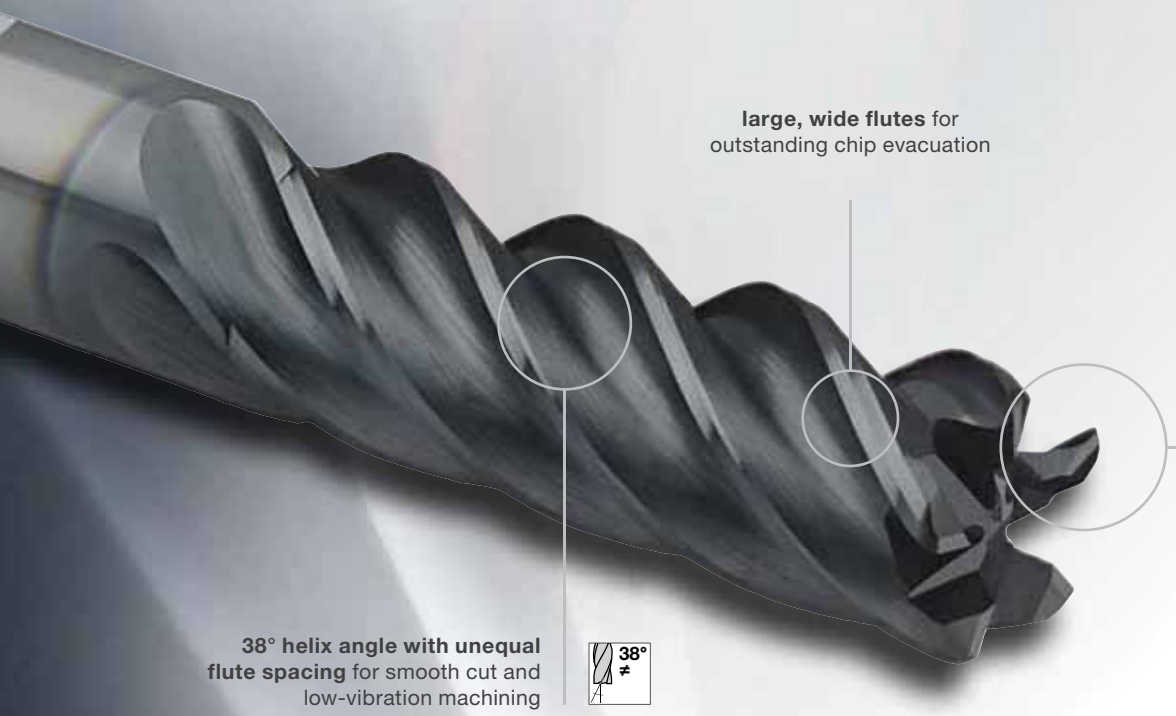
GUHRING

RF 100 5-Speed and 7-Speed

GUHRING – YOUR WORLDWIDE PARTNER

RF 100 5 SPEED

WITH EXTENSIVE CORNER RADIUS OFFERING



large, wide flutes for outstanding chip evacuation

stable cutting edge with corner radius and face correction = Double Protection for long tool life

38° helix angle with unequal flute spacing for smooth cut and low-vibration machining

nano-A™ wear-resistant coating for extended tool life

Dished center for efficient ramping and helical milling

NEW

Highest metal removal rates with outstanding process reliability

The RF100 5-Speed combines the versatility of a 4-flute tool with the feed rate benefits of a 5-flute tool. Unequal flute spacing ensures smooth and quiet cutting, while the dished center allows ramp angles exceeding 10 degrees. The RF100 5-Speed excels with outstanding material removal rates, long tool life, and exceptional process reliability in difficult to machine materials.

// high-performance roughing even at high cutting depths
// maximum feed rates for large metal removal rates
// highly dynamic milling in tough stainless steels, special alloys and a wide variety of steel and cast iron grades

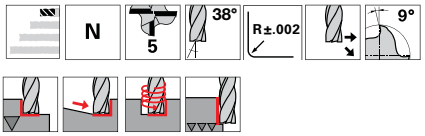
Highly dynamic GTC machining at an a_e of up to 10 %
At limited machine speeds or cutting speeds limited by the material, the RF 100 5 and 7 Speed ensure high feed rates and long tool life thanks to the increased number of teeth.
They are particularly suitable for difficult-to-machine materials under stable conditions.

a_e < 10 % M S P K *RF 100 5 Speed*

Applicable in all tough materials up to 34HRc.
Ramping up to 10°, slotting with cutting depths up to 1 x D, helical milling.

RF 100 5 Speed - Short length, corner radii

Series **6985**

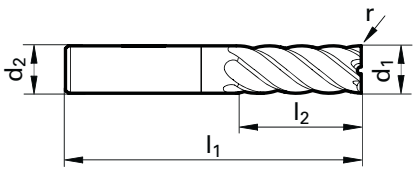


Material		Suitability
P	Steel	●
M	Stainless steel	●
K	Cast iron	●
N	Aluminum	○
S	Ni / Ti alloys	●
H	Hardened steel	
	Composites	

●=Optimal ○=Secondary

Tool material	Solid Carbide	
Coating	nano-A™	nano-A™
Type	N	N
Shank	HA	HB
Internal cooling	✕	✕

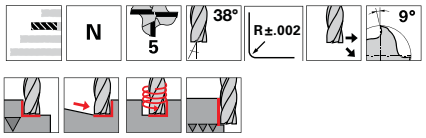
• without center cutting



d1 h10 inch	d2 h6 inch	l1 inch	l2 inch	r inch	No. of flutes	Code no.	EDP Number	EDP Number
1/4	1/4	2	3/8	0.02	5	6.352	**9069850063520**	
1/4	1/4	2	3/8	0.03	5	6.354	**9069850063540**	
1/4	1/4	2	3/8	0.06	5	6.356	**9069850063560**	
5/16	5/16	2	7/16	0.02	5	7.942	**9069850079420**	
5/16	5/16	2	7/16	0.03	5	7.944	**9069850079440**	
5/16	5/16	2	7/16	0.06	5	7.946	**9069850079460**	
3/8	3/8	2 1/2	1/2	0.02	5	9.522	**9069850095220**	
3/8	3/8	2 1/2	1/2	0.03	5	9.524	**9069850095240**	
3/8	3/8	2 1/2	1/2	0.06	5	9.526	**9069850095260**	
3/8	3/8	2 1/2	1/2	0.09	5	9.527	**9069850095270**	
1/2	1/2	2 1/2	5/8	0.03	5	12.704		**9069850127040**
1/2	1/2	2 1/2	5/8	0.06	5	12.706		**9069850127060**
1/2	1/2	2 1/2	5/8	0.09	5	12.707		**9069850127070**
1/2	1/2	2 1/2	5/8	0.12	5	12.709		**9069850127090**
5/8	5/8	3	3/4	0.03	5	15.874		**9069850158740**
5/8	5/8	3	3/4	0.06	5	15.876		**9069850158760**
5/8	5/8	3	3/4	0.09	5	15.877		**9069850158770**
5/8	5/8	3	3/4	0.12	5	15.879		**9069850158790**
3/4	3/4	3 1/2	1	0.03	5	19.054		**9069850190540**
3/4	3/4	3 1/2	1	0.06	5	19.056		**9069850190560**
3/4	3/4	3 1/2	1	0.09	5	19.057		**9069850190570**
3/4	3/4	3 1/2	1	0.12	5	19.059		**9069850190590**
3/4	3/4	3 1/2	1	0.19	5	19.050		**9069850190500**
1	1	4	1 1/4	0.03	5	25.404		**9069850254040**
1	1	4	1 1/4	0.06	5	25.406		**9069850254060**
1	1	4	1 1/4	0.09	5	25.407		**9069850254070**
1	1	4	1 1/4	0.12	5	25.409		**9069850254090**
1	1	4	1 1/4	0.19	5	25.400		**9069850254000**
1	1	4	1 1/4	0.25	5	25.401		**9069850254010**

RF 100 5 Speed - Standard length, corner radii

Series **6986**

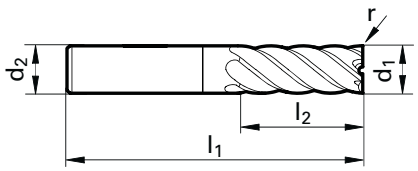


Tool material	Solid Carbide	
Coating	nano-A™	nano-A™
Type	N	N
Shank	HA	HB
Internal cooling		

Material		Suitability
P	Steel	●
M	Stainless steel	●
K	Cast iron	●
N	Aluminum	○
S	Ni / Ti alloys	●
H	Hardened steel	
	Composites	

●=Optimal ○=Secondary

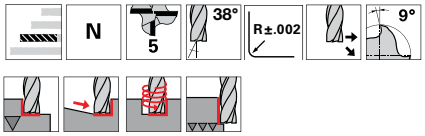
• without center cutting



d1 h10 inch	d2 h6 inch	l1 inch	l2 inch	r inch	No. of flutes	Code no.	EDP Number	EDP Number
1/4	1/4	2 1/2	1/2	0.02	5	6.352	**9069860063520**	
1/4	1/4	2 1/2	1/2	0.03	5	6.354	**9069860063540**	
1/4	1/4	2 1/2	1/2	0.06	5	6.356	**9069860063560**	
5/16	5/16	2 1/2	13/16	0.02	5	7.942	**9069860079420**	
5/16	5/16	2 1/2	13/16	0.03	5	7.944	**9069860079440**	
5/16	5/16	2 1/2	13/16	0.06	5	7.946	**9069860079460**	
3/8	3/8	3	1	0.02	5	9.522	**9069860095220**	
3/8	3/8	3	1	0.03	5	9.524	**9069860095240**	
3/8	3/8	3	1	0.06	5	9.526	**9069860095260**	
3/8	3/8	3	1	0.09	5	9.527	**9069860095270**	
1/2	1/2	3	1	0.03	5	12.704		**9069860127040**
1/2	1/2	3	1	0.06	5	12.706		**9069860127060**
1/2	1/2	3	1	0.09	5	12.707		**9069860127070**
1/2	1/2	3	1	0.12	5	12.709		**9069860127090**
5/8	5/8	3 1/2	1 1/4	0.03	5	15.874		**9069860158740**
5/8	5/8	3 1/2	1 1/4	0.06	5	15.876		**9069860158760**
5/8	5/8	3 1/2	1 1/4	0.09	5	15.877		**9069860158770**
5/8	5/8	3 1/2	1 1/4	0.12	5	15.879		**9069860158790**
3/4	3/4	4	1 5/8	0.03	5	19.054		**9069860190540**
3/4	3/4	4	1 5/8	0.06	5	19.056		**9069860190560**
3/4	3/4	4	1 5/8	0.09	5	19.057		**9069860190570**
3/4	3/4	4	1 5/8	0.12	5	19.059		**9069860190590**
3/4	3/4	4	1 5/8	0.19	5	19.050		**9069860190500**
1	1	4 1/2	2	0.03	5	25.404		**9069860254040**
1	1	4 1/2	2	0.06	5	25.406		**9069860254060**
1	1	4 1/2	2	0.09	5	25.407		**9069860254070**
1	1	4 1/2	2	0.12	5	25.409		**9069860254090**
1	1	4 1/2	2	0.19	5	25.400		**9069860254000**
1	1	4 1/2	2	0.25	5	25.401		**9069860254010**

RF 100 5 Speed - Long length, corner radii

Series **6987**

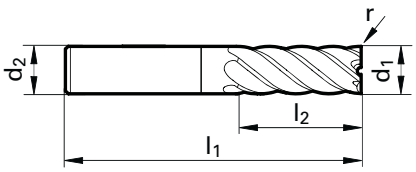


Material		Suitability
P	Steel	●
M	Stainless steel	●
K	Cast iron	●
N	Aluminum	○
S	Ni / Ti alloys	●
H	Hardened steel	
	Composites	

●=Optimal ○=Secondary

Tool material	Solid Carbide	
Coating	nano-A™	nano-A™
Type	N	N
Shank	HA	HB
Internal cooling	✕	✕

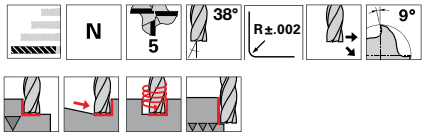
• without center cutting



d1 h10	d2 h6	l1	l2	r	No. of flutes	Code code	EDP Number	EDP Number
inch	inch	inch	inch	inch				
1/4	1/4	2 1/2	3/4	0.02	5	6.352	**9069870063520**	
1/4	1/4	2 1/2	3/4	0.03	5	6.354	**9069870063540**	
1/4	1/4	2 1/2	3/4	0.06	5	6.356	**9069870063560**	
5/16	5/16	3	1	0.02	5	7.942	**9069870079420**	
5/16	5/16	3	1	0.03	5	7.944	**9069870079440**	
5/16	5/16	3	1	0.06	5	7.946	**9069870079460**	
3/8	3/8	3	1 1/4	0.02	5	9.522	**9069870095220**	
3/8	3/8	3	1 1/4	0.03	5	9.524	**9069870095240**	
3/8	3/8	3	1 1/4	0.06	5	9.526	**9069870095260**	
3/8	3/8	3	1 1/4	0.09	5	9.527	**9069870095270**	
1/2	1/2	3 1/2	1 1/4	0.03	5	12.704		**9069870127040**
1/2	1/2	3 1/2	1 1/4	0.06	5	12.706		**9069870127060**
1/2	1/2	3 1/2	1 1/4	0.09	5	12.707		**9069870127070**
1/2	1/2	3 1/2	1 1/4	0.12	5	12.709		**9069870127090**
5/8	5/8	3 3/4	1 5/8	0.03	5	15.874		**9069870158740**
5/8	5/8	3 3/4	1 5/8	0.06	5	15.876		**9069870158760**
5/8	5/8	3 3/4	1 5/8	0.09	5	15.877		**9069870158770**
5/8	5/8	3 3/4	1 5/8	0.12	5	15.879		**9069870158790**
3/4	3/4	5	2 1/4	0.19	5	19.050		**9069870190500**
3/4	3/4	5	2 1/4	0.03	5	19.054		**9069870190540**
3/4	3/4	5	2 1/4	0.06	5	19.056		**9069870190560**
3/4	3/4	5	2 1/4	0.09	5	19.057		**9069870190570**
3/4	3/4	5	2 1/4	0.12	5	19.059		**9069870190590**
1	1	5	2 1/2	0.03	5	25.404		**9069870254040**
1	1	5	2 1/2	0.06	5	25.406		**9069870254060**
1	1	5	2 1/2	0.09	5	25.407		**9069870254070**
1	1	5	2 1/2	0.12	5	25.409		**9069870254090**
1	1	5	2 1/2	0.19	5	25.400		**9069870254000**
1	1	5	2 1/2	0.25	5	25.401		**9069870254010**

RF 100 5 Speed - XL length, corner radii

Series **6988**

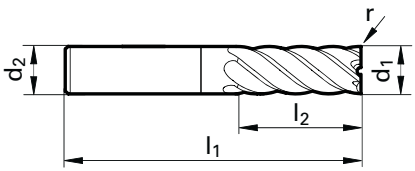


Tool material	Solid Carbide	
Coating	nano-A™	nano-A™
Type	N	N
Shank	HA	HB
Internal cooling	✕	✕

Material		Suitability
P	Steel	●
M	Stainless steel	●
K	Cast iron	●
N	Aluminum	○
S	Ni / Ti alloys	●
H	Hardened steel	
	Composites	

●=Optimal ○=Secondary

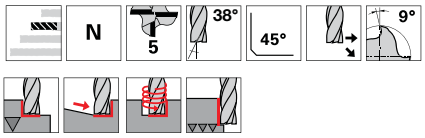
• without center cutting



d1 h10 inch	d2 h6 inch	l1 inch	l2 inch	r inch	No. of flutes	Code code	EDP Number	EDP Number
1/4	1/4	3	1	0.02	5	6.352	**9069880063520**	
1/4	1/4	3	1	0.03	5	6.354	**9069880063540**	
1/4	1/4	3	1	0.06	5	6.356	**9069880063560**	
3/8	3/8	3 1/2	1 1/2	0.02	5	9.522	**9069880095220**	
3/8	3/8	3 1/2	1 1/2	0.03	5	9.524	**9069880095240**	
3/8	3/8	3 1/2	1 1/2	0.06	5	9.526	**9069880095260**	
3/8	3/8	3 1/2	1 1/2	0.09	5	9.527	**9069880095270**	
1/2	1/2	4	1 5/8	0.03	5	12.704		**9069880127040**
1/2	1/2	4	1 5/8	0.06	5	12.706		**9069880127060**
1/2	1/2	4	1 5/8	0.09	5	12.707		**9069880127070**
1/2	1/2	4	1 5/8	0.12	5	12.709		**9069880127090**
5/8	5/8	4 1/8	2 1/8	0.03	5	15.874		**9069880158740**
5/8	5/8	4 1/8	2 1/8	0.06	5	15.876		**9069880158760**
5/8	5/8	4 1/8	2 1/8	0.09	5	15.877		**9069880158770**
5/8	5/8	4 1/8	2 1/8	0.12	5	15.879		**9069880158790**
3/4	3/4	5	2 5/8	0.03	5	19.054		**9069880190540**
3/4	3/4	5	2 5/8	0.06	5	19.056		**9069880190560**
3/4	3/4	5	2 5/8	0.09	5	19.057		**9069880190570**
3/4	3/4	5	2 5/8	0.12	5	19.059		**9069880190590**
3/4	3/4	5	2 5/8	0.19	5	19.050		**9069880190500**
1	1	6	3 1/4	0.03	5	25.404		**9069880254040**
1	1	6	3 1/4	0.06	5	25.406		**9069880254060**
1	1	6	3 1/4	0.09	5	25.407		**9069880254070**
1	1	6	3 1/4	0.12	5	25.409		**9069880254090**
1	1	6	3 1/4	0.19	5	25.400		**9069880254000**
1	1	6	3 1/4	0.25	5	25.401		**9069880254010**

RF 100 5 Speed - Standard length, corner chamfer

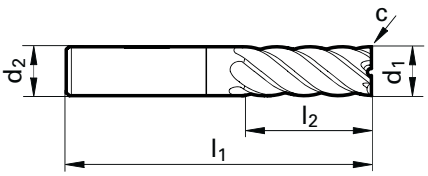
Series **6990**



Material		Suitability
P	Steel	●
M	Stainless steel	●
K	Cast iron	●
N	Aluminum	○
S	Ni / Ti alloys	●
H	Hardened steel	
	Composites	

●=Optimal ○=Secondary

- with chipbreakers
- without center cutting

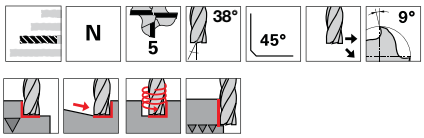


Tool material	Solid Carbide	
Coating	nano-A™	nano-A™
Type	N	N
Shank	HA	HB
Internal cooling		
	NEW	NEW

d1 h10 inch	d2 h6 inch	l1 inch	l2 inch	c inch	No. of flutes	Code no.	EDP Number	EDP Number
1/4	0.2500	2 1/2	3/4	0.005	5	6.350	**9069900063500**	
5/16	0.3125	2 1/2	13/16	0.006	5	7.940	**9069900079400**	
3/8	0.3750	2 3/4	1	0.008	5	9.520		**9069900095200**
1/2	0.5000	3 1/2	1 1/4	0.010	5	12.700		**9069900127000**
5/8	0.6250	3 1/2	1 1/4	0.013	5	15.870		**9069900158700**
3/4	0.7500	4	1 1/2	0.015	5	19.050		**9069900190500**
1	1.0000	4 1/2	2	0.017	5	25.400		**9069900254000**

RF 100 5 Speed - Long length, corner chamfer

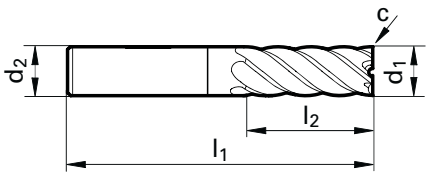
Series **6991**



Material		Suitability
P	Steel	●
M	Stainless steel	●
K	Cast iron	●
N	Aluminum	○
S	Ni / Ti alloys	●
H	Hardened steel	
	Composites	

●=Optimal ○=Secondary

- with chipbreakers
- without center cutting

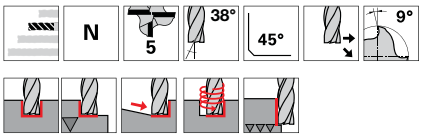


Tool material	Solid Carbide	
Coating	nano-A™	nano-A™
Type	N	N
Shank	HA	HB
Internal cooling		
	NEW	NEW

d1 h10 inch	d2 h6 inch	l1 inch	l2 inch	c inch	No. of flutes	Code no.	EDP Number	EDP Number
1/4	0.2500	2 3/4	1	0.005	5	6.350	**9069910063500**	
5/16	0.3125	3	1 1/4	0.006	5	7.940	**9069910079400**	
3/8	0.3750	3 1/4	1 1/2	0.008	5	9.520		**9069910095200**
1/2	0.5000	4 1/4	2	0.010	5	12.700		**9069910127000**
5/8	0.6250	4 1/2	2 1/4	0.013	5	15.870		**9069910158700**
3/4	0.7500	5	2 1/2	0.015	5	19.050		**9069910190500**
1	1.0000	5 1/2	3	0.017	5	25.400		**9069910254000**

RF 100 5 Speed metric, standard length, corner chamfer

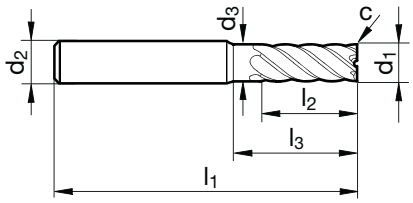
Series	6856	6857
Tool material	Solid Carbide	
Coating	SuperA™	SuperA™
Type	N	N
Shank	HA	HB
Internal cooling		
	NEW	NEW



Material		Suitability
P	Steel	●
M	Stainless steel	●
K	Cast iron	●
N	Aluminum	○
S	Ni / Ti alloys	●
H	Hardened steel	
	Composites	

●=Optimal ○=Secondary

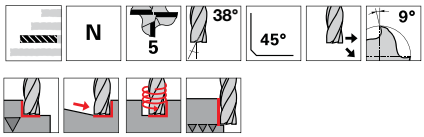
- with chip breaker
- neck clearance
- without center cutting



d1 h10	d2 h6	d3	l1	l2	l3	c	No. of flutes	Code code	EDP Number	
mm	mm	mm	mm	mm	mm	mm x 45°				
6.00	6.00	5.70	57.00	13.00	20.00	0.12	5	6.000	**9068560060000**	**9068570060000**
8.00	8.00	7.70	63.00	19.00	26.00	0.16	5	8.000	**9068560080000**	**9068570080000**
10.00	10.00	9.50	72.00	22.00	30.00	0.20	5	10.000	**9068560100000**	**9068570100000**
12.00	12.00	11.50	83.00	26.00	36.00	0.24	5	12.000	**9068560120000**	**9068570120000**
16.00	16.00	15.50	92.00	32.00	42.00	0.32	5	16.000	**9068560160000**	**9068570160000**
20.00	20.00	19.50	104.00	38.00	52.00	0.40	5	20.000	**9068560200000**	**9068570200000**

RF 100 5-Speed metric, long length, corner chamfer

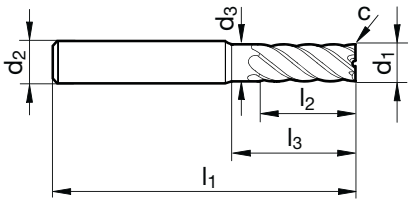
Series	6858	6859
Tool material	Solid Carbide	
Coating	SuperA™	SuperA™
Type	N	N
Shank	HA	HB
Internal cooling		
	NEW	NEW



Material		Suitability
P	Steel	●
M	Stainless steel	●
K	Cast iron	●
N	Aluminum	○
S	Ni / Ti alloys	●
H	Hardened steel	
	Composites	

●=Optimal ○=Secondary

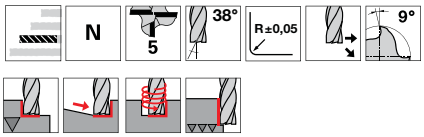
- with chip breaker
- neck clearance
- without center cutting



d1 h10	d2 h6	l1	l2	l3	c	No. of flutes	Code code	EDP Number	
mm	mm	mm	mm	mm	mm x 45°				
6.00	6.00	65.00	24.00	29.00	0.12	5	6.000	**9068580060000**	**9068590060000**
8.00	8.00	75.00	32.00	39.00	0.16	5	8.000	**9068580080000**	**9068590080000**
10.00	10.00	90.00	40.00	50.00	0.20	5	10.000	**9068580100000**	**9068590100000**
12.00	12.00	100.00	46.00	55.00	0.24	5	12.000	**9068580120000**	**9068590120000**
16.00	16.00	108.00	55.00	60.00	0.32	5	16.000	**9068580160000**	**9068590160000**
20.00	20.00	126.00	65.00	76.00	0.40	5	20.000	**9068580200000**	**9068590200000**

RF 100 5 Speed metric, long length, corner radii

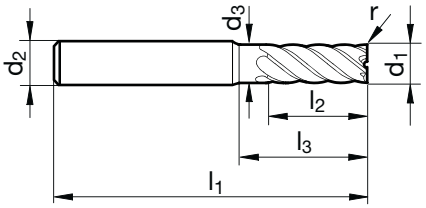
Series	6860	6861
Tool material	Solid Carbide	
Coating	SuperA™	SuperA™
Type	N	N
Shank	HA	HB
Internal cooling		
	NEW	NEW



Material		Suitability
P	Steel	●
M	Stainless steel	●
K	Cast iron	●
N	Aluminum	○
S	Ni / Ti alloys	●
H	Hardened steel	
	Composites	

●=Optimal ○=Secondary

- with chip breaker
- neck clearance
- without center cutting



d1 h10	d2 h6	d3	l1	l2	l3	r	No. of flutes	Code code	EDP Number	
mm	mm	mm	mm	mm	mm	mm				
6.00	6.00	5.70	65.00	20.00	28.00	0.20	5	6.002	9068600060020	9068610060020
6.00	6.00	5.70	65.00	20.00	28.00	0.50	5	6.005	9068600060050	9068610060050
6.00	6.00	5.70	65.00	20.00	28.00	1.00	5	6.010	9068600060100	9068610060100
8.00	8.00	7.70	75.00	26.00	38.00	0.30	5	8.003	9068600080030	9068610080030
8.00	8.00	7.70	75.00	26.00	38.00	0.50	5	8.005	9068600080050	9068610080050
8.00	8.00	7.70	75.00	26.00	38.00	1.00	5	8.010	9068600080100	9068610080100
8.00	8.00	7.70	75.00	26.00	38.00	1.50	5	8.015	9068600080150	9068610080150
10.00	10.00	9.50	80.00	32.00	38.00	0.50	5	10.005	9068600100050	9068610100050
10.00	10.00	9.50	80.00	32.00	38.00	1.00	5	10.010	9068600100100	9068610100100
10.00	10.00	9.50	80.00	32.00	38.00	1.50	5	10.015	9068600100150	9068610100150
10.00	10.00	9.50	80.00	32.00	38.00	2.00	5	10.020	9068600100200	9068610100200
12.00	12.00	11.50	93.00	40.00	46.00	0.50	5	12.005	9068600120050	9068610120050
12.00	12.00	11.50	93.00	40.00	46.00	1.00	5	12.010	9068600120100	9068610120100
12.00	12.00	11.50	93.00	40.00	46.00	1.50	5	12.015	9068600120150	9068610120150
12.00	12.00	11.50	93.00	40.00	46.00	2.00	5	12.020	9068600120200	9068610120200
16.00	16.00	15.50	108.00	50.00	58.00	0.50	5	16.005	9068600160050	9068610160050
16.00	16.00	15.50	108.00	50.00	58.00	1.00	5	16.010	9068600160100	9068610160100
16.00	16.00	15.50	108.00	50.00	58.00	1.50	5	16.015	9068600160150	9068610160150
16.00	16.00	15.50	108.00	50.00	58.00	2.00	5	16.020	9068600160200	9068610160200
16.00	16.00	15.50	108.00	50.00	58.00	3.00	5	16.030	9068600160300	9068610160300
20.00	20.00	19.50	126.00	62.00	74.00	1.00	5	20.010	9068600200100	9068610200100
20.00	20.00	19.50	126.00	62.00	74.00	1.50	5	20.015	9068600200150	9068610200150
20.00	20.00	19.50	126.00	62.00	74.00	2.00	5	20.020	9068600200200	9068610200200
20.00	20.00	19.50	126.00	62.00	74.00	3.00	5	20.030	9068600200300	9068610200300

RF 100 Speed in application

RF 100 Speed series 6774 3/4“ on machine component

Application:
HPC roughing; dry machining
in 4140 (28 HRc) steel
in HPC clamping chuck with PinLock collet for pull-out prevention

Cutting parameters:
DOC (a_p): 2.36 WOC (a_e): up to .040
SFM: 885 RPM: 4300
IPT: .0083 IPM: up to 146

Metal removal rate Q = 13.8 in^3/min
Tool life 278 minutes for roughing operations!

RF 100 7 SPEED

specialized face geometry allows for helical milling with 5% step down per revolution

32° ≠

32° helix angle with unequal flute spacing for reduced contact points and low-vibration machining

Ratio®

Chip breaker allows for better chip evacuation and lower cutting forces

stable cutting edge corner thanks to corner protection chamfer and face correction

a_e <8%

M S P K

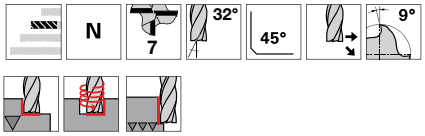
RF 100 7 Speed

Applicable in all tough materials up to 1200 N/mm².
Helical milling up to 0.05 x D a_p infeeds per cycle.

RF 100 7 SPEED

RF 100 7 Speed - Standard length, corner chamfer

Series **6997**

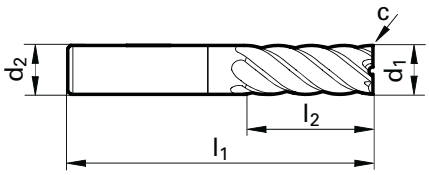


Material		Suitability
P	Steel	●
M	Stainless steel	●
K	Cast iron	●
N	Aluminum	○
S	Ni / Ti alloys	●
H	Hardened steel	
	Composites	

●=Optimal ○=Secondary

Tool material	Solid Carbide	
Coating	nano-A™	nano-A™
Type	N	N
Shank	HA	HB
Internal cooling		
	NEW	NEW

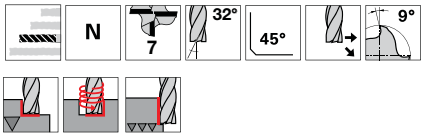
- with chipbreakers
- without center cutting



d1 h10 inch	d2 h6 inch	l1 inch	l2 inch	c inch	No. of flutes	Code no.	EDP Number	EDP Number
1/4	1/4	2 1/2	3/4	0.005	7	6.350	**9069970063500**	
5/16	5/16	2 1/2	13/16	0.006	7	7.940	**9069970079400**	
3/8	3/8	2 3/4	1	0.008	7	9.520		**9069970095200**
1/2	1/2	3 1/2	1 1/4	0.010	7	12.700		**9069970127000**
5/8	5/8	3 1/2	1 1/4	0.013	7	15.870		**9069970158700**
3/4	3/4	4	1 1/2	0.015	7	19.050		**9069970190500**
1	1	4 1/2	2	0.017	7	25.400		**9069970254000**

RF 100 7 Speed - Long length, corner chamfer

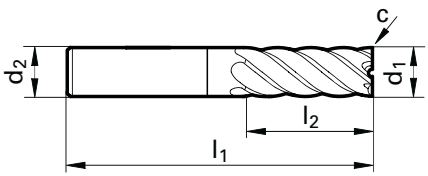
Series **6998**



Material		Suitability
P	Steel	●
M	Stainless steel	●
K	Cast iron	●
N	Aluminum	○
S	Ni / Ti alloys	●
H	Hardened steel	
	Composites	

●=Optimal ○=Secondary

- with chipbreakers
- without center cutting

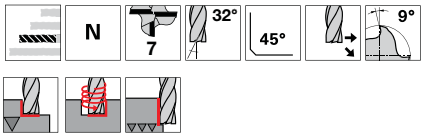


Tool material	Solid Carbide	
Coating	nano-A™	nano-A™
Type	N	N
Shank	HA	HB
Internal cooling		
	NEW	NEW

d1 h10	d2 h6	l1	l2	c	No. of flutes	Code no.	EDP Number	EDP Number
inch	inch	inch	inch	inch				
1/4	1/4	2 3/4	1	0.005	7	6.350	**9069980063500**	
5/16	5/16	3	1 1/4	0.006	7	7.940	**9069980079400**	
3/8	3/8	3 1/4	1 1/2	0.008	7	9.520		**9069980095200**
1/2	1/2	4 1/4	2	0.010	7	12.700		**9069980127000**
5/8	5/8	4 1/2	2 1/4	0.013	7	15.870		**9069980158700**
3/4	3/4	5	2 1/2	0.015	7	19.050		**9069980190500**
1	1	5 1/2	3	0.017	7	25.400		**9069980254000**

RF 100 7 Speed metric, Long length, corner chamfer

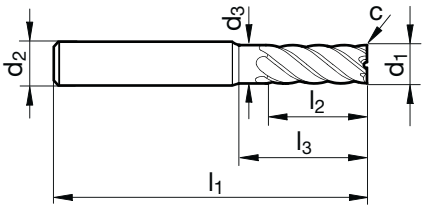
Series	6864	6865
Tool material	Solid Carbide	
Coating	SuperA™	SuperA™
Type	N	N
Shank	HA	HB
Internal cooling		
	NEW	NEW



Material		Suitability
P	Steel	●
M	Stainless steel	●
K	Cast iron	●
N	Aluminum	○
S	Ni / Ti alloys	●
H	Hardened steel	
	Composites	

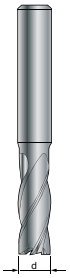
●=Optimal ○=Secondary

- with chip breaker
- neck clearance
- without center cutting



d1 h10	d2 h6	d3	l1	l2	l3	c	No. of flutes	Code code	EDP Number	
mm	mm	mm	mm	mm	mm	mm				
6.00	6.00	5.70	65.00	20.00	28.00	0.12	7	6.000	**9068640060000**	**9068650060000**
8.00	8.00	7.70	75.00	26.00	38.00	0.16	7	8.000	**9068640080000**	**9068650080000**
10.00	10.00	9.50	80.00	32.00	38.00	0.20	7	10.000	**9068640100000**	**9068650100000**
12.00	12.00	11.50	93.00	40.00	46.00	0.24	7	12.000	**9068640120000**	**9068650120000**
16.00	16.00	15.50	108.00	50.00	58.00	0.32	7	16.000	**9068640160000**	**9068650160000**
20.00	20.00	19.50	126.00	62.00	74.00	0.40	7	20.000	**9068640200000**	**9068650200000**

FEEDS & SPEEDS FOR RF100 Speed



$$RPM = \frac{SFM}{d_1} \times 3.82$$

IPM = No. of teeth x IPT x RPM

For finishing use WOC (ae) .01 up to .1xd, use SFM from .25xd column, do not increase IPT from table values

Material	Hardness	Surface feet per minute - SFM					Feed Rate Inch per Tooth - IPT							
		High Speed Milling			Rough	Slot	d1 End Mill Diameter							
		DOC 2xd			DOC 1xd		1/8 3.17mm	1/4 6.35mm	5/16 7.94mm	3/8 9.52mm	1/2 12.70mm	5/8 15.87mm	3/4 19.05mm	1 25.40mm
		WOC .05xd	WOC .1xd	WOC .25xd	WOC .4 to .9xd	WOC 1xd								
		2.5	2.3	1.5	1	1	Multiply IPT x this factor based on WOC							
Structural + free-cutting steels, unalloyed heat-treatable + case hardened steels A283, 1151, 1215, L10, 10Lxx, 11Lxx, 12Lxx, 41Lxx, 51Lxx, 86Lxx, 86Lxx, 10xx	up to 28 HRc	1200	1100	900	650	575	.0007	.0013	.0016	.0023	.0030	.0040	.0045	.0060
Free-cutting steels, unalloyed case hardened steels, nitriding steels 1151, 1215, L10, 10Lxx, 11Lxx, 12Lxx, 41Lxx, 51Lxx, 86Lxx, 86Lxx, 10xx, 11xx	28 to 38 HRc	1100	1000	850	650	525	.0006	.0012	.0015	.0021	.0028	.0035	.0041	.0056
Alloyed heat-treatable, tool and high speed steels 13xx, 2340, 31xx, 32xx, 33xx, 34xx, 40xx, 41xx, 43xx, 4640, 50xx, 51xx, 61xx, 71xx, 86xx, 87xx, 92xx, 98xx, 98xx, Ax, Ox, Dx, Hxx, Lx, Wx, Mx, Tx	28 to 44 HRc	900	800	680	650	425	.0006	.0011	.0014	.0019	.0025	.0031	.0038	.0052
Hardened Steels Carbon and Alloy Steels, Tool & Die Steels	Up to 54 HRc	480	460	360	250	225	.0005	.0009	.0011	.0015	.0020	.0023	.0030	.0040
	54 to 60 HRc	250					Finishing only WOC less than .1xd .0003	.0006	.0008	.0010	.0013	.0016	.0019	.0028
Stainless steel 303, 410, 420F, 430, 430F, 416	Up to 28 HRc	840	760	450	450	400	.0006	.0011	.0014	.0019	.0025	.0031	.0038	.0052
Stainless steel 304, 304L, 420, 17-4PH, 17-7PH, 15-5PH, 13-8PH	up tp 28 HRc	525	475	330	330	250	.0005	.0010	.0013	.0017	.0023	.0027	.0034	.0044
Stainless steel 310, 316, 316B, 316L, 317, Duplex	over 28 HRc	420	380	260	260	200	.0005	.0009	.0011	.0015	.0020	.0023	.0030	.0040
Titanium Alloys 6Al-4V, 5Al-2.5 Sn, 6Al-2Sn-4Zr-6Mo, 3Ai-8V-6Cr4Mo-4Zr, 10V-2Fe-3Ai, 13V-11Cr-3Ai	up to 42 HRc	420	380	260	260	200	.0003	.0007	.0009	.0012	.0016	.0020	.0023	.0032
High-Temperature Alloys Inconel, Nimonic, Monel, Hastelloy, Waspalloy, A286, Rene 41, Udimet, Stellite	up to 42 HRc	210	190	130	130	100	.0004	.0006	.0008	.0009	.0013	.0016	.0019	.0024
Cast iron, grey cast iron, spheroidal graphite and malleable cast iron 0.6010 EN-GL100 (GG10), 0.6020 EN-GJL-200 (GG20), 0.7050 EN-GJS-500-7 (GGG50), 0.8535 EN-GJMW-350-4 (GTW35)	up to 240 HB 30	1100	1000	850	620	525	.0007	.0014	.0017	.0024	.0033	.0039	.0049	.0064
Cast iron, grey cast iron, spheroidal graphite and malleable cast iron 0.6025 EN-GL250 (GG25), 0.6035 EN-GJL-350 (GG35), 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)	over 240 HB 30	950	860	720	550	450	.0006	.0013	.0016	.0021	.0028	.0035	.0041	.0056
Aluminum, Al-wrought alloys, Al-alloys 2024, 6061, 7075, 1050, 6351, 5005, 2017, 7075	up to 3% Si	3400	3090	2600	1950	1625	.0008	.0016	.0020	.0030	.0040	.0051	.0060	.0080
Aluminum-cast alloys 3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9, 3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	over 3% Si	1575	1425	1200	1000	750	.0007	.0014	.0017	.0023	.0030	.0039	.0045	.0060
Magnesium-alloys MgMn2, G-MgAl8Zn1, G-MgAl6Zn3	–	1210	1100	920	725	575	.0006	.0013	.0016	.0021	.0028	.0035	.0041	.0056
Non-ferrous metals (copper, short- or long-chipping brass or bronze)	up to 28 HRc	1680	1520	1280	975	800	.0007	.0014	.0017	.0023	.0030	.0039	.0045	.0060

Efficient milling with the correct strategies

Principles and objectives

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

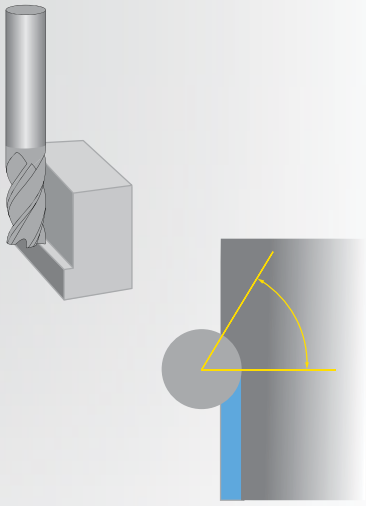
Modification of cutting distribution
- low cutting widths a_e
- high cutting depths a_p

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

Maximum metal removal rate
- saving time/machine costs

Application Parameters

Small cutting width up to 0.33 x D	→	Low radial engagement <70°
	→	Cutting edge spends less time in contact with workpiece
Very high feed rate	→	Reduced chip thickness results in a significantly higher feed rate
Very high cutting speed	→	Reduced heating and prolonged cooling allow for very high speeds
High cutting depth	→	Improved leverage
	→	High removal rates
	→	Increased contact points of the tool



Angle of engagement & Tool contact time

Metal removal rate

The formula below calculates cubic Inches of material removed per minute. This calculation is important in determining the efficiency of your milling strategy.

$$DOC_{(ap)} \times WOC_{(ae)} \times Feed\ rate_{(inch/min)} = In^3/Min$$

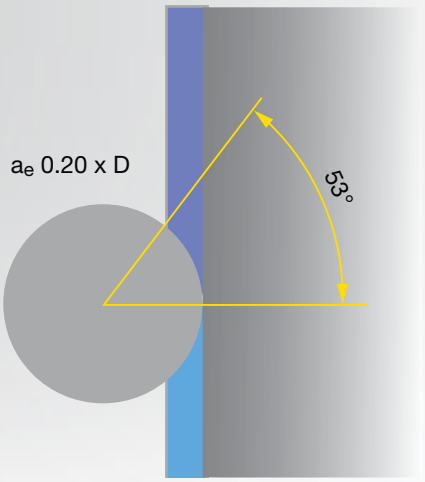
Influence on process through tool engagement

Engagement angle

The engagement angle is important in determining the load acting on the tool. Engagement remains constant in straight milling paths, increases in concave paths, and decreases in convex paths.

Straight milling path
- constant angle of engagement
- constant tool load

Example: a_e 0.20 x D = 53° engagement
Engagement remains a constant 53°

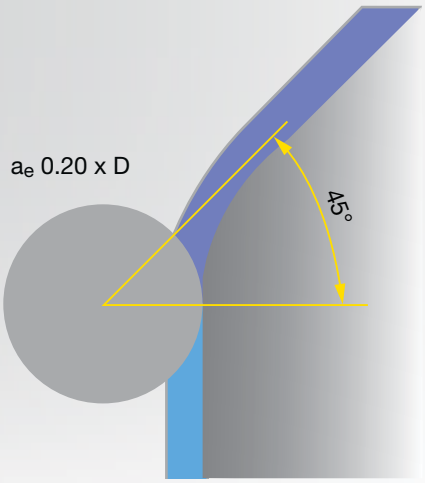


Convex milling path

- Engagement decreases as tool enters radius
- Tool load decreases

Example: a_e 0.20 x D = 53° engagement
Engagement is reduced to 45°

Result: a_e may be increased
f_z can be increased

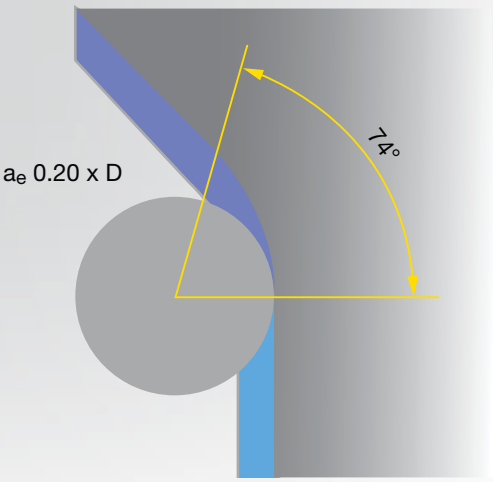


Concave milling path

- Engagement increases as tool enters radius
- Tool load increasing

Example: a_e 0.20 x D = 53° engagement
Engagement is increased to 74°

Result: a_e must be reduced
f_z must be reduced in radius

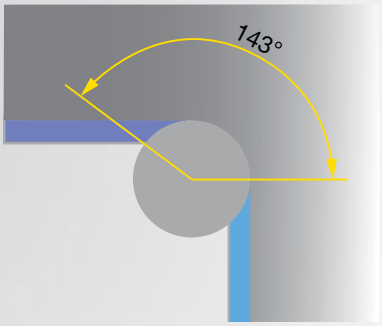


Influence on process through tool engagement

Engagement angle at 90° corner radii

Tool radius = Corner radius
- Very unfavorable for tool dynamics
- Abrupt increase in tool load
- Catastrophic failure of cutting tool likely

a_e 0.20 x D

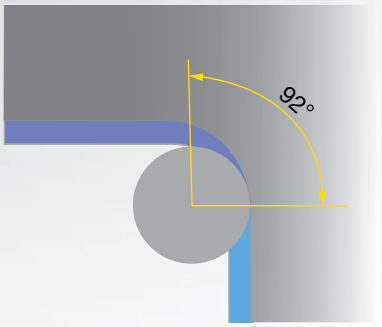


Example: Engagement angle increases 270% from 53° to 143°

Measures: v_c and f_z must be heavily reduced

Tool radius < Corner radius
- Corner created by interpolating path
- Increase in tool load is less abrupt
- Smaller increase in tool load

a_e 0.20 x D

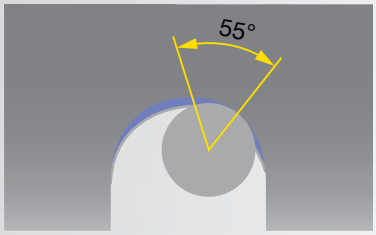


Example: Engagement angle increases 174% from 53° to 92°

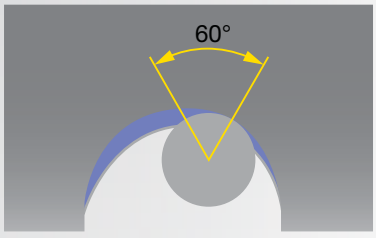
Measures: a_e must be reduced
f_z must be heavily reduced in radius

Ratio of slot width to tool diameter during trochoidal milling

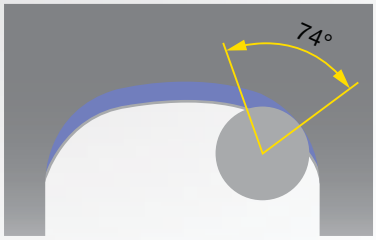
Groove width 1.7 – 2.0 x D
- C-shaped tool path
- a_e max. 0.10 x D (theoretical 37°)
- Engagement angle increases by up to 50% (55° engagement)



Groove width 2.1 – 3.0 x D
- C-shaped tool path
- a_e max. 0.15 x D (theoretical 46°)
- Engagement angle increases by up to 30% (60° engagement)



Groove width from 3.1 x D
- D-shaped tool path
- a_e max. 0,20 x D (theoretical 53°)
- Engagement angle increases by up to 40% (74° engagement)



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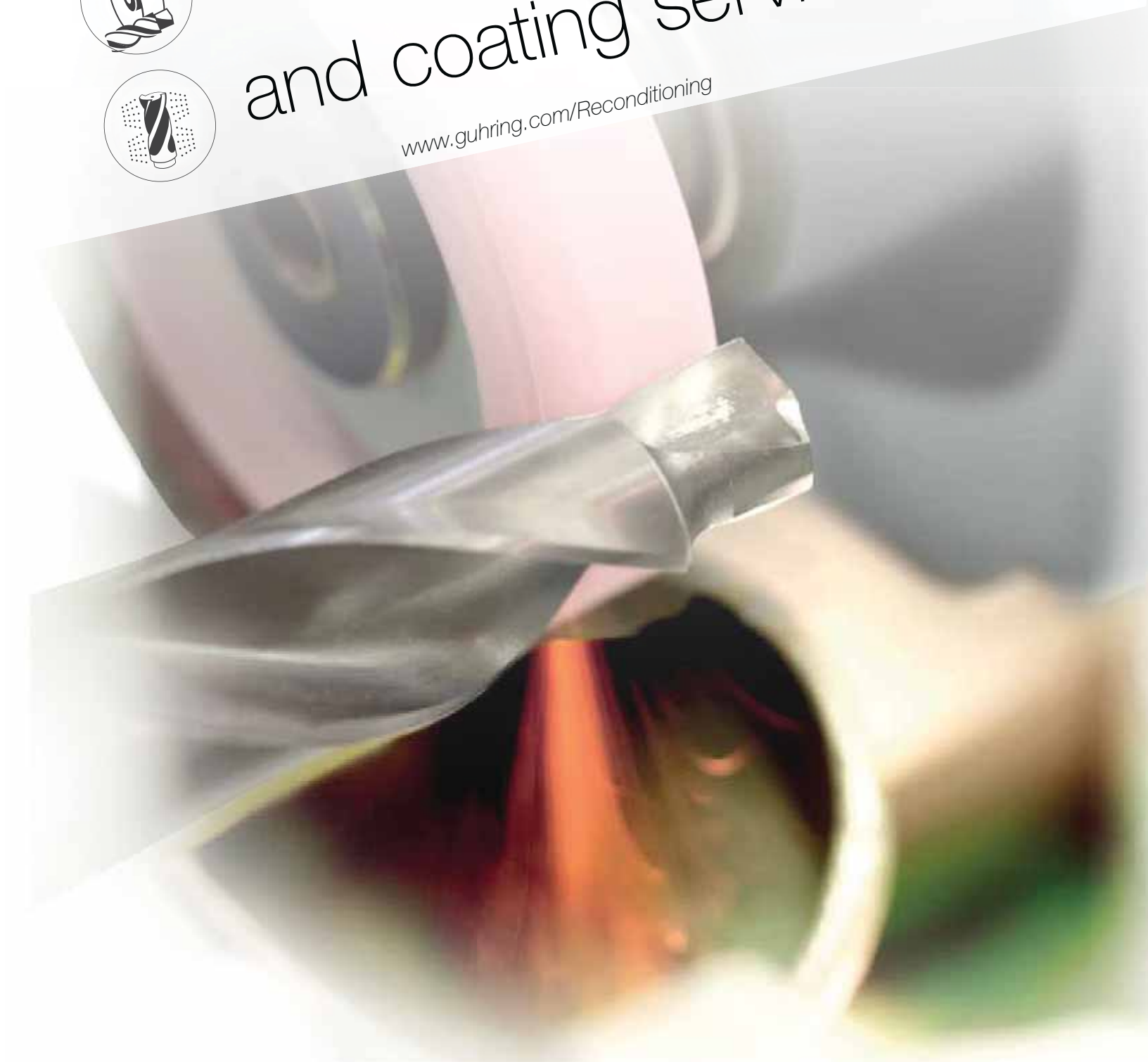

Guhring HPC power clamp chucks

Well clamped is well milled!

Summary of advantages

- extreme clamping force thanks to mechanical clamping transmission
- ideal combination with HPC end mills and thread milling cutters
- for immense speeds with HPC and HSC milling
- maximum rigidity

GÜHROJET

Thanks to the securing pin in the PinLock clamping sleeve, tool pull-out is prevented when applied with standard milling tools utilizing HB shanks to DIN 6535 specifications. The combination of the HPC clamping technology, high concentricity, and the Guhrojet peripheral cooling feature allows us to achieve the perfect balance of high metal removal rates, longer tool life and improved surface finish.

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