

# GÜHRING

Sharp extra short for 40 % higher milling performance

new



## RF100 SHARP

Solid carbide milling cutter for top performance  
in soft, tough and high-alloyed materials

# OUR SHARPEST MILLING CUTTER

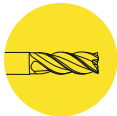
## *Specialist for soft, tough and high-alloyed materials*

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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 achieve high-quality machining results.



exceptionally easy cutting  
**in soft, tough & high-alloyed materials**  
with a tensile strength of 300 - 900 N/mm<sup>2</sup>



full flexibility in milling operations  
**slotting, roughing, ramping, helical, finishing**



powerful & smooth  
**on all machines**



application-oriented construction dimensions  
**for cost-efficient machining**

# RF100 SHARP

**Steel**



**Stainless steel**



**Aluminium**



**Special alloys**



# FROM UNSTABLE TO HPC

## Powerful on all machines

The RF 100 Sharp solid carbide milling cutter is designed to cover all of the different operating conditions – and always achieves outstanding results.



### Application example

Effective, quiet milling on weaker machines and unstable clamping.



<b>Machine</b>	Spinner TC 600 CNC lathe
<b>Milling tool</b>	RF 100 Sharp, art. no. 6478, Ø 10 mm, Z=4
<b>Operating conditions</b>	MTC
<b>Milling operation</b>	Hexagonal milling
<b>Tool holder</b>	BMT Life Tool ER 25 collet chuck
<b>Material/component</b>	1.7131 or 16MnCr5/shaft
<b>Cutting parameters</b>	<b>v<sub>c</sub></b> 130 m/min <b>S</b> 4,138 rpm <b>f<sub>z</sub></b> 0.07 mm <b>v<sub>f</sub></b> 1,158 mm/min <b>a<sub>e</sub></b> 8 mm <b>a<sub>p</sub></b> 3.8 mm
	<b>Metal removal rate Q</b> 35 cm <sup>3</sup> /min
	<b>Tool life</b> 78 min

## Short machining times and long tool lives

- **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

**HPC**

### Application example

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



<b>Machine</b>	CNC BAZ DMG DMU 100 P
<b>Milling tool</b>	RF 100 Sharp, art. no. 6479, Ø 16 mm, Z=4
<b>Operating conditions</b>	HPC
<b>Milling operation</b>	Contour roughing
<b>Tool holder</b>	HSK 100 A GühroJet Weldon tool holder
<b>Material/component</b>	1.0503 or C45 / block
<b>Cutting parameters</b>	<b>v<sub>c</sub></b> 180 m/min <b>S</b> 3,580 rpm <b>f<sub>z</sub></b> 0.1 mm <b>v<sub>f</sub></b> 1,430 mm/min <b>a<sub>e</sub></b> 6 mm <b>a<sub>p</sub></b> 34 mm
	<b>Metal removal rate Q</b> 291 cm <sup>3</sup> /min
	<b>Tool life</b> 134 min

# THE EXTRA SHORT



**Ressource-efficient and economical  
thanks to lower material consumption**

**new**

**40% HIGHER MILLING PERFORMANCE**  
thanks to more compact dimensions

**EXTRA SHORT DESIGN**  
maximum stability and  
hardly any radial deflection

**EXTRA-TOUGH CUTTING MATERIAL**  
prevents damage to cutting edges  
even under unstable conditions



**SPECIAL FRONT END**  
for slot drilling and high ramping angles



**1xD CUTTING EDGE LENGTH**  
maximum feed rate when slotting

**AICrN COATING**  
for highest wear resistance

**2xD THE REACH**  
for more flexibility  
with deeper contours

**RF100 SHARP**  
EXTRA SHORT

## EXTRA SHORT

### Application example

HSC slot drilling in the micro range with  $\varnothing$  1 mm in stainless steel and high-performance slotting  $\varnothing$  10 mm in C45 steel.



<b>Machine</b>	Core micro
<b>Milling tool</b>	RF 100 Sharp extra short, art. no. 6938, $\varnothing$ 1 mm, Z=4
<b>Milling operation</b>	Plunging + slotting (slot drilling)
<b>Tool holder</b>	HSK-E40 precision collet chuck holders
<b>Cooling</b>	Emulsion
<b>Material</b>	INOX 1.4301
<b>Cutting parameters</b>	<b>v<sub>c</sub></b> 70 m/min <b>S</b> 22,282 rpm <b>f<sub>z</sub></b> Slotting 0.01 mm <b>v<sub>f</sub></b> Slotting 891 mm/min <b>f<sub>z</sub></b> Plunging 0.002 mm <b>v<sub>f</sub></b> Plunging 178 mm/min <b>a<sub>e</sub></b> 1 mm <b>a<sub>p</sub></b> 0.8 mm
	<b>Metal removal rate Q</b> Slotting 0.7 cm <sup>3</sup> /min
	<b>Tool life</b> 1,850 slots (10.5 mm long each)

<b>Machine</b>	MAG NBV 700
<b>Milling tool</b>	RF 100 Sharp extra short, art. no. 6938, $\varnothing$ 10 mm, Z=4
<b>Milling operation</b>	Slotting
<b>Tool holder</b>	HPC clamping chuck HSK-A 63
<b>Cooling</b>	Air
<b>Material</b>	C45
<b>Cutting parameters</b>	<b>v<sub>c</sub></b> 180 m/min <b>S</b> 5,730 rpm <b>f<sub>z</sub></b> 0.08 mm <b>v<sub>f</sub></b> 1,833 mm/min <b>a<sub>e</sub></b> 10 mm <b>a<sub>p</sub></b> 10 mm
	<b>Metal removal rate Q</b> 183.3 cm <sup>3</sup> /min
	<b>Tool life</b> 113 min

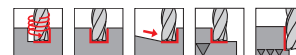
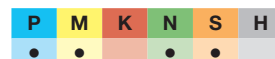


Ratio end mills RF 100 Sharp extra short

Article no. 6938



especially for soft, tough and high-alloyed materials • neck clearance • centre cutting • 40% higher milling performance thanks to short stable design • with special front end

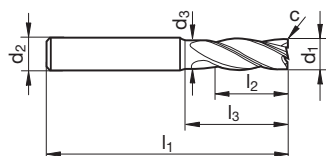
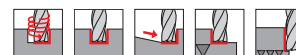
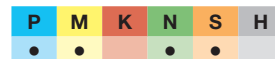


Ratio end mills RF 100 Sharp extra short

Article no. 6939



especially for soft, tough and high-alloyed materials • neck clearance • centre cutting • 40% higher milling performance thanks to short stable design • with special front end



Article no.

6938

6939

d1 e8 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Order no.
0.80	4.00	0.75	40	0.8	1.7	0.00	4	6938 0.800
1.00	4.00	0.92	40	1.0	2.1	0.01	4	6938 1.000
1.20	4.00	1.12	40	1.2	2.5	0.01	4	6938 1.200
1.40	4.00	1.32	40	1.4	2.9	0.01	4	6938 1.400
1.50	4.00	1.40	40	1.5	3.2	0.01	4	6938 1.500
1.60	4.00	1.50	40	1.6	3.4	0.01	4	6938 1.600
1.80	4.00	1.70	40	1.8	3.8	0.01	4	6938 1.800
2.00	6.00	1.85	50	2.0	4.2	0.02	4	6938 2.000
2.50	6.00	2.35	50	2.5	5.3	0.02	4	6938 2.500
2.80	6.00	2.65	50	2.8	5.9	0.02	4	6938 2.800
3.00	6.00	2.85	50	3.0	6.3	0.03	4	6938 3.000
3.50	6.00	3.30	50	3.5	7.4	0.03	4	6938 3.500 6939 3.500
3.80	6.00	3.60	50	3.8	8.0	0.03	4	6938 3.800 6939 3.800
4.00	6.00	3.80	50	4.0	8.4	0.04	4	6938 4.000 6939 4.000
4.50	6.00	4.30	50	4.5	9.5	0.04	4	6938 4.500 6939 4.500
4.80	6.00	4.60	50	4.8	10.1	0.04	4	6938 4.800 6939 4.800
5.00	6.00	4.80	50	5.0	10.5	0.05	4	6938 5.000 6939 5.000
5.50	6.00	5.30	50	5.5	12.0	0.05	4	6938 5.500 6939 5.500
5.70	6.00	5.50	50	5.7	12.0	0.05	4	6938 5.700 6939 5.700
6.00	6.00	5.70	50	6.0	12.0	0.06	4	6938 6.000 6939 6.000
6.70	8.00	6.40	55	6.7	16.0	0.06	4	6938 6.700 6939 6.700
7.00	8.00	6.70	55	7.0	16.0	0.07	4	6938 7.000 6939 7.000
7.70	8.00	7.40	55	7.7	16.0	0.07	4	6938 7.700 6939 7.700
8.00	8.00	7.70	55	8.0	16.0	0.08	4	6938 8.000 6939 8.000
9.00	10.00	8.70	61	9.0	20.0	0.09	4	6938 9.000 6939 9.000
9.70	10.00	9.40	61	9.7	20.0	0.09	4	6938 9.700 6939 9.700
10.00	10.00	9.50	61	10.0	20.0	0.10	4	6938 10.000 6939 10.000
11.00	12.00	10.50	70	11.0	24.0	0.11	4	6938 11.000 6939 11.000
11.70	12.00	11.20	70	11.7	24.0	0.11	4	6938 11.700 6939 11.700
12.00	12.00	11.50	70	12.0	24.0	0.12	4	6938 12.000 6939 12.000
14.00	14.00	13.50	75	14.0	28.0	0.14	4	6938 14.000 6939 14.000
15.60	16.00	15.10	82	15.6	32.0	0.15	4	6938 15.600 6939 15.600
16.00	16.00	15.50	82	16.0	32.0	0.16	4	6938 16.000 6939 16.000



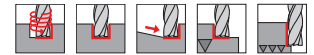
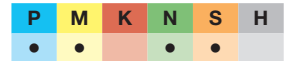


Ratio end mills RF 100 Sharp

Article no. 6478



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

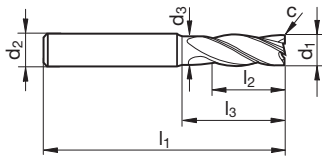
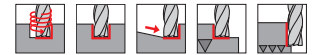
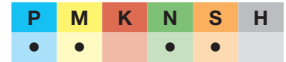


Ratio end mills RF 100 Sharp

Article no. 6479



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



Article no.

6478

6479

d1 e8 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Order no.
1.00	4.00	0.92	50	3.0	4.0	0.02	4	6478 1.000
1.50	4.00	1.40	50	4.5	6.0	0.03	4	6478 1.500
2.00	6.00	1.85	50	6.0	8.0	0.04	4	6478 2.000
2.50	6.00	2.35	50	7.5	10.0	0.05	4	6478 2.500
3.00	6.00	2.85	57	10.0	15.0	0.06	4	6478 3.000
4.00	6.00	3.80	57	14.0	18.0	0.08	4	6478 4.000 6479 4.000
5.00	6.00	4.80	57	15.0	20.0	0.10	4	6478 5.000 6479 5.000
6.00	6.00	5.70	57	16.0	20.0	0.12	4	6478 6.000 6479 6.000
8.00	8.00	7.70	63	21.0	26.0	0.16	4	6478 8.000 6479 8.000
10.00	10.00	9.50	72	25.0	31.0	0.20	4	6478 10.000 6479 10.000
12.00	12.00	11.50	83	28.0	37.0	0.24	4	6478 12.000 6479 12.000
14.00	14.00	13.50	83	28.0	37.0	0.28	4	6478 14.000 6479 14.000
16.00	16.00	15.50	92	36.0	43.0	0.32	4	6478 16.000 6479 16.000
20.00	20.00	19.50	104	41.0	53.0	0.40	4	6478 20.000 6479 20.000

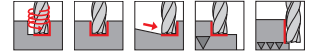
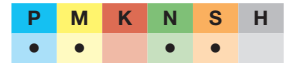


## Ratio end mills RF 100 Sharp

Article no. **6480**



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

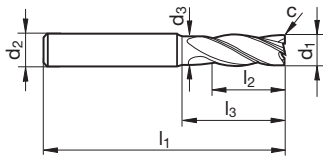
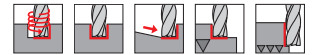
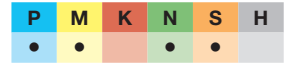


## Ratio end mills RF 100 Sharp

Article no. **6481**



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



Article no.

**6480**

**6481**

d1 e8 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Order no.
1.00	4.00	0.92	50	3.0	5.5	0.02	4	6480 1.000
1.50	4.00	1.40	50	4.5	8.5	0.03	4	6480 1.500
2.00	6.00	1.85	57	6.0	11.5	0.04	4	6480 2.000
2.50	6.00	2.35	57	7.5	14.5	0.05	4	6480 2.500
3.00	6.00	2.85	65	10.0	20.0	0.06	4	6480 3.000
4.00	6.00	3.80	65	14.0	27.0	0.08	4	6480 4.000
5.00	6.00	4.80	65	15.0	28.0	0.10	4	6480 5.000
6.00	6.00	5.70	75	19.0	38.0	0.12	4	6480 6.000
8.00	8.00	7.70	80	21.0	43.0	0.16	4	6480 8.000
10.00	10.00	9.50	93	26.0	52.0	0.20	4	6480 10.000
12.00	12.00	11.50	100	28.0	54.0	0.24	4	6480 12.000
14.00	14.00	13.50	100	28.0	54.0	0.28	4	6480 14.000
16.00	16.00	15.50	123	38.0	74.0	0.32	4	6480 16.000
20.00	20.00	19.50	126	41.0	75.0	0.40	4	6480 20.000

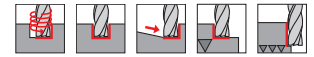
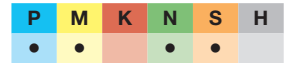


Ratio end mills RF 100 Sharp

Article no. 6962



especially for soft, tough and high-alloyed materials • neck clearance • centre cutting

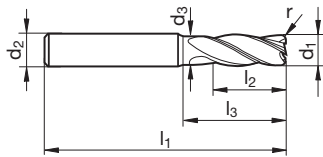
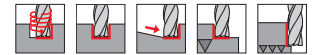
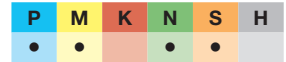


Ratio end mills RF 100 Sharp

Article no. 6963



especially for soft, tough and high-alloyed materials • neck clearance • centre cutting



Article no.

6962

6963

d1 e8 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	r mm	Z	Order no.
3.00	6.00	2.85	57	8.0	15.0	0.20	4	6962 3.002 6963 3.002
3.00	6.00	2.85	57	8.0	15.0	0.50	4	6962 3.005 6963 3.005
4.00	6.00	3.80	57	11.0	18.0	0.20	4	6962 4.002 6963 4.002
4.00	6.00	3.80	57	11.0	18.0	0.50	4	6962 4.005 6963 4.005
4.00	6.00	3.80	57	11.0	18.0	1.00	4	6962 4.010 6963 4.010
5.00	6.00	4.80	57	13.0	18.0	0.20	4	6962 5.002 6963 5.002
5.00	6.00	4.80	57	13.0	18.0	0.50	4	6962 5.005 6963 5.005
5.00	6.00	4.80	57	13.0	18.0	1.00	4	6962 5.010 6963 5.010
6.00	6.00	5.70	57	13.0	20.0	0.20	4	6962 6.002 6963 6.002
6.00	6.00	5.70	57	13.0	20.0	0.50	4	6962 6.005 6963 6.005
6.00	6.00	5.70	57	13.0	20.0	1.00	4	6962 6.010 6963 6.010
6.00	6.00	5.70	57	13.0	20.0	1.50	4	6962 6.015 6963 6.015
8.00	8.00	7.70	63	19.0	26.0	0.30	4	6962 8.003 6963 8.003
8.00	8.00	7.70	63	19.0	26.0	0.50	4	6962 8.005 6963 8.005
8.00	8.00	7.70	63	19.0	26.0	1.00	4	6962 8.010 6963 8.010
8.00	8.00	7.70	63	19.0	26.0	1.50	4	6962 8.015 6963 8.015
8.00	8.00	7.70	63	19.0	26.0	2.00	4	6962 8.020 6963 8.020
10.00	10.00	9.50	72	22.0	31.0	0.30	4	6962 10.003 6963 10.003
10.00	10.00	9.50	72	22.0	31.0	0.50	4	6962 10.005 6963 10.005
10.00	10.00	9.50	72	22.0	31.0	1.00	4	6962 10.010 6963 10.010
10.00	10.00	9.50	72	22.0	31.0	1.50	4	6962 10.015 6963 10.015
10.00	10.00	9.50	72	22.0	31.0	2.00	4	6962 10.020 6963 10.020
10.00	10.00	9.50	72	22.0	31.0	2.50	4	6962 10.025 6963 10.025
12.00	12.00	11.50	83	26.0	37.0	0.30	4	6962 12.003 6963 12.003
12.00	12.00	11.50	83	26.0	37.0	0.50	4	6962 12.005 6963 12.005
12.00	12.00	11.50	83	26.0	37.0	1.00	4	6962 12.010 6963 12.010
12.00	12.00	11.50	83	26.0	37.0	1.50	4	6962 12.015 6963 12.015
12.00	12.00	11.50	83	26.0	37.0	2.00	4	6962 12.020 6963 12.020
12.00	12.00	11.50	83	26.0	37.0	2.50	4	6962 12.025 6963 12.025
12.00	12.00	11.50	83	26.0	37.0	3.00	4	6962 12.030 6963 12.030
16.00	16.00	15.50	92	32.0	43.0	0.50	4	6962 16.005 6963 16.005
16.00	16.00	15.50	92	32.0	43.0	1.00	4	6962 16.010 6963 16.010
16.00	16.00	15.50	92	32.0	43.0	1.50	4	6962 16.015 6963 16.015
16.00	16.00	15.50	92	32.0	43.0	2.00	4	6962 16.020 6963 16.020
16.00	16.00	15.50	92	32.0	43.0	2.50	4	6962 16.025 6963 16.025
16.00	16.00	15.50	92	32.0	43.0	3.00	4	6962 16.030 6963 16.030
16.00	16.00	15.50	92	32.0	43.0	4.00	4	6962 16.040 6963 16.040
20.00	20.00	19.50	104	38.0	53.0	0.50	4	6962 20.005 6963 20.005
20.00	20.00	19.50	104	38.0	53.0	1.00	4	6962 20.010 6963 20.010
20.00	20.00	19.50	104	38.0	53.0	1.50	4	6962 20.015 6963 20.015
20.00	20.00	19.50	104	38.0	53.0	2.00	4	6962 20.020 6963 20.020
20.00	20.00	19.50	104	38.0	53.0	2.50	4	6962 20.025 6963 20.025
20.00	20.00	19.50	104	38.0	53.0	3.00	4	6962 20.030 6963 20.030
20.00	20.00	19.50	104	38.0	53.0	4.00	4	6962 20.040 6963 20.040

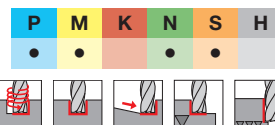


Ratio end mill sets RF 100 Sharp extra short

Article no. 6468



especially for soft, tough and high-alloyed materials • 40% higher milling performance thanks to short stable design • neck clearance • special front end • consisting of art. no. 6938

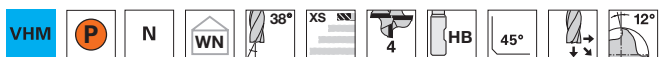


Article no. **6468**

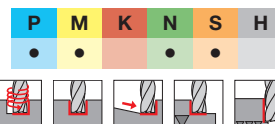
Ø-range mm	Pieces/set	Order no.
6/8/10/12	4	6468 1.000

Ratio end mill sets RF 100 Sharp extra short

Article no. 6469



especially for soft, tough and high-alloyed materials • 40% higher milling performance thanks to short stable design • neck clearance • special front end • consisting of art. no. 6939



Article no. **6469**

Ø-range mm	Pieces/set	Order no.
6/8/10/12	4	6469 1.000

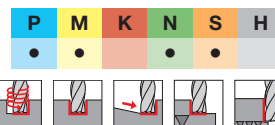


Ratio end mill sets RF 100 Sharp

Article no. 6482



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



Article no. **6482**

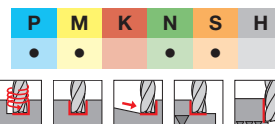
Ø-range mm	Pieces/set	Order no.
6/8/10/12/16	5	6482 1.000
6/8/10/12	4	6482 2.000

Ratio end mill sets RF 100 Sharp

Article no. 6483



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



Article no. **6483**

Ø-range mm	Pieces/set	Order no.
6/8/10/12/16	5	6483 1.000
6/8/10/12	4	6483 2.000



## RF 100 Sharp

### Milling conditions:

<b>HPC</b>	stable machining conditions high drive power
<b>MTC</b>	unstable machining conditions low drive power
	long tools
	long (DIN)+ 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 %
	extra short tools		$f_z$ +40 %



Machining group	Application	$v_c$ (m/min)	$a_e$ max.	$f_z$ (mm/z) with nom. $\emptyset$								
				1	3	4	6	8	10	12	16	20
<b>P1.1.1</b> Unalloyed steel, annealed, 0.15 % C, Rm 420 N/mm <sup>2</sup> , 125 HB <b>P1.1.2</b> Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm <sup>2</sup> , 125 HB <b>P1.1.3</b> Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm <sup>2</sup> , 190 HB <b>P1.1.4</b> Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm <sup>2</sup> , 190 HB <b>P1.1.5</b> Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm <sup>2</sup> , 250 HB <b>P1.1.6</b> Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm <sup>2</sup> , 270 HB <b>P1.1.7</b> Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm <sup>2</sup> , 300 HB	Slotting	180	1xD	0.005	0.016	0.020	0.030	0.040	0.060	0.070	0.095	0.120
	Roughing	205	0.75xD	0.007	0.021	0.030	0.040	0.055	0.070	0.085	0.110	0.140
	Finishing	360	0.02xD	0.007	0.020	0.025	0.040	0.055	0.065	0.080	0.105	0.130
<b>P2.1.1</b> Low-alloy steel, annealed, Rm 610 N/mm <sup>2</sup> , 180 HB <b>P2.1.2</b> Low-alloy steel, heat-treated, Rm 930 N/mm <sup>2</sup> , 275 HB <b>P2.1.3</b> Low-alloy steel, heat-treated, Rm 1020 N/mm <sup>2</sup> , 300 HB <b>P2.1.4</b> Low-alloy steel, heat-treated, Rm 1190 N/mm <sup>2</sup> , 350 HB	Slotting	160	1xD	0.005	0.015	0.020	0.030	0.040	0.055	0.065	0.090	0.110
	Roughing	185	0.75xD	0.006	0.019	0.025	0.040	0.050	0.065	0.075	0.100	0.125
	Finishing	320	0.02xD	0.006	0.018	0.025	0.035	0.050	0.060	0.075	0.095	0.120
<b>P3.1.1</b> High-alloy steel and tool steel, annealed, Rm 680 N/mm <sup>2</sup> , 200 HB <b>P3.1.2</b> High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm <sup>2</sup> , 325 HB	Slotting	135	1xD	0.004	0.013	0.020	0.025	0.035	0.050	0.060	0.080	0.100
	Roughing	155	0.75xD	0.006	0.017	0.025	0.035	0.045	0.060	0.070	0.090	0.115
	Finishing	270	0.02xD	0.006	0.017	0.020	0.035	0.045	0.055	0.065	0.090	0.110
<b>M1.1.1</b> Stainless steel, ferritic/martensitic, with machining additives <b>M1.1.2</b> Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm <sup>2</sup> , 200 HB	Slotting	120	1xD	0.004	0.013	0.020	0.025	0.035	0.050	0.060	0.080	0.100
	Roughing	140	0.75xD	0.006	0.017	0.025	0.035	0.045	0.060	0.070	0.090	0.115
	Finishing	240	0.02xD	0.006	0.017	0.020	0.035	0.045	0.055	0.065	0.090	0.110
<b>M1.1.3</b> Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm <sup>2</sup> , 240 HB	Slotting	90	1xD	0.004	0.012	0.015	0.025	0.030	0.045	0.055	0.070	0.090
	Roughing	100	0.75xD	0.005	0.016	0.020	0.030	0.040	0.050	0.060	0.085	0.105
	Finishing	175	0.02xD	0.005	0.015	0.020	0.030	0.040	0.050	0.060	0.080	0.100
<b>M2.1.1</b> Stainless steel, austenitic, quenched, 180 HB	Slotting	80	1xD	0.004	0.012	0.015	0.025	0.030	0.045	0.055	0.070	0.090
	Roughing	100	0.6xD	0.005	0.016	0.020	0.030	0.045	0.055	0.065	0.085	0.110
	Finishing	160	0.01xD	0.005	0.014	0.020	0.025	0.035	0.045	0.055	0.070	0.090
<b>M2.2.1</b> Duplex steel, high-strength stainless steels	Slotting	60	1xD	0.003	0.010	0.015	0.020	0.030	0.040	0.045	0.065	0.080
	Roughing	75	0.6xD	0.005	0.014	0.020	0.030	0.040	0.045	0.055	0.075	0.095
	Finishing	120	0.01xD	0.004	0.012	0.015	0.025	0.030	0.040	0.045	0.065	0.080
<b>K1.1.1</b> Grey cast iron, pearlitic/ferritic, 180 HB <b>K1.1.2</b> Grey cast iron, pearlitic/martensitic, 260 HB <b>K1.2.1</b> Cast iron with spheroidal graphite, ferritic, 160 HB <b>K1.2.2</b> Cast iron with spheroidal graphite, pearlitic, 250 HB												
<b>K1.3.1</b> Malleable cast iron, ferritic, 130 HB <b>K1.3.2</b> Malleable cast iron, pearlitic, 230 HB												
<b>K2.1.1</b> Vermicular graphite cast iron (GJV) <b>K2.2.1</b> Austenitic-ferritic spheroidal graphite cast iron (ADI)												
<b>N1.1.1</b> Wrought aluminium alloys, non-hardened, 60 HB <b>N1.1.2</b> Wrought aluminium alloys, hardened, 100 HB	Slotting	500	1xD	0.007	0.021	0.030	0.040	0.055	0.080	0.095	0.130	0.160
	Roughing	575	0.75xD	0.009	0.028	0.035	0.055	0.075	0.090	0.110	0.145	0.185
	Finishing	1000	0.02xD	0.009	0.026	0.035	0.055	0.070	0.090	0.105	0.140	0.175
<b>N2.1.1</b> Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB <b>N2.1.2</b> Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB	Slotting	230	1xD	0.005	0.016	0.020	0.030	0.040	0.060	0.070	0.095	0.120
	Roughing	265	0.75xD	0.007	0.021	0.030	0.040	0.055	0.070	0.085	0.110	0.140
	Finishing	460	0.02xD	0.007	0.020	0.025	0.040	0.055	0.065	0.080	0.105	0.130
<b>N2.1.3</b> Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB	Slotting	180	1xD	0.005	0.016	0.020	0.030	0.040	0.060	0.070	0.095	0.120
	Roughing	180	0.75xD	0.006	0.018	0.025	0.035	0.050	0.060	0.070	0.095	0.120
	Finishing	365	0.02xD	0.007	0.020	0.025	0.040	0.055	0.065	0.080	0.105	0.130



Machining group	Application	V <sub>c</sub> (m/min)	a <sub>e</sub> max.	f <sub>z</sub> (mm/z) with nom. Ø								
				1	3	4	6	8	10	12	16	20
<b>N3.1.1</b> Copper and copper alloys: Free-machining alloy, Pb > 1 % <b>N3.1.2</b> Copper and copper alloys: CuZn, CuSnZn	Slotting	250	1xD	0.005	0.016	0.020	0.030	0.040	0.060	0.070	0.095	0.120
	Roughing	290	0.75xD	0.007	0.021	0.030	0.040	0.055	0.070	0.085	0.110	0.140
	Finishing	500	0.02xD	0.007	0.020	0.025	0.040	0.055	0.065	0.080	0.105	0.130
<b>N3.1.3</b> Copper and copper alloys: CuSn, lead-free copper and copper electrolyte	Slotting	195	1xD	0.005	0.015	0.020	0.030	0.040	0.055	0.065	0.090	0.110
	Roughing	225	0.75xD	0.006	0.019	0.025	0.040	0.050	0.065	0.075	0.100	0.125
	Finishing	390	0.02xD	0.006	0.018	0.025	0.035	0.050	0.060	0.075	0.095	0.120
<b>N4.1.1</b> Non-metallic materials: Duroplastics, fibre-reinforced plastics	Slotting	150	1xD	0.006	0.017	0.020	0.035	0.045	0.065	0.075	0.100	0.125
	Roughing	175	0.75xD	0.007	0.022	0.030	0.045	0.060	0.070	0.085	0.115	0.145
	Finishing	300	0.02xD	0.007	0.021	0.030	0.040	0.055	0.070	0.085	0.110	0.140
<b>N4.1.2</b> Non-metallic materials: Hard rubber, wood, etc.	Slotting	200	1xD	0.005	0.015	0.020	0.030	0.040	0.055	0.065	0.090	0.110
	Roughing	230	0.75xD	0.006	0.019	0.025	0.040	0.050	0.065	0.075	0.105	0.130
	Finishing	400	0.02xD	0.006	0.019	0.025	0.035	0.050	0.060	0.075	0.100	0.125
<b>N4.1.3</b> Non-metallic materials: Graphite	Slotting	240	1xD	0.007	0.021	0.030	0.040	0.055	0.080	0.095	0.130	0.160
	Roughing	275	0.75xD	0.009	0.028	0.035	0.055	0.075	0.090	0.110	0.145	0.185
	Finishing	480	0.02xD	0.009	0.026	0.035	0.055	0.070	0.090	0.105	0.140	0.175
<b>S1.1.1</b> Heat-resistant alloys, Fe-based, annealed, 200 HB	Slotting	30	1xD	0.004	0.011	0.015	0.020	0.030	0.040	0.050	0.065	0.080
	Roughing	40	0.6xD	0.005	0.014	0.020	0.030	0.040	0.050	0.060	0.075	0.095
	Finishing	60	0.01xD	0.004	0.012	0.015	0.025	0.030	0.040	0.050	0.065	0.080
<b>S1.1.2</b> Heat-resistant alloys, Fe-based, hardened, 280 HB	Slotting	25	1xD	0.004	0.011	0.015	0.020	0.030	0.040	0.050	0.065	0.080
	Roughing	30	0.6xD	0.005	0.014	0.020	0.030	0.040	0.050	0.060	0.075	0.095
	Finishing	50	0.01xD	0.004	0.012	0.015	0.025	0.030	0.040	0.050	0.065	0.080
<b>S1.1.3</b> Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB	Slotting	15	1xD	0.003	0.009	0.010	0.015	0.025	0.030	0.040	0.050	0.065
	Roughing	20	0.6xD	0.004	0.012	0.015	0.025	0.030	0.040	0.045	0.060	0.080
	Finishing	35	0.01xD	0.003	0.010	0.015	0.020	0.025	0.030	0.040	0.050	0.065
<b>S1.1.4</b> Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB	Slotting	15	1xD	0.003	0.008	0.010	0.015	0.020	0.030	0.035	0.050	0.060
	Roughing	15	0.6xD	0.004	0.011	0.015	0.020	0.030	0.035	0.045	0.060	0.075
	Finishing	25	0.01xD	0.003	0.009	0.010	0.020	0.025	0.030	0.035	0.050	0.060
<b>S1.1.5</b> Heat-resistant alloys, Ni- or Co-based, cast, 320 HB	Slotting	15	1xD	0.003	0.009	0.010	0.015	0.025	0.030	0.040	0.050	0.065
	Roughing	20	0.6xD	0.004	0.012	0.015	0.025	0.030	0.040	0.045	0.060	0.080
	Finishing	30	0.01xD	0.003	0.010	0.015	0.020	0.025	0.030	0.040	0.050	0.065
<b>S2.1.1</b> Titanium alloys, pure titanium, Rm 400 N/mm <sup>2</sup>	Slotting	70	1xD	0.004	0.013	0.020	0.025	0.035	0.050	0.060	0.080	0.100
	Roughing	90	0.6xD	0.006	0.018	0.025	0.035	0.050	0.060	0.070	0.095	0.120
	Finishing	140	0.02xD	0.006	0.017	0.020	0.035	0.045	0.055	0.065	0.090	0.110
<b>S2.1.2</b> Titanium alloys, Alpha and Beta alloys, hardened, Rm 1050 N/mm <sup>2</sup>	Slotting	60	1xD	0.004	0.012	0.015	0.025	0.030	0.045	0.055	0.070	0.090
	Roughing	75	0.6xD	0.005	0.016	0.020	0.030	0.045	0.055	0.065	0.085	0.110
	Finishing	120	0.02xD	0.005	0.015	0.020	0.030	0.040	0.050	0.060	0.080	0.100
<b>H1.1.1</b> Hardened steel, hardened and tempered, < 55 HRC												
<b>H1.1.2</b> Hardened steel, hardened and tempered, < 60 HRC												
<b>H1.1.3</b> Hardened steel, hardened and tempered, > 60 HRC												
<b>H2.1.1</b> Chilled cast iron, 400 HB												
<b>H2.1.2</b> Chilled cast iron, hardened and tempered, < 55 HRC												

# LENGTH SELECTION MADE EASY

RF100  
**SHARP**

### RF 100 SHARP ER

- Standard design according to "DIN 6527 long"
- dimensions from Ø 3 mm
- corner radii available from 0.2-4 mm



### RF 100 SHARP DIN+

- flexible use at different depths, requiring fewer milling cutters and making it possible to regrind more often
- is based on "DIN long", but +12 % more cutting length (with Ø 16.0 mm)
- micro range dimensions from Ø 1 mm



### RF 100 SHARP MEDIUM LENGTH

- extended reach enables machining with 2 milling cutters and suitable for the bridging of interference contours at greater depths
- cutting edge makes up more than 50 % of the reach
- micro range dimensions from Ø 1 mm



### RF 100 SHARP EXTRA SHORT

- short dimension ensures high stability and running smoothness
- machining with up to 40 % higher feed rate
- cutting edge length of 1xD and 2xD the reach
- micro range dimensions from Ø 0.8 mm



### DIMENSION COMPARISON

Product	Length	d1 mm	d3 mm	l1 mm	l2 mm	l3 mm	Z
RF 100 Sharp ER		16.0	15.5	92.0	32.0	43.0	4
RF 100 Sharp DIN+		16.0	15.5	92.0	36.0	43.0	4
RF 100 Sharp medium length		16.0	15.5	123.0	38.0	74.0	4
RF 100 Sharp extra short		16.0	15.5	82.0	16.0	32.0	4





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- **individual approval processes for your company**
- **conveniently download CAD data when purchasing**

# ISO code

<b>P</b>	Steel, high-alloyed steel
<b>M</b>	Stainless steel
<b>K</b>	Grey cast iron, spheroidal graphite iron and malleable cast iron
<b>N</b>	Aluminium and other non-ferrous metals
<b>S</b>	Special-, super- and titanium-alloys
<b>H</b>	Hardened steel and chilled cast iron
<b>O</b>	Fibre-reinforced plastics (FRP), graphite

Tool recommendations regarding the suitability for application groups or specifications of max. tensile strength and hardness can be found on the product and cutting value pages.

- optimal suitability
- limited suitability

# Surfaces

**P** AlCrN

# Pictograms

Cutting material

VHM

Solid carbide

Shank form



according to DIN 6535

Standard



according to DIN according to company standard

Type



Applications



Slotting



Roughing



Ramping



Helix



Finishing

Length



extra short



long (DIN)



long (DIN) +



medium length

Number of cutting edges



Number of main cutting edges

Helix angle



Size of helix angle/no. of different helix angles

Rake angle



Rake angle of circumference cutting edges

Cutting edge profile



Corner chamfer



Radius with tolerance

Infeed



for lateral infeeds,  
for ramping and drilling



## Solid carbide milling cutter RF 100 Sharp

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