GÜHRING

Ratio end mill RF 100 AL µFinisher

Perfect finishing results
in aluminum machining

Ratio end mill RF 100 AL µFinisher

Better performance during finishing

Brilliant aluminium surfaces

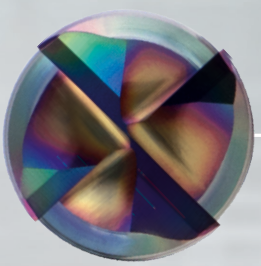
Finishing in particular demands excellent dimensional accuracy and a flawless surface finish.
With the RF 100 AL µFinisher four-fluted solid carbide milling cutter, Gühring offers a specialist tool for aluminium that not only meets these requirements with ease – but also delivers maximum cost-effectiveness thanks to high feed rates.

For finishing operations on aluminium – such as first and fine finishing of pockets and contours – the RF 100 AL µFinisher is the right choice. Compared to 3-fluted finishing end mills, this tool enables significantly higher feed rates and shorter machining times – without compromising on machining quality: the material specialist stands out thanks to exceptionally high tool accuracy, ensured by h5-toleranced solid carbide blanks with no taper on the cutting edge. In addition, the ultra-thin, wear-resistant Carbo+ coating ensures a long tool life and is particularly resistant to built-up edge formation. This makes the tool perfectly suited for dry and MQL machining.

X 50 % longer tool life

X 33 % higher feed rate

X exceptionally high tool accuracy



reduced cutting pressure
due to the small number
of contact points

tightest tolerances &
exceptionally smooth machining
made possible by a nano polished
circular support chamfer

maximum tool rigidity &
minimisation of radial deflection
thanks to a stable core diameter
without neck clearance

prevention of built-up edges &
improved lubrication for aluminium chips
thanks to the wear-resistant Carbo+ coating

maximum dimensional and angular accuracy
using h5-toleranced precision blanks
without taper on the tool

Tech Tip:

For high-precision finishing tasks on
other materials in ISO groups P / M / S / K,
µFinishers are available with a Perrox coating
on request.

Application recommendations:

1. **Roughing**
2. **First-finishing**
   for small and uniform stock removal (< 0.01xD)
3. **Fine finishing**
   with the µFinisher for an optimal finish

Application example

Component:	Housing Aluminium EN AW-5083 (AlMg4.5Mn)	
Customer objective:	High-precision finished surface <Rz 1	
Difficulty:	The housing features thin-walled ribs and requires visually flawless exposed surfaces. The machining depth is 5xD.	
	Gühring	**Competition**
Tool & milling strategy:	#8222 Ø 12 mm, RF 100 AL µF, solid carbide aluminium finishing end mill, 4-fluted cutter → Synchronous roll milling	Solid carbide aluminium finishing end mill Ø 12 mm, 3-fluted cutter → Synchronous roll milling
Cutting parameters:	V_c 400 m/min **n** 10,610 rpm f_z 0.02 mm V_f 848 mm/min a_p 60 mm (5xD) a_e 0.12 mm (0.01xD)	V_c 400 m/min **n** 10,610 rpm f_z 0.02 mm V_f 636 mm/min a_p 60 mm (5xD) a_e 0.12 mm (0.01xD)
Machining time:	88 sec.	118 sec.
Result:	Rz 0.6 µm	Rz 0.7 µm
	The Gühring high-precision finishing end mill for aluminium achieves better surface qualities in 25 % less machining time.	

The ideal clamping chuck for the Finisher

For best results, we recommend:

Hydraulic chuck
4299 20.063

+

GühroJet reduction bush
4369 16.020

+

µFinisher
8222 16.000

HPC clamping chuck
4300 20.063

+

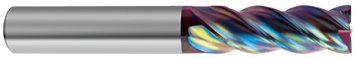
GühroJet clamping sleeve
4302 16.020

+

µFinisher
8222 16.000

Ratio end mills RF 100 AL µF

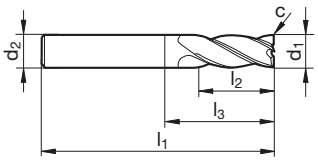
Article no. **8220**



NEW | VHM | Cb+ | W | WN | 40° | 2,2xD | 4 | HA | 45° | | 10°

P	M	K	N	S	H	O
			●			○

nano polished cutting edges • centre cutting • cylindrical support land and unequal cutting edge pitch for optimal running smoothness • narrow tolerance without taper for maximum component accuracy



Article no. **8220**

d1 js7 mm	d2 h5 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Order no.
1.00	4.00	38	2.5	2.7	0.020	4	8220 1.000
1.50	4.00	45	3.8	4.0	0.030	4	8220 1.500
2.00	6.00	50	5.0	5.6	0.040	4	8220 2.000
2.50	6.00	50	6.3	7.3	0.050	4	8220 2.500
3.00	6.00	50	7.5	9.1	0.060	4	8220 3.000
4.00	6.00	54	11.0	14.0	0.080	4	8220 4.000
5.00	6.00	57	14.0	18.0	0.100	4	8220 5.000
6.00	6.00	57	16.0	21.0	0.120	4	8220 6.000
8.00	8.00	63	21.0	27.0	0.160	4	8220 8.000
10.00	10.00	72	25.0	32.0	0.200	4	8220 10.000
12.00	12.00	83	30.0	38.0	0.240	4	8220 12.000
14.00	14.00	83	31.0	38.0	0.280	4	8220 14.000
16.00	16.00	92	36.0	44.0	0.320	4	8220 16.000
20.00	20.00	104	44.0	54.0	0.400	4	8220 20.000

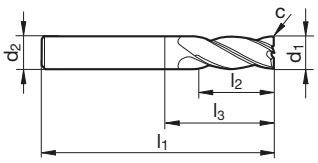
Ratio end mills RF 100 AL µF

Article no. **8221**

NEW | VHM | Cb+ | W | WN | 40° | 3,2xD | 4 | HA | 45° | | 10°

P	M	K	N	S	H	O
			●			○

nano polished cutting edges • centre cutting • cylindrical support land and unequal cutting edge pitch for optimal running smoothness • narrow tolerance without taper for maximum component accuracy



Article no. **8221**

d1 js7 mm	d2 h5 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Order no.
1.00	4.00	38	4.0	4.2	0.020	4	8221 1.000
1.50	4.00	45	6.0	6.3	0.030	4	8221 1.500
2.00	6.00	57	8.0	8.6	0.040	4	8221 2.000
2.50	6.00	57	10.0	11.0	0.050	4	8221 2.500
3.00	6.00	57	12.0	13.6	0.060	4	8221 3.000
4.00	6.00	57	15.0	18.0	0.080	4	8221 4.000
5.00	6.00	65	17.0	21.0	0.100	4	8221 5.000
6.00	6.00	65	21.0	29.0	0.120	4	8221 6.000
8.00	8.00	75	28.0	39.0	0.160	4	8221 8.000
10.00	10.00	80	33.0	40.0	0.200	4	8221 10.000
12.00	12.00	93	41.0	48.0	0.240	4	8221 12.000
14.00	14.00	100	46.0	55.0	0.280	4	8221 14.000
16.00	16.00	108	52.0	60.0	0.320	4	8221 16.000
20.00	20.00	126	65.0	76.0	0.400	4	8221 20.000

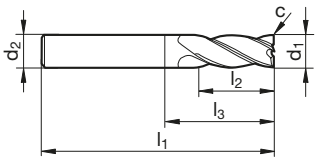
Ratio end mills RF 100 AL µF+

Article no. **8222**

NEW | VHM | Cb+ | W | WN | 40° | 5,2xD | 4 | HA | 45° | 10°

P	M	K	N	S	H	O
			●			○

nano polished cutting edges • centre cutting • cylindrical support land and unequal cutting edge pitch for optimal running smoothness • narrow tolerance without taper for maximum component accuracy



Article no. **8222**

d1 js7 mm	d2 h5 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Order no.
1.00	4.00	45	6.0	6.2	0.020	4	8222 1.000
1.50	4.00	50	9.0	9.3	0.030	4	8222 1.500
2.00	6.00	57	12.0	12.6	0.040	4	8222 2.000
2.50	6.00	65	15.0	16.0	0.050	4	8222 2.500
3.00	6.00	65	18.0	19.6	0.060	4	8222 3.000
4.00	6.00	65	22.0	25.0	0.080	4	8222 4.000
5.00	6.00	69	28.0	32.0	0.100	4	8222 5.000
6.00	6.00	75	33.0	39.0	0.120	4	8222 6.000
8.00	8.00	86	44.0	50.0	0.160	4	8222 8.000
10.00	10.00	100	55.0	60.0	0.200	4	8222 10.000
12.00	12.00	120	65.0	75.0	0.240	4	8222 12.000
14.00	14.00	150	85.0	105.0	0.280	4	8222 14.000
16.00	16.00	150	85.0	102.0	0.320	4	8222 16.000
20.00	20.00	175	105.0	125.0	0.400	4	8222 20.000

Ratio end mill RF 100 AL µFinisher

Milling conditions:

HPC — stable machining conditions, high drive power

2,2xD — long tools

3,2xD — medium length tools

Correction factors:

5,2xD — extralong tools — v_c -60 % f_z -55 %

Machining group	Application	v_c (m/min)	a_e max.	f_z (mm/z) with nom. Ø									
				1	2	3	4	6	8	10	12	16	20
N1.1.1 Wrought aluminium alloys, non-hardened, 60 HB **N1.1.2** Wrought aluminium alloys, hardened, 100 HB	First-finishing	1000	0.03xD	0.010	0.019	0.029	0.04	0.06	0.08	0.10	0.12	0.16	0.19
	Fine finishing	1000	0.01xD	0.008	0.016	0.024	0.03	0.05	0.07	0.08	0.10	0.13	0.16
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB **N2.1.2** Aluminium casting alloys, hardened, ≤ 12% Si, 90 HB	First-finishing	460	0.03xD	0.007	0.014	0.022	0.03	0.05	0.06	0.07	0.09	0.12	0.15
	Fine finishing	460	0.01xD	0.006	0.012	0.018	0.03	0.04	0.05	0.06	0.07	0.10	0.12
N2.1.3 Aluminium casting alloys, non-hardened, > 12% Si, 130 HB	First-finishing	365	0.03xD	0.007	0.014	0.022	0.03	0.05	0.06	0.07	0.09	0.12	0.15
	Fine finishing	365	0.01xD	0.006	0.012	0.018	0.03	0.04	0.05	0.06	0.07	0.10	0.12
N3.1.1 Copper and copper alloys: free-machining alloy, Pb > 1 % **N3.1.2** Copper and copper alloys: CuZn, CuSnZn	First-finishing	500	0.03xD	0.007	0.014	0.022	0.03	0.05	0.06	0.07	0.09	0.12	0.15
	Fine finishing	500	0.01xD	0.006	0.012	0.018	0.03	0.04	0.05	0.06	0.07	0.10	0.12
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte	First-finishing	390	0.03xD	0.007	0.013	0.020	0.03	0.04	0.06	0.07	0.08	0.11	0.14
	Fine finishing	390	0.01xD	0.006	0.011	0.017	0.02	0.04	0.05	0.06	0.07	0.09	0.11
01.1.1 Thermoplastics	First-finishing	300	0.03xD	0.008	0.015	0.023	0.03	0.05	0.06	0.08	0.09	0.12	0.15
	Fine finishing	300	0.01xD	0.006	0.013	0.019	0.03	0.04	0.05	0.07	0.08	0.10	0.13
01.1.3 Duroplastics **01.3.2** Duroplastics reinforced with aramid/synthetic fibres **01.3.3** Duroplastics reinforced with natural fibres	First-finishing	210	0.03xD	0.008	0.015	0.023	0.03	0.05	0.06	0.08	0.09	0.12	0.15
	Fine finishing	210	0.01xD	0.006	0.013	0.019	0.03	0.04	0.05	0.07	0.08	0.10	0.13
01.4.1 Acrylic glass / plexiglass / PMMA	First-finishing	240	0.03xD	0.008	0.015	0.023	0.03	0.05	0.06	0.08	0.09	0.12	0.15
	Fine finishing	240	0.01xD	0.006	0.013	0.019	0.03	0.04	0.05	0.07	0.08	0.10	0.13

All the values stated are guide values. You can find detailed cutting values online in our Gühring Navigator at webnavigator.guehring.de/en.

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ISO Code

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

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

● optimal suitability
○ limited suitability

Surfaces

Cb+ Carbo+

Pictograms

Cutting material	VHM solid carbide
Shank form	 according to DIN 6535
Standard	 according to company standard
Type	W
Applications	 finishing
Length	 long  medium length  extralong
Number of cutting edges	 Number of main cutting edges
Helix angle	 Size of helix angle/no. of different helix angles
Rake angle	 Rake angle of circumference cutting edges
Cutting edge profile	 Corner chamfer
Infeed	 for lateral infeeds, for ramping and drilling

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