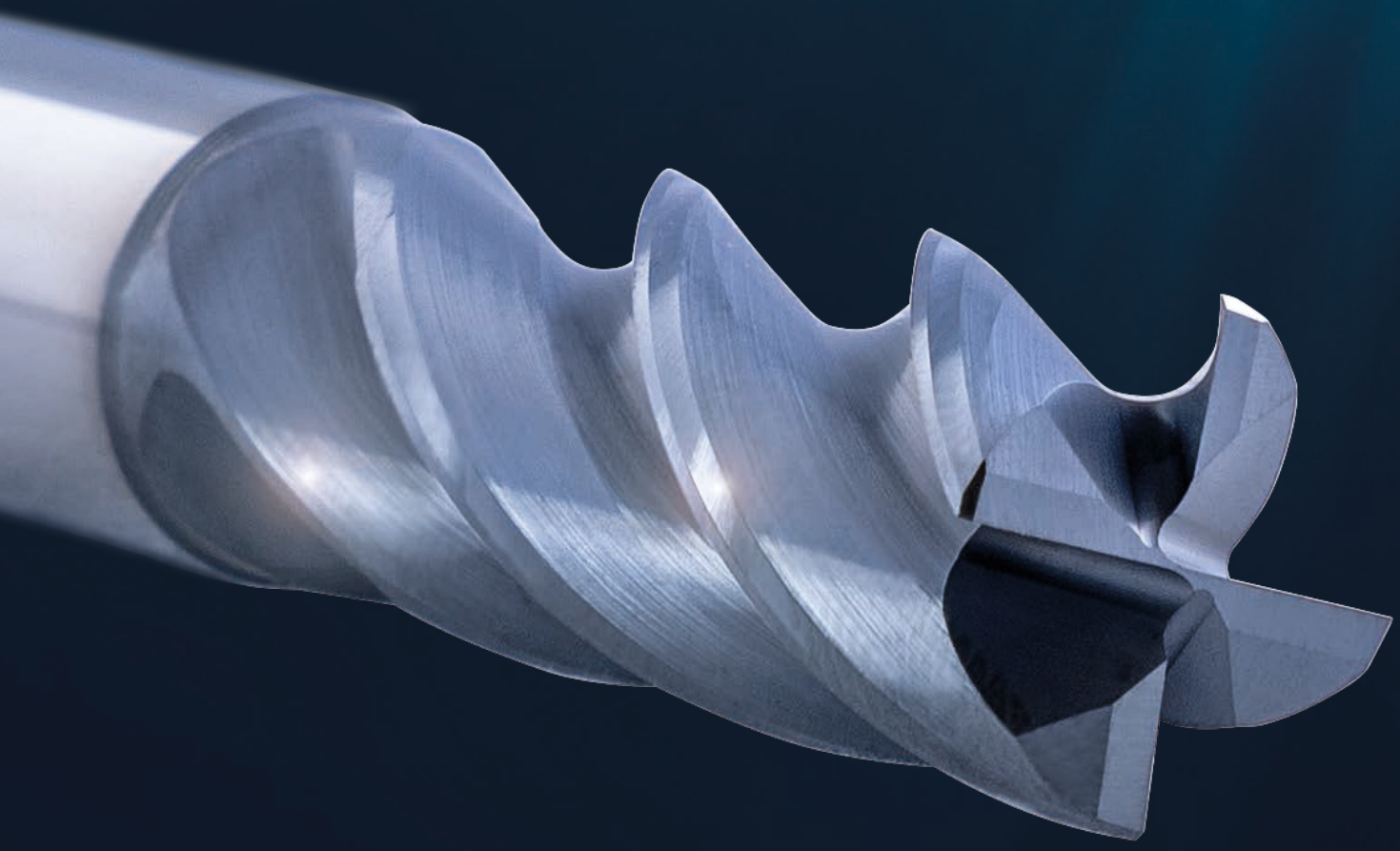

RF100
SHARP
The new solid carbide milling cutter.
GÜHRING

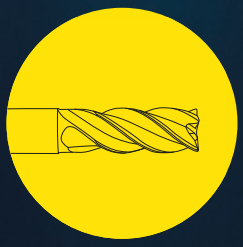
RF100 SHARP

Milling soft, tough and high-alloyed materials presents particular challenges when it comes to the tool. If you choose the wrong one, you will end up with chips that stick and jam – causing the tool to break. With our sharpest solid carbide milling cutter to date, you don‘t have to worry as you’ll always achieve high-quality machining results.

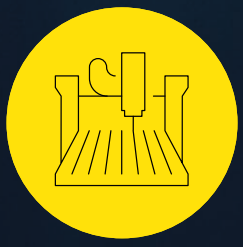


YOUR ADVANTAGES:

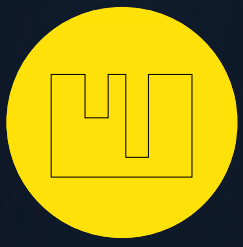
Exceptionally easy cutting
in soft, tough & high-alloyed materials



Full flexibility in milling operations
slotting, roughing, ramping, helical, finishing



Powerful and smooth
under all operating conditions



Special construction dimensions
for cost-efficient machining

Our specialist for

soft, tough & high-alloyed materials

with a tensile strength of

300 – 900 N/mm²

With a rake angle of 12°, the RF 100 Sharp cuts easily through all soft, tough and high-alloyed materials. Cutting pressure and cutting forces are significantly reduced, enabling reliable machining of materials with a tensile strength of 300 – 900 N/mm² and high ductility. These include free machining and hardening steels, stainless steels as well as tough special alloys and higher-strength aluminium alloys.

One milling cutter, full flexibility

for all milling operations

Milling calls for a high level of flexibility.
Whether roughing or fine machining, slotting into solid material or ramping with extreme angles:
With the RF 100 Sharp, all common milling operations can be covered.
One tool for all soft, tough and high-alloyed materials.

Slotting • Roughing • Finishing • Ramping • Plunging, helical


Steel
P
Stainless steel
M
Aluminium
N
Special alloys
S

From unstable to HPC

powerful on all machines

Whether it's a powerful CNC milling machine or a power-limited lathe: The RF 100 Sharp solid carbide milling cutter is designed to cover all of the different operating conditions – and always achieves outstanding results.

Effective, quiet milling on weaker machines & unstable clamping: **Application example MTC**

Machine	Spinner TC 600 CNC lathe	
Milling tool	RF 100 Sharp, article no. 6478, Ø 10 mm, Z=4	
Operating conditions	MTC	
Milling operation	Hexagonal milling	
Tool holder	BMT Life Tool ER 25 collet chuck	
Material/component	1.7131 or 16MnCr5 / shaft	
Cutting parameters	**v_c**	130 m/min
	S	4,138 rpm
	f_z	0.07 mm
	v_f	1,158 mm/min
	a_e	8 mm
	a_p	3.8 mm
	Metal removal rate Q	35 cm^3/min
	Tool life	78 min

- **Tough carbide**
  prevents tool breakage even under very unstable conditions
- **AlCrN coating**
  provides optimum wear protection at all cutting speeds
- **Optimised facet grinding**
  dampens vibrations and increases smoothness and service life
- **Corner protection chamfer**
  provides more stability and edge strength

High-performance milling with extremely high cutting speeds under stable operating conditions:

Application example HPC

HPC

Machine	CNC BAZ DMG DMU 100 P
Milling tool	RF 100 Sharp, article no. 6479, Ø 16 mm, Z=4
Operating conditions	HPC
Milling operation	Contour roughing
Tool holder	HSK 100 A GühroJet Weldon tool holder
Material/component	1.0503 or C45 / block

Cutting parameters		
	v_c	180 m/min
	S	3,580 rpm
	f_z	0.1 mm
	v_f	1,430 mm/min
	a_e	6 mm
	a_p	34 mm
	Metal removal rate Q	291 cm^3/min
	Tool life	134 min

Application-oriented dimensions

save space and costs

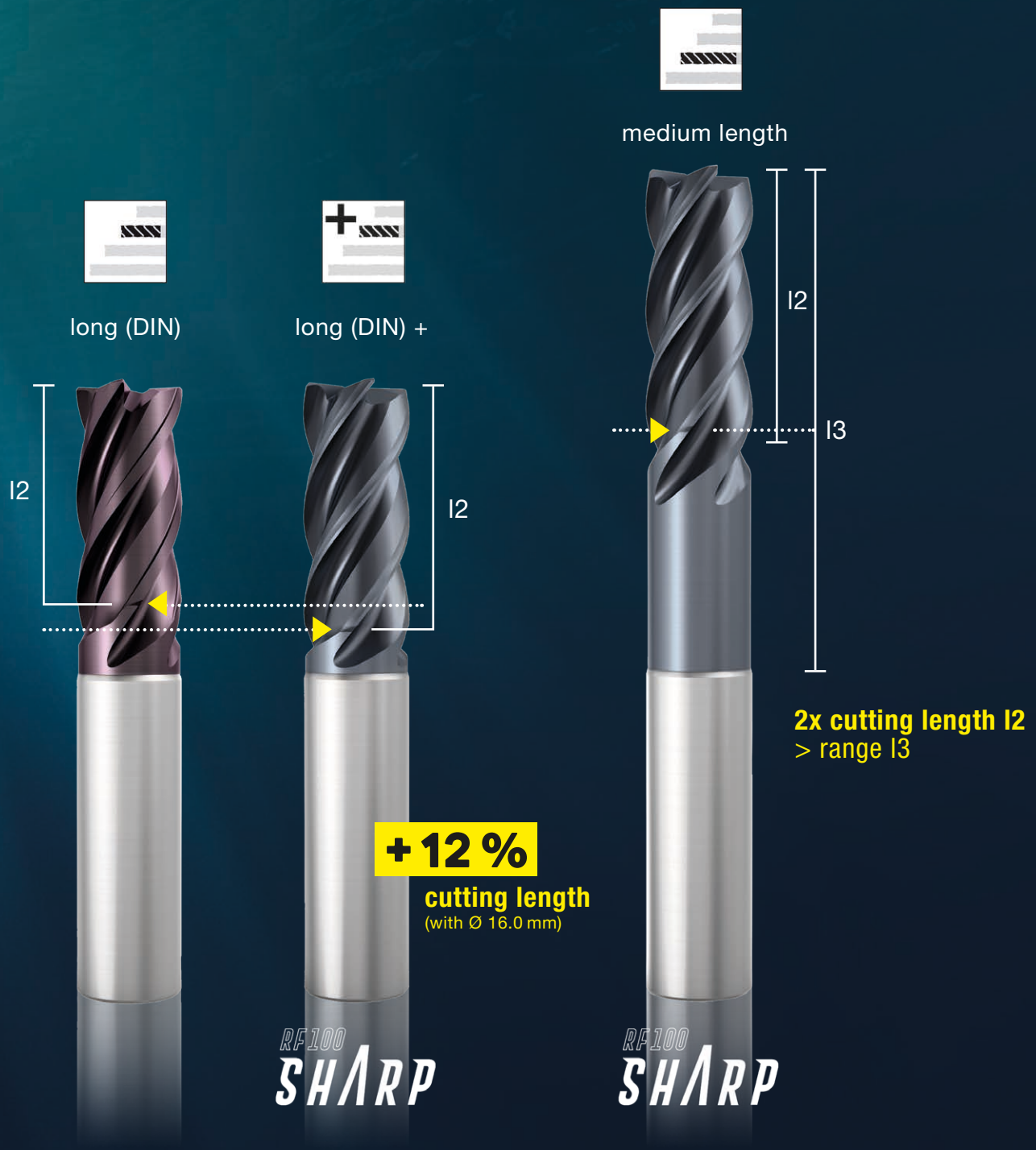
The RF 100 Sharp impresses with its extra-long design (long (DIN) +).
This variant is based on the long (DIN) version, but has an even longer cutting edge compared to standardised milling cutters.
And you benefit from this in three ways:

- **Reduce your tooling costs:**
  When machining deeper depths, you can also use a lower cost tool with a smaller diameter.
- **Save space in the tool magazine:**
  Thanks to the flexible use at different depths, you need fewer milling cutters.
- **Extend the service life of your tool:**
  Due to the extra length, you can regrind and recoat the milling cutter more times.

Still not enough?

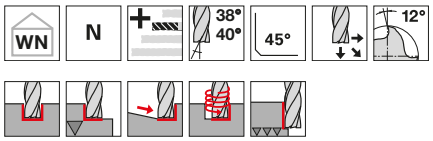
For even greater depths, the RF 100 Sharp is also available in a medium length version. This version is designed so that the cutting edge (l2) represents more than 50 % of the reach (cutting edge + neck) (l3). This allows you to machine your workpiece with only two cutting paths.

The smallest diameter starts at 1 mm, meaning that the RF 100 Sharp is perfect for use in the micro range as well.



Product	Length	d1 mm	d2 mm	d3 mm	l1 mm	l2 mm	l3 mm	c	Z
Standard solid carbide milling cutter	long (DIN)	16.0	16.0	15.5	92.0	**32.0**	43.0	0.32	4
RF 100 Sharp	long (DIN) +	16.0	16.0	15.5	92.0	**36.0**	43.0	0.32	4
RF 100 Sharp	medium length	16.0	16.0	15.5	123.0	38.0	74.0	0.32	4

Ratio end mills RF 100 Sharp



Tool material	Solid carbide	
Surface	P	P
Type	N	N
Shank form	HA	HB

P	•
M	•
K	
N	•
S	•
H	

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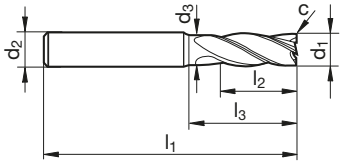
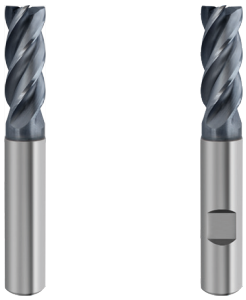
Cutting data page 14

- especially for soft, tough and high-alloyed materials
- longer cutting edge than DIN 6527 L
- neck clearance
- centre cutting



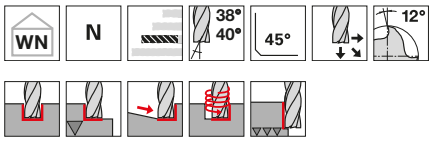


Article no.	6478	6479
Discount group	106	106

d1 e8	d2 h6	d3	l1	l2	l3	c	Z	Code no.	Availability	
mm	mm	mm	mm	mm	mm	mm x 45°				
1.000	4.000	0.920	50.000	3.000	4.000	0.020	4	1.000	●	
1.500	4.000	1.400	50.000	4.500	6.000	0.030	4	1.500	●	
2.000	6.000	1.900	50.000	6.000	8.000	0.040	4	2.000	●	
2.500	6.000	2.400	50.000	7.500	10.000	0.050	4	2.500	●	
3.000	6.000	2.900	57.000	10.000	15.000	0.060	4	3.000	●	
4.000	6.000	3.800	57.000	14.000	18.000	0.080	4	4.000	●	●
5.000	6.000	4.800	57.000	15.000	20.000	0.100	4	5.000	●	●
6.000	6.000	5.700	57.000	16.000	20.000	0.120	4	6.000	●	●
8.000	8.000	7.700	63.000	21.000	26.000	0.160	4	8.000	●	●
10.000	10.000	9.500	72.000	25.000	31.000	0.200	4	10.000	●	●
12.000	12.000	11.500	83.000	28.000	37.000	0.240	4	12.000	●	●
14.000	14.000	13.500	83.000	28.000	37.000	0.280	4	14.000	●	●
16.000	16.000	15.500	92.000	36.000	43.000	0.320	4	16.000	●	●
20.000	20.000	19.500	104.000	41.000	53.000	0.400	4	20.000	●	●

ISO	Hardness	v_c	f_z (mm/z) / Ø								v_c	f_z (mm/z) / Ø							
			1	3	6	8	10	12	16	20		1	3	6	8	10	12	16	20
			a_p = 1.0xD						a_e = 1.0xD			a_p = 1.0xD						a_e max = 0.6xD	
P	< 500 N/mm²	180	0.010	0.016	0.030	0.042	0.06	0.072	0.1	0.12	210	0.011	0.018	0.036	0.048	0.069	0.08	0.11	0.14
	500-900 N/mm²	140	0.008	0.014	0.027	0.036	0.05	0.06	0.08	0.1	160	0.009	0.016	0.031	0.041	0.058	0.07	0.09	0.12
M	< 500 N/mm²	120	0.006	0.012	0.025	0.032	0.045	0.055	0.075	0.085	140	0.007	0.016	0.031	0.041	0.058	0.07	0.09	0.12
	500-900 N/mm²	80	0.005	0.010	0.021	0.028	0.04	0.048	0.06	0.07	100	0.006	0.013	0.025	0.034	0.048	0.06	0.08	0.1
S	< 900 N/mm²	45	0.004	0.008	0.016	0.022	0.032	0.04	0.05	0.065	60	0.005	0.010	0.020	0.027	0.038	0.05	0.06	0.085
N	> 250 N/mm²	350	0.012	0.020	0.038	0.05	0.08	0.095	0.13	0.16	600	0.013	0.022	0.045	0.06	0.09	0.012	0.15	0.18

Ratio end mills RF 100 Sharp



Tool material	Solid carbide	
Surface	P	P
Type	N	N
Shank form	HA	HB

P	•
M	•
K	
N	•
S	•
H	

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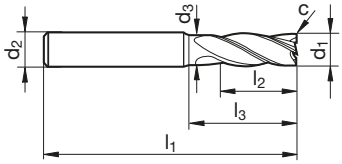
Cutting data page 14

- especially for soft, tough and high-alloyed materials
- medium length version
- neck clearance
- centre cutting

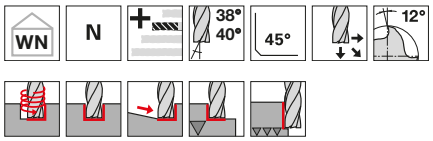


Article no.	6480	6481
Discount group	106	106

d1 e8	d2 h6	d3	l1	l2	l3	c	Z	Code no.	Availability	
mm	mm	mm	mm	mm	mm	mm x 45°				
1.000	4.000	0.920	50.000	3.000	5.500	0.020	4	1.000	●	
1.500	4.000	1.400	50.000	4.500	8.500	0.030	4	1.500	●	
2.000	6.000	1.900	57.000	6.000	11.500	0.040	4	2.000	●	
2.500	6.000	2.400	57.000	7.500	14.500	0.050	4	2.500	●	
3.000	6.000	2.900	65.000	10.000	20.000	0.060	4	3.000	●	
4.000	6.000	3.800	65.000	14.000	27.000	0.080	4	4.000	●	●
5.000	6.000	4.800	65.000	15.000	28.000	0.100	4	5.000	●	●
6.000	6.000	5.700	75.000	19.000	38.000	0.120	4	6.000	●	●
8.000	8.000	7.700	80.000	21.000	43.000	0.160	4	8.000	●	●
10.000	10.000	9.500	93.000	26.000	52.000	0.200	4	10.000	●	●
12.000	12.000	11.500	100.000	28.000	54.000	0.240	4	12.000	●	●
14.000	14.000	13.500	100.000	28.000	54.000	0.280	4	14.000	●	●
16.000	16.000	15.500	123.000	38.000	74.000	0.320	4	16.000	●	●
20.000	20.000	19.500	126.000	41.000	75.000	0.400	4	20.000	●	●

ISO	Hardness	v_c	f_z (mm/z)/Ø								v_c	f_z (mm/z)/Ø							
			1	3	6	8	10	12	16	20		1	3	6	8	10	12	16	20
			a_p = 1.0xD						a_e = 0.4xD			a_p = 2.0xD						a_e max = 0.1xD	
P	< 500 N/mm²	**180**	0.010	0.016	0.030	0.042	0.06	0.072	0.1	0.12	**210**	0.011	0.018	0.036	0.048	0.069	0.08	0.11	0.14
	500-900 N/mm²	**140**	0.008	0.014	0.027	0.036	0.05	0.06	0.08	0.1	**160**	0.009	0.016	0.031	0.041	0.058	0.07	0.09	0.12
M	< 500 N/mm²	**120**	0.006	0.012	0.025	0.032	0.045	0.055	0.075	0.085	**140**	0.007	0.016	0.031	0.041	0.058	0.07	0.09	0.12
	500-900 N/mm²	**80**	0.005	0.010	0.021	0.028	0.04	0.048	0.06	0.07	**100**	0.006	0.013	0.025	0.034	0.048	0.06	0.08	0.1
S	< 900 N/mm²	**45**	0.004	0.008	0.016	0.022	0.032	0.04	0.05	0.065	**60**	0.005	0.010	0.020	0.027	0.038	0.05	0.06	0.085
N	> 250 N/mm²	**350**	0.012	0.020	0.038	0.05	0.08	0.095	0.13	0.16	**600**	0.013	0.022	0.045	0.06	0.09	0.012	0.15	0.18

Ratio end mill sets RF 100 Sharp



Tool material	**Solid carbide**
Surface	P
Type	N
Shank form	HA

P	•
M	•
K	
N	•
S	•
H	

GÜHRINGNAVIGATOR

Cutting data page 14

- especially for soft, tough and high-alloyed materials
- longer cutting edge than DIN 6527 L
- neck clearance
- centre cutting
- consisting of art. no. 6478

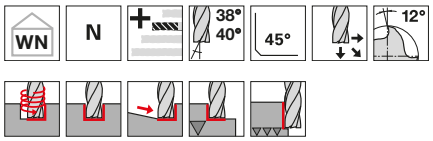
Article no.	**6482**
Discount group	**106**

Ø-range	Pieces/set	Code no.	Availability
mm			
6/8/10/12/16	5	1.000	●
6/8/10/12	4	2.000	●

ISO	Hardness	v_c	f_z (mm/z)/Ø							
			1	3	6	8	10	12	16	20
			a_p = 1.0xD					a_e = 1.0xD		
P	< 500 N/mm²	**180**	0.010	0.016	0.030	0.042	0.06	0.072	0.1	0.12
	500-900 N/mm²	**140**	0.008	0.014	0.027	0.036	0.05	0.06	0.08	0.1
M	< 500 N/mm²	**120**	0.006	0.012	0.025	0.032	0.045	0.055	0.075	0.085
	500-900 N/mm²	**80**	0.005	0.010	0.021	0.028	0.04	0.048	0.06	0.07
S	< 900 N/mm²	**45**	0.004	0.008	0.016	0.022	0.032	0.04	0.05	0.065
N	> 250 N/mm²	**350**	0.012	0.020	0.038	0.05	0.08	0.095	0.13	0.16

v_c	f_z (mm/z)/Ø							
	1	3	6	8	10	12	16	20
	a_p = 1.0xD					a_e max = 0.6xD		
210	0.011	0.018	0.036	0.048	0.069	0.08	0.11	0.14
160	0.009	0.016	0.031	0.041	0.058	0.07	0.09	0.12
140	0.007	0.016	0.031	0.041	0.058	0.07	0.09	0.12
100	0.006	0.013	0.025	0.034	0.048	0.06	0.08	0.1
60	0.005	0.010	0.020	0.027	0.038	0.05	0.06	0.085
600	0.013	0.022	0.045	0.06	0.09	0.012	0.15	0.18

Ratio end mill sets RF 100 Sharp



Tool material	**Solid carbide**
Surface	P
Type	N
Shank form	HB

P	•
M	•
K	
N	•
S	•
H	

GÜHRINGNAVIGATOR

Cutting data page 14

- especially for soft, tough and high-alloyed materials
- longer cutting edge than DIN 6527 L
- neck clearance
- centre cutting
- consisting of art. no. 6479

Article no.	**6483**
Discount group	**106**

Ø-range	Pieces/set	Code no.	Availability
mm			
6/8/10/12/16	5	1.000	●
6/8/10/12	4	2.000	●

ISO	Hardness	v_c	f_z (mm/z)/Ø							
			1	3	6	8	10	12	16	20
			a_p = 1.0xD					a_e = 1.0xD		
P	< 500 N/mm²	**180**	0.010	0.016	0.030	0.042	0.06	0.072	0.1	0.12
	500-900 N/mm²	**140**	0.008	0.014	0.027	0.036	0.05	0.06	0.08	0.1
M	< 500 N/mm²	**120**	0.006	0.012	0.025	0.032	0.045	0.055	0.075	0.085
	500-900 N/mm²	**80**	0.005	0.010	0.021	0.028	0.04	0.048	0.06	0.07
S	< 900 N/mm²	**45**	0.004	0.008	0.016	0.022	0.032	0.04	0.05	0.065
N	> 250 N/mm²	**350**	0.012	0.020	0.038	0.05	0.08	0.095	0.13	0.16

v_c	f_z (mm/z)/Ø							
	1	3	6	8	10	12	16	20
	a_p = 1.0xD					a_e max = 0.6xD		
210	0.011	0.018	0.036	0.048	0.069	0.08	0.11	0.14
160	0.009	0.016	0.031	0.041	0.058	0.07	0.09	0.12
140	0.007	0.016	0.031	0.041	0.058	0.07	0.09	0.12
100	0.006	0.013	0.025	0.034	0.048	0.06	0.08	0.1
60	0.005	0.010	0.020	0.027	0.038	0.05	0.06	0.085
600	0.013	0.022	0.045	0.06	0.09	0.012	0.15	0.18

Milling conditions:

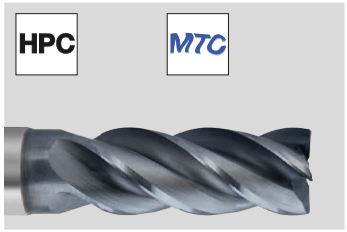
HPC stable machining conditions high drive power

M7C unstable machining conditions low drive power

long tools

Correction factors:

a_p roughing > 1.5 x D	v_c -25%	f_z -25%
medium length tools	v_c -40%	f_z -40%



Material	Hard-ness	Application	a_e max	v_c	f_z (mm/z) with nom. Ø								
					1	3	4	6	8	10	12	16	20
Struct./free-cutting steels, unall. 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	≤ 850 N/mm²	Slotting	1 x D	180	0.010	0.016	0.021	0.031	0.042	0.060	0.072	0.10	0.12
		Roughing	0.75 x D	210	0.011	0.018	0.024	0.036	0.048	0.069	0.083	0.11	0.14
		Finishing	0.02 x D	360	0.011	0.017	0.023	0.034	0.046	0.066	0.079	0.11	0.13
Free-cutting steels, unall. case hard. steels, nitr. 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/mm²	Slotting	1 x D	160	0.009	0.014	0.019	0.029	0.038	0.055	0.066	0.09	0.11
		Roughing	0.75 x D	190	0.010	0.017	0.022	0.033	0.044	0.063	0.076	0.10	0.13
		Finishing	0.02 x D	320	0.010	0.016	0.021	0.032	0.042	0.061	0.073	0.10	0.12
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 Spring steel = 1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4	850-1,400 N/mm²	Slotting	1 x D	135	0.008	0.014	0.018	0.027	0.036	0.050	0.060	0.08	0.10
		Roughing	0.75 x D	160	0.009	0.016	0.021	0.031	0.041	0.058	0.069	0.09	0.12
		Finishing	0.02 x D	270	0.009	0.015	0.020	0.030	0.040	0.055	0.066	0.09	0.11
Stainless steel 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X10CrNiS18-9 USA = 303, 410, 420F, 430, 430F	≤ 750 N/mm²	Slotting	1 x D	120	0.006	0.014	0.018	0.027	0.036	0.050	0.060	0.08	0.10
		Roughing	0.75 x D	140	0.008	0.016	0.021	0.031	0.041	0.058	0.069	0.09	0.12
		Finishing	0.02 x D	240	0.008	0.015	0.020	0.030	0.040	0.055	0.066	0.09	0.11
Stainless steel 1.4301X5CrNi18-10, 1.4303 X5CrNi18-12 1.4310 XCrNi18-8 USA = 304, 304L, 420	750-850 N/mm²	Slotting	1 x D	80	0.005	0.012	0.016	0.024	0.032	0.045	0.054	0.07	0.09
		Roughing	0.75 x D	100	0.007	0.014	0.018	0.028	0.037	0.052	0.062	0.08	0.10
		Finishing	0.02 x D	160	0.007	0.013	0.018	0.026	0.035	0.050	0.059	0.08	0.10
Stainless steel 1.4438 X2CrNiMo18-15-4, 1.4404 X2CrNiMo17-12-2, 1.4571 X6CrNiTi18-10 USA = 310, 316, 316B, 316L, 317	≥ 850 N/mm²	Slotting	1 x D	60	0.004	0.011	0.014	0.021	0.028	0.040	0.048	0.06	0.08
		Roughing	0.60 x D	80	0.006	0.013	0.017	0.025	0.034	0.048	0.058	0.08	0.10
		Finishing	0.01 x D	120	0.007	0.011	0.014	0.021	0.028	0.040	0.048	0.06	0.08
Special alloys (nickel based "Ni") Nimonic, Inconel, Monel, Hastelloy	≤ 1,300 N/mm²	Slotting	1 x D	30	0.004	0.008	0.011	0.017	0.022	0.032	0.038	0.05	0.06
		Roughing	0.60 x D	40	0.006	0.010	0.013	0.020	0.027	0.038	0.046	0.06	0.08
		Finishing	0.01 x D	60	0.006	0.008	0.011	0.017	0.022	0.032	0.038	0.05	0.06
Titanium alloys ("Ti") 3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7164 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5	≤ 1,300 N/mm²	Slotting	1 x D	60	0.005	0.012	0.016	0.024	0.032	0.045	0.054	0.07	0.09
		Roughing	0.60 x D	80	0.007	0.014	0.019	0.029	0.038	0.054	0.065	0.09	0.11
		Finishing	0.02 x D	120	0.007	0.013	0.018	0.026	0.035	0.050	0.059	0.08	0.10
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	≤ 7% Si	Slotting	1 x D	500	0.011	0.020	0.026	0.039	0.052	0.080	0.096	0.13	0.16
		Roughing	0.75 x D	600	0.012	0.022	0.030	0.045	0.060	0.092	0.110	0.15	0.18
		Finishing	0.02 x D	1000	0.012	0.021	0.029	0.043	0.057	0.088	0.106	0.14	0.18
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	≥ 7% Si	Slotting	1 x D	230	0.010	0.017	0.022	0.033	0.044	0.060	0.072	0.10	0.12
		Roughing	0.75 x D	300	0.011	0.019	0.025	0.038	0.051	0.069	0.083	0.11	0.14
		Finishing	0.02 x D	460	0.011	0.018	0.024	0.036	0.048	0.066	0.079	0.11	0.13
Magnesium-alloys MgMn2, G-MgAl8Zn1, G-MgAl6Zn3	-	Slotting	1 x D	180	0.009	0.015	0.020	0.030	0.040	0.055	0.066	0.09	0.11
		Roughing	0.75 x D	210	0.010	0.017	0.023	0.035	0.046	0.063	0.076	0.10	0.13
		Finishing	0.02 x D	360	0.010	0.017	0.022	0.033	0.044	0.061	0.073	0.10	0.12
Non-ferr. met. (copper, short-/long-chipp. brass/bronze) 2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb 2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 ... 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5 2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 ... 2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	≤ 850 N/mm²	Slotting	1 x D	250	0.010	0.017	0.022	0.033	0.044	0.060	0.072	0.10	0.12
		Roughing	0.75 x D	290	0.011	0.019	0.025	0.038	0.051	0.069	0.083	0.11	0.14
		Finishing	0.02 x D	500	0.010	0.018	0.024	0.036	0.048	0.066	0.079	0.11	0.13

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