

The Gühring logo is displayed in a bold, black, sans-serif font within a bright yellow rectangular box. The background of the entire advertisement is a close-up photograph of a Gühring milling tool. The tool has a black, cylindrical upper section and a lower section with a multi-fluted, multi-colored (rainbow) coating. It is positioned vertically, just above a piece of light-colored metal workpiece that is being machined. The lighting is dramatic, highlighting the metallic textures and the precision of the tool.

GÜHRING

New milling tools

Milling tools for machining aluminium



> 180,000

Customers worldwide



8,000

Employees worldwide

900

Sales representatives worldwide



110,000

Articles in the standard range



Quality

Made in Germany



1.1 bn

Turnover



48

Subsidiaries

Gühring is more than just a tools supplier.

As a partner for tools and an expert in process optimisation, we support you in all matters – after all, as a manufacturer with a service guarantee, we are by your side every step of the way. Whether you are dealing with one of our hundreds of local sales representatives or a personal contact on any of our digital channels: We are always here to help.

GÜHRING

Perfection in machining

Contents

Low-burr, smooth, precise

With around 50 new grades ranging from micro to profile machining, we cover every application in the field of aluminium milling.



P	M	K	N	S	H	O	Tool illustration	Z	Cutting edge profile	Length	Tool material	Surface	d1/mm	Article no.	Page
Micro-precision milling cutters RF 100 AL															
			•			○		NEW		45°		VHM	Cb+	0.500 - 3.000	8069 8
			•			○		NEW		45°		VHM	Cb+	0.500 - 3.000	8070 9
			•			○		NEW		R±0,01		VHM	Cb+	0.500 - 3.000	8065 10
			•			○		NEW		R±0,01		VHM	Cb+	0.500 - 3.000	8066 11
Ratio end mills RF 100 AL															
			•			○		NEW		45°		VHM	Cb+	5.000 - 25.000	8234 14
			•			○		NEW		45°		VHM	Cb+	5.000 - 25.000	8235 14
			•			○		NEW		45°		VHM	Cb+	1.000 - 25.000	8232 15
			•			○		NEW		45°		VHM	Cb+	3.500 - 25.000	8233 15
			•					NEW		45°		VHM	○	1.000 - 25.000	8230 16
			•					NEW		45°		VHM	○	3.500 - 25.000	8231 16
			•			○		NEW		R±0,05		VHM	Cb+	6.000 - 25.000	8248 17
			•			○		NEW		R±0,05		VHM	Cb+	6.000 - 25.000	8249 17
			•			○		NEW		R±0,05		VHM	Cb+	1.000 - 25.000	8246 18
			•			○		NEW		R±0,05		VHM	Cb+	4.000 - 25.000	8247 18
			•					NEW		R±0,05		VHM	○	1.000 - 25.000	8244 19
			•					NEW		R±0,05		VHM	○	4.000 - 25.000	8245 19
			•			○		NEW		45°		VHM	Cb+	1.000 - 25.000	8238 20
			•			○		NEW		45°		VHM	Cb+	3.500 - 25.000	8239 20
			•					NEW		45°		VHM	○	1.000 - 25.000	8236 21
			•					NEW		45°		VHM	○	3.500 - 25.000	8237 21
			•			○		NEW		R±0,05		VHM	Cb+	1.000 - 25.000	8252 22
			•			○		NEW		R±0,05		VHM	Cb+	4.000 - 25.000	8253 22
			•					NEW		R±0,05		VHM	○	1.000 - 25.000	8250 23
			•					NEW		R±0,05		VHM	○	4.000 - 25.000	8251 23
			•			○		NEW		45°		VHM	Cb+	1.000 - 20.000	8242 24
			•			○		NEW		45°		VHM	Cb+	3.500 - 20.000	8243 24
			•					NEW		45°		VHM	○	1.000 - 20.000	8240 25
			•					NEW		45°		VHM	○	3.500 - 20.000	8241 25
			•			○		NEW		R±0,05		VHM	Cb+	1.000 - 20.000	8256 26
			•			○		NEW		R±0,05		VHM	Cb+	4.000 - 20.000	8257 26



P	M	K	N	S	H	O	Tool illustration	Z	Cutting edge profile	Length	Tool material	Surface	d1/mm	Article no.	Page
Ratio end mills RF 100 AL															
			•					NEW			6xD	VHM	○	1.000 - 20.000	8254 27
			•					NEW			6xD	VHM	○	4.000 - 20.000	8255 27
Ratio roughing end mills Alu RF 100 AL															
			•			○		NEW		45°		VHM	Cb+	6.000 - 20.000	6464 28
			•			○		NEW		45°		VHM	Cb+	6.000 - 20.000	6465 28
			•			○		NEW		45°		VHM	Cb+	6.000 - 20.000	6466 29
			•			○		NEW		45°		VHM	Cb+	6.000 - 20.000	6467 29
			•			○		NEW		45°	5xD	VHM	Cb+	10.000 - 25.000	6463 30
Ball nose end mills GA 200 A															
			•			○		NEW				VHM	○	3.000 - 16.000	6916 31
			•			•		NEW				VHM	Cb+	3.000 - 16.000	6917 31
End mills (single-fluted)															
			•			•				90°		VHM	○	2.000 - 16.000	6793 34
			•			•		NEW		90°		VHM	Cb+	2.000 - 16.000	8138 34
			•			•		NEW		90°		VHM	○	3.000 - 16.000	6935 35
			•			•		NEW		90°		VHM	Cb+	3.000 - 16.000	8135 35
			•			•		NEW		30°		VHM	○	1.000 - 10.000	6936 36
			•			•		NEW		30°		VHM	Cb+	1.000 - 10.000	8136 36
			•			•		NEW		30°		VHM	○	1.000 - 10.000	6937 37
			•			•		NEW		30°		VHM	Cb+	1.000 - 10.000	8137 37
90° Chamfering milling cutters															
			•			○		NEW				VHM	○	4.000 - 12.000	6918 38
			•			•		NEW				VHM	Cb+	4.000 - 12.000	6919 38



RF 100 AL Micro

Smooth milling with extreme metal removal rates

A new level of non-ferrous micro-machining

Materials in the ISO-N group are becoming increasingly important in the machining industry. They pose no problems to the RF 100 AL Micro solid carbide milling cutter, even in the micro range.

This rise in usage is due, for example, to increasing requirements in the electrical industry, as components for electric drives must be lighter and must be produced more efficiently.

With the RF 100 AL Micro, Gühring is bringing a high-end tool to the market that meets the requirements of these materials. The micro-precision milling cutter impresses with extreme metal removal rates, maximum running smoothness and perfect surfaces. And you don't have to worry about burr development or process reliability with this material specialist.

X Machining time reduced by 76 %

- X** significantly enhanced machining performance at medium & high speeds
- X** longer tool lives thanks to adapted carbide & Carbo+ coating
- X** new round bevel chamfer for high running smoothness & perfect finishing surfaces
- X** very high process reliability thanks to perfected cooling & chip removal



corner radius or corner chamfer
for specific requirements & wear protection

ultra-thin Carbo+ coating
for significantly increased performance & long tool lives

innovative GührJet internal cooling
for reliable chip removal

available in the diameter range
2.5xD | 5xD, Ø 0.5 – 3.0 mm

Application example

Component: Joint body, AIMGSi1

Tool: #8069, Ø 2.4 mm

Customer target: Reduction of machining time, fewer infeeds

Difficulty: 4 mm slot depth infeed in two cuts

Cutting data:	Gühring (two steps)	Competition (three steps)
v_c	240 m/min	v_c 182 m/min
n	31,800 rpm	n 24,000 rpm
f_z	0.053 mm/z	f_z 0.025 mm/z
v_f	5,056 mm/min	v_f 1,824 mm/min
a_p	2.4 mm (1xD)	a_p 1.8 mm (0.75xD)

Machining time: 2.4 sec

10 sec



Micro-precision milling cutters RF 100 AL

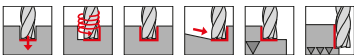
Article no. **8069**



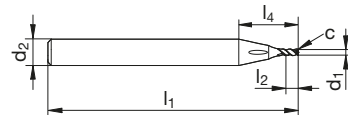
cutting data see page 39



for extreme cutting values and cutting performance • with internal cooling: GühroJet peripheral cooling with 6 or 4 exits • centre cutting



High-performance milling cutters



Article no.

8069

d1 h8 mm	d2 h5 mm	l1 mm	l2 mm	l4 mm	c mm x 45°	Z	Order no.
0.500	4.00	38.0	1.250	10.000	0.010	3	8069 0.500
0.750	4.00	38.0	1.875	10.000	0.015	3	8069 0.750
0.790	4.00	38.1	1.975	10.100	0.016	3	8069 0.790
0.800	4.00	38.0	2.000	10.000	0.016	3	8069 0.800
1.000	4.00	38.0	2.500	10.000	0.020	3	8069 1.000
1.190	4.00	38.1	2.975	10.100	0.024	3	8069 1.190
1.200	4.00	38.0	3.000	10.000	0.024	3	8069 1.200
1.500	4.00	45.0	3.750	17.000	0.030	3	8069 1.500
1.590	4.00	44.4	3.975	16.500	0.032	3	8069 1.590
1.800	4.00	45.0	4.500	17.000	0.036	3	8069 1.800
1.980	6.00	50.8	4.950	14.800	0.040	3	8069 1.980
2.000	6.00	50.0	5.000	14.400	0.040	3	8069 2.000
2.200	6.00	50.0	5.500	14.800	0.044	3	8069 2.200
2.380	6.00	50.8	5.950	15.000	0.048	3	8069 2.380
2.500	6.00	50.0	6.250	15.100	0.050	3	8069 2.500
2.780	6.00	50.8	6.950	15.400	0.056	3	8069 2.780
2.800	6.00	50.0	7.000	15.400	0.056	3	8069 2.800
3.000	6.00	50.0	7.500	15.800	0.060	3	8069 3.000



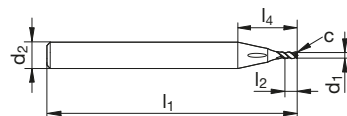
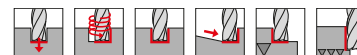
Micro-precision milling cutters RF 100 AL

Article no. **8070**

cutting data see page 40



for extreme cutting values and cutting performance • with internal cooling: GühroJet peripheral cooling with 6 or 4 exits • centre cutting



Article no.

8070

d1 h8 mm	d2 h5 mm	l1 mm	l2 mm	l4 mm	c mm x 45°	Z	Order no.
0.500	4.00	38.0	2.500	10.500	0.010	3	8070 0.500
0.750	4.00	38.0	3.750	11.100	0.015	3	8070 0.750
0.790	4.00	38.1	3.950	11.200	0.016	3	8070 0.790
0.800	4.00	38.0	4.000	11.200	0.016	3	8070 0.800
1.000	4.00	45.0	5.000	17.000	0.020	3	8070 1.000
1.190	4.00	50.8	5.950	22.800	0.024	3	8070 1.190
1.200	4.00	50.0	6.000	22.000	0.024	3	8070 1.200
1.500	4.00	50.0	7.500	22.000	0.030	3	8070 1.500
1.590	4.00	50.8	7.950	22.800	0.032	3	8070 1.590
1.800	4.00	50.0	9.000	22.000	0.036	3	8070 1.800
1.980	6.00	57.1	9.900	21.200	0.040	3	8070 1.980
2.000	6.00	57.0	10.000	21.000	0.040	3	8070 2.000
2.200	6.00	57.0	11.000	21.000	0.044	3	8070 2.200
2.380	6.00	57.1	11.900	21.200	0.048	3	8070 2.380
2.500	6.00	57.0	12.500	21.600	0.050	3	8070 2.500
2.780	6.00	57.1	13.900	22.700	0.056	3	8070 2.780
2.800	6.00	57.0	14.000	22.800	0.056	3	8070 2.800
3.000	6.00	57.0	15.000	23.600	0.060	3	8070 3.000

High-performance milling cutters

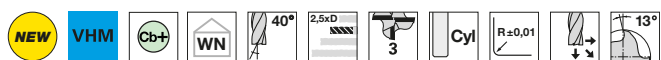


Micro-precision milling cutters RF 100 AL

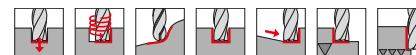
Article no. **8065**



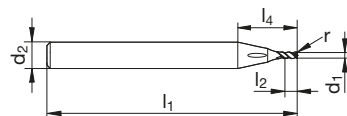
cutting data see page 39



for extreme cutting values and cutting performance • with internal cooling: GühroJet peripheral cooling with 6 or 4 exits • centre cutting



High-performance milling cutters



Article no.

8065

d1 h8 mm	d2 h5 mm	l1 mm	l2 mm	l4 mm	r mm	Z	Order no.
0.50	4.00	38	1.250	10.000	0.05	3	8065 0.500
0.50	4.00	38	1.250	10.000	0.10	3	8065 0.501
0.75	4.00	38	1.875	10.000	0.05	3	8065 0.750
0.75	4.00	38	1.875	10.000	0.10	3	8065 0.751
0.80	4.00	38	2.000	10.000	0.05	3	8065 0.800
0.80	4.00	38	2.000	10.000	0.10	3	8065 0.801
1.00	4.00	38	2.500	10.000	0.05	3	8065 1.000
1.00	4.00	38	2.500	10.000	0.10	3	8065 1.001
1.00	4.00	38	2.500	10.000	0.20	3	8065 1.002
1.20	4.00	38	3.000	10.000	0.10	3	8065 1.201
1.20	4.00	38	3.000	10.000	0.20	3	8065 1.202
1.50	4.00	45	3.750	17.000	0.10	3	8065 1.501
1.50	4.00	45	3.750	17.000	0.20	3	8065 1.502
1.50	4.00	45	3.750	17.000	0.30	3	8065 1.503
1.80	4.00	45	4.500	17.000	0.10	3	8065 1.801
1.80	4.00	45	4.500	17.000	0.20	3	8065 1.802
1.80	4.00	45	4.500	17.000	0.30	3	8065 1.803
2.00	6.00	50	5.000	14.400	0.10	3	8065 2.001
2.00	6.00	50	5.000	14.400	0.20	3	8065 2.002
2.00	6.00	50	5.000	14.400	0.30	3	8065 2.003
2.00	6.00	50	5.000	14.400	0.50	3	8065 2.005
2.50	6.00	50	6.250	15.100	0.20	3	8065 2.502
2.50	6.00	50	6.250	15.100	0.30	3	8065 2.503
2.50	6.00	50	6.250	15.100	0.50	3	8065 2.505
2.80	6.00	50	7.000	15.400	0.20	3	8065 2.802
2.80	6.00	50	7.000	15.400	0.30	3	8065 2.803
2.80	6.00	50	7.000	15.400	0.50	3	8065 2.805
3.00	6.00	50	7.500	15.800	0.20	3	8065 3.002
3.00	6.00	50	7.500	15.800	0.30	3	8065 3.003
3.00	6.00	50	7.500	15.800	0.50	3	8065 3.005



Micro-precision milling cutters RF 100 AL

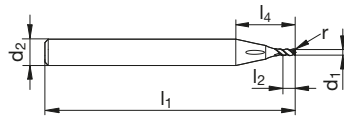
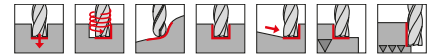
Article no. 8066



cutting data see page 40



for extreme cutting values and cutting performance • with internal cooling: GühroJet peripheral cooling with 6 or 4 exits • centre cutting



Article no.

8066

d1 h8 mm	d2 h5 mm	l1 mm	l2 mm	l4 mm	r mm	Z	Order no.
0.50	4.00	38	2.500	10.500	0.05	3	8066 0.500
0.50	4.00	38	2.500	10.500	0.10	3	8066 0.501
0.75	4.00	38	3.750	11.100	0.05	3	8066 0.750
0.75	4.00	38	3.750	11.100	0.10	3	8066 0.751
0.80	4.00	38	4.000	11.200	0.05	3	8066 0.800
0.80	4.00	38	4.000	11.200	0.10	3	8066 0.801
1.00	4.00	45	5.000	17.000	0.05	3	8066 1.000
1.00	4.00	45	5.000	17.000	0.10	3	8066 1.001
1.00	4.00	45	5.000	17.000	0.20	3	8066 1.002
1.20	4.00	50	6.000	22.000	0.10	3	8066 1.201
1.20	4.00	50	6.000	22.000	0.20	3	8066 1.202
1.50	4.00	50	7.500	22.000	0.10	3	8066 1.501
1.50	4.00	50	7.500	22.000	0.20	3	8066 1.502
1.50	4.00	50	7.500	22.000	0.30	3	8066 1.503
1.80	4.00	50	9.000	22.000	0.10	3	8066 1.801
1.80	4.00	50	9.000	22.000	0.20	3	8066 1.802
1.80	4.00	50	9.000	22.000	0.30	3	8066 1.803
2.00	6.00	57	10.000	21.000	0.10	3	8066 2.001
2.00	6.00	57	10.000	21.000	0.20	3	8066 2.002
2.00	6.00	57	10.000	21.000	0.30	3	8066 2.003
2.00	6.00	57	10.000	21.000	0.50	3	8066 2.005
2.50	6.00	57	12.500	21.600	0.20	3	8066 2.502
2.50	6.00	57	12.500	21.600	0.30	3	8066 2.503
2.50	6.00	57	12.500	21.600	0.50	3	8066 2.505
2.80	6.00	57	14.000	22.800	0.20	3	8066 2.802
2.80	6.00	57	14.000	22.800	0.30	3	8066 2.803
2.80	6.00	57	14.000	22.800	0.50	3	8066 2.805
3.00	6.00	57	15.000	23.600	0.20	3	8066 3.002
3.00	6.00	57	15.000	23.600	0.30	3	8066 3.003
3.00	6.00	57	15.000	23.600	0.50	3	8066 3.005

High-performance milling cutters



RF 100 AL

For guaranteed perfect surfaces

30 % higher machining performance in aluminium and plastic

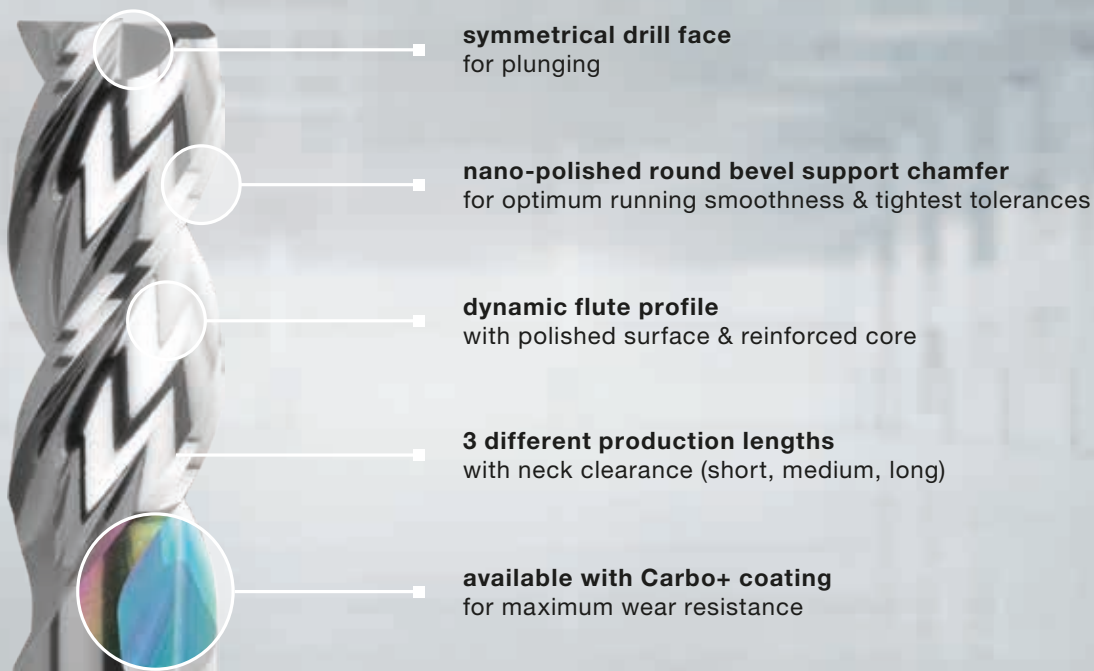
The new RF 100 AL solid carbide milling cutter unleashes its strengths when machining aluminium, non-ferrous metals and plastics. The three-fluted cutter scores points with the highest cutting performance as well as perfect surfaces and dimensional accuracy.

Thanks to its nano-polished round bevel support chamfer, the solid carbide milling cutter achieves the tightest tolerances and optimum running smoothness. Thanks to the large, polished flutes with a dynamic flute profile, you benefit from long tool lives and better chip removal.

The RF 100 AL with optional Carbo+ coating is ideal for dry and MQL machining. The extra-smooth coating prevents built-up edges and guarantees a long tool life.

x **Tool life** increased by 54 %
x **Machining time** reduced by 59 %

-  **X** perfect dimensional accuracy & the best surface qualities
-  **X** highest machining performance & perfect chip removal
-  **X** continuous range from 1–20 mm with corner chamfers
-  **X** wide range of corner radii from R 0.1–4 mm



Application example

Component: Integral component, AlCuMg1

Tool: #8240, Ø 12 mm

Customer target: Running time reduction

Difficulty: The component contains thin-walled, vibration-sensitive lands

Cutting data:	Gühring	Competition
v_c	546 m/min	452 m/min
n	14,500 rpm	12,000 rpm
v_f	5,220 mm/min	3,600 mm/min
a_e	2.5 mm	1.5 mm

Tool life:	485 m	315 m
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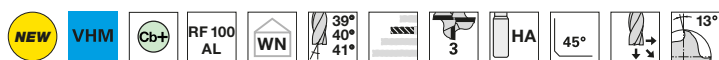


Ratio end mills RF 100 AL

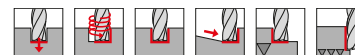
Article no. **8234**



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nano polished cutting edges • neck clearance • centre cutting • with internal cooling: radial and axial exits

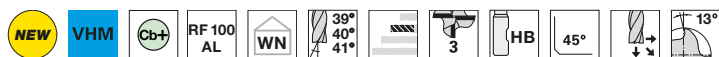


Ratio end mills RF 100 AL

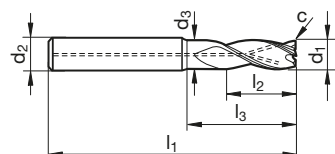
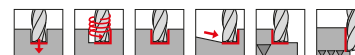
Article no. **8235**



cutting data see page 41



nano polished cutting edges • neck clearance • centre cutting • with internal cooling: radial and axial exits



Article no.

8234

8235

d1 js7 mm	d2 h5 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z
5.00	6.00	4.80	57	13.0	18.0	0.05	3
6.00	6.00	5.70	57	13.0	20.0	0.06	3
8.00	8.00	7.70	63	19.0	26.0	0.08	3
10.00	10.00	9.50	72	22.0	30.0	0.10	3
12.00	12.00	11.50	83	26.0	36.0	0.12	3
16.00	16.00	15.50	92	32.0	42.0	0.16	3
20.00	20.00	19.50	104	38.0	52.0	0.20	3
25.00	25.00	24.00	121	45.0	63.0	0.25	3

Order no.

8234 5.000	8235 5.000
8234 6.000	8235 6.000
8234 8.000	8235 8.000
8234 10.000	8235 10.000
8234 12.000	8235 12.000
8234 16.000	8235 16.000
8234 20.000	8235 20.000
8234 25.000	8235 25.000

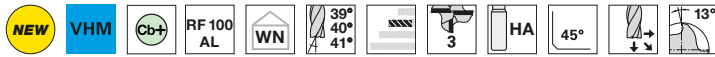


Ratio end mills RF 100 AL

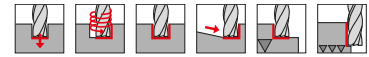
Article no. 8232



cutting data see page 41



nano polished cutting edges • neck clearance • centre cutting

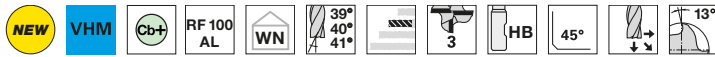


Ratio end mills RF 100 AL

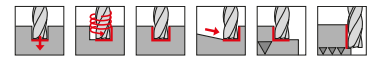
Article no. 8233



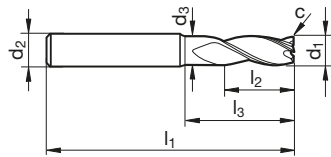
cutting data see page 41



nano polished cutting edges • neck clearance • centre cutting



High-performance milling cutters



Article no.

8232

8233

d1 js7 mm	d2 h5 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Order no.
1.00	4.00	0.92	50	2.5	5.0	0.02	3	8232 1.000
1.50	4.00	1.40	50	4.0	7.5	0.03	3	8232 1.500
2.00	6.00	1.85	57	5.0	10.0	0.04	3	8232 2.000
2.50	6.00	2.35	57	6.5	12.5	0.05	3	8232 2.500
3.00	6.00	2.85	57	8.0	15.0	0.06	3	8232 3.000
3.50	6.00	3.30	57	11.0	15.0	0.03	3	8232 3.500
4.00	6.00	3.80	57	11.0	18.0	0.04	3	8232 4.000
4.50	6.00	4.30	57	13.0	18.0	0.04	3	8232 4.500
5.00	6.00	4.80	57	13.0	18.0	0.05	3	8232 5.000
5.50	6.00	5.30	57	13.0	20.0	0.05	3	8232 5.500
6.00	6.00	5.70	57	13.0	20.0	0.06	3	8232 6.000
7.50	8.00	7.20	63	19.0	26.0	0.07	3	8232 7.500
8.00	8.00	7.70	63	19.0	26.0	0.08	3	8232 8.000
9.50	10.00	9.20	72	22.0	30.0	0.09	3	8232 9.500
10.00	10.00	9.50	72	22.0	30.0	0.10	3	8232 10.000
11.50	12.00	11.00	83	26.0	36.0	0.11	3	8232 11.500
12.00	12.00	11.50	83	26.0	36.0	0.12	3	8232 12.000
14.00	14.00	13.50	83	26.0	36.0	0.14	3	8232 14.000
16.00	16.00	15.50	92	32.0	42.0	0.16	3	8232 16.000
20.00	20.00	19.50	104	38.0	52.0	0.20	3	8232 20.000
25.00	25.00	24.00	121	45.0	63.0	0.25	3	8232 25.000

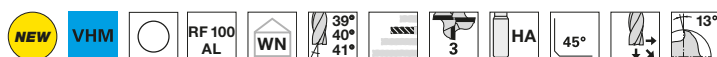


Ratio end mills RF 100 AL

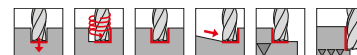
Article no. **8230**



cutting data see page 41



nano polished cutting edges • neck clearance • centre cutting

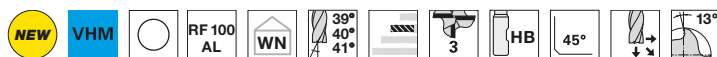


Ratio end mills RF 100 AL

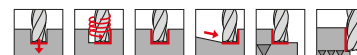
Article no. **8231**



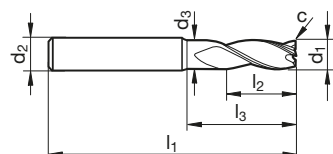
cutting data see page 41



nano polished cutting edges • neck clearance • centre cutting



High-performance milling
cutters



Article no.

8230

8231

d1 js7 mm	d2 h5 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z
1.00	4.00	0.92	50	2.5	5.0	0.02	3
1.50	4.00	1.40	50	4.0	7.5	0.03	3
2.00	6.00	1.85	57	5.0	10.0	0.04	3
2.50	6.00	2.35	57	6.5	12.5	0.05	3
3.00	6.00	2.85	57	8.0	15.0	0.06	3
3.50	6.00	3.30	57	11.0	15.0	0.03	3
4.00	6.00	3.80	57	11.0	18.0	0.04	3
4.50	6.00	4.30	57	13.0	18.0	0.04	3
5.00	6.00	4.80	57	13.0	18.0	0.05	3
5.50	6.00	5.30	57	13.0	20.0	0.05	3
6.00	6.00	5.70	57	13.0	20.0	0.06	3
7.50	8.00	7.20	63	19.0	26.0	0.07	3
8.00	8.00	7.70	63	19.0	26.0	0.08	3
9.50	10.00	9.20	72	22.0	30.0	0.09	3
10.00	10.00	9.50	72	22.0	30.0	0.10	3
11.50	12.00	11.00	83	26.0	36.0	0.11	3
12.00	12.00	11.50	83	26.0	36.0	0.12	3
14.00	14.00	13.50	83	26.0	36.0	0.14	3
16.00	16.00	15.50	92	32.0	42.0	0.16	3
20.00	20.00	19.50	104	38.0	52.0	0.20	3
25.00	25.00	24.00	121	45.0	63.0	0.25	3

Order no.
8230 1.000
8230 1.500
8230 2.000
8230 2.500
8230 3.000
8230 3.500
8231 3.500
8230 4.000
8231 4.000
8230 4.500
8231 4.500
8230 5.000
8231 5.000
8230 5.500
8231 5.500
8230 6.000
8231 6.000
8230 7.500
8231 7.500
8230 8.000
8231 8.000
8230 9.500
8231 9.500
8230 10.000
8231 10.000
8230 11.500
8231 11.500
8230 12.000
8231 12.000
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8231 20.000
8230 25.000
8231 25.000

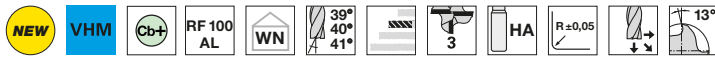


Ratio end mills RF 100 AL

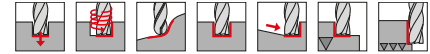
Article no. 8248



cutting data see page 41



nano polished cutting edges • neck clearance • centre cutting • with internal cooling: radial and axial exits

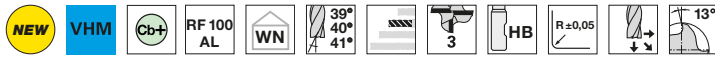


Ratio end mills RF 100 AL

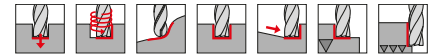
Article no. 8249



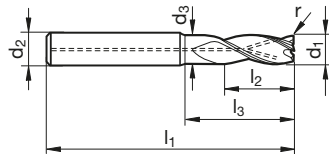
cutting data see page 41



nano polished cutting edges • neck clearance • centre cutting • with internal cooling: radial and axial exits



High-performance milling cutters



Article no.

8248

8249

d1 js7 mm	d2 h5 mm	d3 mm	l1 mm	l2 mm	l3 mm	r mm	Z	Order no.	
6.00	6.00	5.70	57	13.0	20.0	0.20	3	8248 6.002	8249 6.002
6.00	6.00	5.70	57	13.0	20.0	0.50	3	8248 6.005	8249 6.005
6.00	6.00	5.70	57	13.0	20.0	0.80	3	8248 6.008	8249 6.008
6.00	6.00	5.70	57	13.0	20.0	1.00	3	8248 6.010	8249 6.010
8.00	8.00	7.70	63	19.0	26.0	0.20	3	8248 8.002	8249 8.002
8.00	8.00	7.70	63	19.0	26.0	0.50	3	8248 8.005	8249 8.005
8.00	8.00	7.70	63	19.0	26.0	0.80	3	8248 8.008	8249 8.008
8.00	8.00	7.70	63	19.0	26.0	1.00	3	8248 8.010	8249 8.010
8.00	8.00	7.70	63	19.0	26.0	2.00	3	8248 8.020	8249 8.020
10.00	10.00	9.50	72	22.0	30.0	0.30	3	8248 10.003	8249 10.003
10.00	10.00	9.50	72	22.0	30.0	0.50	3	8248 10.005	8249 10.005
10.00	10.00	9.50	72	22.0	30.0	0.80	3	8248 10.008	8249 10.008
10.00	10.00	9.50	72	22.0	30.0	1.00	3	8248 10.010	8249 10.010
10.00	10.00	9.50	72	22.0	30.0	1.50	3	8248 10.015	8249 10.015
12.00	12.00	11.50	83	26.0	36.0	0.30	3	8248 12.003	8249 12.003
12.00	12.00	11.50	83	26.0	36.0	0.50	3	8248 12.005	8249 12.005
12.00	12.00	11.50	83	26.0	36.0	0.80	3	8248 12.008	8249 12.008
12.00	12.00	11.50	83	26.0	36.0	1.00	3	8248 12.010	8249 12.010
12.00	12.00	11.50	83	26.0	36.0	1.50	3	8248 12.015	8249 12.015
12.00	12.00	11.50	83	26.0	36.0	2.00	3	8248 12.020	8249 12.020
12.00	12.00	11.50	83	26.0	36.0	2.50	3	8248 12.025	8249 12.025
12.00	12.00	11.50	83	26.0	36.0	3.00	3	8248 12.030	8249 12.030
12.00	12.00	11.50	83	26.0	36.0	4.00	3	8248 12.040	8249 12.040
16.00	16.00	15.50	92	32.0	42.0	0.50	3	8248 16.005	8249 16.005
16.00	16.00	15.50	92	32.0	42.0	1.00	3	8248 16.010	8249 16.010
16.00	16.00	15.50	92	32.0	42.0	2.00	3	8248 16.020	8249 16.020
16.00	16.00	15.50	92	32.0	42.0	2.50	3	8248 16.025	8249 16.025
16.00	16.00	15.50	92	32.0	42.0	3.00	3	8248 16.030	8249 16.030
16.00	16.00	15.50	92	32.0	42.0	4.00	3	8248 16.040	8249 16.040
20.00	20.00	19.50	104	38.0	52.0	0.50	3	8248 20.005	8249 20.005
20.00	20.00	19.50	104	38.0	52.0	1.00	3	8248 20.010	8249 20.010
20.00	20.00	19.50	104	38.0	52.0	2.00	3	8248 20.020	8249 20.020
20.00	20.00	19.50	104	38.0	52.0	2.50	3	8248 20.025	8249 20.025
20.00	20.00	19.50	104	38.0	52.0	3.00	3	8248 20.030	8249 20.030
20.00	20.00	19.50	104	38.0	52.0	4.00	3	8248 20.040	8249 20.040
25.00	25.00	24.00	121	45.0	63.0	2.00	3	8248 25.020	8249 25.020
25.00	25.00	24.00	121	45.0	63.0	3.00	3	8248 25.030	8249 25.030
25.00	25.00	24.00	121	45.0	63.0	4.00	3	8248 25.040	8249 25.040

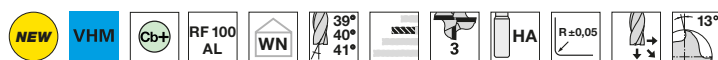


Ratio end mills RF 100 AL

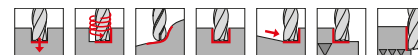
Article no. **8246**



cutting data see page 41



nano polished cutting edges • neck clearance • centre cutting

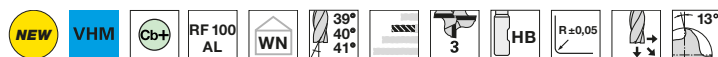


Ratio end mills RF 100 AL

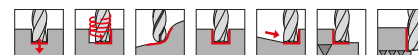
Article no. **8247**



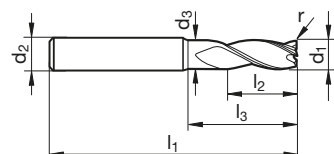
cutting data see page 41



nano polished cutting edges • neck clearance • centre cutting



High-performance milling cutters



Article no.

8246

8247

d1 js7 mm	d2 h5 mm	d3 mm	l1 mm	l2 mm	l3 mm	r mm	Z	Order no.
1.00	4.00	0.92	50	2.5	5.0	0.10	3	8246 1.001
1.00	4.00	0.92	50	2.5	5.0	0.20	3	8246 1.002
2.00	6.00	1.85	57	5.0	10.0	0.10	3	8246 2.001
2.00	6.00	1.85	57	5.0	10.0	0.20	3	8246 2.002
3.00	6.00	2.85	57	8.0	15.0	0.20	3	8246 3.002
3.00	6.00	2.85	57	8.0	15.0	0.50	3	8246 3.005
4.00	6.00	3.80	57	11.0	18.0	0.20	3	8246 4.002
4.00	6.00	3.80	57	11.0	18.0	0.50	3	8246 4.005
4.00	6.00	3.80	57	11.0	18.0	1.00	3	8246 4.010
5.00	6.00	4.80	57	13.0	18.0	0.20	3	8246 5.002
5.00	6.00	4.80	57	13.0	18.0	0.50	3	8246 5.005
5.00	6.00	4.80	57	13.0	18.0	1.00	3	8246 5.010
6.00	6.00	5.70	57	13.0	20.0	0.20	3	8246 6.002
6.00	6.00	5.70	57	13.0	20.0	0.50	3	8246 6.005
6.00	6.00	5.70	57	13.0	20.0	0.80	3	8246 6.008
6.00	6.00	5.70	57	13.0	20.0	1.00	3	8246 6.010
8.00	8.00	7.70	63	19.0	26.0	0.20	3	8246 8.002
8.00	8.00	7.70	63	19.0	26.0	0.50	3	8246 8.005
8.00	8.00	7.70	63	19.0	26.0	0.80	3	8246 8.008
8.00	8.00	7.70	63	19.0	26.0	1.00	3	8246 8.010
8.00	8.00	7.70	63	19.0	26.0	2.00	3	8246 8.020
10.00	10.00	9.50	72	22.0	30.0	0.30	3	8246 10.003
10.00	10.00	9.50	72	22.0	30.0	0.50	3	8246 10.005
10.00	10.00	9.50	72	22.0	30.0	0.80	3	8246 10.008
10.00	10.00	9.50	72	22.0	30.0	1.00	3	8246 10.010
10.00	10.00	9.50	72	22.0	30.0	1.50	3	8246 10.015
12.00	12.00	11.50	83	26.0	36.0	0.30	3	8246 12.003
12.00	12.00	11.50	83	26.0	36.0	0.50	3	8246 12.005
12.00	12.00	11.50	83	26.0	36.0	0.80	3	8246 12.008
12.00	12.00	11.50	83	26.0	36.0	1.00	3	8246 12.010
12.00	12.00	11.50	83	26.0	36.0	1.50	3	8246 12.015
12.00	12.00	11.50	83	26.0	36.0	2.00	3	8246 12.020
12.00	12.00	11.50	83	26.0	36.0	2.50	3	8246 12.025
12.00	12.00	11.50	83	26.0	36.0	3.00	3	8246 12.030
12.00	12.00	11.50	83	26.0	36.0	4.00	3	8246 12.040
16.00	16.00	15.50	92	32.0	42.0	0.50	3	8246 16.005
16.00	16.00	15.50	92	32.0	42.0	1.00	3	8246 16.010
16.00	16.00	15.50	92	32.0	42.0	2.00	3	8246 16.020
16.00	16.00	15.50	92	32.0	42.0	2.50	3	8246 16.025
16.00	16.00	15.50	92	32.0	42.0	3.00	3	8246 16.030
16.00	16.00	15.50	92	32.0	42.0	4.00	3	8246 16.040
20.00	20.00	19.50	104	38.0	52.0	0.50	3	8246 20.005
20.00	20.00	19.50	104	38.0	52.0	1.00	3	8246 20.010
20.00	20.00	19.50	104	38.0	52.0	2.00	3	8246 20.020
20.00	20.00	19.50	104	38.0	52.0	2.50	3	8246 20.025
20.00	20.00	19.50	104	38.0	52.0	3.00	3	8246 20.030
20.00	20.00	19.50	104	38.0	52.0	4.00	3	8246 20.040
25.00	25.00	24.00	121	45.0	63.0	2.00	3	8246 25.020
25.00	25.00	24.00	121	45.0	63.0	3.00	3	8246 25.030
25.00	25.00	24.00	121	45.0	63.0	4.00	3	8246 25.040

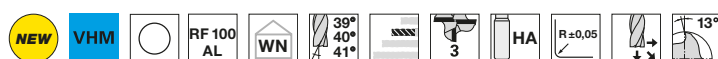


Ratio end mills RF 100 AL

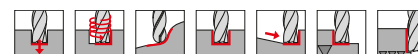
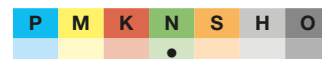
Article no. 8244



cutting data see page 41



nano polished cutting edges • neck clearance • centre cutting

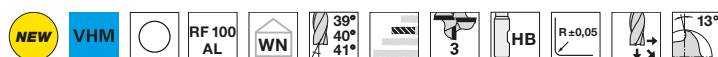


Ratio end mills RF 100 AL

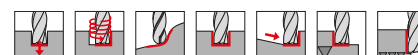
Article no. 8245



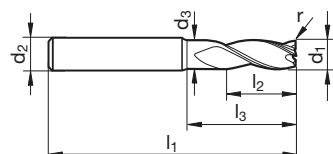
cutting data see page 41



nano polished cutting edges • neck clearance • centre cutting



High-performance milling cutters



Article no.

8244

8245

d1 js7 mm	d2 h5 mm	d3 mm	l1 mm	l2 mm	l3 mm	r mm	Z	Order no.
1.00	4.00	0.92	50	2.5	5.0	0.10	3	8244 1.001
1.00	4.00	0.92	50	2.5	5.0	0.20	3	8244 1.002
2.00	6.00	1.85	57	5.0	10.0	0.10	3	8244 2.001
2.00	6.00	1.85	57	5.0	10.0	0.20	3	8244 2.002
3.00	6.00	2.85	57	8.0	15.0	0.20	3	8244 3.002
3.00	6.00	2.85	57	8.0	15.0	0.50	3	8244 3.005
4.00	6.00	3.80	57	11.0	18.0	0.20	3	8244 4.002
4.00	6.00	3.80	57	11.0	18.0	0.50	3	8244 4.005
4.00	6.00	3.80	57	11.0	18.0	1.00	3	8244 4.010
5.00	6.00	4.80	57	13.0	18.0	0.20	3	8244 5.002
5.00	6.00	4.80	57	13.0	18.0	0.50	3	8244 5.005
5.00	6.00	4.80	57	13.0	18.0	1.00	3	8244 5.010
6.00	6.00	5.70	57	13.0	20.0	0.20	3	8244 6.002
6.00	6.00	5.70	57	13.0	20.0	0.50	3	8244 6.005
6.00	6.00	5.70	57	13.0	20.0	0.80	3	8244 6.008
6.00	6.00	5.70	57	13.0	20.0	1.00	3	8244 6.010
8.00	8.00	7.70	63	19.0	26.0	0.20	3	8244 8.002
8.00	8.00	7.70	63	19.0	26.0	0.50	3	8244 8.005
8.00	8.00	7.70	63	19.0	26.0	0.80	3	8244 8.008
8.00	8.00	7.70	63	19.0	26.0	1.00	3	8244 8.010
8.00	8.00	7.70	63	19.0	26.0	2.00	3	8244 8.020
10.00	10.00	9.50	72	22.0	30.0	0.30	3	8244 10.003
10.00	10.00	9.50	72	22.0	30.0	0.50	3	8244 10.005
10.00	10.00	9.50	72	22.0	30.0	0.80	3	8244 10.008
10.00	10.00	9.50	72	22.0	30.0	1.00	3	8244 10.010
10.00	10.00	9.50	72	22.0	30.0	1.50	3	8244 10.015
12.00	12.00	11.50	83	26.0	36.0	0.30	3	8244 12.003
12.00	12.00	11.50	83	26.0	36.0	0.50	3	8244 12.005
12.00	12.00	11.50	83	26.0	36.0	0.80	3	8244 12.008
12.00	12.00	11.50	83	26.0	36.0	1.00	3	8244 12.010
12.00	12.00	11.50	83	26.0	36.0	1.50	3	8244 12.015
12.00	12.00	11.50	83	26.0	36.0	2.00	3	8244 12.020
12.00	12.00	11.50	83	26.0	36.0	2.50	3	8244 12.025
12.00	12.00	11.50	83	26.0	36.0	3.00	3	8244 12.030
12.00	12.00	11.50	83	26.0	36.0	4.00	3	8244 12.040
16.00	16.00	15.50	92	32.0	42.0	0.50	3	8244 16.005
16.00	16.00	15.50	92	32.0	42.0	1.00	3	8244 16.010
16.00	16.00	15.50	92	32.0	42.0	2.00	3	8244 16.020
16.00	16.00	15.50	92	32.0	42.0	2.50	3	8244 16.025
16.00	16.00	15.50	92	32.0	42.0	3.00	3	8244 16.030
16.00	16.00	15.50	92	32.0	42.0	4.00	3	8244 16.040
20.00	20.00	19.50	104	38.0	52.0	0.50	3	8244 20.005
20.00	20.00	19.50	104	38.0	52.0	1.00	3	8244 20.010
20.00	20.00	19.50	104	38.0	52.0	2.00	3	8244 20.020
20.00	20.00	19.50	104	38.0	52.0	2.50	3	8244 20.025
20.00	20.00	19.50	104	38.0	52.0	3.00	3	8244 20.030
20.00	20.00	19.50	104	38.0	52.0	4.00	3	8244 20.040
25.00	25.00	24.00	121	45.0	63.0	2.00	3	8244 25.020
25.00	25.00	24.00	121	45.0	63.0	3.00	3	8244 25.030
25.00	25.00	24.00	121	45.0	63.0	4.00	3	8244 25.040

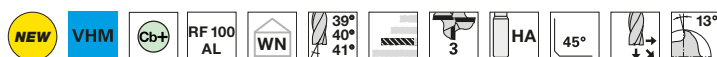


Ratio end mills RF 100 AL

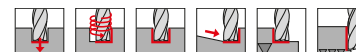
Article no. **8238**



cutting data see page 41



nano polished cutting edges • neck clearance • centre cutting

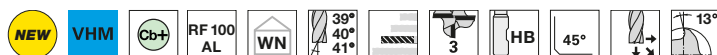


Ratio end mills RF 100 AL

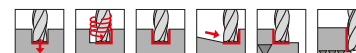
Article no. **8239**



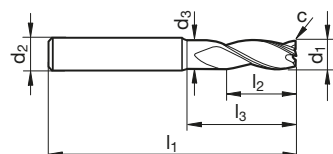
cutting data see page 41



nano polished cutting edges • neck clearance • centre cutting



High-performance milling cutters



Article no.

8238

8239

d1 js7 mm	d2 h5 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Order no.
1.00	4.00	0.92	50	2.5	7.0	0.02	3	8238 1.000
1.50	4.00	1.40	50	4.0	10.5	0.03	3	8238 1.500
2.00	6.00	1.85	57	5.0	14.0	0.04	3	8238 2.000
2.50	6.00	2.35	57	6.5	17.5	0.05	3	8238 2.500
3.00	6.00	2.85	65	8.0	21.0	0.06	3	8238 3.000
3.50	6.00	3.30	65	11.0	26.0	0.03	3	8238 3.500 8239 3.500
4.00	6.00	3.80	65	11.0	26.0	0.04	3	8238 4.000 8239 4.000
4.50	6.00	4.30	65	13.0	26.0	0.04	3	8238 4.500 8239 4.500
5.00	6.00	4.80	65	13.0	26.0	0.05	3	8238 5.000 8239 5.000
5.50	6.00	5.30	65	13.0	28.0	0.05	3	8238 5.500 8239 5.500
6.00	6.00	5.70	65	13.0	28.0	0.06	3	8238 6.000 8239 6.000
7.50	8.00	7.20	75	19.0	38.0	0.07	3	8238 7.500 8239 7.500
8.00	8.00	7.70	75	19.0	38.0	0.08	3	8238 8.000 8239 8.000
9.50	10.00	9.20	80	22.0	38.0	0.09	3	8238 9.500 8239 9.500
10.00	10.00	9.50	80	22.0	38.0	0.10	3	8238 10.000 8239 10.000
11.50	12.00	11.00	93	26.0	46.0	0.11	3	8238 11.500 8239 11.500
12.00	12.00	11.50	93	26.0	46.0	0.12	3	8238 12.000 8239 12.000
14.00	14.00	13.50	100	26.0	54.0	0.14	3	8238 14.000 8239 14.000
16.00	16.00	15.50	108	32.0	58.0	0.16	3	8238 16.000 8239 16.000
20.00	20.00	19.50	126	38.0	74.0	0.20	3	8238 20.000 8239 20.000
25.00	25.00	24.00	150	45.0	92.0	0.25	3	8238 25.000 8239 25.000



Ratio end mills RF 100 AL

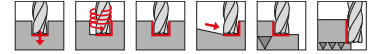
Article no. 8236



cutting data see page 41



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Ratio end mills RF 100 AL

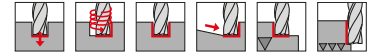
Article no. 8237



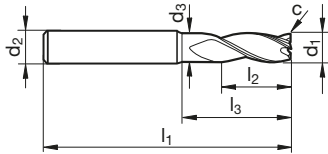
cutting data see page 41



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High-performance milling cutters



Article no.

8236

8237

d1 js7 mm	d2 h5 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Order no.
1.00	4.00	0.92	50	2.5	7.0	0.02	3	8236 1.000
1.50	4.00	1.40	50	4.0	10.5	0.03	3	8236 1.500
2.00	6.00	1.85	57	5.0	14.0	0.04	3	8236 2.000
2.50	6.00	2.35	57	6.5	17.5	0.05	3	8236 2.500
3.00	6.00	2.85	65	8.0	21.0	0.06	3	8236 3.000
3.50	6.00	3.30	65	11.0	26.0	0.03	3	8236 3.500 8237 3.500
4.00	6.00	3.80	65	11.0	26.0	0.04	3	8236 4.000 8237 4.000
4.50	6.00	4.30	65	13.0	26.0	0.04	3	8236 4.500 8237 4.500
5.00	6.00	4.80	65	13.0	26.0	0.05	3	8236 5.000 8237 5.000
5.50	6.00	5.30	65	13.0	28.0	0.05	3	8236 5.500 8237 5.500
6.00	6.00	5.70	65	13.0	28.0	0.06	3	8236 6.000 8237 6.000
7.50	8.00	7.20	75	19.0	38.0	0.07	3	8236 7.500 8237 7.500
8.00	8.00	7.70	75	19.0	38.0	0.08	3	8236 8.000 8237 8.000
9.50	10.00	9.20	80	22.0	38.0	0.09	3	8236 9.500 8237 9.500
10.00	10.00	9.50	80	22.0	38.0	0.10	3	8236 10.000 8237 10.000
11.50	12.00	11.00	93	26.0	46.0	0.11	3	8236 11.500 8237 11.500
12.00	12.00	11.50	93	26.0	46.0	0.12	3	8236 12.000 8237 12.000
14.00	14.00	13.50	100	26.0	54.0	0.14	3	8236 14.000 8237 14.000
16.00	16.00	15.50	108	32.0	58.0	0.16	3	8236 16.000 8237 16.000
20.00	20.00	19.50	126	38.0	74.0	0.20	3	8236 20.000 8237 20.000
25.00	25.00	24.00	150	45.0	92.0	0.25	3	8236 25.000 8237 25.000

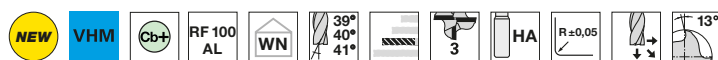


Ratio end mills RF 100 AL

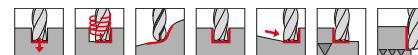
Article no. **8252**



cutting data see page 41



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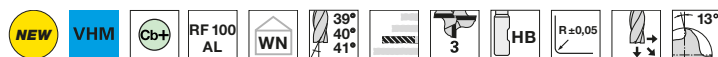


Ratio end mills RF 100 AL

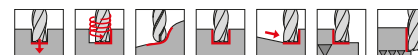
Article no. **8253**



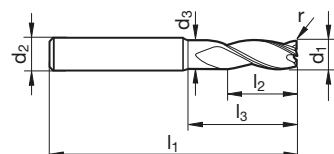
cutting data see page 41



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High-performance milling cutters



Article no.

8252

8253

d1 js7 mm	d2 h5 mm	d3 mm	l1 mm	l2 mm	l3 mm	r mm	Z	Order no.
1.00	4.00	0.92	50	2.5	7.0	0.10	3	8252 1.001
1.00	4.00	0.92	50	2.5	7.0	0.20	3	8252 1.002
2.00	6.00	1.85	57	5.0	14.0	0.10	3	8252 2.001
2.00	6.00	1.85	57	5.0	14.0	0.20	3	8252 2.002
3.00	6.00	2.85	65	8.0	21.0	0.20	3	8252 3.002
3.00	6.00	2.85	65	8.0	21.0	0.50	3	8252 3.005
4.00	6.00	3.80	65	11.0	26.0	0.20	3	8252 4.002
4.00	6.00	3.80	65	11.0	26.0	0.50	3	8252 4.005
4.00	6.00	3.80	65	11.0	26.0	1.00	3	8252 4.010
5.00	6.00	4.80	65	13.0	26.0	0.20	3	8252 5.002
5.00	6.00	4.80	65	13.0	26.0	0.50	3	8252 5.005
5.00	6.00	4.80	65	13.0	26.0	1.00	3	8252 5.010
6.00	6.00	5.70	65	13.0	28.0	0.20	3	8252 6.002
6.00	6.00	5.70	65	13.0	28.0	0.50	3	8252 6.005
6.00	6.00	5.70	65	13.0	28.0	0.80	3	8252 6.008
6.00	6.00	5.70	65	13.0	28.0	1.00	3	8252 6.010
8.00	8.00	7.70	75	19.0	38.0	0.20	3	8252 8.002
8.00	8.00	7.70	75	19.0	38.0	0.50	3	8252 8.005
8.00	8.00	7.70	75	19.0	38.0	0.80	3	8252 8.008
8.00	8.00	7.70	75	19.0	38.0	1.00	3	8252 8.010
8.00	8.00	7.70	75	19.0	38.0	2.00	3	8252 8.020
10.00	10.00	9.50	80	22.0	38.0	0.30	3	8252 10.003
10.00	10.00	9.50	80	22.0	38.0	0.50	3	8252 10.005
10.00	10.00	9.50	80	22.0	38.0	0.80	3	8252 10.008
10.00	10.00	9.50	80	22.0	38.0	1.00	3	8252 10.010
10.00	10.00	9.50	80	22.0	38.0	1.50	3	8252 10.015
12.00	12.00	11.50	93	26.0	46.0	0.30	3	8252 12.003
12.00	12.00	11.50	93	26.0	46.0	0.50	3	8252 12.005
12.00	12.00	11.50	93	26.0	46.0	0.80	3	8252 12.008
12.00	12.00	11.50	93	26.0	46.0	1.00	3	8252 12.010
12.00	12.00	11.50	93	26.0	46.0	1.50	3	8252 12.015
12.00	12.00	11.50	93	26.0	46.0	2.00	3	8252 12.020
12.00	12.00	11.50	93	26.0	46.0	3.00	3	8252 12.030
16.00	16.00	15.50	108	32.0	58.0	0.50	3	8252 16.005
16.00	16.00	15.50	108	32.0	58.0	1.00	3	8252 16.010
16.00	16.00	15.50	108	32.0	58.0	1.50	3	8252 16.015
16.00	16.00	15.50	108	32.0	58.0	2.00	3	8252 16.020
16.00	16.00	15.50	108	32.0	58.0	2.50	3	8252 16.025
16.00	16.00	15.50	108	32.0	58.0	3.00	3	8252 16.030
16.00	16.00	15.50	108	32.0	58.0	4.00	3	8252 16.040
20.00	20.00	19.50	126	38.0	74.0	0.50	3	8252 20.005
20.00	20.00	19.50	126	38.0	74.0	1.00	3	8252 20.010
20.00	20.00	19.50	126	38.0	74.0	1.50	3	8252 20.015
20.00	20.00	19.50	126	38.0	74.0	2.00	3	8252 20.020
20.00	20.00	19.50	126	38.0	74.0	2.50	3	8252 20.025
20.00	20.00	19.50	126	38.0	74.0	3.00	3	8252 20.030
20.00	20.00	19.50	126	38.0	74.0	4.00	3	8252 20.040
25.00	25.00	24.00	150	45.0	92.0	2.00	3	8252 25.020
25.00	25.00	24.00	150	45.0	92.0	3.00	3	8252 25.030
25.00	25.00	24.00	150	45.0	92.0	4.00	3	8252 25.040

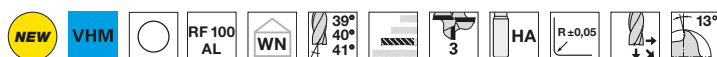


Ratio end mills RF 100 AL

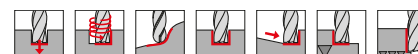
Article no. 8250



cutting data see page 41



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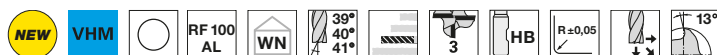


Ratio end mills RF 100 AL

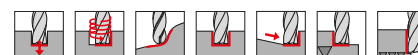
Article no. 8251



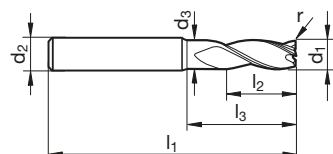
cutting data see page 41



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High-performance milling cutters



Article no.

8250

8251

d1 js7 mm	d2 h5 mm	d3 mm	l1 mm	l2 mm	l3 mm	r mm	Z	Order no.
1.00	4.00	0.92	50	2.5	7.0	0.10	3	8250 1.001
1.00	4.00	0.92	50	2.5	7.0	0.20	3	8250 1.002
2.00	6.00	1.85	57	5.0	14.0	0.10	3	8250 2.001
2.00	6.00	1.85	57	5.0	14.0	0.20	3	8250 2.002
3.00	6.00	2.85	65	8.0	21.0	0.20	3	8250 3.002
3.00	6.00	2.85	65	8.0	21.0	0.50	3	8250 3.005
4.00	6.00	3.80	65	11.0	26.0	0.20	3	8250 4.002
4.00	6.00	3.80	65	11.0	26.0	0.50	3	8250 4.005
4.00	6.00	3.80	65	11.0	26.0	1.00	3	8250 4.010
5.00	6.00	4.80	65	13.0	26.0	0.20	3	8250 5.002
5.00	6.00	4.80	65	13.0	26.0	0.50	3	8250 5.005
5.00	6.00	4.80	65	13.0	26.0	1.00	3	8250 5.010
6.00	6.00	5.70	65	13.0	28.0	0.20	3	8250 6.002
6.00	6.00	5.70	65	13.0	28.0	0.50	3	8250 6.005
6.00	6.00	5.70	65	13.0	28.0	0.80	3	8250 6.008
6.00	6.00	5.70	65	13.0	28.0	1.00	3	8250 6.010
8.00	8.00	7.70	75	19.0	38.0	0.20	3	8250 8.002
8.00	8.00	7.70	75	19.0	38.0	0.50	3	8250 8.005
8.00	8.00	7.70	75	19.0	38.0	0.80	3	8250 8.008
8.00	8.00	7.70	75	19.0	38.0	1.00	3	8250 8.010
8.00	8.00	7.70	75	19.0	38.0	2.00	3	8250 8.020
10.00	10.00	9.50	80	22.0	38.0	0.30	3	8250 10.003
10.00	10.00	9.50	80	22.0	38.0	0.50	3	8250 10.005
10.00	10.00	9.50	80	22.0	38.0	0.80	3	8250 10.008
10.00	10.00	9.50	80	22.0	38.0	1.00	3	8250 10.010
10.00	10.00	9.50	80	22.0	38.0	1.50	3	8250 10.015
12.00	12.00	11.50	93	26.0	46.0	0.30	3	8250 12.003
12.00	12.00	11.50	93	26.0	46.0	0.50	3	8250 12.005
12.00	12.00	11.50	93	26.0	46.0	0.80	3	8250 12.008
12.00	12.00	11.50	93	26.0	46.0	1.00	3	8250 12.010
12.00	12.00	11.50	93	26.0	46.0	1.50	3	8250 12.015
12.00	12.00	11.50	93	26.0	46.0	2.00	3	8250 12.020
12.00	12.00	11.50	93	26.0	46.0	3.00	3	8250 12.030
16.00	16.00	15.50	108	32.0	58.0	0.50	3	8250 16.005
16.00	16.00	15.50	108	32.0	58.0	1.00	3	8250 16.010
16.00	16.00	15.50	108	32.0	58.0	1.50	3	8250 16.015
16.00	16.00	15.50	108	32.0	58.0	2.00	3	8250 16.020
16.00	16.00	15.50	108	32.0	58.0	2.50	3	8250 16.025
16.00	16.00	15.50	108	32.0	58.0	3.00	3	8250 16.030
16.00	16.00	15.50	108	32.0	58.0	4.00	3	8250 16.040
20.00	20.00	19.50	126	38.0	74.0	0.50	3	8250 20.005
20.00	20.00	19.50	126	38.0	74.0	1.00	3	8250 20.010
20.00	20.00	19.50	126	38.0	74.0	1.50	3	8250 20.015
20.00	20.00	19.50	126	38.0	74.0	2.00	3	8250 20.020
20.00	20.00	19.50	126	38.0	74.0	2.50	3	8250 20.025
20.00	20.00	19.50	126	38.0	74.0	3.00	3	8250 20.030
20.00	20.00	19.50	126	38.0	74.0	4.00	3	8250 20.040
25.00	25.00	24.00	150	45.0	92.0	2.00	3	8250 25.020
25.00	25.00	24.00	150	45.0	92.0	3.00	3	8250 25.030
25.00	25.00	24.00	150	45.0	92.0	4.00	3	8250 25.040



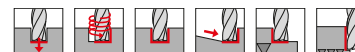
Ratio end mills RF 100 AL

Article no. **8242**



nano polished cutting edges • neck clearance • centre cutting

cutting data see page 41



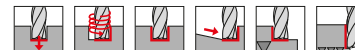
Ratio end mills RF 100 AL

Article no. **8243**

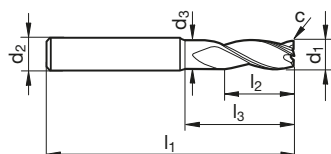


nano polished cutting edges • neck clearance • centre cutting

cutting data see page 41



High-performance milling
cutters



Article no.

8242

8243

d1 js7 mm	d2 h5 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Order no.
1.00	4.00	0.92	50	2.5	9.0	0.02	3	8242 1.000
1.50	4.00	1.40	50	4.0	13.5	0.03	3	8242 1.500
2.00	6.00	1.85	60	5.0	18.0	0.04	3	8242 2.000
2.50	6.00	2.35	65	6.5	22.5	0.05	3	8242 2.500
3.00	6.00	2.85	70	8.0	27.0	0.06	3	8242 3.000
3.50	6.00	3.30	75	11.0	30.0	0.03	3	8242 3.500 8243 3.500
4.00	6.00	3.80	75	11.0	30.0	0.04	3	8242 4.000 8243 4.000
4.50	6.00	4.30	75	13.0	35.0	0.04	3	8242 4.500 8243 4.500
5.00	6.00	4.80	75	13.0	35.0	0.05	3	8242 5.000 8243 5.000
5.50	6.00	5.30	75	13.0	38.0	0.05	3	8242 5.500 8243 5.500
6.00	6.00	5.70	75	13.0	38.0	0.06	3	8242 6.000 8243 6.000
7.50	8.00	7.20	86	19.0	49.0	0.07	3	8242 7.500 8243 7.500
8.00	8.00	7.70	86	19.0	49.0	0.08	3	8242 8.000 8243 8.000
9.50	10.00	9.20	100	22.0	60.0	0.09	3	8242 9.500 8243 9.500
10.00	10.00	9.50	100	22.0	60.0	0.10	3	8242 10.000 8243 10.000
11.50	12.00	11.00	120	26.0	74.0	0.11	3	8242 11.500 8243 11.500
12.00	12.00	11.50	120	26.0	74.0	0.12	3	8242 12.000 8243 12.000
14.00	14.00	13.50	150	26.0	104.0	0.14	3	8242 14.000 8243 14.000
16.00	16.00	15.50	150	32.0	101.0	0.16	3	8242 16.000 8243 16.000
20.00	20.00	19.50	175	38.0	124.0	0.20	3	8242 20.000 8243 20.000

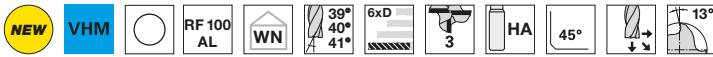


Ratio end mills RF 100 AL

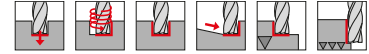
Article no. 8240



cutting data see page 41



nano polished cutting edges • neck clearance • centre cutting

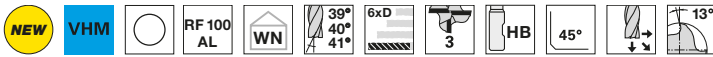


Ratio end mills RF 100 AL

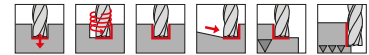
Article no. 8241



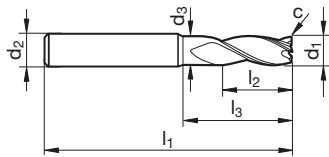
cutting data see page 41



nano polished cutting edges • neck clearance • centre cutting



High-performance milling cutters



Article no.

8240

8241

d1 js7 mm	d2 h5 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Order no.
1.00	4.00	0.92	50	2.5	9.0	0.02	3	8240 1.000
1.50	4.00	1.40	50	4.0	13.5	0.03	3	8240 1.500
2.00	6.00	1.85	60	5.0	18.0	0.04	3	8240 2.000
2.50	6.00	2.35	65	6.5	22.5	0.05	3	8240 2.500
3.00	6.00	2.85	70	8.0	27.0	0.06	3	8240 3.000
3.50	6.00	3.30	75	11.0	30.0	0.03	3	8240 3.500
4.00	6.00	3.80	75	11.0	30.0	0.04	3	8240 4.000
4.50	6.00	4.30	75	13.0	35.0	0.04	3	8240 4.500
5.00	6.00	4.80	75	13.0	35.0	0.05	3	8240 5.000
5.50	6.00	5.30	75	13.0	38.0	0.05	3	8240 5.500
6.00	6.00	5.70	75	13.0	38.0	0.06	3	8240 6.000
7.50	8.00	7.20	86	19.0	49.0	0.07	3	8240 7.500
8.00	8.00	7.70	86	19.0	49.0	0.08	3	8240 8.000
9.50	10.00	9.20	100	22.0	60.0	0.09	3	8240 9.500
10.00	10.00	9.50	100	22.0	60.0	0.10	3	8240 10.000
11.50	12.00	11.00	120	26.0	74.0	0.11	3	8240 11.500
12.00	12.00	11.50	120	26.0	74.0	0.12	3	8240 12.000
14.00	14.00	13.50	150	26.0	104.0	0.14	3	8240 14.000
16.00	16.00	15.50	150	32.0	101.0	0.16	3	8240 16.000
20.00	20.00	19.50	175	38.0	124.0	0.20	3	8240 20.000



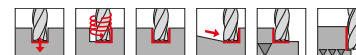
Ratio end mills RF 100 AL

Article no. **8256**



nano polished cutting edges • neck clearance • centre cutting

cutting data see page 41



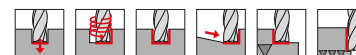
Ratio end mills RF 100 AL

Article no. **8257**

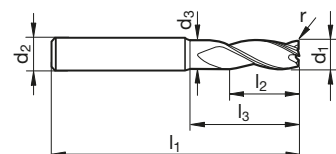


nano polished cutting edges • neck clearance • centre cutting

cutting data see page 41



High-performance milling cutters



Article no.

8256

8257

d1 js7 mm	d2 h5 mm	d3 mm	l1 mm	l2 mm	l3 mm	r mm	Z	Order no.
1.00	4.00	0.92	50	2.5	9.0	0.10	3	8256 1.001
1.00	4.00	0.92	50	2.5	9.0	0.20	3	8256 1.002
2.00	6.00	1.85	60	5.0	18.0	0.10	3	8256 2.001
2.00	6.00	1.85	60	5.0	18.0	0.20	3	8256 2.002
3.00	6.00	2.85	70	8.0	27.0	0.20	3	8256 3.002
3.00	6.00	2.85	70	8.0	27.0	0.50	3	8256 3.005
4.00	6.00	3.80	75	11.0	30.0	0.20	3	8256 4.002
4.00	6.00	3.80	75	11.0	30.0	0.50	3	8256 4.005
4.00	6.00	3.80	75	11.0	30.0	1.00	3	8256 4.010
5.00	6.00	4.80	75	13.0	35.0	0.20	3	8256 5.002
5.00	6.00	4.80	75	13.0	35.0	0.50	3	8256 5.005
5.00	6.00	4.80	75	13.0	35.0	1.00	3	8256 5.010
6.00	6.00	5.70	75	13.0	38.0	0.20	3	8256 6.002
6.00	6.00	5.70	75	13.0	38.0	0.50	3	8256 6.005
6.00	6.00	5.70	75	13.0	38.0	0.80	3	8256 6.008
6.00	6.00	5.70	75	13.0	38.0	1.00	3	8256 6.010
8.00	8.00	7.70	86	19.0	49.0	0.20	3	8256 8.002
8.00	8.00	7.70	86	19.0	49.0	0.50	3	8256 8.005
8.00	8.00	7.70	86	19.0	49.0	0.80	3	8256 8.008
8.00	8.00	7.70	86	19.0	49.0	1.00	3	8256 8.010
8.00	8.00	7.70	86	19.0	49.0	2.00	3	8256 8.020
10.00	10.00	9.50	100	22.0	60.0	0.30	3	8256 10.003
10.00	10.00	9.50	100	22.0	60.0	0.50	3	8256 10.005
10.00	10.00	9.50	100	22.0	60.0	0.80	3	8256 10.008
10.00	10.00	9.50	100	22.0	60.0	1.00	3	8256 10.010
10.00	10.00	9.50	100	22.0	60.0	1.50	3	8256 10.015
12.00	12.00	11.50	120	26.0	74.0	0.30	3	8256 12.003
12.00	12.00	11.50	120	26.0	74.0	0.50	3	8256 12.005
12.00	12.00	11.50	120	26.0	74.0	0.80	3	8256 12.008
12.00	12.00	11.50	120	26.0	74.0	1.00	3	8256 12.010
12.00	12.00	11.50	120	26.0	74.0	1.50	3	8256 12.015
12.00	12.00	11.50	120	26.0	74.0	2.00	3	8256 12.020
12.00	12.00	11.50	120	26.0	74.0	3.00	3	8256 12.030
16.00	16.00	15.50	150	32.0	101.0	0.50	3	8256 16.005
16.00	16.00	15.50	150	32.0	101.0	1.00	3	8256 16.010
16.00	16.00	15.50	150	32.0	101.0	1.50	3	8256 16.015
16.00	16.00	15.50	150	32.0	101.0	2.00	3	8256 16.020
16.00	16.00	15.50	150	32.0	101.0	2.50	3	8256 16.025
16.00	16.00	15.50	150	32.0	101.0	3.00	3	8256 16.030
16.00	16.00	15.50	150	32.0	101.0	4.00	3	8256 16.040
20.00	20.00	19.50	175	38.0	124.0	0.50	3	8256 20.005
20.00	20.00	19.50	175	38.0	124.0	1.00	3	8256 20.010
20.00	20.00	19.50	175	38.0	124.0	1.50	3	8256 20.015
20.00	20.00	19.50	175	38.0	124.0	2.00	3	8256 20.020
20.00	20.00	19.50	175	38.0	124.0	2.50	3	8256 20.025
20.00	20.00	19.50	175	38.0	124.0	3.00	3	8256 20.030
20.00	20.00	19.50	175	38.0	124.0	4.00	3	8256 20.040

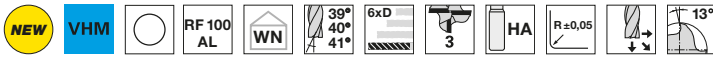


Ratio end mills RF 100 AL

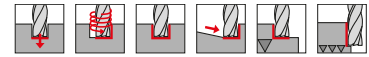
Article no. 8254



cutting data see page 41



nano polished cutting edges • neck clearance • centre cutting



Ratio end mills RF 100 AL

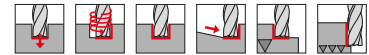
Article no. 8255



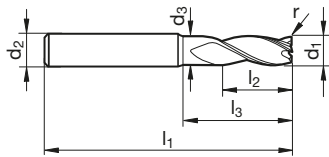
cutting data see page 41



nano polished cutting edges • neck clearance • centre cutting



High-performance milling cutters



Article no.

8254

8255

d1 js7 mm	d2 h5 mm	d3 mm	l1 mm	l2 mm	l3 mm	r mm	Z	Order no.
1.00	4.00	0.92	50	2.5	9.0	0.10	3	8254 1.001
1.00	4.00	0.92	50	2.5	9.0	0.20	3	8254 1.002
2.00	6.00	1.85	60	5.0	18.0	0.10	3	8254 2.001
2.00	6.00	1.85	60	5.0	18.0	0.20	3	8254 2.002
3.00	6.00	2.85	70	8.0	27.0	0.20	3	8254 3.002
3.00	6.00	2.85	70	8.0	27.0	0.50	3	8254 3.005
4.00	6.00	3.80	75	11.0	30.0	0.20	3	8254 4.002
4.00	6.00	3.80	75	11.0	30.0	0.50	3	8254 4.005
4.00	6.00	3.80	75	11.0	30.0	1.00	3	8254 4.010
5.00	6.00	4.80	75	13.0	35.0	0.20	3	8254 5.002
5.00	6.00	4.80	75	13.0	35.0	0.50	3	8254 5.005
5.00	6.00	4.80	75	13.0	35.0	1.00	3	8254 5.010
6.00	6.00	5.70	75	13.0	38.0	0.20	3	8254 6.002
6.00	6.00	5.70	75	13.0	38.0	0.50	3	8254 6.005
6.00	6.00	5.70	75	13.0	38.0	0.80	3	8254 6.008
6.00	6.00	5.70	75	13.0	38.0	1.00	3	8254 6.010
8.00	8.00	7.70	86	19.0	49.0	0.20	3	8254 8.002
8.00	8.00	7.70	86	19.0	49.0	0.50	3	8254 8.005
8.00	8.00	7.70	86	19.0	49.0	0.80	3	8254 8.008
8.00	8.00	7.70	86	19.0	49.0	1.00	3	8254 8.010
8.00	8.00	7.70	86	19.0	49.0	2.00	3	8254 8.020
10.00	10.00	9.50	100	22.0	60.0	0.30	3	8254 10.003
10.00	10.00	9.50	100	22.0	60.0	0.50	3	8254 10.005
10.00	10.00	9.50	100	22.0	60.0	0.80	3	8254 10.008
10.00	10.00	9.50	100	22.0	60.0	1.00	3	8254 10.010
10.00	10.00	9.50	100	22.0	60.0	1.50	3	8254 10.015
12.00	12.00	11.50	120	26.0	74.0	0.30	3	8254 12.003
12.00	12.00	11.50	120	26.0	74.0	0.50	3	8254 12.005
12.00	12.00	11.50	120	26.0	74.0	0.80	3	8254 12.008
12.00	12.00	11.50	120	26.0	74.0	1.00	3	8254 12.010
12.00	12.00	11.50	120	26.0	74.0	1.50	3	8254 12.015
12.00	12.00	11.50	120	26.0	74.0	2.00	3	8254 12.020
12.00	12.00	11.50	120	26.0	74.0	3.00	3	8254 12.030
16.00	16.00	15.50	150	32.0	101.0	0.50	3	8254 16.005
16.00	16.00	15.50	150	32.0	101.0	1.00	3	8254 16.010
16.00	16.00	15.50	150	32.0	101.0	1.50	3	8254 16.015
16.00	16.00	15.50	150	32.0	101.0	2.00	3	8254 16.020
16.00	16.00	15.50	150	32.0	101.0	2.50	3	8254 16.025
16.00	16.00	15.50	150	32.0	101.0	3.00	3	8254 16.030
16.00	16.00	15.50	150	32.0	101.0	4.00	3	8254 16.040
20.00	20.00	19.50	175	38.0	124.0	0.50	3	8254 20.005
20.00	20.00	19.50	175	38.0	124.0	1.00	3	8254 20.010
20.00	20.00	19.50	175	38.0	124.0	1.50	3	8254 20.015
20.00	20.00	19.50	175	38.0	124.0	2.00	3	8254 20.020
20.00	20.00	19.50	175	38.0	124.0	2.50	3	8254 20.025
20.00	20.00	19.50	175	38.0	124.0	3.00	3	8254 20.030
20.00	20.00	19.50	175	38.0	124.0	4.00	3	8254 20.040

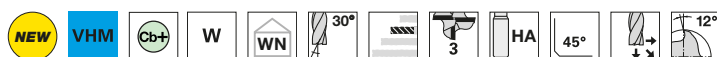


Ratio roughing end mills Alu RF 100 AL

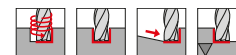
Article no. **6464**



cutting data see page 42



neck clearance • centre cutting • with internal cooling: radial and axial exits

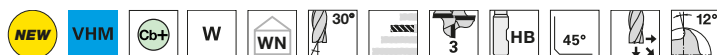


Ratio roughing end mills Alu RF 100 AL

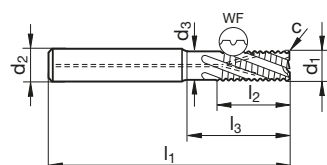
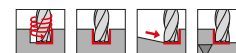
Article no. **6465**



cutting data see page 42



neck clearance • centre cutting • with internal cooling: radial and axial exits



Article no.

6464

6465

d1 js9 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z
6.00	6.00	5.70	57	13.0	20.0	0.06	3
8.00	8.00	7.70	63	19.0	26.0	0.08	3
10.00	10.00	9.50	72	22.0	30.0	0.10	3
12.00	12.00	11.50	83	26.0	36.0	0.12	3
16.00	16.00	15.50	92	32.0	42.0	0.16	3
20.00	20.00	19.50	104	38.0	52.0	0.20	3

Order no.	
6464 6.000	6465 6.000
6464 8.000	6465 8.000
6464 10.000	6465 10.000
6464 12.000	6465 12.000
6464 16.000	6465 16.000
6464 20.000	6465 20.000



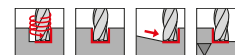
Ratio roughing end mills Alu RF 100 AL

Article no. **6466**

cutting data see page 42



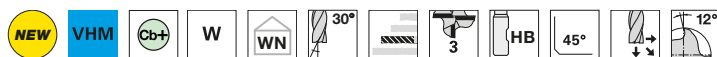
neck clearance • centre cutting • with internal cooling: radial and axial exits



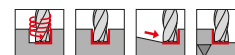
Ratio roughing end mills Alu RF 100 AL

Article no. **6467**

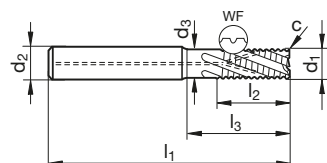
cutting data see page 42



neck clearance • centre cutting • with internal cooling: radial and axial exits



High-performance milling cutters



Article no.

6466**6467**

d1 js9 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z
6.00	6.00	5.70	65	13.0	28.0	0.06	3
8.00	8.00	7.70	75	19.0	38.0	0.08	3
10.00	10.00	9.50	80	22.0	38.0	0.10	3
12.00	12.00	11.50	93	26.0	46.0	0.12	3
16.00	16.00	15.50	108	32.0	58.0	0.16	3
20.00	20.00	19.50	126	38.0	74.0	0.20	3

Order no.

6466 6.000	6467 6.000
6466 8.000	6467 8.000
6466 10.000	6467 10.000
6466 12.000	6467 12.000
6466 16.000	6467 16.000
6466 20.000	6467 20.000



Ratio roughing end mills Alu RF 100 AL

Article no. **6463**

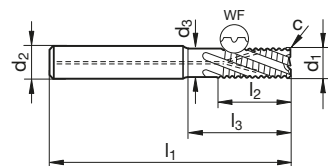
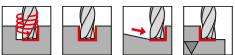


cutting data see page 42



neck clearance • centre cutting • with internal cooling: radial and axial exits

P	M	K	N	S	H	O
			•			○



Article no.

6463

d1 js9 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z
10.00	10.00	9.50	100	22.0	58.0	0.10	3
12.00	12.00	11.50	108	26.0	61.0	0.12	3
16.00	16.00	15.50	132	32.0	82.0	0.16	3
20.00	20.00	19.50	154	38.0	102.0	0.20	3
25.00	25.00	24.00	185	45.0	127.0	0.25	3

Order no.

6463 10.000
6463 12.000
6463 16.000
6463 20.000
6463 25.000

High-performance milling
cutters



Ball nose end mills GA 200 A

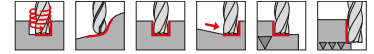
Article no. 6916



cutting data see page 43



neck clearance • centre cutting



Ball nose end mills GA 200 A

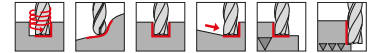
Article no. 6917



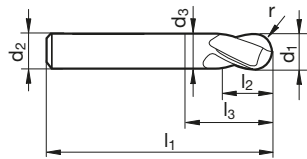
cutting data see page 43



neck clearance • centre cutting



High-performance milling cutters



Article no.

6916

6917

d1 $\begin{smallmatrix} -0,01 \\ -0,03 \end{smallmatrix}$ mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	r mm	Z	Order no.	
3.00	6.00	2.80	57	4.0	15.0	1.50	2	6916 3.000	6917 3.000
4.00	6.00	3.80	57	5.0	18.0	2.00	2	6916 4.000	6917 4.000
5.00	6.00	4.80	57	6.0	18.0	2.50	2	6916 5.000	6917 5.000
6.00	6.00	5.70	57	7.0	20.0	3.00	2	6916 6.000	6917 6.000
8.00	8.00	7.70	63	9.0	26.0	4.00	2	6916 8.000	6917 8.000
10.00	10.00	9.50	72	11.0	30.0	5.00	2	6916 10.000	6917 10.000
12.00	12.00	11.50	83	12.0	36.0	6.00	2	6916 12.000	6917 12.000
16.00	16.00	15.50	92	16.0	42.0	8.00	2	6916 16.000	6917 16.000



Solid carbide single-fluted cutter AL

Low-burr milling in aluminium

Solid carbide single-fluted
cutter for burr-free aluminium
profile machining

Be it in e-mobility, aviation or mechanical engineering – demand for aluminium components is not only increasing all the time, but also its use is growing across a wide range of industries. A case for the solid carbide single-fluted cutter AL.

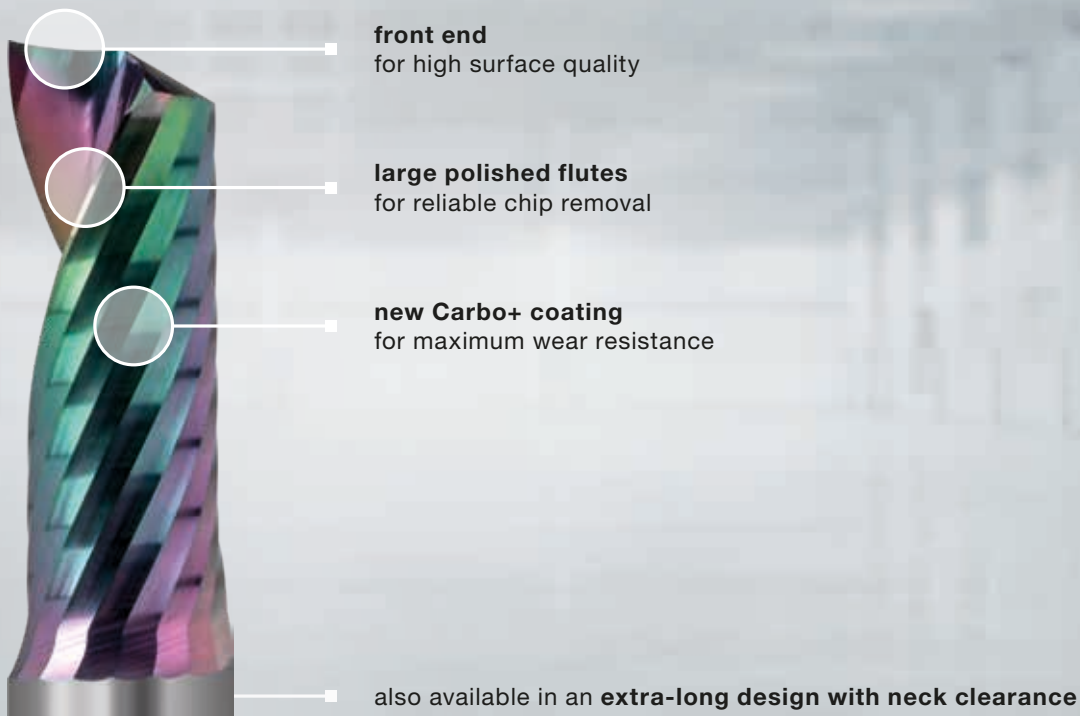
With its large, polished flutes, the tool ensures excellent chip removal during aluminium and plastic machining, ensuring a safe machining process. Thanks to its very positive geometry, you can achieve an easy, low-burr cut with the lowest power consumption when machining aluminium profiles.

And you don't have to worry about wear either: The thin Carbo+ coating keeps the cutting edges extremely sharp. This makes the solid carbide single-fluted cutter ideal for dry and MQL machining.

The tool is available in four designs, including an extra-long design with neck clearance.

x Tool life increased by 51 %

-  **X** low-burr cut & best possible surfaces
-  **X** low power consumption
-  **X** reliable chip removal



Application example

Component: Special AL profile for tent construction (anodised), AlMgSi05

Tool: #8138, Ø 10 mm

Customer target: Burr-free and rework-free cutting edges

Difficulty: Due to the anodised layer, conventional milling cutters suffer wear and produce burrs & poor surfaces

Cutting data:	Gühring	Competition
v_c	785 m/min	v _c 785 m/min
n	24,990 rpm	n 24,990 rpm
f	1,960 mm/min	f 1,273 mm/min

Tool life:	355 m	235 m
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End mills (single-fluted)

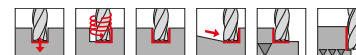
Article no. **6793**



cutting data see page 44



centre cutting • polished flutes



End mills (single-fluted)

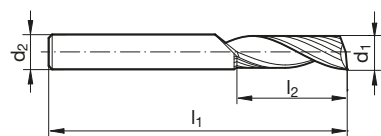
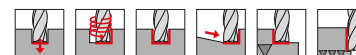
Article no. **8138**



cutting data see page 44



centre cutting • polished flutes



Article no.

6793

8138

d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	Z
2.00	2.00	38	10.0	1
3.00	3.00	39	12.0	1
4.00	4.00	40	15.0	1
5.00	5.00	50	16.0	1
6.00	6.00	57	20.0	1
8.00	8.00	63	22.0	1
10.00	10.00	73	25.0	1
12.00	12.00	83	30.0	1
16.00	16.00	92	35.0	1

Order no.
6793 2.000
6793 3.000
6793 4.000
6793 5.000
6793 6.000
6793 8.000
6793 10.000
6793 12.000
6793 16.000

8138 2.000
8138 3.000
8138 4.000
8138 5.000
8138 6.000
8138 8.000
8138 10.000
8138 12.000
8138 16.000



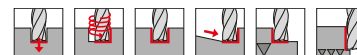
End mills (single-fluted)

Article no. **6935**

cutting data see page 44



centre cutting • polished flutes



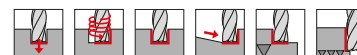
End mills (single-fluted)

Article no. **8135**

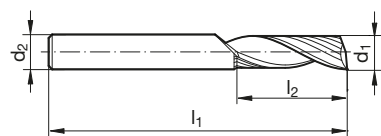
cutting data see page 44



centre cutting • polished flutes



High-performance milling cutters



Article no.

6935**8135**

d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	Z	Order no.	
3.00	3.00	55	18.0	1	6935 3.000	8135 3.000
4.00	4.00	60	22.0	1	6935 4.000	8135 4.000
5.00	5.00	60	24.0	1	6935 5.000	8135 5.000
6.00	6.00	80	30.0	1	6935 6.000	8135 6.000
8.00	8.00	80	32.0	1	6935 8.000	8135 8.000
10.00	10.00	100	45.0	1	6935 10.000	8135 10.000
12.00	12.00	110	52.0	1	6935 12.000	8135 12.000
16.00	16.00	120	55.0	1	6935 16.000	8135 16.000



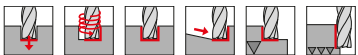
End mills (single-fluted)

Article no. **6936**



centre cutting • polished flutes

cutting data see page 44



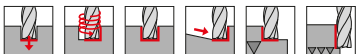
End mills (single-fluted)

Article no. **8136**

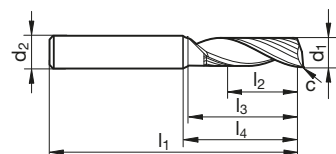


centre cutting • polished flutes

cutting data see page 44



High-performance milling cutters



Article no.

6936

8136

d1 h10 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	l4 mm	c mm	Z
1.00	6.00	50	5.0	7.2	14.000	0.025	1
1.50	6.00	50	7.0	9.7	15.060	0.030	1
2.00	6.00	57	10.0	13.7	19.000	0.035	1
3.00	6.00	57	12.0	15.7	19.000	0.050	1
4.00	6.00	57	14.0	18.0	21.000	0.065	1
5.00	6.00	57	16.0	17.5	21.000	0.080	1
6.00	6.00	57	20.0	21.0	21.000	0.100	1
8.00	8.00	63	22.0	27.0	27.000	0.100	1
10.00	10.00	73	25.0	33.0	33.000	0.130	1

Order no.	
6936 1.000	8136 1.000
6936 1.500	8136 1.500
6936 2.000	8136 2.000
6936 3.000	8136 3.000
6936 4.000	8136 4.000
6936 5.000	8136 5.000
6936 6.000	8136 6.000
6936 8.000	8136 8.000
6936 10.000	8136 10.000



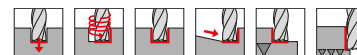
End mills (single-fluted)

Article no. **6937**

cutting data see page 44



neck clearance • centre cutting • polished flutes



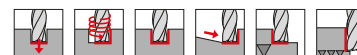
End mills (single-fluted)

Article no. **8137**

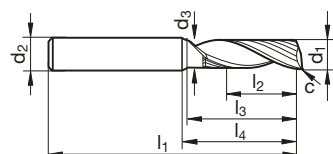
cutting data see page 44



neck clearance • centre cutting • polished flutes



High-performance milling cutters



Article no.

6937**8137**

d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	l4 mm	c mm	Z	Order no.	
1.00	6.00	0.92	50	2.5	7.0	17.140	0.025	1	6937 1.000	8137 1.000
1.50	6.00	1.40	57	4.0	11.0	20.240	0.030	1	6937 1.500	8137 1.500
2.00	6.00	1.85	57	6.0	14.0	22.400	0.035	1	6937 2.000	8137 2.000
3.00	6.00	2.85	65	8.0	22.0	27.280	0.050	1	6937 3.000	8137 3.000
4.00	6.00	3.80	65	11.0	28.0	31.370	0.065	1	6937 4.000	8137 4.000
5.00	6.00	4.80	80	13.0	35.0	37.000	0.080	1	6937 5.000	8137 5.000
6.00	6.00	5.70	80	13.0	41.0	42.000	0.100	1	6937 6.000	8137 6.000
8.00	8.00	7.70	80	19.0	41.0	42.000	0.100	1	6937 8.000	8137 8.000
10.00	10.00	9.50	100	22.0	59.0	60.000	0.130	1	6937 10.000	8137 10.000



90° Chamfering milling cutters

Article no. **6918**



cutting data see page 45



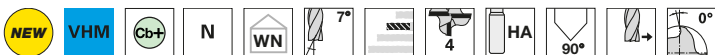
P	M	K	N	S	H	O
			•			○

90° Chamfering milling cutters

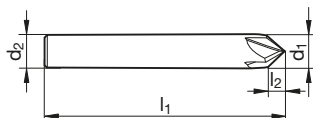
Article no. **6919**



cutting data see page 45



P	M	K	N	S	H	O
			•			•



Article no.

6918

6919

d1 js9 mm	d2 h6 mm	l1 mm	l2 mm	Z
4.00	4.00	50.0	2.0	4
6.00	6.00	57.0	3.0	4
8.00	8.00	63.0	4.0	4
10.00	10.00	72.0	5.0	4
12.00	12.00	83.0	6.0	4

Order no.	
6918 4.000	6919 4.000
6918 6.000	6919 6.000
6918 8.000	6919 8.000
6918 10.000	6919 10.000
6918 12.000	6919 12.000



Micro-precision milling cutters RF 100 AL, 2.5xD

Milling conditions:

HPC

stable machining conditions
high drive power

HSC

stable machining conditions
low cutting depths, high cutting values

2.5xD

tools 2.5xD



GTC

see page
„GTC milling strategies“

Machining group	Application	v _c (m/min)			a _p max.	a _e max.	f _z (mm) with nom. Ø						
		Ø0.5 - 1.0	Ø1.01 - 2.0	Ø2.01 - 3.175			0.5	0.8	1.0	1.5	2.0	2.5	3.0
N1.1.1 Wrought aluminium alloys, non-hardened, 60 HB N1.1.2 Wrought aluminium alloys, hardened, 100 HB	Plunging	80	145	180	1xD	1xD	0.004	0.004	0.006	0.008	0.011	0.014	0.017
	Slotting	135	240	300	1xD	1xD	0.007	0.011	0.014	0.033	0.044	0.055	0.066
	Roughing	130	240	295	2xD	0.33xD	0.012	0.020	0.025	0.041	0.055	0.069	0.083
	Finishing	135	190	245	2.5xD	0.03xD	0.005	0.009	0.011	0.016	0.021	0.027	0.032
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB	Plunging	65	120	150	1xD	1xD	0.004	0.004	0.004	0.006	0.008	0.009	0.011
	Slotting	115	200	250	1xD	1xD	0.005	0.008	0.010	0.023	0.030	0.038	0.045
	Roughing	110	200	245	2xD	0.33xD	0.008	0.014	0.017	0.028	0.038	0.047	0.056
	Finishing	115	160	200	2.5xD	0.03xD	0.004	0.006	0.007	0.011	0.015	0.018	0.022
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB	Plunging	50	95	120	1xD	1xD	0.004	0.004	0.004	0.006	0.008	0.009	0.011
	Slotting	90	160	200	1xD	1xD	0.005	0.008	0.010	0.023	0.030	0.038	0.045
	Roughing	85	160	195	2xD	0.33xD	0.008	0.014	0.017	0.028	0.038	0.047	0.056
	Finishing	90	125	160	2.5xD	0.03xD	0.004	0.006	0.007	0.011	0.015	0.018	0.022
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 % N3.1.2 Copper and copper alloys: CuZn, CuSnZn	Plunging	75	135	170	1xD	1xD	0.004	0.004	0.004	0.004	0.005	0.006	0.008
	Slotting	125	225	280	1xD	1xD	0.004	0.005	0.007	0.015	0.020	0.025	0.030
	Roughing	120	225	275	2xD	0.33xD	0.006	0.009	0.011	0.019	0.025	0.031	0.038
	Finishing	125	175	225	2.5xD	0.03xD	0.004	0.004	0.005	0.007	0.010	0.012	0.015
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte	Plunging	60	105	130	1xD	1xD	0.004	0.004	0.004	0.004	0.005	0.006	0.007
	Slotting	100	175	220	1xD	1xD	0.004	0.005	0.006	0.014	0.018	0.023	0.028
	Roughing	95	175	215	2xD	0.33xD	0.005	0.008	0.010	0.017	0.023	0.029	0.035
	Finishing	100	140	180	2.5xD	0.03xD	0.004	0.004	0.004	0.007	0.009	0.011	0.013
01.1.1 Thermoplastics	Plunging	55	100	120	1xD	1xD	0.004	0.004	0.005	0.008	0.010	0.013	0.015
	Slotting	90	160	200	1xD	1xD	0.007	0.010	0.013	0.030	0.040	0.050	0.060
	Roughing	85	160	200	2xD	0.33xD	0.011	0.018	0.023	0.038	0.050	0.063	0.075
	Finishing	90	125	160	2.5xD	0.03xD	0.005	0.008	0.010	0.015	0.019	0.024	0.029
01.1.3 Duroplastics	Plunging	35	70	85	1xD	1xD	0.004	0.004	0.005	0.008	0.010	0.013	0.015
	Slotting	65	110	140	1xD	1xD	0.007	0.010	0.013	0.030	0.040	0.050	0.060
	Roughing	60	110	140	2xD	0.33xD	0.011	0.018	0.023	0.038	0.050	0.063	0.075
	Finishing	65	90	115	2.5xD	0.03xD	0.005	0.008	0.010	0.015	0.019	0.024	0.029
01.1.5 Acrylic glass / Plexiglass / PMMA	Plunging	40	80	95	1xD	1xD	0.004	0.004	0.005	0.008	0.010	0.013	0.015
	Slotting	70	130	160	1xD	1xD	0.007	0.010	0.013	0.030	0.040	0.050	0.060
	Roughing	70	130	160	2xD	0.33xD	0.011	0.018	0.023	0.038	0.050	0.063	0.075
	Finishing	70	100	130	2.5xD	0.03xD	0.005	0.008	0.010	0.015	0.019	0.024	0.029

Cutting data



Micro-precision milling cutters RF 100 AL, 5xD

Milling conditions:

HPC

stable machining conditions
high drive power

HSC

stable machining conditions
low cutting depths, high cutting values

5xD

tools 5xD



see page
„GTC milling strategies“

Cutting data

Machining group	Application	v _c (m/min)			a _p max.	a _e max.	f _z (mm) with nom. Ø						
		Ø0.5 - 1.0	Ø1.01 - 2.0	Ø2.01 - 3.175			0.5	0.8	1.0	1.5	2.0	2.5	3.0
N1.1.1 Wrought aluminium alloys, non-hardened, 60 HB N1.1.2 Wrought aluminium alloys, hardened, 100 HB	Plunging	55	100	120	0.25xD	1xD	0.004	0.004	0.004	0.007	0.009	0.011	0.013
	Slotting	90	160	200	0.33xD	1xD	0.004	0.006	0.007	0.017	0.022	0.028	0.033
	Roughing	105	195	240	5xD	0.05xD	0.009	0.014	0.018	0.030	0.040	0.049	0.059
	Finishing	95	135	175	5xD	0.02xD	0.004	0.006	0.007	0.011	0.014	0.018	0.021
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB	Plunging	35	60	75	0.25xD	1xD	0.004	0.004	0.004	0.005	0.006	0.008	0.009
	Slotting	55	100	125	0.33xD	1xD	0.004	0.004	0.005	0.011	0.015	0.019	0.023
	Roughing	65	125	150	5xD	0.05xD	0.006	0.010	0.012	0.020	0.027	0.034	0.041
	Finishing	60	85	110	5xD	0.02xD	0.004	0.004	0.005	0.007	0.010	0.012	0.014
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB	Plunging	25	50	60	0.25xD	1xD	0.004	0.004	0.004	0.005	0.006	0.008	0.009
	Slotting	45	80	100	0.33xD	1xD	0.004	0.004	0.005	0.011	0.015	0.019	0.023
	Roughing	50	95	120	5xD	0.05xD	0.006	0.010	0.012	0.020	0.027	0.034	0.041
	Finishing	45	65	85	5xD	0.02xD	0.004	0.004	0.005	0.007	0.010	0.012	0.014
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 % N3.1.2 Copper and copper alloys: CuZn, CuSnZn	Plunging	35	70	85	0.25xD	1xD	0.004	0.004	0.004	0.004	0.004	0.005	0.006
	Slotting	65	110	140	0.33xD	1xD	0.004	0.004	0.004	0.008	0.010	0.013	0.015
	Roughing	75	140	170	5xD	0.05xD	0.004	0.006	0.008	0.014	0.018	0.023	0.027
	Finishing	65	95	120	5xD	0.02xD	0.004	0.004	0.004	0.005	0.006	0.008	0.010
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte	Plunging	30	55	65	0.25xD	1xD	0.004	0.004	0.004	0.004	0.004	0.005	0.006
	Slotting	50	90	110	0.33xD	1xD	0.004	0.004	0.004	0.007	0.009	0.012	0.014
	Roughing	60	110	135	5xD	0.05xD	0.004	0.006	0.007	0.012	0.017	0.021	0.025
	Finishing	55	75	95	5xD	0.02xD	0.004	0.004	0.004	0.004	0.006	0.007	0.009
01.1.1 Thermoplastics	Plunging	25	50	60	0.25xD	1xD	0.004	0.004	0.004	0.006	0.008	0.010	0.012
	Slotting	45	80	100	0.33xD	1xD	0.004	0.005	0.007	0.015	0.020	0.025	0.030
	Roughing	55	100	120	5xD	0.05xD	0.008	0.013	0.016	0.027	0.036	0.045	0.054
	Finishing	50	65	85	5xD	0.02xD	0.004	0.005	0.006	0.010	0.013	0.016	0.019
01.1.3 Duroplastics	Plunging	20	35	40	0.25xD	1xD	0.004	0.004	0.004	0.006	0.008	0.010	0.012
	Slotting	30	55	70	0.33xD	1xD	0.004	0.005	0.007	0.015	0.020	0.025	0.030
	Roughing	35	70	85	5xD	0.05xD	0.008	0.013	0.016	0.027	0.036	0.045	0.054
	Finishing	35	45	60	5xD	0.02xD	0.004	0.005	0.006	0.010	0.013	0.016	0.019
01.1.5 Acrylic glass / Plexiglass / PMMA	Plunging	20	40	50	0.25xD	1xD	0.004	0.004	0.004	0.006	0.008	0.010	0.012
	Slotting	35	65	80	0.33xD	1xD	0.004	0.005	0.007	0.015	0.020	0.025	0.030
	Roughing	40	80	95	5xD	0.05xD	0.008	0.013	0.016	0.027	0.036	0.045	0.054
	Finishing	40	55	70	5xD	0.02xD	0.004	0.005	0.006	0.010	0.013	0.016	0.019



RF 100 AL for stable conditions

Milling conditions:

HPC stable machining conditions
high drive power

short tools

long tools

Correction factors:

a_p roughing > 1.5xD v_c -25 % f_z -25 %

medium length tools v_c -40 % f_z -40 %

extra length tools v_c -60 % f_z -55 %



see page „GTC milling strategies“

Machining group	Application	V _c (m/min)	a _p max.	a _e max.	f _z (mm) with nom. Ø											
					1	2	3	4	6	8	10	12	16	20	25	
N1.1.1 Wrought aluminium alloys, non-hardened, 60 HB N1.1.2 Wrought aluminium alloys, hardened, 100 HB	Slotting	500	1xD	1xD	0.0070	0.0141	0.021	0.030	0.040	0.055	0.080	0.095	0.130	0.160	0.200	
	Roughing	575	1xD	0.75xD	0.0092	0.0184	0.028	0.035	0.055	0.075	0.090	0.110	0.145	0.185	0.230	
	Finishing	1000	1xD	0.02xD	0.0088	0.0176	0.026	0.035	0.055	0.070	0.090	0.105	0.140	0.175	0.220	
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB	Slotting	230	1xD	1xD	0.0053	0.0106	0.016	0.020	0.030	0.040	0.060	0.070	0.095	0.120	0.150	
	Roughing	265	1xD	0.75xD	0.0069	0.0138	0.021	0.030	0.040	0.055	0.070	0.085	0.110	0.140	0.175	
	Finishing	460	1xD	0.02xD	0.0066	0.0132	0.020	0.025	0.040	0.055	0.065	0.080	0.105	0.130	0.165	
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB	Slotting	180	1xD	1xD	0.0053	0.0106	0.016	0.020	0.030	0.040	0.060	0.070	0.095	0.120	0.150	
	Roughing	180	1xD	0.75xD	0.0060	0.0120	0.018	0.025	0.035	0.050	0.060	0.070	0.095	0.120	0.150	
	Finishing	365	1xD	0.02xD	0.0066	0.0132	0.020	0.025	0.040	0.055	0.065	0.080	0.105	0.130	0.165	
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 % N3.1.2 Copper and copper alloys: CuZn, CuSnZn	Slotting	250	1xD	1xD	0.0053	0.0106	0.016	0.020	0.030	0.040	0.060	0.070	0.095	0.120	0.150	
	Roughing	290	1xD	0.75xD	0.0069	0.0138	0.021	0.030	0.040	0.055	0.070	0.085	0.110	0.140	0.175	
	Finishing	500	1xD	0.02xD	0.0066	0.0132	0.020	0.025	0.040	0.055	0.065	0.080	0.105	0.130	0.165	
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte	Slotting	195	1xD	1xD	0.0049	0.0097	0.015	0.020	0.030	0.040	0.055	0.065	0.090	0.110	0.140	
	Roughing	225	1xD	0.75xD	0.0064	0.0127	0.019	0.025	0.040	0.050	0.065	0.075	0.100	0.125	0.160	
	Finishing	390	1xD	0.02xD	0.0061	0.0122	0.018	0.025	0.035	0.050	0.060	0.075	0.095	0.120	0.150	
01.1.1 Thermoplastics	Slotting	150	1xD	1xD	0.0055	0.0110	0.017	0.020	0.035	0.045	0.065	0.075	0.100	0.125	0.155	
	Roughing	225	1xD	0.33xD	0.0081	0.0163	0.024	0.035	0.050	0.065	0.080	0.100	0.130	0.165	0.205	
	Finishing	300	1xD	0.01xD	0.0063	0.0125	0.019	0.025	0.040	0.050	0.065	0.075	0.100	0.125	0.155	
01.1.3 Duroplastics	Slotting	105	1xD	1xD	0.0055	0.0110	0.017	0.020	0.035	0.045	0.065	0.075	0.100	0.125	0.155	
	Roughing	160	1xD	0.33xD	0.0081	0.0163	0.024	0.035	0.050	0.065	0.080	0.100	0.130	0.165	0.205	
	Finishing	210	1xD	0.01xD	0.0063	0.0125	0.019	0.025	0.040	0.050	0.065	0.075	0.100	0.125	0.155	
01.1.5 Acrylic glass / Plexiglass / PMMA	Slotting	120	1xD	1xD	0.0055	0.0110	0.017	0.020	0.035	0.045	0.065	0.075	0.100	0.125	0.155	
	Roughing	180	1xD	0.33xD	0.0081	0.0163	0.024	0.035	0.050	0.065	0.080	0.100	0.130	0.165	0.205	
	Finishing	240	1xD	0.01xD	0.0063	0.0125	0.019	0.025	0.040	0.050	0.065	0.075	0.100	0.125	0.155	

Cutting data



RF 100 AL for stable conditions

Milling conditions:



stable machining conditions
high drive power



long tools

Correction factors:



a_p roughing > 1.5xD

v_c -25 % f_z -25 %



medium length tools

v_c -40 % f_z -40 %



extra length tools

v_c -60 % f_z -55 %



Cutting data

Machining group	Application	V _c (m/min)	a _p max.	a _e max.	f _z (mm) with nom. Ø						
					6	8	10	12	16	20	25
N1.1.1 Wrought aluminium alloys, non-hardened, 60 HB N1.1.2 Wrought aluminium alloys, hardened, 100 HB	Slotting	375	1xD	1xD	0.0200	0.0250	0.0350	0.0450	0.0600	0.0750	0.0950
	Roughing	430	1xD	0.75xD	0.0250	0.0350	0.0450	0.0500	0.0700	0.0850	0.1050
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB	Slotting	200	1xD	1xD	0.0200	0.0250	0.0350	0.0400	0.0550	0.0700	0.0900
	Roughing	230	1xD	0.75xD	0.0250	0.0300	0.0400	0.0500	0.0650	0.0800	0.1000
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB	Slotting	160	1xD	1xD	0.0200	0.0250	0.0350	0.0400	0.0550	0.0700	0.0900
	Roughing	160	1xD	0.75xD	0.0200	0.0300	0.0350	0.0400	0.0550	0.0700	0.0900
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 % N3.1.2 Copper and copper alloys: CuZn, CuSnZn	Slotting	220	1xD	1xD	0.0200	0.0250	0.0350	0.0400	0.0550	0.0700	0.0900
	Roughing	255	1xD	0.75xD	0.0250	0.0300	0.0400	0.0500	0.0650	0.0800	0.1000
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte	Slotting	170	1xD	1xD	0.0150	0.0250	0.0300	0.0400	0.0500	0.0650	0.0800
	Roughing	200	1xD	0.75xD	0.0200	0.0300	0.0350	0.0450	0.0600	0.0750	0.0950
01.1.1 Thermoplastics	Slotting	110	1xD	1xD	0.0150	0.0250	0.0350	0.0400	0.0550	0.0650	0.0850
	Roughing	170	1xD	0.33xD	0.0250	0.0350	0.0450	0.0500	0.0700	0.0850	0.1050
01.1.3 Duroplaste	Slotting	80	1xD	1xD	0.0150	0.0250	0.0350	0.0400	0.0550	0.0650	0.0850
	Roughing	120	1xD	0.33xD	0.0250	0.0350	0.0450	0.0500	0.0700	0.0850	0.1050
01.1.5 Acrylglas / Plexiglas / PMMA	Slotting	90	1xD	1xD	0.0150	0.0250	0.0350	0.0400	0.0550	0.0650	0.0850
	Roughing	135	1xD	0.33xD	0.0250	0.0350	0.0450	0.0500	0.0700	0.0850	0.1050



RF 100 AL for stable conditions

Milling conditions:



stable machining conditions
high drive power



short tools



long tools

Correction factors:



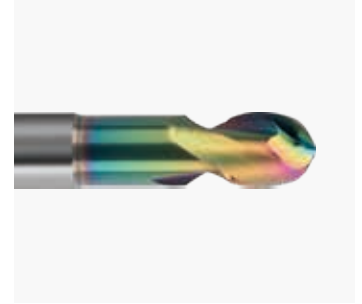
medium length tools

v_c -25 % f_z -25 %



extra length tools

v_c -50 % f_z -50 %



Machining group	Application	v_c (m/min)	a_p max.	a_e max.	f_z (mm) with nom. ϕ						
					3	4	6	8	10	12	16
N1.1.1 Wrought aluminium alloys, non-hardened, 60 HB N1.1.2 Wrought aluminium alloys, hardened, 100 HB	Slotting	895	0.3xD	0.1xD	0.064	0.085	0.130	0.170	0.215	0.255	0.345
	Roughing	865	0.1xD	0.05xD	0.079	0.105	0.160	0.210	0.265	0.315	0.420
	Finishing	895	0.02xD	0.01xD	0.069	0.090	0.140	0.185	0.230	0.275	0.370
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB	Slotting	450	0.3xD	0.1xD	0.058	0.080	0.115	0.155	0.195	0.235	0.310
	Roughing	435	0.1xD	0.05xD	0.072	0.095	0.145	0.190	0.240	0.290	0.385
	Finishing	450	0.02xD	0.01xD	0.063	0.085	0.125	0.170	0.210	0.250	0.335
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB	Slotting	355	0.3xD	0.1xD	0.058	0.080	0.115	0.155	0.195	0.235	0.310
	Roughing	340	0.1xD	0.05xD	0.072	0.095	0.145	0.190	0.240	0.290	0.385
	Finishing	355	0.02xD	0.01xD	0.063	0.085	0.125	0.170	0.210	0.250	0.335
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 % N3.1.2 Copper and copper alloys: CuZn, CuSnZn	Slotting	360	0.3xD	0.1xD	0.058	0.080	0.115	0.155	0.195	0.235	0.310
	Roughing	345	0.1xD	0.05xD	0.072	0.095	0.145	0.190	0.240	0.290	0.385
	Finishing	360	0.02xD	0.01xD	0.063	0.085	0.125	0.170	0.210	0.250	0.335
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte	Slotting	280	0.3xD	0.1xD	0.054	0.070	0.110	0.145	0.180	0.215	0.285
	Roughing	270	0.1xD	0.05xD	0.066	0.090	0.130	0.175	0.220	0.265	0.355
	Finishing	280	0.02xD	0.01xD	0.058	0.075	0.115	0.155	0.195	0.230	0.310
01.1.1 Thermoplastics	Slotting	295	0.3xD	0.1xD	0.062	0.085	0.125	0.165	0.210	0.250	0.330
	Roughing	285	0.1xD	0.05xD	0.077	0.100	0.155	0.205	0.255	0.305	0.410
	Finishing	295	0.02xD	0.01xD	0.067	0.090	0.135	0.180	0.225	0.270	0.360
01.1.3 Duroplastics	Slotting	210	0.3xD	0.1xD	0.062	0.085	0.125	0.165	0.210	0.250	0.330
	Roughing	200	0.1xD	0.05xD	0.077	0.100	0.155	0.205	0.255	0.305	0.410
	Finishing	210	0.02xD	0.01xD	0.067	0.090	0.135	0.180	0.225	0.270	0.360
01.1.5 Acrylic glass / Plexiglass / PMMA	Slotting	235	0.3xD	0.1xD	0.062	0.085	0.125	0.165	0.210	0.250	0.330
	Roughing	230	0.1xD	0.05xD	0.077	0.100	0.155	0.205	0.255	0.305	0.410
	Finishing	235	0.02xD	0.01xD	0.067	0.090	0.135	0.180	0.225	0.270	0.360

Cutting data



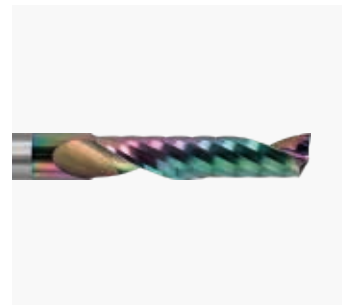
Solid carbide single-fluted cutters AL

Milling conditions:

	unstable machining conditions low drive power
	stable machining conditions low cutting depths, high cutting values
	short tools
	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 %
	extra length tools	v_c -60 %	f_z -55 %



Cutting data

Machining group	Application	v _c (m/min)	a _p max.	a _e max.	f _z (mm) with nom. Ø								
					1	2	3	4	6	8	10	12	16
N1.1.1 Wrought aluminium alloys, non-hardened, 60 HB N1.1.2 Wrought aluminium alloys, hardened, 100 HB	Slotting	500	1xD	1xD	0.0070	0.0141	0.021	0.030	0.040	0.055	0.080	0.095	0.130
	Roughing	575	1xD	0.75xD	0.0092	0.0184	0.028	0.035	0.055	0.075	0.090	0.110	0.145
	Finishing	1000	1xD	0.02xD	0.0088	0.0176	0.026	0.035	0.055	0.070	0.090	0.105	0.140
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB	Slotting	230	1xD	1xD	0.0053	0.0106	0.016	0.020	0.030	0.040	0.060	0.070	0.095
	Roughing	265	1xD	0.75xD	0.0069	0.0138	0.021	0.030	0.040	0.055	0.070	0.085	0.110
	Finishing	460	1xD	0.02xD	0.0066	0.0132	0.020	0.025	0.040	0.055	0.065	0.080	0.105
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB	Slotting	180	1xD	1xD	0.0053	0.0106	0.016	0.020	0.030	0.040	0.060	0.070	0.095
	Roughing	180	1xD	0.75xD	0.0060	0.0120	0.018	0.025	0.035	0.050	0.060	0.070	0.095
	Finishing	365	1xD	0.02xD	0.0066	0.0132	0.020	0.025	0.040	0.055	0.065	0.080	0.105
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 % N3.1.2 Copper and copper alloys: CuZn, CuSnZn	Slotting	250	1xD	1xD	0.0053	0.0106	0.016	0.020	0.030	0.040	0.060	0.070	0.095
	Roughing	290	1xD	0.75xD	0.0069	0.0138	0.021	0.030	0.040	0.055	0.070	0.085	0.110
	Finishing	500	1xD	0.02xD	0.0066	0.0132	0.020	0.025	0.040	0.055	0.065	0.080	0.105
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte	Slotting	195	1xD	1xD	0.0049	0.0097	0.015	0.020	0.030	0.040	0.055	0.065	0.090
	Roughing	225	1xD	0.75xD	0.0064	0.0127	0.019	0.025	0.040	0.050	0.065	0.075	0.100
	Finishing	390	1xD	0.02xD	0.0061	0.0122	0.018	0.025	0.035	0.050	0.060	0.075	0.095
01.1.1 Thermoplastics	Slotting	150	1xD	1xD	0.0055	0.0110	0.017	0.020	0.035	0.045	0.065	0.075	0.100
	Roughing	225	1xD	0.33xD	0.0081	0.0163	0.024	0.035	0.050	0.065	0.080	0.100	0.130
	Finishing	300	1xD	0.01xD	0.0063	0.0125	0.019	0.025	0.040	0.050	0.065	0.075	0.100
01.1.3 Duroplastics	Slotting	105	1xD	1xD	0.0055	0.0110	0.017	0.020	0.035	0.045	0.065	0.075	0.100
	Roughing	160	1xD	0.33xD	0.0081	0.0163	0.024	0.035	0.050	0.065	0.080	0.100	0.130
	Finishing	210	1xD	0.01xD	0.0063	0.0125	0.019	0.025	0.040	0.050	0.065	0.075	0.100
01.1.5 Acrylic glass / Plexiglass / PMMA	Slotting	120	1xD	1xD	0.0055	0.0110	0.017	0.020	0.035	0.045	0.065	0.075	0.100
	Roughing	180	1xD	0.33xD	0.0081	0.0163	0.024	0.035	0.050	0.065	0.080	0.100	0.130
	Finishing	240	1xD	0.01xD	0.0063	0.0125	0.019	0.025	0.040	0.050	0.065	0.075	0.100



Chamfering milling cutters AL

Milling conditions:

HPCstable machining conditions
high drive power

short tools



long tools

Korrekturfaktoren:



extra length tools

 v_c -60 % f_z -55 %

Machining group	Application	v_c (m/min)	a_p max.	a_e max.	f_z (mm) with nom. Ø				
					4	6	8	10	12
N1.1.1 Wrought aluminium alloys. non-hardened. 60 HB N1.1.2 Wrought aluminium alloys. hardened. 100 HB	Chamfering	345	0.25xD	0.25xD	0.0300	0.0450	0.0600	0.0750	0.0900
	Deburring	600	0.05xD	0.05xD	0.0300	0.0450	0.0550	0.0700	0.0850
N2.1.1 Aluminium casting alloys. non-hardened. ≤ 12 % Si. 75 HB N2.1.2 Aluminium casting alloys. hardened. ≤ 12 % Si. 90 HB	Chamfering	185	0.25xD	0.25xD	0.0250	0.0400	0.0500	0.0650	0.0750
	Deburring	320	0.05xD	0.05xD	0.0250	0.0350	0.0500	0.0600	0.0750
N2.1.3 Aluminium casting alloys. non-hardened. > 12 % Si. 130 HB	Chamfering	125	0.25xD	0.25xD	0.0200	0.0350	0.0450	0.0550	0.0650
	Deburring	255	0.05xD	0.05xD	0.0250	0.0350	0.0500	0.0600	0.0750
N3.1.1 Copper and copper alloys: Free-machining alloy. Pb > 1 % N3.1.2 Copper and copper alloys: CuZn. CuSnZn	Chamfering	230	0.25xD	0.25xD	0.0200	0.0300	0.0400	0.0550	0.0650
	Deburring	400	0.05xD	0.05xD	0.0200	0.0300	0.0400	0.0500	0.0600
N3.1.3 Copper and copper alloys: CuSn. lead-free copper and copper electrolyte	Chamfering	180	0.25xD	0.25xD	0.0200	0.0300	0.0400	0.0500	0.0600
	Deburring	315	0.05xD	0.05xD	0.0200	0.0300	0.0350	0.0450	0.0550
01.1.1 Thermoplaste	Chamfering	105	0.25xD	0.25xD	0.0200	0.0300	0.0350	0.0450	0.0550
	Deburring	300	0.05xD	0.05xD	0.0250	0.0400	0.0500	0.0650	0.0750
01.1.3 Duroplaste	Chamfering	225	0.25xD	0.25xD	0.0350	0.0500	0.0650	0.0800	0.1000
	Deburring	210	0.05xD	0.05xD	0.0250	0.0400	0.0500	0.0650	0.0750
01.1.5 Acrylglas / Plexiglas / PMMA	Chamfering	160	0.25xD	0.25xD	0.0350	0.0500	0.0650	0.0800	0.1000
	Deburring	240	0.05xD	0.05xD	0.0250	0.0400	0.0500	0.0650	0.0750

Cutting data



EFFICIENT MILLING

WITH THE RIGHT STRATEGIES

GTC MILLING STRATEGIES

These milling strategies belong to the state-of-the-art and most effective application methods for current solid carbide milling tools. When applied, an enormously high metal removal rate ensures a considerable increase in productivity. Very high cutting parameters can be achieved even with less powerful machines or unstable machining conditions. With difficult-to-machine materials or unfavourable diameter-length-ratios of the tools a massive increase of process reliability can be achieved.



1 HIGH PERFORMANCE CUTTING

max. metal removal rate/time → stable conditions; short overhang; high performance; good cooling

HPC

2 HIGH SPEED CUTTING

at high speed/high feed rate → high dynamics; low cutting depth; low drive power

HSC

PRINCIPLES & OBJECTIVES



Maximum tool utilisation

- utilisation of entire cutting edge length
- full power delivery
- increased tool life
- balanced wear



Modification of cutting distribution

- low cutting widths a_e
- high cutting depths a_p



High process reliability

- low tool wrapping
- improved thermal conditions at tool cutting edge
- low mechanical stress



Maximum metal removal rate

- saving time/machine costs





Guide values for increasing the cutting values with cutting edge lengths up to 3xD					
Roughing and finishing					
Material	Application	radial feed in % of Ø	v _c factor*	f _z factor*	Angle of engagement
	Slotting	100 %	1	1	180°
	HPC Roughing	33 %	1.5	1.3	70°
	HPC Roughing	25 %	1.6	1.5	60°
	HPC Roughing	20 %	1.7	1.6	53°
	HPC Roughing	15 %	1.8	1.9	46°
	HPC Roughing	10 %	1.9	2.3	37°
	HPC Roughing	8 %	2.0	2.5	31°
	HPC Roughing	5 %	2.1	2.5	26°
	HSC Finishing	3 %	2.0	1.2	20°
	HSC Finishing	2 %	2.0	1.1	18°
	HSC Finishing	1 %	2.0	1.0	11°
	HSC fine finishing	0.5 %	2.2	0.9	8°

*Base value for the calculation with v_c and f_z factors is the value specified in the Gühring Navigator for "slotting" in the respective material group.

Base cutting values slotting – RF 100 tools – smooth cutting													
Material	Hardness	Application	v _c	f _z with nom. Ø									
				3	4	5	6	8	10	12	16	20	25
P1	≤ 850 N/mm ²	Slotting	180	0.015	0.020	0.025	0.030	0.040	0.060	0.072	0.096	0.120	0.150
P2	850-1200 N/mm ²	Slotting	160	0.014	0.019	0.024	0.029	0.038	0.055	0.066	0.088	0.110	0.138
P3	850-1400 N/mm ²	Slotting	135	0.014	0.018	0.023	0.027	0.036	0.050	0.060	0.080	0.100	0.125
M1	< 750 N/mm ²	Slotting	120	0.014	0.018	0.023	0.027	0.036	0.050	0.060	0.080	0.100	0.125
M2	750-850 N/mm ²	Slotting	80	0.012	0.016	0.020	0.024	0.032	0.045	0.054	0.072	0.090	0.113
M3	> 850 N/mm ²	Slotting	70	0.011	0.014	0.018	0.021	0.028	0.040	0.048	0.064	0.080	0.100
S-Ni	≤ 1300 N/mm ²	Slotting	30	0.008	0.011	0.014	0.017	0.022	0.032	0.038	0.051	0.064	0.080
S-Ti	≤ 1300 N/mm ²	Slotting	60	0.012	0.016	0.020	0.024	0.032	0.045	0.054	0.072	0.090	0.113
K1	≤ 240 HB	Slotting	160	0.017	0.022	0.028	0.033	0.044	0.065	0.078	0.104	0.130	0.163
K2	> 240 HB	Slotting	140	0.015	0.020	0.025	0.030	0.040	0.055	0.066	0.088	0.110	0.138
Wr. al.alloy	≤ 5 % Si	Slotting	500	0.020	0.026	0.033	0.039	0.052	0.075	0.090	0.120	0.150	0.188
Cast al. alloy	> 5 % Si	Slotting	230	0.017	0.022	0.028	0.033	0.044	0.060	0.072	0.096	0.120	0.150
Non-fer.metals	≤ 850 N/mm ²	Slotting	250	0.017	0.022	0.028	0.033	0.044	0.060	0.072	0.096	0.120	0.150

METAL REMOVAL RATE

$$a_p \text{ (mm)} \times a_e \text{ (mm)} \times v_f \text{ (m/min)} = Q \text{ (cm}^3\text{/min)}$$

Example – RF 100 U (Ø 12 mm, 4 flutes)	
Application	HPC roughing: 15 % a _e , 2xD a _p , C45
Feed	radial feed, a _e = 1.8 mm (15 % of D)
Base value slotting	v _c = 180 m/min, f _z = 0.072 mm
Conversion	v _c factor = 1.8 → v _c : 180 m/min x 1.8 = 324 m/min f _z factor = 1.9 → f _z : 0.072 mm x 1.9 = 0.137 mm
Increased values	v _c = 324 m/min / f _z = 0.137 mm, n = 8594 rev/min / v _f = 4710 mm/min
Metal removal rate	Q = 203 cm ³ /min



New milling tools

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