000	0.150	2	20.000

Solid carbide end mills

Slot drills (2-fluted)



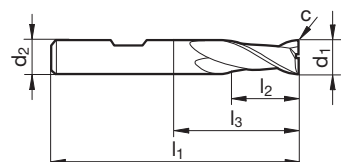
Catalog no. 74521



P	M	K	N	S	H
•	•	•	•		

Application
recomm. p. 566

- centre cutting
- universal application



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
2.000	6.000	57.000	6.000	9.400	0.025	2	2.000
2.500	6.000	57.000	7.000	10.400	0.050	2	2.500
3.000	6.000	57.000	7.000	11.900	0.050	2	3.000
3.500	6.000	57.000	7.000	12.400	0.050	2	3.500
3.800	6.000	57.000	8.000	13.400	0.050	2	3.800
4.000	6.000	57.000	8.000	13.400	0.050	2	4.000
4.500	6.000	57.000	8.000	14.900	0.050	2	4.500
4.800	6.000	57.000	10.000	16.900	0.050	2	4.800
5.000	6.000	57.000	10.000	16.900	0.050	2	5.000
5.750	6.000	57.000	10.000	18.400	0.050	2	5.750
6.000	6.000	57.000	10.000	21.000	0.050	2	6.000
6.750	8.000	63.000	13.000	22.400	0.100	2	6.750
7.000	8.000	63.000	13.000	22.400	0.100	2	7.000
7.750	8.000	63.000	16.000	25.400	0.100	2	7.750
8.000	8.000	63.000	16.000	27.000	0.100	2	8.000
8.700	10.000	72.000	16.000	27.400	0.100	2	8.700
9.000	10.000	72.000	16.000	27.400	0.100	2	9.000
9.700	10.000	72.000	19.000	30.400	0.100	2	9.700
10.000	10.000	72.000	19.000	32.000	0.100	2	10.000
11.700	12.000	83.000	22.000	35.400	0.100	2	11.700
12.000	12.000	83.000	22.000	38.000	0.100	2	12.000
14.000	14.000	83.000	22.000	38.000	0.150	2	14.000
15.700	16.000	92.000	26.000	44.000	0.150	2	15.700
16.000	16.000	92.000	26.000	44.000	0.150	2	16.000
18.000	18.000	92.000	26.000	44.000	0.150	2	18.000
20.000	20.000	104.000	32.000	54.000	0.150	2	20.000

Solid carbide end mills

Slot drills (2-fluted)



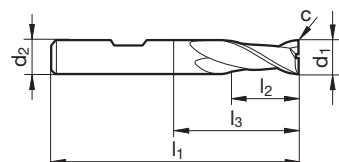
Catalog no. 54521



P	M	K	N	S	H
•	•	•	○	•	

Application
recomm. p. 568

- centre cutting
- universal application



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
2.000	6.000	57.000	6.000	10.400	0.025	2	2.000
2.800	6.000	57.000	7.000	11.400	0.050	2	2.800
3.000	6.000	57.000	7.000	11.400	0.050	2	3.000
3.800	6.000	57.000	8.000	13.900	0.050	2	3.800
4.000	6.000	57.000	8.000	13.900	0.050	2	4.000
4.800	6.000	57.000	10.000	16.900	0.050	2	4.800
5.000	6.000	57.000	10.000	16.900	0.050	2	5.000
5.750	6.000	57.000	10.000	17.900	0.050	2	5.750
6.000	6.000	57.000	10.000	21.000	0.050	2	6.000
6.750	8.000	63.000	13.000	21.900	0.100	2	6.750
7.000	8.000	63.000	13.000	21.900	0.100	2	7.000
7.750	8.000	63.000	16.000	25.900	0.100	2	7.750
8.000	8.000	63.000	16.000	27.000	0.100	2	8.000
8.700	10.000	72.000	16.000	27.400	0.100	2	8.700
9.000	10.000	72.000	16.000	27.400	0.100	2	9.000
9.700	10.000	72.000	19.000	31.400	0.100	2	9.700
10.000	10.000	72.000	19.000	32.000	0.100	2	10.000
11.700	12.000	83.000	22.000	36.400	0.100	2	11.700
12.000	12.000	83.000	22.000	38.000	0.100	2	12.000
14.000	14.000	83.000	22.000	38.000	0.150	2	14.000
15.700	16.000	92.000	26.000	44.000	0.150	2	15.700
16.000	16.000	92.000	26.000	44.000	0.150	2	16.000
18.000	18.000	92.000	26.000	44.000	0.150	2	18.000
20.000	20.000	104.000	32.000	54.000	0.150	2	20.000

Solid carbide end mills

Slot drills (2-fluted)



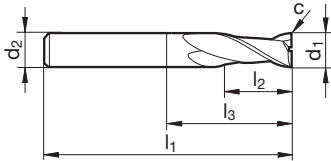
Catalog no. 74404



P	M	K	N	S	H
●		○	○		

Application
recomm. p. 568

- extra long
- centre cutting
- universal application



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
3.000	3.000	75.000	20.000	28.000	0.050	2	3.000
4.000	4.000	75.000	25.000	33.000	0.050	2	4.000
5.000	5.000	75.000	30.000	37.000	0.050	2	5.000
6.000	6.000	75.000	30.000	41.000	0.050	2	6.000
8.000	8.000	100.000	40.000	53.000	0.100	2	8.000
10.000	10.000	100.000	40.000	50.000	0.100	2	10.000
12.000	12.000	150.000	45.000	58.000	0.100	2	12.000
14.000	14.000	150.000	45.000	63.000	0.150	2	14.000
16.000	16.000	150.000	65.000	85.000	0.150	2	16.000
18.000	18.000	150.000	65.000	85.000	0.150	2	18.000
20.000	20.000	150.000	65.000	100.000	0.150	2	20.000

Solid carbide end mills

Slot drills (2-fluted)



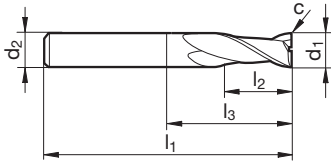
Catalog no. 54404



P	M	K	N	S	H
•		•	○		

Application
recomm. p. 568

- extra long
- centre cutting
- universal application



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
5.000	5.000	75.000	30.000	41.000	0.050	2	5.000
6.000	6.000	75.000	30.000	42.000	0.050	2	6.000
8.000	8.000	100.000	40.000	53.000	0.100	2	8.000
10.000	10.000	100.000	40.000	50.000	0.100	2	10.000
12.000	12.000	150.000	45.000	58.000	0.100	2	12.000
14.000	14.000	150.000	45.000	64.000	0.150	2	14.000
16.000	16.000	150.000	65.000	86.000	0.150	2	16.000
20.000	20.000	150.000	65.000	89.000	0.150	2	20.000

Solid carbide end mills

Mini slot drills (3-fluted)



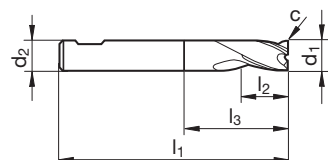
Catalog no. 64080



P	M	K	N	S	H
•		•			

Application
recomm. p. 568

- extra short
- centre cutting
- optimal one-way milling cutter



d1 e8 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
0.300	3.000	38.000	1.000	3.400		3	0.300
0.400	3.000	38.000	1.000	3.400		3	0.400
0.500	3.000	38.000	1.500	3.400	0.025	3	0.500
0.600	3.000	38.000	1.500	3.400	0.025	3	0.600
0.800	3.000	38.000	2.000	3.900	0.025	3	0.800
1.000	3.000	38.000	2.000	3.900	0.025	3	1.000
1.200	3.000	38.000	2.000	3.900	0.025	3	1.200
1.500	3.000	38.000	2.000	3.900	0.025	3	1.500
1.800	3.000	38.000	2.000	3.900	0.025	3	1.800
2.000	6.000	38.000	4.000	7.400	0.025	3	2.000
2.500	6.000	38.000	5.000	8.400	0.050	3	2.500
3.000	6.000	38.000	5.000	8.400	0.050	3	3.000
3.500	6.000	38.000	6.000	9.400	0.050	3	3.500
4.000	6.000	38.000	7.000	10.400	0.050	3	4.000
4.500	6.000	38.000	8.000	12.400	0.050	3	4.500
5.000	6.000	38.000	8.000	12.400	0.050	3	5.000
5.500	6.000	38.000	8.000	12.400	0.050	3	5.500
5.750	6.000	38.000	8.000	12.400	0.050	3	5.750
6.000	6.000	38.000	8.000	14.000	0.050	3	6.000
6.750	8.000	42.000	10.000	15.400	0.100	3	6.750
7.000	8.000	42.000	10.000	16.400	0.100	3	7.000
7.750	8.000	42.000	10.000	16.400	0.100	3	7.750
8.000	8.000	43.000	11.000	19.000	0.100	3	8.000
8.700	10.000	48.000	11.000	17.400	0.100	3	8.700
9.000	10.000	48.000	11.000	17.400	0.100	3	9.000
9.700	10.000	48.000	11.000	17.400	0.100	3	9.700
10.000	10.000	50.000	13.000	23.000	0.100	3	10.000
12.000	12.000	55.000	15.000	24.500	0.100	3	12.000
14.000	14.000	58.000	15.000	28.000	0.150	3	14.000
16.000	16.000	62.000	18.000	29.000	0.150	3	16.000
18.000	18.000	70.000	20.000	37.000	0.150	3	18.000
20.000	20.000	75.000	22.000	41.000	0.150	3	20.000

Solid carbide end mills

Mini slot drills (3-fluted)



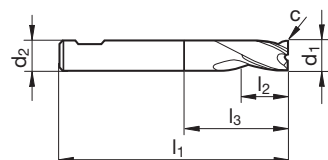
Catalog no. 64180



P	M	K	N	S	H
	•			•	

Application
recomm. p. 568

- solid design
- centre cutting
- optimal one-way milling cutter



d1 e8 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
1.000	3.000	38.000	2.000	3.900	0.025	3	1.000
1.200	3.000	38.000	2.000	3.900	0.025	3	1.200
1.500	3.000	38.000	3.000	4.900	0.025	3	1.500
1.800	3.000	38.000	3.000	4.900	0.025	3	1.800
2.000	6.000	45.000	4.000	7.400	0.025	3	2.000
2.500	6.000	45.000	5.000	8.400	0.050	3	2.500
3.000	6.000	45.000	6.000	9.400	0.050	3	3.000
3.500	6.000	45.000	6.000	9.400	0.050	3	3.500
4.000	6.000	45.000	7.000	10.400	0.050	3	4.000
4.500	6.000	45.000	8.000	12.400	0.050	3	4.500
5.000	6.000	45.000	8.000	12.400	0.050	3	5.000
5.500	6.000	45.000	8.000	12.400	0.050	3	5.500
5.750	6.000	45.000	10.000	15.000	0.050	3	5.750
6.000	6.000	45.000	10.000	15.000	0.050	3	6.000
6.750	8.000	55.000	10.000	15.400	0.100	3	6.750
7.000	8.000	55.000	12.000	18.400	0.100	3	7.000
7.750	8.000	55.000	12.000	18.400	0.100	3	7.750
8.000	8.000	55.000	13.000	19.000	0.100	3	8.000
8.700	10.000	55.000	14.000	20.400	0.100	3	8.700
9.000	10.000	55.000	14.000	20.400	0.100	3	9.000
9.700	10.000	55.000	16.000	23.400	0.100	3	9.700
10.000	10.000	55.000	16.000	25.000	0.100	3	10.000

Solid carbide end mills

Slot drills (3-fluted)



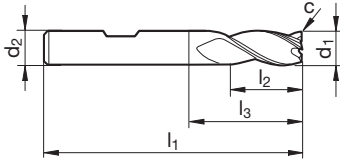
Catalog no. 74522



P	M	K	N	S	H
•	•	•	•		

Application
recomm. p. 566

- extra short
- centre cutting
- universal application



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
2.000	6.000	50.000	3.000	7.400	0.025	3	2.000
3.000	6.000	50.000	4.000	8.400	0.050	3	3.000
4.000	6.000	54.000	5.000	10.400	0.050	3	4.000
5.000	6.000	54.000	6.000	12.400	0.050	3	5.000
5.500	6.000	54.000	7.000	14.900	0.050	3	5.500
6.000	6.000	54.000	7.000	18.000	0.050	3	6.000
7.000	8.000	58.000	8.000	16.900	0.100	3	7.000
8.000	8.000	58.000	9.000	22.000	0.100	3	8.000
10.000	10.000	66.000	11.000	26.000	0.100	3	10.000
12.000	12.000	73.000	12.000	28.000	0.100	3	12.000
14.000	14.000	75.000	14.000	30.000	0.150	3	14.000
16.000	16.000	82.000	16.000	34.000	0.150	3	16.000
18.000	18.000	84.000	18.000	36.000	0.150	3	18.000
20.000	20.000	92.000	20.000	42.000	0.150	3	20.000

Solid carbide end mills

Slot drills (3-fluted)



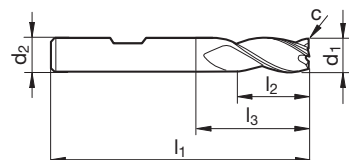
Catalog no. 64522



P	M	K	N	S	H
•	•	•	○	•	

Application
recomm. p. 566

- extra short
- centre cutting
- universal application



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
2.000	6.000	50.000	3.000	7.400	0.025	3	2.000
3.000	6.000	50.000	4.000	8.400	0.050	3	3.000
4.000	6.000	54.000	5.000	10.400	0.050	3	4.000
5.000	6.000	54.000	6.000	12.400	0.050	3	5.000
6.000	6.000	54.000	7.000	18.000	0.050	3	6.000
7.000	8.000	58.000	8.000	16.900	0.100	3	7.000
8.000	8.000	58.000	9.000	22.000	0.100	3	8.000
10.000	10.000	66.000	11.000	26.000	0.100	3	10.000
12.000	12.000	73.000	12.000	28.000	0.100	3	12.000
14.000	14.000	75.000	14.000	30.000	0.150	3	14.000
16.000	16.000	82.000	16.000	34.000	0.150	3	16.000
20.000	20.000	92.000	20.000	42.000	0.150	3	20.000

Solid carbide end mills

Slot drills (3-fluted)



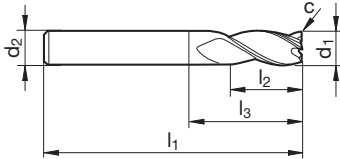
Catalog no. 54523



P	M	K	N	S	H
•	•	•	○	•	

Application
recomm. p. 568

- centre cutting
- universal application



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
2.000	6.000	57.000	6.000	10.400	0.025	3	2.000
2.500	6.000	57.000	7.000	11.400	0.050	3	2.500
3.000	6.000	57.000	7.000	11.400	0.050	3	3.000
3.500	6.000	57.000	7.000	11.400	0.050	3	3.500
4.000	6.000	57.000	8.000	13.900	0.050	3	4.000
4.500	6.000	57.000	8.000	13.900	0.050	3	4.500
5.000	6.000	57.000	10.000	16.900	0.050	3	5.000
6.000	6.000	57.000	10.000	21.000	0.050	3	6.000
8.000	8.000	63.000	16.000	27.000	0.100	3	8.000
10.000	10.000	72.000	19.000	32.000	0.100	3	10.000
12.000	12.000	83.000	22.000	38.000	0.100	3	12.000
14.000	14.000	83.000	22.000	38.000	0.150	3	14.000
16.000	16.000	92.000	26.000	44.000	0.150	3	16.000
18.000	18.000	92.000	26.000	44.000	0.150	3	18.000
20.000	20.000	104.000	32.000	54.000	0.150	3	20.000

Solid carbide end mills

Slot drills (3-fluted)



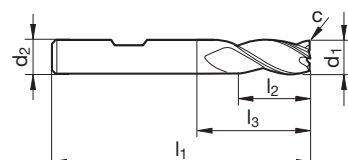
Catalog no. 74523



P	M	K	N	S	H
•	•	•	•		

Application
recomm. p. 566

- centre cutting
- universal application



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
2.000	6.000	57.000	6.000	10.400	0.025	3	2.000
2.500	6.000	57.000	7.000	11.400	0.050	3	2.500
3.000	6.000	57.000	7.000	11.400	0.050	3	3.000
3.500	6.000	57.000	7.000	11.400	0.050	3	3.500
4.000	6.000	57.000	8.000	13.900	0.050	3	4.000
4.500	6.000	57.000	8.000	13.900	0.050	3	4.500
5.000	6.000	57.000	10.000	16.900	0.050	3	5.000
6.000	6.000	57.000	10.000	21.000	0.050	3	6.000
8.000	8.000	63.000	16.000	27.000	0.100	3	8.000
10.000	10.000	72.000	19.000	32.000	0.100	3	10.000
12.000	12.000	83.000	22.000	38.000	0.100	3	12.000
14.000	14.000	83.000	22.000	38.000	0.150	3	14.000
16.000	16.000	92.000	26.000	44.000	0.150	3	16.000
18.000	18.000	92.000	26.000	44.000	0.150	3	18.000
20.000	20.000	104.000	32.000	54.000	0.150	3	20.000

Solid carbide end mills

Slot drills (3-fluted)



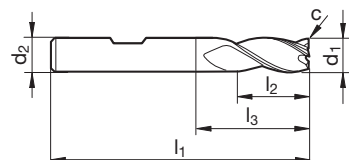
Catalog no. 64523



P	M	K	N	S	H
•	•	•	○	•	

Application
recomm. p. 568

- centre cutting
- universal application



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
2.000	6.000	57.000	6.000	9.400	0.025	3	2.000
2.500	6.000	57.000	7.000	10.400	0.050	3	2.500
3.000	6.000	57.000	7.000	11.900	0.050	3	3.000
3.500	6.000	57.000	7.000	12.400	0.050	3	3.500
4.000	6.000	57.000	8.000	13.400	0.050	3	4.000
4.500	6.000	57.000	8.000	14.900	0.050	3	4.500
5.000	6.000	57.000	10.000	16.900	0.050	3	5.000
6.000	6.000	57.000	10.000	21.000	0.050	3	6.000
8.000	8.000	63.000	16.000	27.000	0.100	3	8.000
10.000	10.000	72.000	19.000	32.000	0.100	3	10.000
12.000	12.000	83.000	22.000	38.000	0.100	3	12.000
14.000	14.000	83.000	22.000	38.000	0.150	3	14.000
16.000	16.000	92.000	26.000	44.000	0.150	3	16.000
18.000	18.000	92.000	26.000	44.000	0.150	3	18.000
20.000	20.000	104.000	32.000	54.000	0.150	3	20.000

Solid carbide end mills

Slot drills (3-fluted)



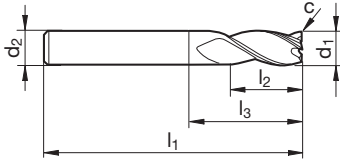
Catalog no. 74424



P	M	K	N	S	H
●		○	○		

Application
recomm. p. 568

- extra long
- centre cutting
- universal application



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
3.000	3.000	75.000	20.000	47.000	0.050	3	3.000
4.000	4.000	75.000	25.000	47.000	0.050	3	4.000
5.000	5.000	75.000	30.000	47.000	0.050	3	5.000
6.000	6.000	75.000	30.000	39.000	0.050	3	6.000
8.000	8.000	100.000	40.000	64.000	0.100	3	8.000
10.000	10.000	100.000	40.000	60.000	0.100	3	10.000
12.000	12.000	150.000	45.000	105.000	0.100	3	12.000
16.000	16.000	150.000	65.000	102.000	0.150	3	16.000
20.000	20.000	150.000	65.000	100.000	0.150	3	20.000

Solid carbide end mills

Slot drills (3-fluted)



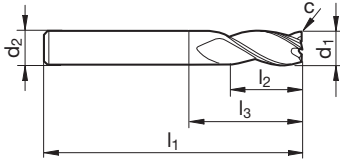
Catalog no. 54424



P	M	K	N	S	H
•		•	○		

Application
recomm. p. 568

- extra long
- centre cutting
- universal application



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
3.000	3.000	75.000	20.000	47.000	0.050	3	3.000
4.000	4.000	75.000	25.000	47.000	0.050	3	4.000
5.000	5.000	75.000	30.000	47.000	0.050	3	5.000
6.000	6.000	75.000	30.000	39.000	0.050	3	6.000
8.000	8.000	100.000	40.000	64.000	0.100	3	8.000
10.000	10.000	100.000	40.000	60.000	0.100	3	10.000
12.000	12.000	150.000	45.000	105.000	0.100	3	12.000
16.000	16.000	150.000	65.000	102.000	0.150	3	16.000
20.000	20.000	150.000	65.000	100.000	0.150	3	20.000

Solid carbide end mills

Slot drills NH (3-fluted)



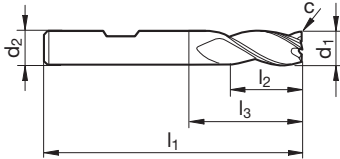
Catalog no. 64570



P	M	K	N	S	H
•	•	•		○	

Application
recomm. p. 568

- high-performance end mill for universal use
- extra short
- centre cutting



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
3.000	6.000	50.000	4.000	7.900	0.050	3	3.000
4.000	6.000	54.000	5.000	8.900	0.050	3	4.000
5.000	6.000	54.000	6.000	11.400	0.050	3	5.000
6.000	6.000	54.000	7.000	18.000	0.050	3	6.000
8.000	8.000	58.000	9.000	22.000	0.100	3	8.000
10.000	10.000	66.000	11.000	26.000	0.100	3	10.000
12.000	12.000	73.000	12.000	28.000	0.100	3	12.000
16.000	16.000	82.000	16.000	34.000	0.150	3	16.000
18.000	18.000	84.000	18.000	36.000	0.150	3	18.000
20.000	20.000	92.000	20.000	42.000	0.150	3	20.000

Solid carbide end mills

Slot drills NH (3-fluted)



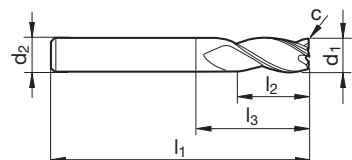
Catalog no. 74478



P	M	K	N	S	H
•	•	•			

Application
recomm. p. 566

- high cutting performance, very smooth operation
- high-performance end mill for universal use
- centre cutting



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
3.000	6.000	57.000	7.000	11.400	0.050	3	3.000
3.500	6.000	57.000	7.000	11.400	0.050	3	3.500
4.000	6.000	57.000	8.000	13.900	0.050	3	4.000
4.500	6.000	57.000	8.000	13.900	0.050	3	4.500
5.000	6.000	57.000	10.000	16.900	0.050	3	5.000
6.000	6.000	57.000	10.000	21.000	0.050	3	6.000
8.000	8.000	63.000	16.000	27.000	0.100	3	8.000
10.000	10.000	72.000	19.000	32.000	0.100	3	10.000
12.000	12.000	83.000	22.000	38.000	0.100	3	12.000
14.000	14.000	83.000	22.000	38.000	0.150	3	14.000
16.000	16.000	92.000	26.000	44.000	0.150	3	16.000
18.000	18.000	92.000	26.000	44.000	0.150	3	18.000
20.000	20.000	104.000	32.000	54.000	0.150	3	20.000

Solid carbide end mills

Slot drills NH (3-fluted)



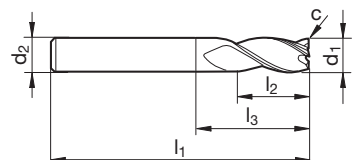
Catalog no. 64478



P	M	K	N	S	H
•	•	•		○	

Application
recomm. p. 568

- high cutting performance, very smooth operation
- high-performance end mill for universal use
- centre cutting



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
1.000	3.000	38.000	2.000	3.400	0.020	3	1.000
1.500	3.000	38.000	3.000	5.900	0.020	3	1.500
2.000	6.000	57.000	6.000	8.900	0.030	3	2.000
2.500	6.000	57.000	7.000	9.900	0.040	3	2.500
3.000	6.000	57.000	7.000	10.900	0.050	3	3.000
3.500	6.000	57.000	7.000	10.900	0.050	3	3.500
4.000	6.000	57.000	8.000	11.900	0.060	3	4.000
4.500	6.000	57.000	8.000	13.400	0.070	3	4.500
5.000	6.000	57.000	10.000	15.400	0.080	3	5.000
6.000	6.000	57.000	10.000	21.000	0.090	3	6.000
8.000	8.000	63.000	16.000	27.000	0.120	3	8.000
10.000	10.000	72.000	19.000	32.000	0.150	3	10.000
12.000	12.000	83.000	22.000	38.000	0.180	3	12.000
14.000	14.000	83.000	22.000	38.000	0.210	3	14.000
16.000	16.000	92.000	26.000	44.000	0.190	3	16.000
18.000	18.000	92.000	26.000	44.000	0.220	3	18.000
20.000	20.000	104.000	32.000	54.000	0.240	3	20.000

Solid carbide end mills

Slot drills NH (3-fluted)



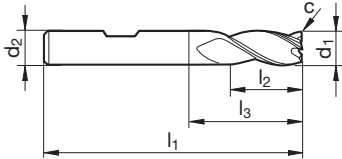
Catalog no. 64571



P	M	K	N	S	H
•	•	•		○	

Application
recomm. p. 568

- high cutting performance, very smooth operation
- high-performance end mill for universal use
- centre cutting



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
3.000	6.000	57.000	7.000	10.900	0.050	3	3.000
3.500	6.000	57.000	7.000	10.900	0.050	3	3.500
4.000	6.000	57.000	8.000	11.900	0.050	3	4.000
4.500	6.000	57.000	8.000	13.400	0.050	3	4.500
5.000	6.000	57.000	10.000	15.400	0.050	3	5.000
6.000	6.000	57.000	10.000	21.000	0.050	3	6.000
8.000	8.000	63.000	16.000	27.000	0.100	3	8.000
9.000	10.000	72.000	16.000	25.400	0.100	3	9.000
10.000	10.000	72.000	19.000	32.000	0.100	3	10.000
12.000	12.000	83.000	22.000	38.000	0.100	3	12.000
14.000	14.000	83.000	22.000	38.000	0.150	3	14.000
16.000	16.000	92.000	26.000	44.000	0.150	3	16.000
18.000	18.000	92.000	26.000	44.000	0.150	3	18.000
20.000	20.000	104.000	32.000	54.000	0.150	3	20.000

Solid carbide end mills

End mills (4-fluted)



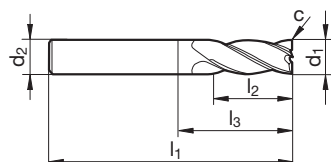
Catalog no. 54524



P	M	K	N	S	H
•		•	○		

Application
recomm. p. 570

- centre cutting
- universal application



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
2.000	6.000	57.000	7.000	11.400	0.025	4	2.000
3.000	6.000	57.000	8.000	12.900	0.050	4	3.000
4.000	6.000	57.000	11.000	16.900	0.050	4	4.000
5.000	6.000	57.000	13.000	19.900	0.050	4	5.000
6.000	6.000	57.000	13.000	21.000	0.050	4	6.000
8.000	8.000	63.000	19.000	27.000	0.100	4	8.000
10.000	10.000	72.000	22.000	32.000	0.100	4	10.000
12.000	12.000	83.000	26.000	38.000	0.100	4	12.000
14.000	14.000	83.000	26.000	38.000	0.150	4	14.000
16.000	16.000	92.000	32.000	44.000	0.150	4	16.000
18.000	18.000	92.000	32.000	44.000	0.150	4	18.000
20.000	20.000	104.000	38.000	54.000	0.150	4	20.000

Solid carbide end mills

End mills (4-fluted)



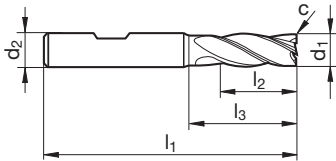
Catalog no. 74525



P	M	K	N	S	H
•	•	•	•		

Application
recomm. p. 570

- centre cutting
- universal application



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
3.000	6.000	57.000	8.000	12.900	0.050	4	3.000
4.000	6.000	57.000	11.000	16.900	0.050	4	4.000
5.000	6.000	57.000	13.000	19.900	0.050	4	5.000
6.000	6.000	57.000	13.000	21.000	0.050	4	6.000
8.000	8.000	63.000	19.000	27.000	0.100	4	8.000
10.000	10.000	72.000	22.000	32.000	0.100	4	10.000
12.000	12.000	83.000	26.000	38.000	0.100	4	12.000
14.000	14.000	83.000	26.000	38.000	0.150	4	14.000
16.000	16.000	92.000	32.000	44.000	0.150	4	16.000
18.000	18.000	92.000	32.000	44.000	0.150	4	18.000
20.000	20.000	104.000	38.000	54.000	0.150	4	20.000

Solid carbide end mills

End mills (4-fluted)



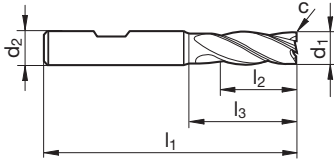
Catalog no. 64525



P	M	K	N	S	H
●	○	●			

Application
recomm. p. 570

- centre cutting
- universal application



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
2.000	6.000	57.000	7.000	9.900	0.025	4	2.000
3.000	6.000	57.000	8.000	12.400	0.050	4	3.000
4.000	6.000	57.000	11.000	15.900	0.050	4	4.000
5.000	6.000	57.000	13.000	19.400	0.050	4	5.000
6.000	6.000	57.000	13.000	21.000	0.050	4	6.000
7.000	8.000	63.000	16.000	23.900	0.100	4	7.000
8.000	8.000	63.000	19.000	27.000	0.100	4	8.000
10.000	10.000	72.000	22.000	32.000	0.100	4	10.000
12.000	12.000	83.000	26.000	38.000	0.100	4	12.000
14.000	14.000	83.000	26.000	38.000	0.150	4	14.000
16.000	16.000	92.000	32.000	44.000	0.150	4	16.000
18.000	18.000	92.000	32.000	44.000	0.150	4	18.000
20.000	20.000	104.000	38.000	54.000	0.150	4	20.000

Solid carbide end mills

End mills (4-fluted)



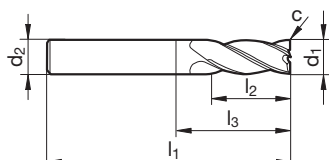
Catalog no. 54444



P	M	K	N	S	H
•		•	○		

Application
recomm. p. 570

- extra long
- centre cutting
- universal application



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
3.000	3.000	75.000	20.000	47.000	0.050	4	3.000
4.000	4.000	75.000	25.000	47.000	0.050	4	4.000
5.000	5.000	75.000	30.000	47.000	0.050	4	5.000
6.000	6.000	75.000	30.000	39.000	0.050	4	6.000
8.000	8.000	100.000	40.000	64.000	0.100	4	8.000
10.000	10.000	100.000	40.000	60.000	0.100	4	10.000
12.000	12.000	150.000	45.000	105.000	0.100	4	12.000
14.000	14.000	150.000	45.000	105.000	0.150	4	14.000
16.000	16.000	150.000	65.000	102.000	0.150	4	16.000
18.000	18.000	150.000	65.000	102.000	0.150	4	18.000
20.000	20.000	150.000	65.000	100.000	0.150	4	20.000

Solid carbide end mills

End mills with corner radius



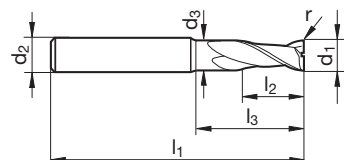
Catalog no. 54522



P	M	K	N	S	H
•	•	•	○	•	

Application
recomm. p. 566

- neck clearance
- centre cutting



d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	r	Z	Code no.
6.000	6.000	5.700	57.000	10.000	21.000	0.500	2	6.005
6.000	6.000	5.700	57.000	10.000	21.000	1.000	2	6.010
8.000	8.000	7.700	63.000	16.000	27.000	0.500	2	8.005
8.000	8.000	7.700	63.000	16.000	27.000	1.000	2	8.010
8.000	8.000	7.700	63.000	16.000	27.000	1.500	2	8.015
10.000	10.000	9.500	72.000	19.000	32.000	0.500	2	10.005
10.000	10.000	9.500	72.000	19.000	32.000	1.000	2	10.010
10.000	10.000	9.500	72.000	19.000	32.000	1.500	2	10.015
10.000	10.000	9.500	72.000	19.000	32.000	2.000	2	10.020
12.000	12.000	11.500	83.000	22.000	38.000	0.500	2	12.005
12.000	12.000	11.500	83.000	22.000	38.000	1.000	2	12.010
12.000	12.000	11.500	83.000	22.000	38.000	2.000	2	12.020
16.000	16.000	15.500	92.000	26.000	44.000	1.000	2	16.010
16.000	16.000	15.500	92.000	26.000	44.000	2.000	2	16.020

Solid carbide end mills

End mills with corner radius



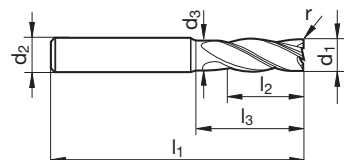
Catalog no. 54526



P	M	K	N	S	H
•	•	•	○	•	

Application
recomm. p. 570

- neck clearance
- centre cutting



d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	r	Z	Code no.
6.000	6.000	5.700	57.000	13.000	21.000	0.500	4	6.005
6.000	6.000	5.700	57.000	13.000	21.000	1.000	4	6.010
8.000	8.000	7.700	63.000	19.000	27.000	0.500	4	8.005
8.000	8.000	7.700	63.000	19.000	27.000	1.000	4	8.010
8.000	8.000	7.700	63.000	19.000	27.000	1.500	4	8.015
8.000	8.000	7.700	63.000	19.000	27.000	2.000	4	8.020
10.000	10.000	9.500	72.000	22.000	32.000	0.500	4	10.005
10.000	10.000	9.500	72.000	22.000	32.000	0.800	4	10.008
10.000	10.000	9.500	72.000	22.000	32.000	1.000	4	10.010
10.000	10.000	9.500	72.000	22.000	32.000	1.500	4	10.015
10.000	10.000	9.500	72.000	22.000	32.000	2.000	4	10.020
12.000	12.000	11.500	83.000	26.000	38.000	0.500	4	12.005
12.000	12.000	11.500	83.000	26.000	38.000	0.800	4	12.008
12.000	12.000	11.500	83.000	26.000	38.000	1.000	4	12.010
12.000	12.000	11.500	83.000	26.000	38.000	1.500	4	12.015
12.000	12.000	11.500	83.000	26.000	38.000	2.000	4	12.020
16.000	16.000	15.500	92.000	32.000	44.000	1.000	4	16.010
16.000	16.000	15.500	92.000	32.000	44.000	2.000	4	16.020
20.000	20.000	19.500	104.000	38.000	54.000	1.000	4	20.010
20.000	20.000	19.500	104.000	38.000	54.000	2.000	4	20.020

Solid carbide end mills

End mills with corner radius



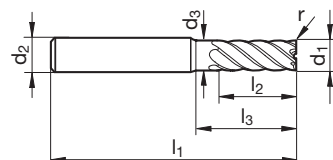
Catalog no. 54206



P	M	K	N	S	H
●	●	●	○	●	○

Application
recomm. p. 574

- outstanding surface finish with fine finishing operations
- neck clearance
- centre cutting



d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	r	Z	Code no.
6.000	6.000	5.700	57.000	13.000	20.000	0.500	6	6.005
6.000	6.000	5.700	57.000	13.000	20.000	1.000	6	6.010
8.000	8.000	7.700	63.000	19.000	26.000	0.500	6	8.005
8.000	8.000	7.700	63.000	19.000	26.000	1.000	6	8.010
8.000	8.000	7.700	63.000	19.000	26.000	1.500	6	8.015
8.000	8.000	7.700	63.000	19.000	26.000	2.000	6	8.020
10.000	10.000	9.500	72.000	22.000	30.000	0.500	6	10.005
10.000	10.000	9.500	72.000	22.000	30.000	0.800	6	10.008
10.000	10.000	9.500	72.000	22.000	30.000	1.000	6	10.010
10.000	10.000	9.500	72.000	22.000	30.000	1.500	6	10.015
10.000	10.000	9.500	72.000	22.000	30.000	2.000	6	10.020
12.000	12.000	11.500	83.000	26.000	36.000	0.500	6	12.005
12.000	12.000	11.500	83.000	26.000	36.000	0.800	6	12.008
12.000	12.000	11.500	83.000	26.000	36.000	1.000	6	12.010
12.000	12.000	11.500	83.000	26.000	36.000	1.500	6	12.015
12.000	12.000	11.500	83.000	26.000	36.000	2.000	6	12.020
16.000	16.000	15.500	92.000	32.000	42.000	1.000	6	16.010
16.000	16.000	15.500	92.000	32.000	42.000	2.000	6	16.020
20.000	20.000	19.500	104.000	38.000	52.000	1.000	8	20.010
20.000	20.000	19.500	104.000	38.000	52.000	2.000	8	20.020

Solid carbide end mills

Finishing end mills (multiple fluted)



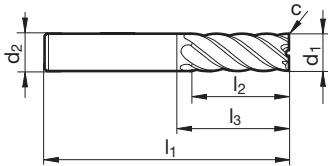
Catalog no. 54205



P	M	K	N	S	H
•	•	•	○	•	○

Application
recomm. p. 574

- outstanding surface finish
- centre cutting
- suitable for fine-finishing in materials up to 50 HRC



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
3.000	6.000	57.000	8.000	11.400	0.050	6	3.000
4.000	6.000	57.000	11.000	15.900	0.050	6	4.000
5.000	6.000	57.000	13.000	17.900	0.050	6	5.000
6.000	6.000	57.000	13.000	21.000	0.050	6	6.000
8.000	8.000	63.000	19.000	27.000	0.100	6	8.000
10.000	10.000	72.000	22.000	32.000	0.100	6	10.000
12.000	12.000	83.000	26.000	38.000	0.100	6	12.000
14.000	14.000	83.000	26.000	38.000	0.150	6	14.000
16.000	16.000	92.000	32.000	44.000	0.150	6	16.000
18.000	18.000	92.000	32.000	44.000	0.150	8	18.000
20.000	20.000	104.000	38.000	54.000	0.150	8	20.000

Solid carbide end mills

Finishing end mills (multiple fluted)



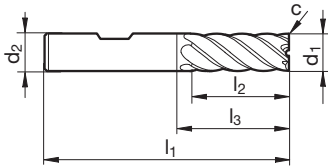
Catalog no. 54201



P	M	K	N	S	H
●	●	●	○	●	○

Application
recomm. p. 574

- outstanding surface finish
- centre cutting
- suitable for fine-finishing in materials up to 50 HRC



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
6.000	6.000	57.000	13.000	21.000	0.050	6	6.000
8.000	8.000	63.000	19.000	27.000	0.100	6	8.000
10.000	10.000	72.000	22.000	32.000	0.100	6	10.000
12.000	12.000	83.000	26.000	38.000	0.100	6	12.000
14.000	14.000	83.000	26.000	38.000	0.150	6	14.000
16.000	16.000	92.000	32.000	44.000	0.150	6	16.000
18.000	18.000	92.000	32.000	44.000	0.150	8	18.000
20.000	20.000	104.000	38.000	54.000	0.150	8	20.000

Solid carbide end mills

Finishing end mills (multiple fluted)



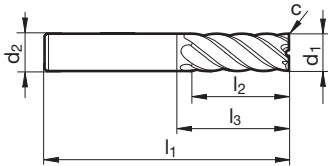
Catalog no. 54225



P	M	K	N	S	H
•	•	•	○	•	○

Application
recomm. p. 574

- outstanding surface finish
- extra long
- centre cutting
- suitable for fine-finishing in materials up to 50 HRC



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
6.000	6.000	75.000	30.000	39.000	0.050	6	6.000
8.000	8.000	100.000	40.000	64.000	0.100	6	8.000
10.000	10.000	100.000	40.000	60.000	0.100	6	10.000
12.000	12.000	150.000	45.000	105.000	0.100	6	12.000
16.000	16.000	150.000	65.000	102.000	0.150	6	16.000
20.000	20.000	150.000	65.000	100.000	0.150	8	20.000

Solid carbide end mills

Finishing end mills (multiple fluted)



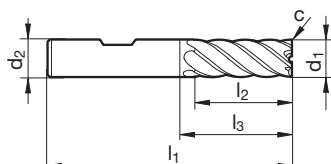
Catalog no. 54221



P	M	K	N	S	H
•	•	•	○	•	○

Application
recomm. p. 574

- outstanding surface finish
- extra long
- centre cutting
- suitable for fine-finishing in materials up to 50 HRC



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
6.000	6.000	75.000	30.000	39.000	0.050	6	6.000
8.000	8.000	100.000	40.000	64.000	0.100	6	8.000
10.000	10.000	100.000	40.000	60.000	0.100	6	10.000
12.000	12.000	150.000	45.000	105.000	0.100	6	12.000
16.000	16.000	150.000	65.000	102.000	0.150	6	16.000
20.000	20.000	150.000	65.000	100.000	0.150	8	20.000

Solid carbide end mills

Hard milling cutters (multi-fluted)



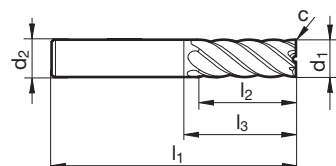
Catalog no. 54207



P	M	K	N	S	H
		•			•

Application
recomm. p. 574

- outstanding surface finish
- centre cutting
- suitable for hard-milling and fine-finishing in hardened materials up to 62 HRC and more



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
3.000	6.000	57.000	8.000	11.400	0.050	6	3.000
4.000	6.000	57.000	11.000	15.900	0.050	6	4.000
5.000	6.000	57.000	13.000	17.900	0.050	6	5.000
6.000	6.000	57.000	13.000	21.000	0.050	6	6.000
8.000	8.000	63.000	19.000	27.000	0.100	6	8.000
10.000	10.000	72.000	22.000	32.000	0.100	6	10.000
12.000	12.000	83.000	26.000	38.000	0.100	6	12.000
14.000	14.000	83.000	26.000	38.000	0.150	6	14.000
16.000	16.000	92.000	32.000	44.000	0.150	6	16.000
18.000	18.000	92.000	32.000	44.000	0.150	8	18.000
20.000	20.000	104.000	38.000	54.000	0.150	8	20.000

Solid carbide end mills

Hard milling cutters (multi-fluted)



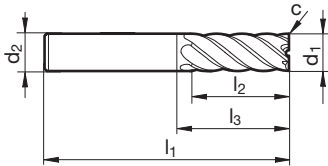
Catalog no. 54227



P	M	K	N	S	H
		•			•

Application
recomm. p. 574

- outstanding surface finish
- extra long
- centre cutting
- suitable for hard-milling and fine-finishing in hardened materials up to 62 HRC and more



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
6.000	6.000	75.000	30.000	39.000	0.050	6	6.000
8.000	8.000	100.000	40.000	64.000	0.100	6	8.000
10.000	10.000	100.000	40.000	60.000	0.100	6	10.000
12.000	12.000	150.000	45.000	105.000	0.100	6	12.000
16.000	16.000	150.000	65.000	102.000	0.150	6	16.000
20.000	20.000	150.000	65.000	100.000	0.150	8	20.000

Solid carbide end mills

Roughing end mills



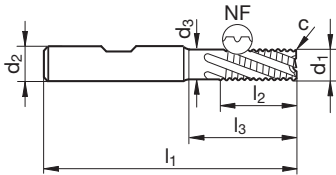
Catalog no. 54496



P	M	K	N	S	H
●	○	●	○		

Application
recomm. p. 572

- suitable for roughing operations in general steels
- centre cutting



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
6.000	6.000	57.000	13.000	20.000	0.300	4	6.000
8.000	8.000	63.000	19.000	26.000	0.300	4	8.000
10.000	10.000	72.000	22.000	30.000	0.300	4	10.000
12.000	12.000	83.000	26.000	36.000	0.500	4	12.000
14.000	14.000	83.000	26.000	36.000	0.500	4	14.000
16.000	16.000	92.000	32.000	42.000	0.500	4	16.000
18.000	18.000	92.000	32.000	42.000	0.500	4	18.000
20.000	20.000	104.000	38.000	52.000	0.500	4	20.000
25.000	25.000	121.000	45.000	63.000	0.600	5	25.000

Solid carbide end mills

Roughing end mills



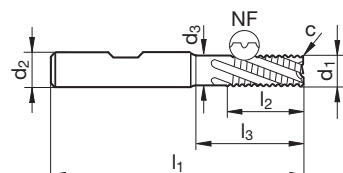
Catalog no. 54497



P	M	K	N	S	H
●	○	●	○		

Application
recomm. p. 572

- for roughing-finishing
- centre cutting



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
6.000	6.000	57.000	13.000	20.000	0.300	5	6.000
8.000	8.000	63.000	19.000	26.000	0.300	5	8.000
10.000	10.000	72.000	22.000	30.000	0.300	5	10.000
12.000	12.000	83.000	26.000	36.000	0.500	5	12.000
14.000	14.000	83.000	26.000	36.000	0.500	5	14.000
16.000	16.000	92.000	32.000	42.000	0.500	6	16.000
18.000	18.000	92.000	32.000	42.000	0.500	6	18.000
20.000	20.000	104.000	38.000	52.000	0.500	6	20.000
25.000	25.000	121.000	45.000	63.000	0.600	6	25.000

Solid carbide end mills

Roughing end mills



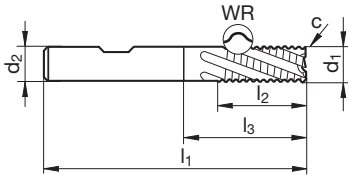
Catalog no. 74203



P	M	K	N	S	H
			•		

Application
recomm. p. 572

- high metal removal rate in aluminium and non-ferrous metals through roughing profile
- centre cutting



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
6.000	6.000	57.000	10.000	21.000	0.300	3	6.000
8.000	8.000	63.000	16.000	27.000	0.300	3	8.000
10.000	10.000	72.000	19.000	32.000	0.300	3	10.000
12.000	12.000	83.000	22.000	38.000	0.500	3	12.000
14.000	14.000	83.000	22.000	38.000	0.500	3	14.000
16.000	16.000	92.000	26.000	44.000	0.500	3	16.000
18.000	18.000	92.000	26.000	44.000	0.500	3	18.000
20.000	20.000	104.000	32.000	54.000	0.500	3	20.000

Solid carbide end mills

Roughing end mills



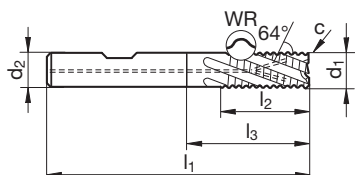
Catalog no. 74303



P	M	K	N	S	H
			•		

Application
recomm. p. 572

- with internal cooling for longer tool life and optimal chip evacuation
- high metal removal rate in aluminium and non-ferrous metals through roughing profile
- centre cutting



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
6.000	6.000	57.000	10.000	21.000	0.300	3	6.000
8.000	8.000	63.000	16.000	27.000	0.300	3	8.000
10.000	10.000	72.000	19.000	32.000	0.300	3	10.000
12.000	12.000	83.000	22.000	38.000	0.500	3	12.000
16.000	16.000	92.000	26.000	44.000	0.500	3	16.000
20.000	20.000	104.000	32.000	54.000	0.500	3	20.000

Solid carbide end mills

Roughing end mills



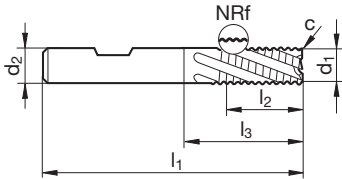
Catalog no. 64495



P	M	K	N	S	H
•	•	•			

Application
recomm. p. 572

- fine tooth roughing profile
- centre cutting



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
6.000	6.000	57.000	13.000	20.000	0.300	4	6.000
8.000	8.000	63.000	19.000	26.000	0.300	4	8.000
10.000	10.000	72.000	22.000	30.000	0.300	4	10.000
12.000	12.000	83.000	26.000	36.000	0.500	4	12.000
14.000	14.000	83.000	26.000	36.000	0.500	4	14.000
16.000	16.000	92.000	32.000	42.000	0.500	4	16.000
18.000	18.000	92.000	32.000	42.000	0.500	4	18.000
20.000	20.000	104.000	38.000	52.000	0.500	4	20.000

Solid carbide end mills

Roughing end mills



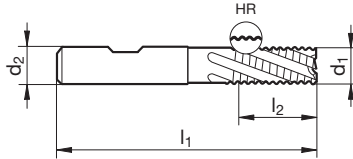
Catalog no. 64497



P	M	K	N	S	H
•		•			•

Application
recomm. p. 572

- fine tooth roughing profile
- chip breaker geometry
- centre cutting
- for difficult-to-machine materials with 3° rake angle
- especially suitable for milling steel with high tensile strength, cast iron, grey cast iron and hardened steel upto 56HRc



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
6.000	6.000	57.000	13.000	21.000	0.300	4	6.000
8.000	8.000	63.000	19.000	27.000	0.300	4	8.000
10.000	10.000	72.000	22.000	32.000	0.300	4	10.000
12.000	12.000	83.000	26.000	38.000	0.500	4	12.000
16.000	16.000	92.000	32.000	44.000	0.500	4	16.000
20.000	20.000	104.000	38.000	54.000	0.500	4	20.000

Solid carbide end mills

Ball nose end mills



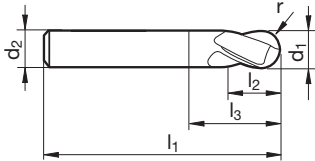
Catalog no. 74543



P	M	K	N	S	H
•	•	•	○		

Application
recomm. p. 574

- centre cutting
- ball nose



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	r mm	Z	Code no.
3.000	6.000	57.000	7.000	11.400	1.500	2	3.000
4.000	6.000	57.000	8.000	13.900	2.000	2	4.000
5.000	6.000	57.000	10.000	16.900	2.500	2	5.000
6.000	6.000	57.000	10.000	21.000	3.000	2	6.000
8.000	8.000	63.000	16.000	27.000	4.000	2	8.000
10.000	10.000	72.000	19.000	32.000	5.000	2	10.000
12.000	12.000	83.000	22.000	38.000	6.000	2	12.000
14.000	14.000	83.000	22.000	38.000	7.000	2	14.000
16.000	16.000	92.000	26.000	44.000	8.000	2	16.000
18.000	18.000	92.000	26.000	44.000	9.000	2	18.000
20.000	20.000	104.000	32.000	54.000	10.000	2	20.000

Solid carbide end mills

Ball nose end mills



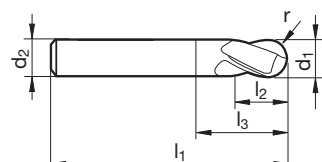
Catalog no. 54541



P	M	K	N	S	H
•	•	•	○	○	

Application
recomm. p. 574

- centre cutting
- ball nose



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	r mm	Z	Code no.
0.500	3.000	38.000	1.000	2.100	0.250	2	0.500
0.800	3.000	38.000	1.000	2.100	0.400	2	0.800
1.000	3.000	38.000	2.000	3.900	0.500	2	1.000
1.500	3.000	38.000	3.000	6.400	0.750	2	1.500
2.000	6.000	57.000	6.000	9.400	1.000	2	2.000
3.000	6.000	57.000	7.000	11.900	1.500	2	3.000
4.000	6.000	57.000	8.000	13.400	2.000	2	4.000
5.000	6.000	57.000	10.000	16.900	2.500	2	5.000
6.000	6.000	57.000	10.000	21.000	3.000	2	6.000
8.000	8.000	63.000	16.000	27.000	4.000	2	8.000
10.000	10.000	72.000	19.000	32.000	5.000	2	10.000
12.000	12.000	83.000	22.000	38.000	6.000	2	12.000
14.000	14.000	83.000	22.000	38.000	7.000	2	14.000
16.000	16.000	92.000	26.000	44.000	8.000	2	16.000
18.000	18.000	92.000	26.000	44.000	9.000	2	18.000
20.000	20.000	104.000	32.000	54.000	10.000	2	20.000

Solid carbide end mills

Ball nose end mills



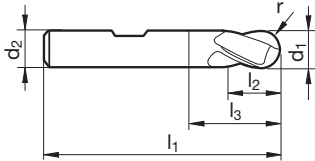
Catalog no. 64542



P	M	K	N	S	H
•	•	•	○	○	

Application
recomm. p. 574

- centre cutting
- ball nose



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	r mm	Z	Code no.
1.000	3.000	38.000	2.000	3.900	0.500	2	1.000
1.500	3.000	38.000	3.000	6.400	0.750	2	1.500
2.000	6.000	57.000	6.000	9.400	1.000	2	2.000
3.000	6.000	57.000	7.000	11.900	1.500	2	3.000
4.000	6.000	57.000	8.000	13.400	2.000	2	4.000
5.000	6.000	57.000	10.000	16.900	2.500	2	5.000
6.000	6.000	57.000	10.000	21.000	3.000	2	6.000
8.000	8.000	63.000	16.000	27.000	4.000	2	8.000
10.000	10.000	72.000	19.000	32.000	5.000	2	10.000
12.000	12.000	83.000	22.000	38.000	6.000	2	12.000
14.000	14.000	83.000	22.000	38.000	7.000	2	14.000
16.000	16.000	92.000	26.000	44.000	8.000	2	16.000
18.000	18.000	92.000	26.000	44.000	9.000	2	18.000
20.000	20.000	104.000	32.000	54.000	10.000	2	20.000

Solid carbide end mills

Ball nose end mills



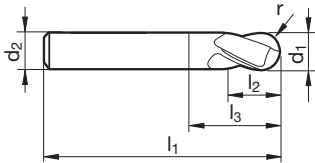
Catalog no. 74545



P	M	K	N	S	H
●	○	●	○		

Application
recomm. p. 574

- extra long
- centre cutting
- ball nose



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	r mm	Z	Code no.
3.000	3.000	75.000	20.000	47.000	1.500	2	3.000
4.000	4.000	75.000	25.000	47.000	2.000	2	4.000
5.000	5.000	75.000	30.000	47.000	2.500	2	5.000
6.000	6.000	75.000	30.000	39.000	3.000	2	6.000
8.000	8.000	100.000	40.000	64.000	4.000	2	8.000
10.000	10.000	100.000	40.000	60.000	5.000	2	10.000
12.000	12.000	150.000	45.000	105.000	6.000	2	12.000

Solid carbide end mills

Ball nose end mills



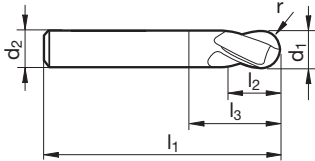
Catalog no. 64545



P	M	K	N	S	H
•	•	•	○	○	

Application
recomm. p. 574

- extra long
- centre cutting
- ball nose



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	r mm	Z	Code no.
3.000	3.000	75.000	20.000	47.000	1.500	2	3.000
4.000	4.000	75.000	25.000	47.000	2.000	2	4.000
5.000	5.000	75.000	30.000	47.000	2.500	2	5.000
6.000	6.000	75.000	30.000	39.000	3.000	2	6.000
8.000	8.000	100.000	40.000	64.000	4.000	2	8.000
10.000	10.000	100.000	40.000	60.000	5.000	2	10.000
12.000	12.000	150.000	45.000	105.000	6.000	2	12.000

Solid carbide end mills

Ball nose end mills



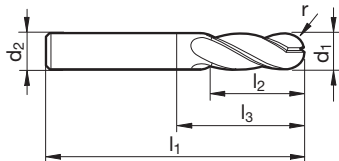
Catalog no. 74531



P	M	K	N	S	H
•	•	•	○		

Application
recomm. p. 574

- centre cutting
- ball nose



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	r mm	Z	Code no.
4.000	4.000	50.000	11.000	22.000	2.000	4	4.000
5.000	5.000	50.000	13.000	22.000	2.500	4	5.000
6.000	6.000	57.000	13.000	21.000	3.000	4	6.000
8.000	8.000	63.000	19.000	27.000	4.000	4	8.000
10.000	10.000	72.000	22.000	32.000	5.000	4	10.000
12.000	12.000	83.000	26.000	38.000	6.000	4	12.000
16.000	16.000	92.000	32.000	44.000	8.000	4	16.000

Solid carbide end mills

Ball nose end mills



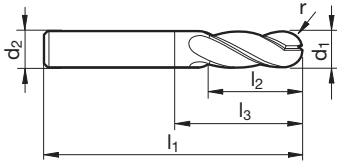
Catalog no. 54531



P	M	K	N	S	H
•	•	•	○	○	

Application
recomm. p. 574

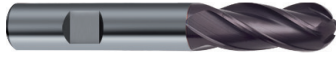
- centre cutting
- ball nose



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	r mm	Z	Code no.
4.000	4.000	50.000	11.000	22.000	2.000	4	4.000
5.000	5.000	50.000	13.000	22.000	2.500	4	5.000
6.000	6.000	57.000	13.000	21.000	3.000	4	6.000
8.000	8.000	63.000	19.000	27.000	4.000	4	8.000
10.000	10.000	72.000	22.000	32.000	5.000	4	10.000
12.000	12.000	83.000	26.000	38.000	6.000	4	12.000
14.000	14.000	83.000	26.000	38.000	7.000	4	14.000
16.000	16.000	92.000	32.000	44.000	8.000	4	16.000
18.000	18.000	92.000	32.000	44.000	9.000	4	18.000
20.000	20.000	104.000	38.000	54.000	10.000	4	20.000

Solid carbide end mills

Ball nose end mills



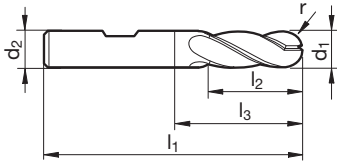
Catalog no. 64532



P	M	K	N	S	H
•	•	•	○	○	

Application
recomm. p. 574

- centre cutting
- ball nose



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	r mm	Z	Code no.
3.000	6.000	57.000	8.000	11.400	1.500	4	3.000
4.000	6.000	57.000	11.000	14.400	2.000	4	4.000
5.000	6.000	57.000	13.000	17.400	2.500	4	5.000
6.000	6.000	57.000	13.000	21.000	3.000	4	6.000
8.000	8.000	63.000	19.000	27.000	4.000	4	8.000
10.000	10.000	72.000	22.000	32.000	5.000	4	10.000
12.000	12.000	83.000	26.000	38.000	6.000	4	12.000
14.000	14.000	83.000	26.000	38.000	7.000	4	14.000
16.000	16.000	92.000	32.000	44.000	8.000	4	16.000
18.000	18.000	92.000	32.000	44.000	9.000	4	18.000
20.000	20.000	104.000	38.000	54.000	10.000	4	20.000

Solid carbide end mills

Ball nose end mills



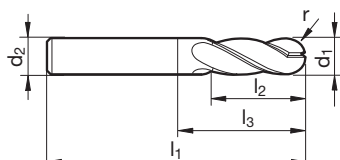
Catalog no. 64535



P	M	K	N	S	H
•	•	•	○	○	

Application
recomm. p. 574

- extra long
- centre cutting
- ball nose



d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	r mm	Z	Code no.
3.000	3.000	75.000	20.000	47.000	1.500	4	3.000
4.000	4.000	75.000	25.000	47.000	2.000	4	4.000
5.000	5.000	75.000	30.000	47.000	2.500	4	5.000
6.000	6.000	75.000	30.000	39.000	3.000	4	6.000
8.000	8.000	100.000	40.000	64.000	4.000	4	8.000
10.000	10.000	100.000	40.000	60.000	5.000	4	10.000
12.000	12.000	150.000	45.000	105.000	6.000	4	12.000

Solid carbide end mills

Torus end mills



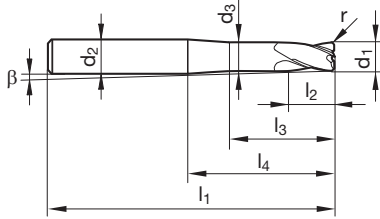
Catalog no. 54304



P	M	K	N	S	H
•	•	•		○	•

Application
recomm. p. 578

- short version
- centre cutting
- for the moulding-industry
- long tool life thanks to extremely hard coating



d1 h8 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	l4 mm	r mm	β °	Z	Code no.
3.000	6.000	2.800	57.000	5.000	9.400	21.000	0.500	4.200	4	3.000
4.000	6.000	3.800	57.000	6.000	13.400	21.000	0.500	2.800	4	4.000
5.000	6.000	4.800	57.000	8.000	15.900	21.000	0.500	1.400	4	5.000
6.000	6.000	5.700	57.000	9.000	21.000	21.000	1.000		4	6.000
8.000	8.000	7.700	63.000	12.000	27.000	27.000	1.000		4	8.000
10.000	10.000	9.500	72.000	15.000	32.000	32.000	1.500		4	10.000
12.000	12.000	11.500	83.000	18.000	38.000	38.000	1.500		4	12.000
16.000	16.000	15.500	92.000	24.000	44.000	44.000	2.000		4	16.000

Solid carbide end mills

Torus end mills



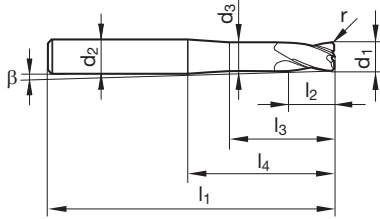
Catalog no. 54305



P	M	K	N	S	H
•	•	•		•	•

Application
recomm. p. 578

- long version
- centre cutting
- with extra long reach for the moulding-industry
- long tool life thanks to extremely hard coating



d1 h8 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	l4 mm	r mm	β °	Z	Code no.
6.000	6.000	5.700	75.000	9.000	38.000	39.000	1.000		4	6.000
8.000	8.000	7.700	100.000	12.000	63.000	64.000	1.000		4	8.000
10.000	10.000	9.500	100.000	15.000	58.000	60.000	1.500		4	10.000
12.000	12.000	11.500	150.000	18.000	103.000	105.000	1.500		4	12.000
16.000	16.000	15.500	150.000	24.000	100.000	102.000	2.000		4	16.000

Solid carbide end mills

Torus end mills



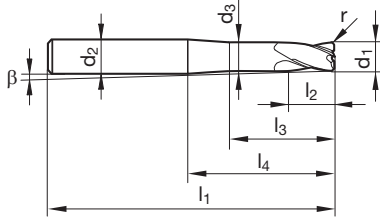
Catalog no. 54302



P	M	K	N	S	H
•	•	•	•	○	

Application
recomm. p. 576

- for roughing, finishing and fine finishing under HSC conditions in die and mold making
- centre cutting
- suitable for hardened materials up to 40-54 HRC
- long tool life thanks to extremely hard coating



d1 h8 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	l4 mm	r mm	β °	Z	Code no.
2.000	6.000	1.800	57.000	3.000	6.200	20.000	0.500	5.900	2	2.000
3.000	6.000	2.800	57.000	3.500	8.400	20.000	0.500	4.400	2	3.000
4.000	6.000	3.800	57.000	4.000	9.400	20.000	1.000	3.100	2	4.000
6.000	6.000	5.600	57.000	6.000	19.000	21.000	2.000		2	6.000
8.000	8.000	7.600	63.000	7.000	25.000	27.000	2.000		2	8.000
10.000	10.000	9.600	72.000	8.000	28.000	32.000	3.000		2	10.000
12.000	12.000	11.500	83.000	10.000	33.000	38.000	4.000		2	12.000

Solid carbide end mills

Torus end mills



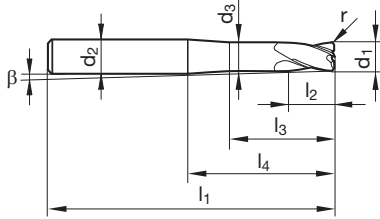
Catalog no. 54303



P	M	K	N	S	H
•	•	•	•	○	

Application
recomm. p. 576

- extra long reach for roughing, finishing and super-finishing under HSC-conditions in the mould and die industry
- centre cutting
- suitable for hardened materials up to 40-54 HRC
- long tool life thanks to extremely hard coating



d1 h8 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	l4 mm	r mm	β °	Z	Code no.
2.000	6.000	1.800	80.000	3.000	8.000	40.000	0.500	2.900	2	2.000
3.000	6.000	2.800	80.000	3.500	12.000	40.000	0.500	2.200	2	3.000
4.000	6.000	3.800	80.000	4.000	20.000	40.000	1.000	1.500	2	4.000
6.000	8.000	5.600	100.000	6.000	59.000	60.000	2.000	1.000	2	6.000
8.000	10.000	7.600	120.000	7.000	74.000	75.000	2.000	0.800	2	8.000
10.000	12.000	9.600	120.000	8.000	68.000	70.000	3.000	0.900	2	10.000
12.000	16.000	11.500	150.000	10.000	95.800	100.000	4.000	1.200	2	12.000

Solid carbide end mills

Ball nose end mills



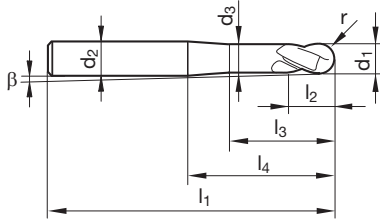
Catalog no. 54306



P	M	K	N	S	H
•	•	•		•	•

Application
recomm. p. 578

- short version
- centre cutting
- long tool life thanks to extremely hard coating



d1 h8 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	l4 mm	r mm	β °	Z	Code no.
0.500	3.000	0.400	38.000	0.750	2.600	10.000	0.250	7.400	2	0.500
0.800	3.000	0.700	38.000	1.200	3.500	10.000	0.400	6.600	2	0.800
1.000	3.000	0.900	38.000	1.500	4.000	10.000	0.500	6.100	2	1.000
1.500	3.000	1.400	38.000	2.250	5.500	10.000	0.750	4.700	2	1.500
2.000	6.000	1.900	57.000	3.000	9.400	21.000	1.000	5.800	2	2.000
3.000	6.000	2.700	57.000	5.000	11.600	21.000	1.500	4.400	2	3.000
4.000	6.000	3.700	57.000	6.000	14.500	21.000	2.000	3.100	2	4.000
5.000	6.000	4.700	57.000	8.000	17.300	21.000	2.500	1.600	2	5.000
6.000	6.000	5.700	57.000	9.000	20.000	21.000	3.000		2	6.000
8.000	8.000	7.700	63.000	12.000	26.000	27.000	4.000		2	8.000
10.000	10.000	9.500	72.000	15.000	30.000	32.000	5.000		2	10.000
12.000	12.000	11.500	83.000	18.000	36.000	38.000	6.000		2	12.000
16.000	16.000	15.500	92.000	24.000	42.000	44.000	8.000		2	16.000

Solid carbide end mills

Ball nose end mills



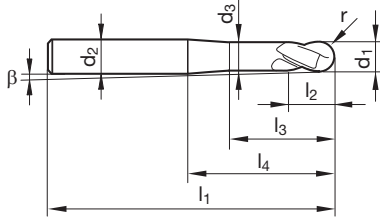
Catalog no. 54307



P	M	K	N	S	H
•	•	•		•	•

Application
recomm. p. 578

- long version
- centre cutting
- with extra long reach for the moulding-industry
- long tool life thanks to extremely hard coating



d1 h8 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	l4 mm	r mm	β °	Z	Code no.
3.000	6.000	2.700	75.000	5.000	20.000	39.000	1.500	2.300	2	3.000
4.000	6.000	3.700	75.000	6.000	20.000	39.000	2.000	1.600	2	4.000
5.000	6.000	4.700	75.000	8.000	20.000	39.000	2.500	0.800	2	5.000
6.000	6.000	5.700	75.000	9.000	38.000	39.000	3.000		2	6.000
8.000	8.000	7.700	100.000	12.000	63.000	64.000	4.000		2	8.000
10.000	10.000	9.500	100.000	15.000	58.000	60.000	5.000		2	10.000
12.000	12.000	11.500	150.000	18.000	103.000	105.000	6.000		2	12.000
16.000	16.000	15.500	150.000	24.000	100.000	102.000	8.000		2	16.000

Solid carbide end mills

Ball nose end mills



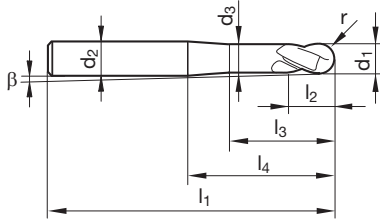
Catalog no. 54300



P	M	K	N	S	H
•	•	•	•	○	

Application
recomm. p. 576

- short version
- centre cutting
- suitable for hardened steels up to HRC 54
- long tool life thanks to extremely hard coating



d1 h8 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	l4 mm	r mm	β °	Z	Code no.
2.000	6.000	1.800	57.000	3.000	6.200	20.000	1.000	6.100	2	2.000
3.000	6.000	2.800	57.000	3.500	8.400	20.000	1.500	4.700	2	3.000
4.000	6.000	3.800	57.000	4.000	9.400	20.000	2.000	3.200	2	4.000
6.000	6.000	5.600	57.000	6.000	19.000	21.000	3.000		2	6.000
8.000	8.000	7.600	63.000	7.000	25.000	27.000	4.000		2	8.000
10.000	10.000	9.600	72.000	8.000	28.000	32.000	5.000		2	10.000
12.000	12.000	11.500	83.000	10.000	33.000	38.000	6.000		2	12.000

Solid carbide end mills

Ball nose end mills



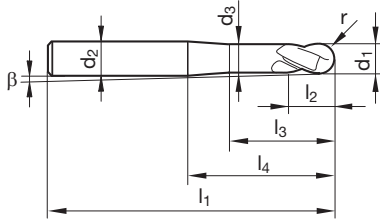
Catalog no. 54301



P	M	K	N	S	H
•	•	•	•	○	

Application
recomm. p. 576

- long version
- centre cutting
- extra long reach for roughing, finishing and super-finishing under HSC-conditions in the mould and die industry
- long tool life thanks to extremely hard coating



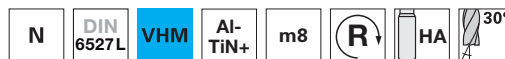
d1 h8 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	l4 mm	r mm	β °	Z	Code no.
2.000	6.000	1.800	80.000	3.000	8.000	40.000	1.000	3.000	2	2.000
3.000	6.000	2.800	80.000	3.500	12.000	40.000	1.500	2.300	2	3.000
4.000	6.000	3.800	80.000	4.000	20.000	40.000	2.000	1.600	2	4.000
6.000	8.000	5.600	100.000	6.000	59.000	60.000	3.000	1.100	2	6.000
8.000	10.000	7.600	120.000	7.000	74.000	75.000	4.000	0.900	2	8.000
10.000	12.000	9.600	120.000	8.000	68.000	70.000	5.000	0.900	2	10.000
12.000	16.000	11.500	150.000	10.000	95.800	100.000	6.000	1.300	2	12.000

Solid carbide end mills

Pilot end mills

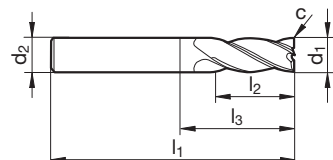


Catalog no. 54700



P	M	K	N	S	H
•	•	•	•	•	•

- for spot-facing and pilot drilling on an angle
- also suitable in combination with gun drills or deep hole drills, type SuperV-T or SuperV-NX
- centre cutting



d1 m8 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Code no.
1.400	3.000	38.000	3.000	5.900	0.010	4	1.400
1.500	3.000	38.000	4.000	6.900	0.020	4	1.500
1.800	3.000	38.000	6.000	8.900	0.020	4	1.800
2.000	3.000	38.000	6.500	9.400	0.020	4	2.000
2.100	3.000	38.000	6.500	9.900	0.020	4	2.100
2.300	3.000	38.000	6.500	9.900	0.020	4	2.300
2.500	3.000	38.000	6.500	9.900	0.030	4	2.500
2.800	3.000	38.000	6.500	10.000	0.030	4	2.800
3.000	6.000	57.000	8.000	12.400	0.030	4	3.000
3.500	6.000	57.000	10.000	14.900	0.040	4	3.500
4.000	6.000	57.000	11.000	15.900	0.040	4	4.000
4.500	6.000	57.000	11.000	17.400	0.050	4	4.500
5.000	6.000	57.000	13.000	19.400	0.050	4	5.000
5.500	6.000	57.000	13.000	20.400	0.060	4	5.500
6.000	8.000	63.000	13.000	20.400	0.060	4	6.000
6.500	8.000	63.000	13.000	20.900	0.070	4	6.500
7.000	8.000	63.000	16.000	23.900	0.070	4	7.000
7.500	8.000	63.000	16.000	23.900	0.080	4	7.500
8.000	10.000	72.000	19.000	26.900	0.080	4	8.000
8.500	10.000	72.000	19.000	28.400	0.090	4	8.500
9.000	10.000	72.000	19.000	28.400	0.090	4	9.000
10.000	12.000	83.000	22.000	31.400	0.100	4	10.000
11.000	12.000	83.000	26.000	36.400	0.110	4	11.000
12.000	14.000	83.000	26.000	37.400	0.120	4	12.000

Deburring and chamfering tools

Deburring end mills 60°

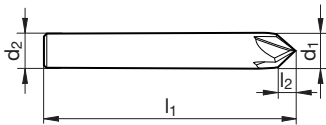


Catalog no. 53393



P	M	K	N	S	H
•	•	•	•	•	

• deburring- and chamfering-mill to machine the hole entry with a 60° angle



d1 js9 mm	d2 h6 mm	l1 mm	l2 mm	Z	Code no.
4.000	4.000	50.000	3.500	4	4.000
6.000	6.000	57.000	5.200	4	6.000
8.000	8.000	63.000	7.000	4	8.000
10.000	10.000	72.000	8.700	4	10.000
12.000	12.000	83.000	10.400	4	12.000

Deburring and chamfering tools

Deburring end mills 60°

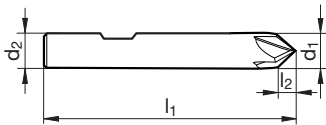


Catalog no. 53394



P	M	K	N	S	H
•	•	•	•	•	

• deburring- and chamfering-mill to machine the hole entry with a 60° angle



d1 js9 mm	d2 h6 mm	l1 mm	l2 mm	Z	Code no.
6.000	6.000	57.000	5.200	4	6.000
8.000	8.000	63.000	7.000	4	8.000
10.000	10.000	72.000	8.700	4	10.000
12.000	12.000	83.000	10.400	4	12.000

Deburring and chamfering tools

Deburring end mills 90°

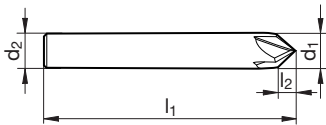


Catalog no. 53395



P	M	K	N	S	H
•	•	•	•	•	

• deburring- and chamfering-mill to machine the hole entry with a 90° angle



d1 js9 mm	d2 h6 mm	l1 mm	l2 mm	Z	Code no.
4.000	4.000	50.000	2.000	4	4.000
6.000	6.000	57.000	3.000	4	6.000
8.000	8.000	63.000	4.000	4	8.000
10.000	10.000	72.000	5.000	4	10.000
12.000	12.000	83.000	6.000	4	12.000

Deburring and chamfering tools

Deburring end mills 90°

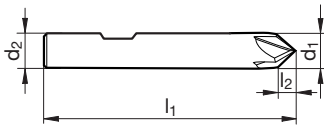


Catalog no. 53396



P	M	K	N	S	H
•	•	•	•	•	

• deburring- and chamfering-mill to machine the hole entry with a 90° angle



d1 js9 mm	d2 h6 mm	l1 mm	l2 mm	Z	Code no.
4.000	4.000	50.000	2.000	4	4.000
6.000	6.000	57.000	3.000	4	6.000
8.000	8.000	63.000	4.000	4	8.000
10.000	10.000	72.000	5.000	4	10.000
12.000	12.000	83.000	6.000	4	12.000

Deburring and chamfering tools

Deburring end mills 120°

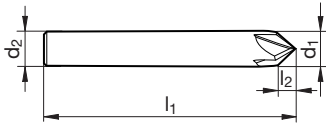


Catalog no. 53397



P	M	K	N	S	H
•	•	•	•	•	

- deburring- and chamfering-mill to machine the hole entry with a 120° angle



d1 js9 mm	d2 h6 mm	l1 mm	l2 mm	Z	Code no.
4.000	4.000	50.000	1.200	4	4.000
6.000	6.000	57.000	1.800	4	6.000
8.000	8.000	63.000	2.400	4	8.000
10.000	10.000	72.000	2.900	4	10.000
12.000	12.000	83.000	3.500	4	12.000

Deburring and chamfering tools

Deburring end mills 120°

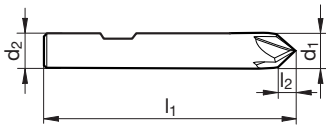


Catalog no. 53398



P	M	K	N	S	H
•	•	•	•	•	

• deburring- and chamfering-mill to machine the hole entry with a 120° angle



d1 js9 mm	d2 h6 mm	l1 mm	l2 mm	Z	Code no.
6.000	6.000	57.000	1.800	4	6.000
8.000	8.000	63.000	2.400	4	8.000
10.000	10.000	72.000	2.900	4	10.000
12.000	12.000	83.000	3.500	4	12.000

Deburring and chamfering tools

Front/back deburrer 90°

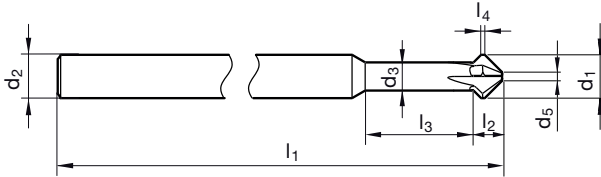


Catalog no. 52365



P	M	K	N	S	H
•	•				

- de-burring and chamfer tool for the machining of bore entry and exit with a 90° chamfer angle
- for clamping in hydraulic and shrink fit chucks
- with shank to DIN 6535



d1 mm	d2 h6 mm	d3 mm	d5 mm	l1 mm	l2 mm	l3 mm	l4 mm	Z	Code no.
3.000	4.000	2.200	0.600	75.000	2.10	9.300	0.500	4	3.000
4.000	4.000	2.900	0.800	75.000	2.70	12.300	0.500	4	4.000
5.000	5.000	3.900	1.000	75.000	3.00	15.000	0.500	4	5.000
6.000	6.000	3.900	1.200	100.000	3.90	14.300	0.500	4	6.000
8.000	6.000	6.000	1.600	100.000	4.70		0.500	4	8.000
10.000	6.000	6.000	2.000	100.000	6.50		0.500	4	10.000
12.000	6.000	6.000	2.400	100.000	8.30		0.500	4	12.000

High speed steel milling cutters

Slot drills (2-fluted)



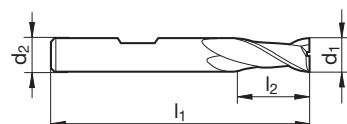
Catalog no. 74231



P	M	K	N	S	H
•	•	•	•		

Application
recomm. p. 580

- extra short
- centre cutting
- for materials with tensile strengths of up to approx. 1200 N/mm²



d1 mm	Tolerance d1	d2 mm	l1 mm	l2 mm	Z	Code no.
1.000	h10	6.000	47.000	2.000	2	1.000
1.500	h10	6.000	47.000	3.000	2	1.500
2.000	e8	6.000	48.000	4.000	2	2.000
2.500	e8	6.000	49.000	5.000	2	2.500
3.000	e8	6.000	49.000	5.000	2	3.000
3.500	h10	6.000	50.000	6.000	2	3.500
4.000	e8	6.000	51.000	7.000	2	4.000
4.500	h10	6.000	51.000	7.000	2	4.500
5.000	e8	6.000	52.000	8.000	2	5.000
5.500	h10	6.000	52.000	8.000	2	5.500
6.000	e8	6.000	52.000	8.000	2	6.000
7.000	e8	10.000	60.000	10.000	2	7.000
8.000	e8	10.000	61.000	11.000	2	8.000
9.000	h10	10.000	61.000	11.000	2	9.000
10.000	e8	10.000	63.000	13.000	2	10.000
12.000	e8	12.000	73.000	16.000	2	12.000
14.000	e8	12.000	73.000	16.000	2	14.000
16.000	e8	16.000	79.000	19.000	2	16.000
18.000	e8	16.000	79.000	19.000	2	18.000
20.000	e8	20.000	88.000	22.000	2	20.000
25.000	e8	25.000	102.000	26.000	2	25.000

High speed steel milling cutters

Slot drills (2-fluted)



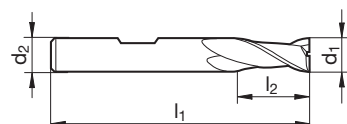
Catalog no. 64640



P	M	K	N	S	H
•	•	•	○		

Application
recomm. p. 580

- extra short
- centre cutting
- for materials with tensile strengths of up to approx. 1200 N/mm²



d1 mm	Tolerance d1	d2 mm	l1 mm	l2 mm	Z	Code no.
1.000	h10	6.000	47.000	2.000	2	1.000
1.500	h10	6.000	47.000	3.000	2	1.500
2.000	e8	6.000	48.000	4.000	2	2.000
2.500	e8	6.000	49.000	5.000	2	2.500
3.000	e8	6.000	49.000	5.000	2	3.000
3.500	h10	6.000	50.000	6.000	2	3.500
4.000	e8	6.000	51.000	7.000	2	4.000
4.500	h10	6.000	51.000	7.000	2	4.500
5.000	e8	6.000	52.000	8.000	2	5.000
5.500	h10	6.000	52.000	8.000	2	5.500
6.000	e8	6.000	52.000	8.000	2	6.000
7.000	e8	10.000	60.000	10.000	2	7.000
8.000	e8	10.000	61.000	11.000	2	8.000
9.000	h10	10.000	61.000	11.000	2	9.000
10.000	e8	10.000	63.000	13.000	2	10.000
12.000	e8	12.000	73.000	16.000	2	12.000
14.000	e8	12.000	73.000	16.000	2	14.000
16.000	e8	16.000	79.000	19.000	2	16.000
18.000	e8	16.000	79.000	19.000	2	18.000
20.000	e8	20.000	88.000	22.000	2	20.000

High speed steel milling cutters

Slot drills (2-fluted)



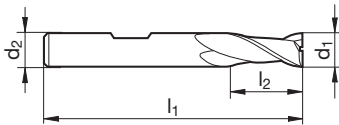
Catalog no. 74243



P	M	K	N	S	H
•	•	•	•		

Application
recomm. p. 580

- centre cutting
- for materials with tensile strengths of up to approx. 1200 N/mm²



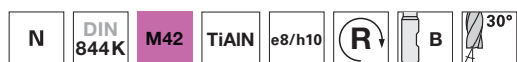
d1 mm	Tolerance d1	d2 mm	l1 mm	l2 mm	Z	Code no.
3.000	e8	6.000	52.000	8.000	2	3.000
3.500	h10	6.000	54.000	10.000	2	3.500
4.000	e8	6.000	55.000	11.000	2	4.000
4.500	h10	6.000	55.000	11.000	2	4.500
5.000	e8	6.000	57.000	13.000	2	5.000
5.500	h10	6.000	57.000	13.000	2	5.500
6.000	e8	6.000	57.000	13.000	2	6.000
7.000	e8	10.000	66.000	16.000	2	7.000
8.000	e8	10.000	69.000	19.000	2	8.000
10.000	e8	10.000	72.000	22.000	2	10.000
12.000	e8	12.000	83.000	26.000	2	12.000
14.000	e8	12.000	83.000	26.000	2	14.000
16.000	e8	16.000	92.000	32.000	2	16.000
18.000	e8	16.000	92.000	32.000	2	18.000
20.000	e8	20.000	104.000	38.000	2	20.000

High speed steel milling cutters

Slot drills (2-fluted)



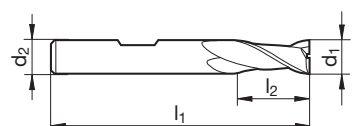
Catalog no. 64670



P	M	K	N	S	H
•	•	•	○		

Application
recomm. p. 580

- centre cutting
- for materials with tensile strengths of up to approx. 1200 N/mm²



d1 mm	Tolerance d1	d2 mm	l1 mm	l2 mm	Z	Code no.
3.000	e8	6.000	52.000	8.000	2	3.000
4.000	e8	6.000	55.000	11.000	2	4.000
5.000	e8	6.000	57.000	13.000	2	5.000
6.000	e8	6.000	57.000	13.000	2	6.000
8.000	e8	10.000	69.000	19.000	2	8.000
10.000	e8	10.000	72.000	22.000	2	10.000
12.000	e8	12.000	83.000	26.000	2	12.000
16.000	e8	16.000	92.000	32.000	2	16.000
18.000	e8	16.000	92.000	32.000	2	18.000
20.000	e8	20.000	104.000	38.000	2	20.000

High speed steel milling cutters

Slot drills (2-fluted)



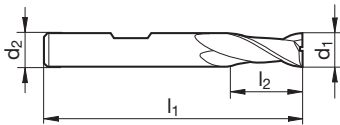
Catalog no. 74244



P	M	K	N	S	H
•		•	•		

Application
recomm. p. 580

- extra long
- centre cutting
- for materials with tensile strengths of up to approx. 1000 N/mm²



d1 mm	Tolerance d1	d2 mm	l1 mm	l2 mm	Z	Code no.
3.000	h10	6.000	56.000	12.000	2	3.000
4.000	h10	6.000	63.000	19.000	2	4.000
5.000	h10	6.000	68.000	24.000	2	5.000
6.000	h10	6.000	68.000	24.000	2	6.000
8.000	h10	10.000	88.000	38.000	2	8.000
10.000	h10	10.000	95.000	45.000	2	10.000
12.000	h10	12.000	110.000	53.000	2	12.000
14.000	h10	12.000	110.000	53.000	2	14.000
16.000	h10	16.000	123.000	63.000	2	16.000
18.000	h10	16.000	123.000	63.000	2	18.000
20.000	h10	20.000	141.000	75.000	2	20.000

High speed steel milling cutters

Slot drills (2-fluted)



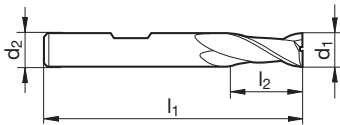
Catalog no. 64671



P	M	K	N	S	H
•		•			

Application
recomm. p. 580

- extra long
- centre cutting
- for materials with tensile strengths of up to approx. 1000 N/mm²



d1 mm	Tolerance d1	d2 mm	l1 mm	l2 mm	Z	Code no.
4.000	h10	6.000	63.000	19.000	2	4.000
5.000	h10	6.000	68.000	24.000	2	5.000
6.000	h10	6.000	68.000	24.000	2	6.000
8.000	h10	10.000	88.000	38.000	2	8.000
10.000	h10	10.000	95.000	45.000	2	10.000
12.000	h10	12.000	110.000	53.000	2	12.000
14.000	h10	12.000	110.000	53.000	2	14.000
16.000	h10	16.000	123.000	63.000	2	16.000
18.000	h10	16.000	123.000	63.000	2	18.000
20.000	h10	20.000	141.000	75.000	2	20.000

High speed steel milling cutters

Slot drills (3-fluted)



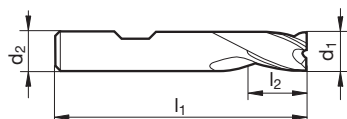
Catalog no. 74280



P	M	K	N	S	H
•	•	•	•		

Application
recomm. p. 580

- extra short
- centre cutting
- for materials with tensile strengths of up to approx. 1200 N/mm²



d1 mm	d1	d2 mm	l1 mm	l2 mm	Z	Code no.
2.800	h10	6.000	49.000	5.000	3	2.800
3.000	e8	6.000	49.000	5.000	3	3.000
3.800	h10	6.000	51.000	7.000	3	3.800
4.000	e8	6.000	51.000	7.000	3	4.000
4.800	h10	6.000	52.000	8.000	3	4.800
5.000	e8	6.000	52.000	8.000	3	5.000
5.750	h10	6.000	52.000	8.000	3	5.750
6.000	e8	6.000	52.000	8.000	3	6.000
6.750	h10	10.000	60.000	10.000	3	6.750
7.000	e8	10.000	60.000	10.000	3	7.000
7.750	h10	10.000	61.000	11.000	3	7.750
8.000	e8	10.000	61.000	11.000	3	8.000
9.700	h10	10.000	63.000	13.000	3	9.700
10.000	e8	10.000	63.000	13.000	3	10.000
11.700	h10	12.000	70.000	13.000	3	11.700
12.000	e8	12.000	73.000	16.000	3	12.000
13.700	h10	12.000	73.000	16.000	3	13.700
14.000	e8	12.000	73.000	16.000	3	14.000
15.700	h10	16.000	79.000	19.000	3	15.700
16.000	e8	16.000	79.000	19.000	3	16.000
18.000	e8	16.000	79.000	19.000	3	18.000
20.000	e8	20.000	88.000	22.000	3	20.000
25.000	e8	25.000	102.000	26.000	3	25.000

High speed steel milling cutters

Slot drills (3-fluted)



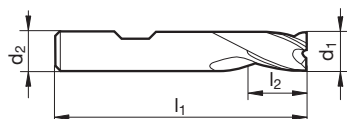
Catalog no. 64604



P	M	K	N	S	H
•	•	•	○		

Application
recomm. p. 580

- extra short
- centre cutting
- for materials with tensile strengths of up to approx. 1200 N/mm²



d1 mm	d1	d2 mm	l1 mm	l2 mm	Z	Code no.
2.800	h10	6.000	49.000	5.000	3	2.800
3.000	e8	6.000	49.000	5.000	3	3.000
3.800	h10	6.000	51.000	7.000	3	3.800
4.000	e8	6.000	51.000	7.000	3	4.000
4.800	h10	6.000	52.000	8.000	3	4.800
5.000	e8	6.000	52.000	8.000	3	5.000
5.750	h10	6.000	52.000	8.000	3	5.750
6.000	e8	6.000	52.000	8.000	3	6.000
7.000	e8	10.000	60.000	10.000	3	7.000
7.750	h10	10.000	61.000	11.000	3	7.750
8.000	e8	10.000	61.000	11.000	3	8.000
9.700	h10	10.000	63.000	13.000	3	9.700
10.000	e8	10.000	63.000	13.000	3	10.000
11.700	h10	12.000	70.000	13.000	3	11.700
12.000	e8	12.000	73.000	16.000	3	12.000
14.000	e8	12.000	73.000	16.000	3	14.000
16.000	e8	16.000	79.000	19.000	3	16.000
18.000	e8	16.000	79.000	19.000	3	18.000
20.000	e8	20.000	88.000	22.000	3	20.000
25.000	e8	25.000	102.000	26.000	3	25.000

High speed steel milling cutters

Slot drills (3-fluted)



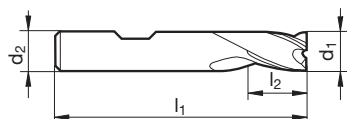
Catalog no. 74282



P	M	K	N	S	H
•	•	•	•		

Application
recomm. p. 580

- centre cutting
- for materials with tensile strengths of up to approx. 1200 N/mm²



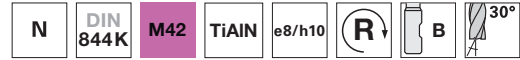
d1 mm	d1	d2 mm	l1 mm	l2 mm	Z	Code no.
3.000	e8	6.000	52.000	8.000	3	3.000
4.000	e8	6.000	55.000	11.000	3	4.000
5.000	e8	6.000	57.000	13.000	3	5.000
5.750	h10	6.000	57.000	13.000	3	5.750
6.000	e8	6.000	57.000	13.000	3	6.000
6.750	h10	10.000	66.000	16.000	3	6.750
7.000	e8	10.000	66.000	16.000	3	7.000
7.750	h10	10.000	69.000	19.000	3	7.750
8.000	e8	10.000	69.000	19.000	3	8.000
9.700	h10	10.000	72.000	22.000	3	9.700
10.000	e8	10.000	72.000	22.000	3	10.000
11.700	h10	12.000	79.000	22.000	3	11.700
12.000	e8	12.000	83.000	26.000	3	12.000
13.700	h10	12.000	83.000	26.000	3	13.700
14.000	e8	12.000	83.000	26.000	3	14.000
15.700	h10	16.000	92.000	32.000	3	15.700
16.000	e8	16.000	92.000	32.000	3	16.000
18.000	e8	16.000	92.000	32.000	3	18.000
20.000	e8	20.000	104.000	38.000	3	20.000

High speed steel milling cutters

Slot drills (3-fluted)



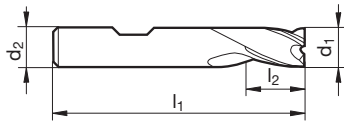
Catalog no. 64641



P	M	K	N	S	H
•	•	•	○		

Application
recomm. p. 580

- centre cutting
- for materials with tensile strengths of up to approx. 1200 N/mm²



d1 mm	d1	d2 mm	l1 mm	l2 mm	Z	Code no.
3.000	e8	6.000	52.000	8.000	3	3.000
4.000	e8	6.000	55.000	11.000	3	4.000
4.800	h10	6.000	57.000	13.000	3	4.800
5.000	e8	6.000	57.000	13.000	3	5.000
6.000	e8	6.000	57.000	13.000	3	6.000
7.000	e8	10.000	66.000	16.000	3	7.000
8.000	e8	10.000	69.000	19.000	3	8.000
10.000	e8	10.000	72.000	22.000	3	10.000
12.000	e8	12.000	83.000	26.000	3	12.000
14.000	e8	12.000	83.000	26.000	3	14.000
16.000	e8	16.000	92.000	32.000	3	16.000
18.000	e8	16.000	92.000	32.000	3	18.000
20.000	e8	20.000	104.000	38.000	3	20.000

High speed steel milling cutters

Slot drills (3-fluted)



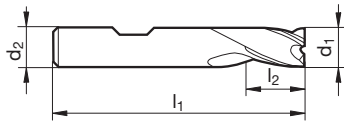
Catalog no. 54294



P	M	K	N	S	H
•	•	•	•		

Application
recomm. p. 580

- extra long
- centre cutting
- for materials with tensile strengths of up to approx. 1000 N/mm²



d1 mm	d1	d2 mm	l1 mm	l2 mm	Z	Code no.
4.000	e8	6.000	63.000	19.000	3	4.000
5.000	e8	6.000	68.000	24.000	3	5.000
6.000	e8	6.000	68.000	24.000	3	6.000
8.000	e8	10.000	88.000	38.000	3	8.000
10.000	e8	10.000	95.000	45.000	3	10.000
12.000	e8	12.000	110.000	53.000	3	12.000
14.000	e8	12.000	110.000	53.000	3	14.000
16.000	e8	16.000	123.000	63.000	3	16.000
18.000	e8	16.000	123.000	63.000	3	18.000

High speed steel milling cutters

Slot drills (3-fluted)



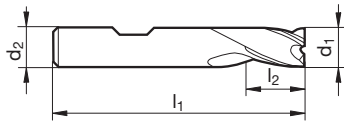
Catalog no. 74294



P	M	K	N	S	H
•		•	•		

Application
recomm. p. 580

- extra long
- centre cutting
- for materials with tensile strengths of up to approx. 1000 N/mm²



d1 mm	d1	d2 mm	l1 mm	l2 mm	Z	Code no.
3.000	h10	6.000	56.000	12.000	3	3.000
4.000	h10	6.000	63.000	19.000	3	4.000
5.000	h10	6.000	68.000	24.000	3	5.000
6.000	h10	6.000	68.000	24.000	3	6.000
8.000	h10	10.000	88.000	38.000	3	8.000
10.000	h10	10.000	95.000	45.000	3	10.000
12.000	h10	12.000	110.000	53.000	3	12.000
14.000	h10	12.000	110.000	53.000	3	14.000
16.000	h10	16.000	123.000	63.000	3	16.000
18.000	h10	16.000	123.000	63.000	3	18.000
20.000	h10	20.000	141.000	75.000	3	20.000

High speed steel milling cutters

Mini slot drills (3-fluted)



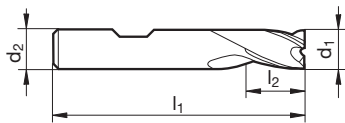
Catalog no. 54080



P	M	K	N	S	H
○	●	●	●	○	

Application
recomm. p. 580

- extra short
- centre cutting
- for materials with tensile strengths of up to approx. 1200 N/mm²



d1 e8 mm	d2 mm	l1 mm	l2 mm	Z	Code no.
3.000	6.000	36.000	5.000	3	3.000
4.000	6.000	38.000	7.000	3	4.000
5.000	6.000	39.000	8.000	3	5.000
6.000	6.000	39.000	8.000	3	6.000
8.000	8.000	43.000	11.000	3	8.000
10.000	10.000	50.000	13.000	3	10.000

High speed steel milling cutters

Mini slot drills (3-fluted)



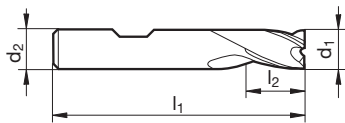
Catalog no. 54180



P	M	K	N	S	H
○	●	●	●	○	

Application
recomm. p. 580

- centre cutting
- for materials with tensile strengths of up to approx. 1200 N/mm²



d1 e8 mm	d2 mm	l1 mm	l2 mm	Z	Code no.
3.000	6.000	39.000	8.000	3	3.000
4.000	6.000	42.000	11.000	3	4.000
5.000	6.000	44.000	13.000	3	5.000
6.000	6.000	44.000	13.000	3	6.000
8.000	8.000	51.000	19.000	3	8.000
10.000	10.000	59.000	22.000	3	10.000

High speed steel milling cutters

End mills (multiple fluted)



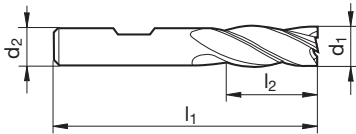
Catalog no. 74617



P	M	K	N	S	H
●	●	○	○		

Application
recomm. p. 582

- centre cutting
- for materials with tensile strengths of up to approx. 1200 N/mm²



d1 k10 mm	d2 mm	l1 mm	l2 mm	Z	Code no.
2.000	6.000	51.000	7.000	4	2.000
3.000	6.000	52.000	8.000	4	3.000
4.000	6.000	55.000	11.000	4	4.000
5.000	6.000	57.000	13.000	4	5.000
6.000	6.000	57.000	13.000	4	6.000
8.000	10.000	69.000	19.000	4	8.000
9.000	10.000	69.000	19.000	4	9.000
10.000	10.000	72.000	22.000	4	10.000
12.000	12.000	83.000	26.000	4	12.000
14.000	12.000	83.000	26.000	4	14.000
15.000	12.000	83.000	26.000	4	15.000
16.000	16.000	92.000	32.000	4	16.000
18.000	16.000	92.000	32.000	4	18.000
20.000	20.000	104.000	38.000	4	20.000
25.000	25.000	121.000	45.000	5	25.000

High speed steel milling cutters

End mills (multiple fluted)



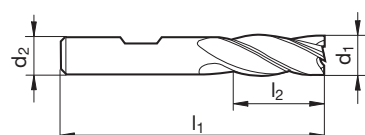
Catalog no. 64667



P	M	K	N	S	H
•	•	•	○		

Application
recomm. p. 582

- centre cutting
- for materials with tensile strengths of up to approx. 1200 N/mm²



d1 k10 mm	d2 mm	l1 mm	l2 mm	Z	Code no.
3.000	6.000	52.000	8.000	4	3.000
4.000	6.000	55.000	11.000	4	4.000
5.000	6.000	57.000	13.000	4	5.000
6.000	6.000	57.000	13.000	4	6.000
7.000	10.000	66.000	16.000	4	7.000
8.000	10.000	69.000	19.000	4	8.000
9.000	10.000	69.000	19.000	4	9.000
10.000	10.000	72.000	22.000	4	10.000
11.000	12.000	79.000	22.000	4	11.000
12.000	12.000	83.000	26.000	4	12.000
13.000	12.000	83.000	26.000	4	13.000
14.000	12.000	83.000	26.000	4	14.000
15.000	12.000	83.000	26.000	4	15.000
16.000	16.000	92.000	32.000	4	16.000
18.000	16.000	92.000	32.000	4	18.000
20.000	20.000	104.000	38.000	4	20.000
25.000	25.000	121.000	45.000	6	25.000

High speed steel milling cutters

End mills (multiple fluted)



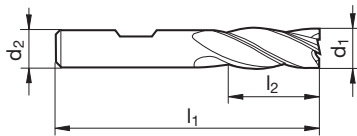
Catalog no. 74847



P	M	K	N	S	H
●	○	●	○		

Application
recomm. p. 582

- long version
- centre cutting
- for materials with tensile strengths of up to approx. 1000 N/mm²



d1 k10 mm	d2 mm	l1 mm	l2 mm	Z	Code no.
3.000	6.000	56.000	12.000	4	3.000
4.000	6.000	63.000	19.000	4	4.000
5.000	6.000	68.000	24.000	4	5.000
6.000	6.000	68.000	24.000	4	6.000
7.000	10.000	80.000	30.000	4	7.000
8.000	10.000	88.000	38.000	4	8.000
9.000	10.000	88.000	38.000	4	9.000
10.000	10.000	95.000	45.000	4	10.000
11.000	12.000	102.000	45.000	4	11.000
12.000	12.000	110.000	53.000	4	12.000
14.000	12.000	110.000	53.000	4	14.000
15.000	12.000	110.000	53.000	4	15.000
16.000	16.000	123.000	63.000	4	16.000
18.000	16.000	123.000	63.000	4	18.000
20.000	20.000	141.000	75.000	4	20.000
25.000	25.000	166.000	90.000	5	25.000

High speed steel milling cutters

End mills (multiple fluted)



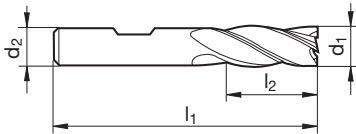
Catalog no. 54847



P	M	K	N	S	H
•	•	•	○		

Application
recomm. p. 582

- long version
- centre cutting
- for materials with tensile strengths of up to approx. 1000 N/mm²



d1 k10 mm	d2 mm	l1 mm	l2 mm	Z	Code no.
3.000	6.000	56.000	12.000	4	3.000
4.000	6.000	63.000	19.000	4	4.000
5.000	6.000	68.000	24.000	4	5.000
6.000	6.000	68.000	24.000	4	6.000
7.000	10.000	80.000	30.000	4	7.000
8.000	10.000	88.000	38.000	4	8.000
10.000	10.000	95.000	45.000	4	10.000
12.000	12.000	110.000	53.000	4	12.000
16.000	16.000	123.000	63.000	4	16.000
20.000	20.000	141.000	75.000	4	20.000
25.000	25.000	166.000	90.000	6	25.000
32.000	32.000	186.000	106.000	6	32.000

High speed steel milling cutters

End mills (4-fluted)



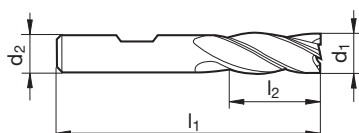
Catalog no. 74800



P	M	K	N	S	H
●	○				

Application
recomm. p. 582

- extra long
- centre cutting
- for materials with tensile strengths of up to approx. 1000 N/mm²



d1 js12 mm	d2 mm	l1 mm	l2 mm	Z	Code no.
6.000	6.000	79.000	40.000	4	6.000
8.000	10.000	105.000	56.000	4	8.000
10.000	10.000	112.000	63.000	4	10.000
12.000	12.000	125.000	71.000	4	12.000
14.000	12.000	125.000	71.000	4	14.000
16.000	16.000	141.000	80.000	4	16.000
18.000	16.000	141.000	80.000	4	18.000
20.000	20.000	163.000	100.000	4	20.000

High speed steel milling cutters

Roughing/finishing end mills



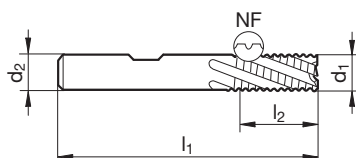
Catalog no. 54815



P	M	K	N	S	H
•	•	•			

Application
recomm. p. 582

- standard roughing-finishing design
- centre cutting



d1 k12 mm	d2 mm	l1 mm	l2 mm	Z	Code no.
6.000	6.000	57.000	13.000	4	6.000
8.000	10.000	69.000	19.000	4	8.000
10.000	10.000	72.000	22.000	4	10.000
12.000	12.000	83.000	26.000	4	12.000
14.000	12.000	83.000	26.000	4	14.000
16.000	16.000	92.000	32.000	4	16.000
18.000	16.000	92.000	32.000	4	18.000
20.000	20.000	104.000	38.000	4	20.000
25.000	25.000	121.000	45.000	4	25.000

High speed steel milling cutters

Roughing end mills (3-fluted)



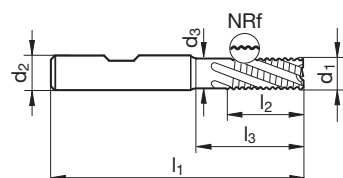
Catalog no. 74825



P	M	K	N	S	H
•	•	•			

Application
recomm. p. 582

- fine tooth roughing profile
- centre cutting
- for materials with tensile strengths of up to 1400 N/mm²



d1 k10 mm	d2 h6 mm	l1 mm	l2 mm	Z	Code no.
6.000	6.000	57.000	13.000	3	6.000
8.000	10.000	69.000	19.000	3	8.000
10.000	10.000	72.000	22.000	3	10.000
12.000	12.000	83.000	26.000	3	12.000
14.000	12.000	83.000	26.000	3	14.000
16.000	16.000	92.000	32.000	3	16.000
18.000	16.000	92.000	32.000	3	18.000
20.000	20.000	104.000	38.000	3	20.000

High speed steel milling cutters

Roughing end mills (3-fluted)



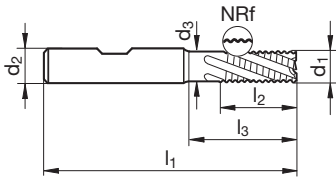
Catalog no. 54825



P	M	K	N	S	H
•	•	•			

Application
recomm. p. 582

- fine tooth roughing profile
- centre cutting
- for materials with tensile strengths of up to 1400 N/mm²



d1 k10 mm	d2 h6 mm	l1 mm	l2 mm	Z	Code no.
6.000	6.000	57.000	13.000	3	6.000
8.000	10.000	69.000	19.000	3	8.000
10.000	10.000	72.000	22.000	3	10.000
12.000	12.000	83.000	26.000	3	12.000
16.000	16.000	92.000	32.000	3	16.000
20.000	20.000	104.000	38.000	3	20.000

High speed steel milling cutters

Roughing end mills (4-fluted)



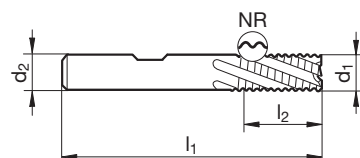
Catalog no. 74816



P	M	K	N	S	H
•	•	•			

Application
recomm. p. 582

- coarse tooth roughing profile
- centre cutting



d1 js12 mm	d2 h6 mm	l1 mm	l2 mm	Z	Code no.
6.000	6.000	57.000	13.000	4	6.000
7.000	10.000	66.000	16.000	4	7.000
8.000	10.000	69.000	19.000	4	8.000
9.000	10.000	69.000	19.000	4	9.000
10.000	10.000	72.000	22.000	4	10.000
11.000	12.000	79.000	22.000	4	11.000
12.000	12.000	83.000	26.000	4	12.000
14.000	12.000	83.000	26.000	4	14.000
15.000	12.000	83.000	26.000	4	15.000
16.000	16.000	92.000	32.000	4	16.000
18.000	16.000	92.000	32.000	4	18.000
20.000	20.000	104.000	38.000	4	20.000
25.000	25.000	121.000	45.000	4	25.000
28.000	25.000	121.000	45.000	4	28.000
30.000	25.000	121.000	45.000	4	30.000

High speed steel milling cutters

Roughing end mills (4-fluted)



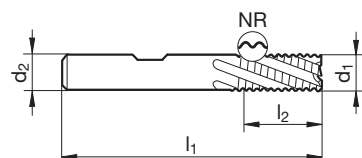
Catalog no. 54816



P	M	K	N	S	H
•	•	•			

Application
recomm. p. 582

- coarse tooth roughing profile
- centre cutting



d1 k12 mm	d2 h6 mm	l1 mm	l2 mm	Z	Code no.
6.000	6.000	57.000	13.000	4	6.000
8.000	10.000	69.000	19.000	4	8.000
10.000	10.000	72.000	22.000	4	10.000
12.000	12.000	83.000	26.000	4	12.000
14.000	12.000	83.000	26.000	4	14.000
16.000	16.000	92.000	32.000	4	16.000
18.000	16.000	92.000	32.000	4	18.000
20.000	20.000	104.000	38.000	4	20.000
22.000	20.000	104.000	38.000	4	22.000
25.000	25.000	121.000	45.000	4	25.000
28.000	25.000	121.000	45.000	4	28.000
30.000	25.000	121.000	45.000	4	30.000
32.000	32.000	133.000	53.000	4	32.000

High speed steel milling cutters

Roughing end mills (4-fluted)



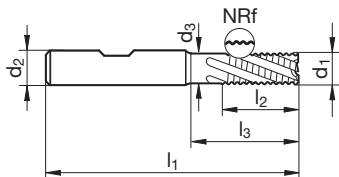
Catalog no. 74845



P	M	K	N	S	H
•	•	•			

Application
recomm. p. 582

- fine tooth roughing profile
- centre cutting
- for materials with tensile strengths of up to 1400 N/mm²



d1 k12 mm	d2 h6 mm	l1 mm	l2 mm	Z	Code no.
6.000	6.000	57.000	13.000	4	6.000
8.000	10.000	69.000	19.000	4	8.000
10.000	10.000	72.000	22.000	4	10.000
12.000	12.000	83.000	26.000	4	12.000
14.000	12.000	83.000	26.000	4	14.000
16.000	16.000	92.000	32.000	4	16.000
18.000	16.000	92.000	32.000	4	18.000
20.000	20.000	104.000	38.000	4	20.000
25.000	25.000	121.000	45.000	5	25.000

High speed steel milling cutters

Roughing end mills (4-fluted)



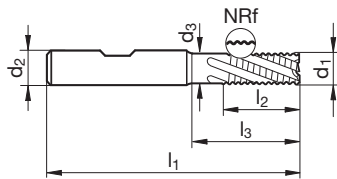
Catalog no. 54845



P	M	K	N	S	H
•	•	•			

Application
recomm. p. 582

- fine tooth roughing profile
- centre cutting
- for materials with tensile strengths of up to 1400 N/mm²



d1 k12 mm	d2 h6 mm	l1 mm	l2 mm	Z	Code no.
6.000	6.000	57.000	13.000	4	6.000
8.000	10.000	69.000	19.000	4	8.000
10.000	10.000	72.000	22.000	4	10.000
12.000	12.000	83.000	26.000	4	12.000
14.000	12.000	83.000	26.000	4	14.000
16.000	16.000	92.000	32.000	4	16.000
18.000	16.000	92.000	32.000	4	18.000
20.000	20.000	104.000	38.000	4	20.000
25.000	25.000	121.000	45.000	5	25.000

High speed steel milling cutters

Roughing end mills (4-fluted)



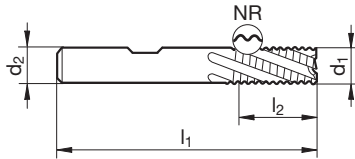
Catalog no. 74836



P	M	K	N	S	H
•	•	•			

Application
recomm. p. 582

- coarse tooth roughing profile
- long version
- centre cutting



d1 k12 mm	d2 h6 mm	l1 mm	l2 mm	Z	Code no.
6.000	6.000	68.000	24.000	4	6.000
8.000	10.000	88.000	38.000	4	8.000
10.000	10.000	95.000	45.000	4	10.000
12.000	12.000	110.000	53.000	4	12.000
16.000	16.000	123.000	63.000	4	16.000
18.000	16.000	123.000	63.000	4	18.000
20.000	20.000	141.000	75.000	4	20.000
25.000	25.000	166.000	90.000	4	25.000

High speed steel milling cutters

Roughing end mills (4-fluted)



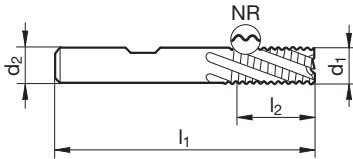
Catalog no. 54836



P	M	K	N	S	H
•	•	•			

Application
recomm. p. 582

- coarse tooth roughing profile
- long version
- centre cutting



d1 k12 mm	d2 h6 mm	l1 mm	l2 mm	Z	Code no.
6.000	6.000	68.000	24.000	4	6.000
8.000	10.000	88.000	38.000	4	8.000
10.000	10.000	95.000	45.000	4	10.000
12.000	12.000	110.000	53.000	4	12.000
14.000	12.000	110.000	53.000	4	14.000
16.000	16.000	123.000	63.000	4	16.000
18.000	16.000	123.000	63.000	4	18.000
20.000	20.000	141.000	75.000	4	20.000
25.000	25.000	166.000	90.000	4	25.000

High speed steel milling cutters

Ball nose end mills



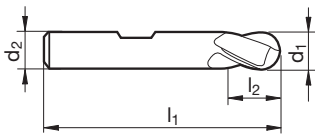
Catalog no. 54275



P	M	K	N	S	H
•	•	•	•		

Application
recomm. p. 580

- extra short
- centre cutting
- ball nose
- for materials with tensile strengths of up to approx. 1000 N/mm²



d1 mm	d1	d2 mm	l1 mm	l2 mm	Z	Code no.
2.000	e8	6.000	48.000	4.000	2	2.000
3.000	e8	6.000	49.000	5.000	2	3.000
4.000	e8	6.000	51.000	7.000	2	4.000
5.000	e8	6.000	52.000	8.000	2	5.000
6.000	e8	6.000	52.000	8.000	2	6.000
7.000	e8	10.000	60.000	10.000	2	7.000
8.000	e8	10.000	61.000	11.000	2	8.000
10.000	e8	10.000	63.000	13.000	2	10.000
12.000	e8	12.000	73.000	16.000	2	12.000
13.000	h10	12.000	73.000	16.000	2	13.000
14.000	e8	12.000	73.000	16.000	2	14.000
15.000	h10	12.000	73.000	16.000	2	15.000
16.000	e8	16.000	79.000	19.000	2	16.000
20.000	e8	20.000	88.000	22.000	2	20.000

High speed steel milling cutters

Ball nose end mills



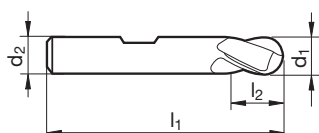
Catalog no. 54276



P	M	K	N	S	H
•	•	•	•		

Application
recomm. p. 580

- centre cutting
- ball nose
- for materials with tensile strengths of up to approx. 1000 N/mm²



d1 mm	d1	d2 mm	l1 mm	l2 mm	Z	Code no.
3.000	h10	6.000	56.000	8.000	2	3.000
4.000	h10	6.000	63.000	11.000	2	4.000
5.000	h10	6.000	68.000	13.000	2	5.000
6.000	h10	6.000	68.000	13.000	2	6.000
7.000	h10	10.000	80.000	16.000	2	7.000
8.000	h10	10.000	88.000	19.000	2	8.000
10.000	h10	10.000	95.000	22.000	2	10.000
12.000	h10	12.000	110.000	26.000	2	12.000
14.000	h10	12.000	110.000	26.000	2	14.000
16.000	h10	16.000	123.000	32.000	2	16.000
18.000	h10	16.000	123.000	32.000	2	18.000
20.000	h10	20.000	141.000	38.000	2	20.000