

# GUHRING

- excellent surface quality for finishing operations
- up to 80 % higher feed rates thanks to nano-polished cutting edges
- innovative cross cutting face geometry



## **RF 100 A** The specialist for aluminium and Al-wrought alloys

GUHRING - YOUR WORLD-WIDE PARTNER

# RF 100 A – the high-performance

The RF 100 A is an entirely new generation of high-performance end mills. The tool strength is highly beneficial for the machining of aluminium wrought alloys.

Thanks to the innovative Guhring nano-polishing process the RF 100 A possesses an extremely smooth surface finish. Thus, up to 80 % higher feed rates are possible whilst simultaneously providing a dramatic improvement in tool life. This advantage is especially noticeable in comparison to conventional coated tools. The newly developed cross centre face cutting geometry permits drilling, plunging or ramping operations with a near constant feed rate. The innovative flute geometry combined with an unequal helix angle of 39°/40°/41° enables optimal chip evacuation with low-vibration operation. Thanks to the innovative peripheral geometry Guhring's new high-performance end mill produces excellent surface qualities for finishing operations.

## The advantages at a glance:

- nano-polished cutting edges = longer tool life and higher feed rates
- unequal helix = low-vibration running
- new cross centre face cutting geometry = improved stability for axial feed

Tools with a cutting edge length of 3xd - 4xd - 5xd have a re-inforced core and are suitable for slotting/roughing of  $a_p = 1xd$ , HPC-roughing and finishing operations across the entire cutting edge length.

Advantage:

- extremely high surface quality
- high straightness of component
- very high metal removal rate



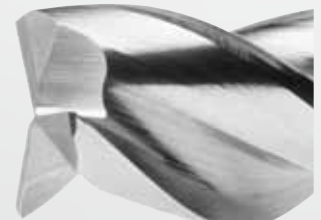
core stability and reinforcement

double reinforced cutting edge

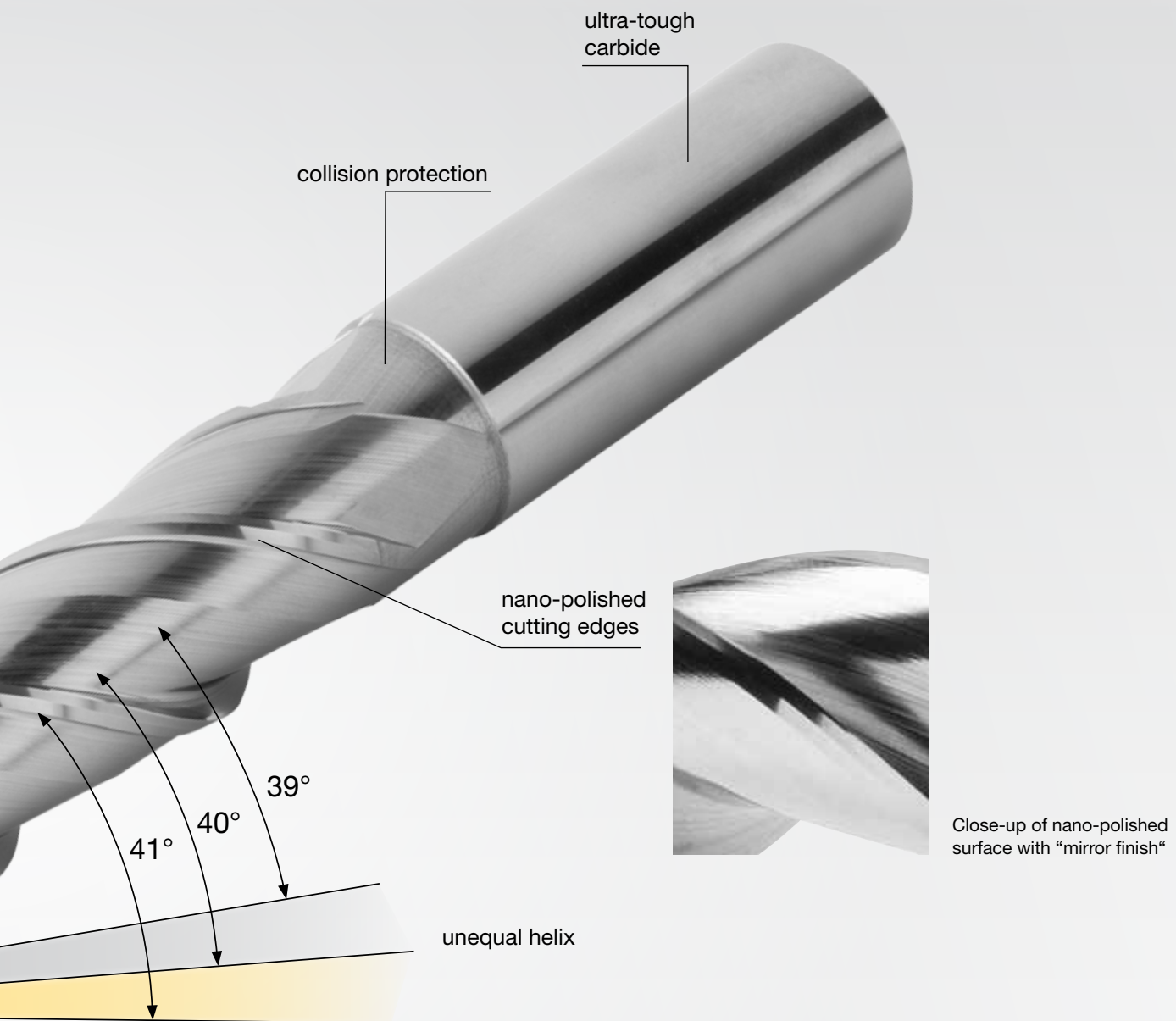
innovative cross cutting face geometry

optionally with corrected corner radius

Close-up of cross cutting face geometry with reinforced cutting edges and more chip space for plunging and ramping operations



# RF 100 A precision end mill for aluminium



Optionally, the RF 100 A is available with precision corner radius which is corrected to NAS specification over its entire form.

Advantage:

- equal cutting conditions over the entire radius
- no vibrations or built-up edge

# APPLICATION EXAMPLES

RF 100 A, Guhring no. 3473, dia. 12 mm, integral component AISi05

## Applicaton:

Pocket milling of form with  $a_p = 1 \times D$

Finishing of form with  $a_p = 3 \times D$

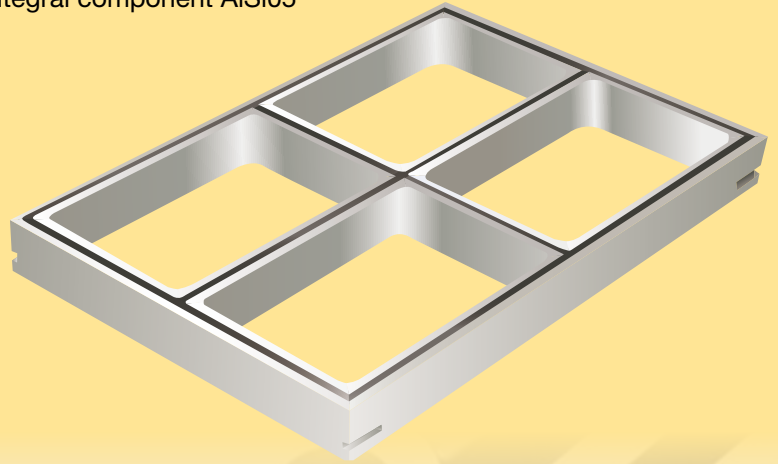
## Cutting parameters:

Feed rate ( $V_f$  mm/min) = 7,800

Speed (n/min) = 18,000

Machining time = 16 min

Saving = 34%, additional finishing tool



Further application examples:

## RF 100 A, Ø 20.0 mm

Slotting in AlMg4.5Mn

$a_e = 20 \text{ mm} / a_p = 11 \text{ mm}$

$v_c = 500 \text{ m/min}$

$f_z = 0.11 \text{ mm/tooth}$

$v_f = 3501 \text{ mm/min}$

Metal removal rate  $Q = 770 \text{ cm}^3/\text{min}$

## RF 100 A, Ø 16.0 mm

Slotting in AlMgSi1

$a_e = 16 \text{ mm} / a_p = 16 \text{ mm}$

$v_c = 500 \text{ m/min}$

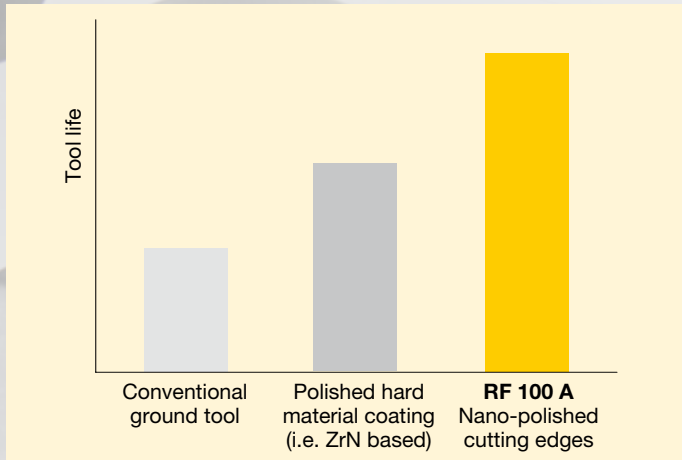
$f_z = 0.094 \text{ mm/tooth}$

$v_f = 3740 \text{ mm/min}$

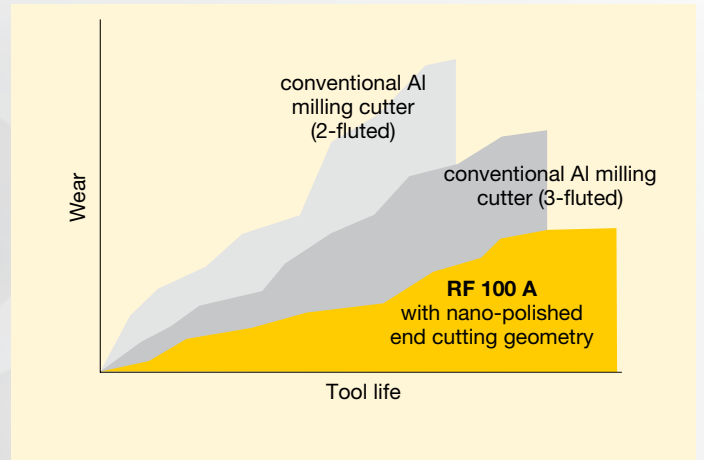
Metal removal rate  $Q = 957 \text{ cm}^3/\text{min}$

# Long tool life with low wear

Tool life comparison aluminium milling cutter with different surface finishes



Drilling comparison between innovative new end cutting geometry and conventional geometry



## Cutting Speeds

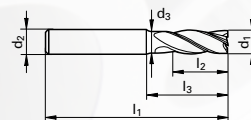
Material	Hardness*	Type of application	Cutting speed (v <sub>c</sub> )	fz (mm/min)						
				4	6	8	10	12	16	20
<b>N</b> Aluminium, Al-wrought alloys, Al-alloys 3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1 3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	up to 3% Si, above 250 - 550 N/mm <sup>2</sup>	Slotting	500	0.030	0.040	0.050	0.065	0.080	0.095	0.110
		Roughing	600	0.040	0.050	0.080	0.100	0.120	0.150	0.170
		Finishing	1000	0.020	0.035	0.045	0.060	0.080	0.090	0.100
<b>N</b> Aluminium-cast alloys 3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9, 3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	above 3% Si	Slotting	230	0.015	0.030	0.040	0.055	0.065	0.080	0.095
		Roughing	280	0.020	0.040	0.050	0.065	0.080	0.095	0.110
		Finishing	350	0.018	0.035	0.045	0.060	0.070	0.090	0.100

With optimal chip evacuation and cooling lubrication (i.e. with "Gührojet" peripheral cooling) the feed rate fz can be increased by up to 80%.

\*As an option our Carbo-coating is available as a special tool for aluminium that exhibits soft and gluey properties.

## RF 100 A (3-fluted)

centre cutting  
 Shank to DIN 6535 HA and HB  
 39/40/41°  
 nano-polished cutting edges



Art.-No.

3472

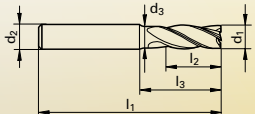

6702



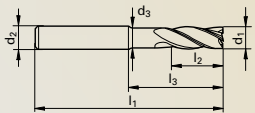

Code-No.	d1 (e8)	d2 (h6)	d3	l1	l2	l3	corner chamfer
	mm	mm	mm	mm	mm	mm	mm x 45°
3.000	3.000	6.000	2.700	57.00	8.00	15.00	0.05
4.000	4.000	6.000	3.700	57.00	11.00	18.00	0.05
5.000	5.000	6.000	4.700	57.00	13.00	18.00	0.05
6.000	6.000	6.000	5.700	57.00	13.00	21.00	0.05
8.000	8.000	8.000	7.700	63.00	19.00	27.00	0.10
10.000	10.000	10.000	9.500	72.00	22.00	32.00	0.10
12.000	12.000	12.000	11.500	83.00	26.00	38.00	0.15
16.000	16.000	16.000	15.500	92.00	32.00	44.00	0.15
20.000	20.000	20.000	19.500	104.00	38.00	54.00	0.15

Availability	
●	●
●	●
●	●
●	●
●	●
●	●
●	●
●	●
●	●

# RF 100 A (3-fluted) with corner radius

								Art.-No.	3599	6729	
<p><b>centre cutting</b>  <b>Shank to DIN 6535 HA and HB</b>  <b>39/40/41° helix</b>  <b>nano-polished cutting edges</b></p>										 <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px; text-align: center;">HA</div> <div style="border: 1px solid black; padding: 2px; text-align: center;">HB</div> </div>	
Code-No.	d1 (e8)	d2 (h6)	d3	l1	l2	l3	Corner rad.	Availability			
	mm	mm	mm	mm	mm	mm	mm				
6.005	6.000	6.000	5.700	57.00	13.00	21.00	0.5	●	●		
6.010	6.000	6.000	5.700	57.00	13.00	21.00	1.0	●	●		
8.005	8.000	8.000	7.700	63.00	19.00	27.00	0.5	●	●		
8.010	8.000	8.000	7.700	63.00	19.00	27.00	1.0	●	●		
10.005	10.000	10.000	9.500	72.00	22.00	32.00	0.5	●	●		
10.010	10.000	10.000	9.500	72.00	22.00	32.00	1.0	●	●		
10.015	10.000	10.000	9.500	72.00	22.00	32.00	1.5	●	●		
12.005	12.000	12.000	11.500	83.00	26.00	38.00	0.5	●	●		
12.010	12.000	12.000	11.500	83.00	26.00	38.00	1.0	●	●		
12.015	12.000	12.000	11.500	83.00	26.00	38.00	1.5	●	●		
12.020	12.000	12.000	11.500	83.00	26.00	38.00	2.0	●	●		
12.025	12.000	12.000	11.500	83.00	26.00	38.00	2.5	●	●		
12.030	12.000	12.000	11.500	83.00	26.00	38.00	3.0	●	●		
12.040	12.000	12.000	11.500	83.00	26.00	38.00	4.0	●	●		
16.010	16.000	16.000	15.500	92.00	32.00	44.00	1.0	●	●		
16.020	16.000	16.000	15.500	92.00	32.00	44.00	2.0	●	●		
16.025	16.000	16.000	15.500	92.00	32.00	44.00	2.5	●	●		
16.030	16.000	16.000	15.500	92.00	32.00	44.00	3.0	●	●		
16.040	16.000	16.000	15.500	92.00	32.00	44.00	4.0	●	●		
20.010	20.000	20.000	19.500	104.00	38.00	54.00	1.0	●	●		
20.020	20.000	20.000	19.500	104.00	38.00	54.00	2.0	●	●		
20.025	20.000	20.000	19.500	104.00	38.00	54.00	2.5	●	●		
20.030	20.000	20.000	19.500	104.00	38.00	54.00	3.0	●	●		
20.040	20.000	20.000	19.500	104.00	38.00	54.00	4.0	●	●		
25.020	25.000	25.000	24.000	121.00	45.00	65.00	2.0	●	●		
25.030	25.000	25.000	24.000	121.00	45.00	65.00	3.0	●	●		
25.040	25.000	25.000	24.000	121.00	45.00	65.00	4.0	●	●		

# RF 100 A (3-fluted) long range

								Art.-No.	3473	6703	
<p><b>centre cutting</b>  <b>Gühring Standard</b>  <b>Shank to DIN 6535 HA and HB</b>  <b>39/40/41° helix</b>  <b>nano-polished cutting edges</b></p>										 <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px; text-align: center;">HA</div> <div style="border: 1px solid black; padding: 2px; text-align: center;">HB</div> </div>	
Code-No.	d1 (e8)	d2 (h6)	d3	l1	l2	l3	corner chamfer	Availability			
	mm	mm	mm	mm	mm	mm	mm x 45°				
6.000	6.000	6.000	5.700	65.00	13.00	29.00	0.05	●	●		
8.000	8.000	8.000	7.700	75.00	19.00	39.00	0.10	●	●		
10.000	10.000	10.000	9.500	80.00	22.00	40.00	0.10	●	●		
12.000	12.000	12.000	11.500	93.00	26.00	48.00	0.15	●	●		
16.000	16.000	16.000	15.500	108.00	32.00	60.00	0.15	●	●		
20.000	20.000	20.000	19.500	126.00	38.00	76.00	0.15	●	●		

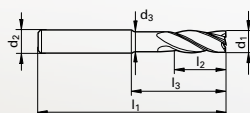
## RF 100 A (3-fluted) 3 x D with reinforced core

Art.-No.

6730

6731

centre cutting  
 Guhring Standard  
 Shank to DIN 6535 HA and HB  
 39/40/41° helix  
 nano-polished cutting edges



Code-No.	d1 (e8)	d2 (h6)	d3	l1	l2	l3	corner chamfer
	mm	mm	mm	mm	mm	mm	mm x 45°
5.000	5.000	6.000	4.700	57.00	15.00	20.00	0.05
6.000	6.000	6.000	5.700	65.00	18.00	29.00	0.05
8.000	8.000	8.000	7.700	75.00	24.00	39.00	0.10
10.000	10.000	10.000	9.500	80.00	30.00	40.00	0.10
12.000	12.000	12.000	11.500	93.00	36.00	48.00	0.15
16.000	16.000	16.000	15.500	108.00	48.00	60.00	0.15
20.000	20.000	20.000	19.500	126.00	60.00	76.00	0.15

Availability	
●	●
●	●
●	●
●	●
●	●
●	●

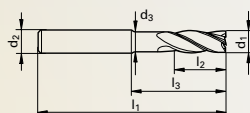
## RF 100 A (3-fluted) 4 x D with reinforced core

Art.-No.

6732

6733

centre cutting  
 Guhring Standard  
 Shank to DIN 6535 HA and HB  
 39/40/41° helix  
 nano-polished cutting edges



Code-No.	d1 (e8)	d2 (h6)	d3	l1	l2	l3	corner chamfer
	mm	mm	mm	mm	mm	mm	mm x 45°
6.000	6.000	6.000	-	65.00	24.00	26.00	0.05
8.000	8.000	8.000	-	75.00	32.00	39.00	0.10
10.000	10.000	10.000	-	100.00	40.00	60.00	0.10
12.000	12.000	12.000	-	100.00	48.00	55.00	0.15
16.000	16.000	16.000	-	125.00	64.00	77.00	0.15
20.000	20.000	20.000	-	150.00	80.00	100.00	0.15

Availability	
●	●
●	●
●	●
●	●
●	●
●	●

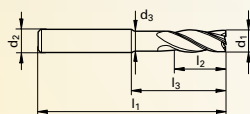
## RF 100 A (3-fluted) 5 x D with reinforced core

Art.-No.

6734

6735

centre cutting  
 Guhring Standard  
 Shank to DIN 6535 HA and HB  
 39/40/41° helix  
 nano-polished cutting edges



Code-No.	d1 (e8)	d2 (h6)	d3	l1	l2	l3	corner chamfer
	mm	mm	mm	mm	mm	mm	mm x 45°
6.000	6.000	6.000	-	75.00	30.00	39.00	0.05
8.000	8.000	8.000	-	86.00	40.00	50.00	0.10
10.000	10.000	10.000	-	100.00	50.00	60.00	0.10
12.000	12.000	12.000	-	120.00	60.00	75.00	0.15
16.000	16.000	16.000	-	150.00	80.00	102.00	0.15
20.000	20.000	20.000	-	175.00	100.00	125.00	0.15

Availability	
●	●
●	●
●	●
●	●
●	●
●	●

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