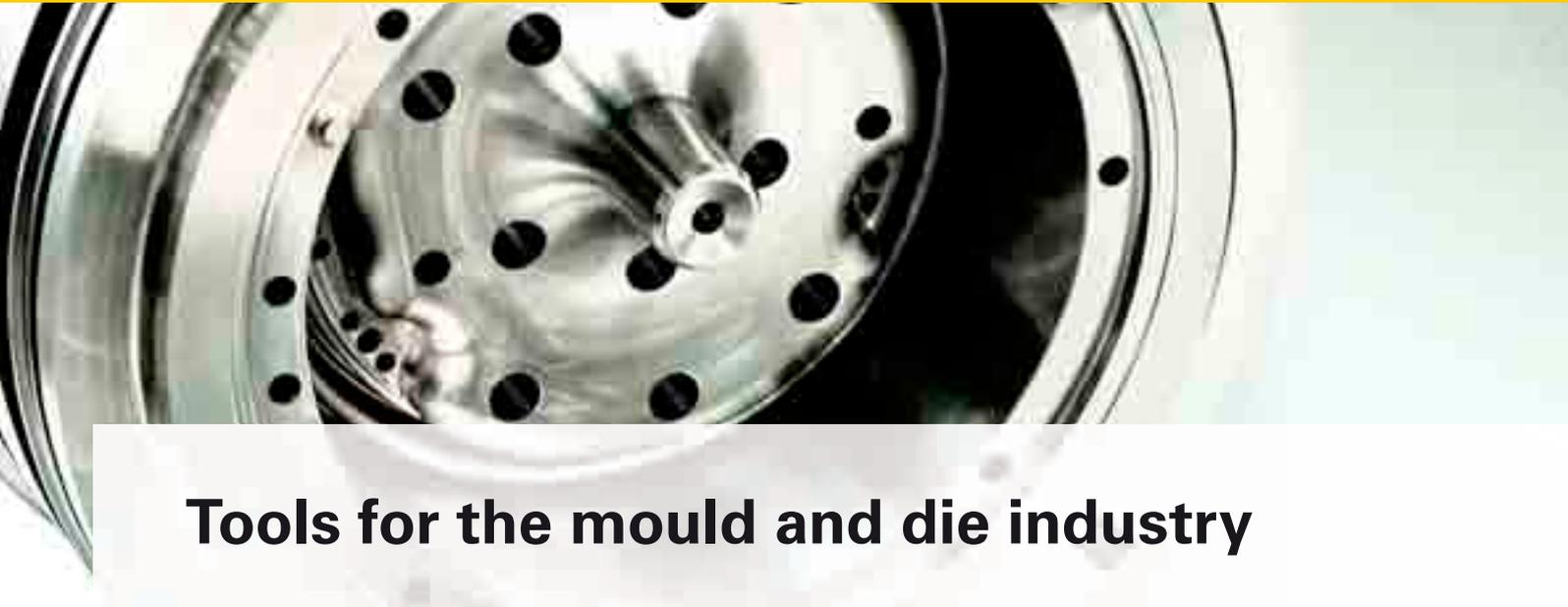


GUHRING



Tools for the mould and die industry



G 2011

Our complete range for the mould and die industry.

Accuracy and process reliability are the essential requirements for the mould and die industry. Guhring precision tools will not let you down in this category. In addition, they convince of course through highest quality, optimum performance and cost-efficiency.

MILLING



RF100

High-performance end mills with unequal helix angle for Roughing and finishing with high performance and maximum quality up to 48 HRC.



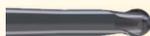
GF300

HSC-profile cutters for 3D hard machining up to 62 HRC in Torus and ball nose form.



GF500

HSC-profile cutters for 3D hard machining of moulds and dies up to 54 HRC in Torus and ball nose form, radius tolerance +/-0.01mm.



THREADING

TAPS



Taps for hard machining up to 55 HRC made of HSS-E-PM or 62 HRC made of solid carbide.

FLUTELESS TAPS

Thread forming in materials up to 1200 N/mm²? No problem with Guhring solid carbide fluteless taps!



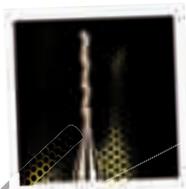
THREAD MILLS

Big threads in hard materials up to 54 HRC - the domain of Guhring solid carbide thread mills.

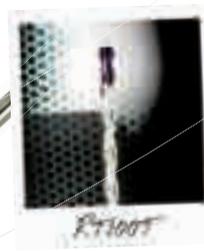
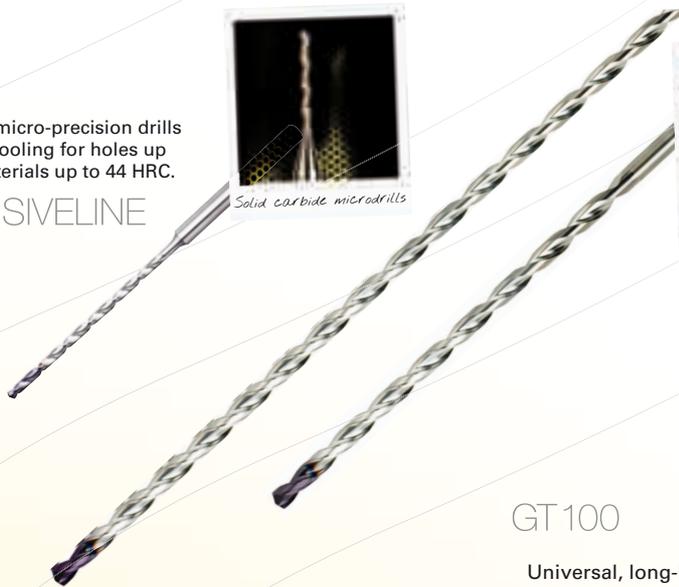


Solid carbide micro-precision drills with internal cooling for holes up to 15xD in materials up to 44 HRC.

EXCLUSIVELINE



Solid carbide microdrills



RT100T

Spiral-flute deep hole drills up to 40xD machine materials up to 44 HRC fast and efficiently.

DRILLING

GT100

Universal, long-lasting and with an enormous program: Spiral-flute HSS-/HSS-E drills up to a flute length of 850 mm.



EB100

For highest accuracy from diameter 2.0 up to 8.0: Solid carbide single-fluted gun drills for drilling depths of max. 160 mm.



EB80

From diameter 3.97 up to 12.7 mm unbeatable accuracy: Single-fluted carbide-tipped gun drills for drilling depths of max. 80xD.



EB800

The precise solution for big holes from diameter 16.0 up to 24.0 mm: Single-fluted gun drills with carbide interchangeable inserts for drilling depths of 30xD.



REAMING

NC REAMER



Universal HSS-E reamers for materials up to 1000 N/mm².



NC reamer



HR500

High-performance reamers for the machining of tool steels and hardened steels up to 62 HRC with cutting rates superior to Cermet.

CLAMPING DEVICE



GM300

Shrink fit chucks, HPC clamping chucks and shrink fit systems for perfect, secure tool clamping.



Drilling spiral-fluted

Guh. no.	Type	Description	Cooling	Tool material	Surface finish	Diameter range	Drilling depth	max. material hardness	Standard	Page
6412	N	Micro-precision drill	IC	Solid carbide	A	1.4 - 3.0	15 x D	< 44 HRC	Guhring std.	13
6509	RT 100 T	Solid carbide spiral-flute deep hole drill	IC	Solid carbide	A	3.0 - 14.0	15 x D	< 44 HRC	Guhring std.	15
6511	RT 100 T	Solid carbide spiral-flute deep hole drill	IC	Solid carbide	A	3.0 - 14.0	20 x D	< 44 HRC	Guhring std.	16
6512	RT 100 T	Solid carbide spiral-flute deep hole drill	IC	Solid carbide	A	3.0 - 12.0	25 x D	< 44 HRC	Guhring std.	17
6513	RT 100 T	Solid carbide spiral-flute deep hole drill	IC	Solid carbide	A	3.0 - 10.0	30 x D	< 44 HRC	Guhring std.	18
6514	RT 100 T	Solid carbide spiral-flute deep hole drill	IC	Solid carbide	A	3.0 - 8.0	40 x D	< 44 HRC	Guhring std.	19
2477	RT 100 U	Ratio drill	IC	Solid carbide	F	3.0 - 20.0	3 x D	< 44 HRC	DIN 6537 K	20
1946	H	Hard twist drill	-	Solid carbide	A	2.6 - 14.1	3 x D	< 62 HRC	DIN 6537 K	21
4110	HT800	Tooling system - holder	IC	-	-	11.0 - 25.99	10 x D	-	Guhring std.	23
4112	HT800	Tooling system - interchangeable insert	-	Solid carbide	F	11.0 - 25.5	-	< 44 HRC	Guhring std.	25
336	GT 100	Long series twist drill	-	HSCO		1.0 - 16.0	DIN 340	< 1000 N/mm ²	DIN 340	27
618	GT 100	Extra length twist drill, series 1	-	HSCO		2.7 - 10.0	DIN 1869/1	< 1000 N/mm ²	DIN 1869/1	28
619	GT 100	Extra length twist drill, series 2	-	HSCO		3.0 - 10.0	DIN 1869/2	< 1000 N/mm ²	DIN 1869/2	28
504	GT 100	Extra length twist drill, series 3	-	HSS		2.5 - 12.0	DIN 1869/3	< 1000 N/mm ²	DIN 1869/3	29
242	GT 100	Extra length twist drill	-	HSS		6.0 - 12.0	400 mm max.	< 1000 N/mm ²	Guhring std.	29
243	GT 100	Extra length twist drill	-	HSS		8.0 - 12.0	650 mm max.	< 1000 N/mm ²	Guhring std.	30
244	GT 100	Extra length twist drill	-	HSS		10.0 - 12.0	850 mm max.	< 1000 N/mm ²	Guhring std.	30
581	-	Center drill	-	HSS		0.5 - 12.5	-	< 1000 N/mm ²	DIN 333	31
557	N	NC-spotting drill 90°	-	HSS		2.95 - 25.4	-	< 1000 N/mm ²	Guhring std.	31

Drilling straight-fluted

Guh. no.	Type	Description	Cooling	Tool material	Surface finish	Diameter range	Drilling depth	max. material hardness	Standard	Page
5632	EB 100	Solid carbide single-fluted gun drill	IC	Solid carbide	A	2.0 - 3.2	max. 45 mm	< 44 HRC	Guhring std.	36
5633	EB 100	Solid carbide single-fluted gun drill	IC	Solid carbide	A	2.0 - 5.0	max. 80 mm	< 44 HRC	Guhring std.	36
5637	EB 100	Solid carbide single-fluted gun drill	IC	Solid carbide	A	2.0 - 5.0	max. 120 mm	< 44 HRC	Guhring std.	37
5638	EB 100	Solid carbide single-fluted gun drill	IC	Solid carbide	A	2.0 - 8.0	max. 160 mm	< 44 HRC	Guhring std.	37
5639	EB 80	Single-fluted carbide tipped gun drill	IC	Carbide	C	3.97 - 12.7	20 x D	< 44 HRC	Guhring std.	38
5640	EB 80	Single-fluted carbide tipped gun drill	IC	Carbide	C	3.97 - 12.7	30 x D	< 44 HRC	Guhring std.	38
5641	EB 80	Single-fluted carbide tipped gun drill	IC	Carbide	C	3.97 - 12.7	40 x D	< 44 HRC	Guhring std.	39
5642	EB 80	Single-fluted carbide tipped gun drill	IC	Carbide	C	3.97 - 12.7	80 x D	< 44 HRC	Guhring std.	39
5644	EB 800	Single-fluted gun drill with interch. inserts	IC	Carbide plates	S	16.0 - 24.0	30 x D	< 44 HRC	Guhring std.	40

Milling

Guh. no.	Type	Description	No. of teeth	Tool material	Surface finish	Diameter range	Application	max. material hardness	Standard	Page
3736	RF 100 U N	High-performance end mill	4	Solid carbide	F	4.0 - 25.0	HPC	< 48 HRC	DIN 6527 L	48
3732	RF 100 U N	High-performance end mill	4	Solid carbide	F	4.0 - 25.0	HPC	< 48 HRC	DIN 6527 L	48
3837	RF 100 U N	High-performance end mill	4	Solid carbide	F	6.0 - 20.0	HPC	< 48 HRC	Guhring std.	49
3838	RF 100 U N	High-performance end mill	4	Solid carbide	F	6.0 - 20.0	HPC	< 48 HRC	Guhring std.	49
3839	RF 100 U N	High-performance end mill	4	Solid carbide	F	6.0 - 20.0	HPC	< 48 HRC	Guhring std.	49
3871	RF 100 U N	High-performance end mill	4	Solid carbide	F	6.0 - 20.0	HPC	< 48 HRC	Guhring std.	49
3897	RF 100 S/F NH	High-performance end mill	5	Solid carbide	F	4.0 - 20.0	HSC/HPC	< 48 HRC	Guhring std.	50
3898	RF 100 S/F NH	High-performance end mill	5	Solid carbide	F	4.0 - 20.0	HSC/HPC	< 48 HRC	Guhring std.	50
3895	RF 100 H H	High-performance end mill	4	Solid carbide	A	6.0 - 20.0	HSC/HPC	< 62 HRC	DIN 6527 L	51
3896	RF 100 H H	High-performance end mill	4	Solid carbide	A	6.0 - 20.0	HSC/HPC	< 62 HRC	DIN 6527 L	51
3715	GH 100 H H	Hard multi-tooth end mill	6-8	Solid carbide	F	3.0 - 20.0	HSC/HPC	< 62 HRC	Guhring std.	52
3716	GH 100 H H	Hard multi-tooth end mill	6-8	Solid carbide	F	6.0 - 20.0	HSC	< 62 HRC	Guhring std.	53
3684	-	Mini slot drill	3	Solid carbide	F	0.3 - 20.0	-	< 1000 N/mm ²	Guhring std.	53

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Milling

Guh. no.	Type	Description	No. of teeth	Tool material	Surface finish	Diameter range	Application	max. material hardness	Standard	Page
3848	GF 500 B N	HSC-ball nose profile cutter	2	Solid carbide	A	2.0 - 12.0	HSC	< 54 HRC	Guhring std.	54
3849	GF 500 B N	HSC-ball nose profile cutter	2	Solid carbide	A	2.0 - 12.0	HSC	< 54 HRC	Guhring std.	54
3853	GF 500 B N	HSC-ball nose profile cutter	2	Solid carbide	A	2.0 - 8.0	HSC	< 54 HRC	Guhring std.	54
3855	GF 500 B N	HSC-ball nose profile cutter	2	Solid carbide	A	6.0 - 12.0	HSC	< 54 HRC	Guhring std.	55
3854	GF 500 B N	HSC-ball nose profile cutter	2	Solid carbide	A	6.0 - 12.0	HSC	< 54 HRC	Guhring std.	55
3866	GF 500 B N	HSC-ball nose profile cutter	2	Solid carbide	A	4.0 - 12.0	HSC	< 54 HRC	Guhring std.	55
3359	GF 300 B H	HSC-ball nose profile cutter	2	Solid carbide	F	0.5 - 16.0	HSC	< 62 HRC	Guhring std.	56
3360	GF 300 B H	HSC-ball nose profile cutter	2	Solid carbide	F	3.0 - 16.0	HSC	< 62 HRC	Guhring std.	56
3679	- N	Ball nose slot drill	2	Solid carbide	F	0.5 - 20.0	Universal	< 1200 N/mm ²	DIN 6527 L	57
3856	GF 500 T N	HSC-profile cutter with Torus form	2	Solid carbide	A	2.0 - 12.0	HSC	< 54 HRC	Guhring std.	58
3859	GF 500 T N	HSC-profile cutter with Torus form	2	Solid carbide	A	2.0 - 12.0	HSC	< 54 HRC	Guhring std.	58
3860	GF 500 T N	HSC-profile cutter with Torus form	2	Solid carbide	A	2.0 - 8.0	HSC	< 54 HRC	Guhring std.	58
3865	GF 500 T N	HSC-profile cutter with Torus form	2	Solid carbide	A	6.0 - 12.0	HSC	< 54 HRC	Guhring std.	59
3863	GF 500 T N	HSC-profile cutter with Torus form	2	Solid carbide	A	4.0 - 12.0	HSC	< 54 HRC	Guhring std.	59
3498	RF 100 Ti N	High-performance end mill	4	Solid carbide	A	6.0 - 25.0	HSC/HPC	< 48 HRC	DIN 6527 L	60
3499	RF 100 Ti N	High-performance end mill	4	Solid carbide	A	6.0 - 25.0	HSC/HPC	< 48 HRC	DIN 6527 L	60
3361	GF 300 T H	Hard profile cutter with Torus grind	4	Solid carbide	F	3.0 - 16.0	HSC/HPC	< 62 HRC	Guhring std.	61
3362	GF 300 T H	Hard profile cutter with Torus grind	4	Solid carbide	F	6.0 - 16.0	HSC/HPC	< 62 HRC	Guhring std.	61
3363	GH 100 H H	Hard multi-tooth end mill corner radius	6-8	Solid carbide	F	6.0 - 16.0	HSC	< 62 HRC	Guhring std.	62
3563	GH 100 U N	Multi-tooth end mill corner radius	6-8	Solid carbide	F	6.0 - 20.0	HSC/HPC	< 48 HRC	DIN 6527 L	63

Threading

Guh. no.	Type/Form	Description	Cooling	Tool material	Surface finish	Diameter range	Hole	max. material hardness	Standard	Page
1201	H/D	Tap for ISO metric threads	-	HSS-E PM	C	M6 - M12		< 54 HRC	DIN 371	70
2944	H/D	Tap for ISO metric threads	-	Solid carbide	C	M3 - M16		< 62 HRC	~ DIN 371	68
1161	H/D	Tap for ISO metric fine threads	-	Solid carbide	C	M6 - M12		< 62 HRC	Guhring std.	69
1972	N/C	Fluteless tap for ISO metric threads	IC	Solid carbide	C	M3 - M10		< 1200 N/mm ²	~ DIN 371	71
3526	TMC SP	Thread milling cutters for ISO metr. threads	IC	Solid carbide	C	M3 - M20		< 54 HRC	Guhring std.	72
3541	TMU SP	Thread milling cutters for ISO metr. threads	IC	Solid carbide	C	≥14 - ≥30		< 54 HRC	Guhring std.	73

Reaming

Guh. no.	Type	Description	IC	Tool material	Surface finish	Diameter range	Hole	max. material hardness	Standard	Page
490	-	NC machine reamer	-	HSS-E	○	1.5 - 20.0		< 1000 N/mm ²	Guhring std.	78
1685	HR 500 S	High-performance reamer	IC	Solid carbide	A	4.0 - 20.0		< 62 HRC	Guhring std.	81
1686	HR 500 D	High-performance reamer	IC	Solid carbide	A	4.0 - 20.0		< 62 HRC	Guhring std.	81

Clamping device

Guh. no.	Type	Description	Cone type	Cone size / nom. size	max. material hardness	Standard	Page
4736	GM 300	Shrink fit chuck	HSK-A	32 - 100	6.0 - 32.0	DIN 69882-8	86
4737	GM 300	Shrink fit chuck	HSK-E	32 - 63	3.0 - 32.0	Guhring std.	90
4738	GM 300	Shrink fit chuck	ISO taper	40 - 50	3.0 - 32.0	Guhring std.	88
4719	GM 300	Shrink fit extension	-	16 - 25	3.0 - 16.0	Guhring std.	89
4300	GM 300	HPC clamping chuck	HSK-A	63	3.0 - 20.0	Guhring std.	91
4301	GM 300	HPC clamping chuck	ISO taper	40	3.0 - 20.0	Guhring std.	92
4302	GM 300	Clamping sleeve for HPC clamping chucks	-	20	6.0 - 20.0	Guhring std.	92
4742	GISS 2000	Induction shrink fit system	-	-	3.0 - 32.0	Guhring std.	93

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EXCLUSIVELINE MICRO-PRECISION DRILLS RT 100 HARD TWIST DRILLS
HT 800 WP GT 100 NC-SPOTTING DRILLS CENTER DRILLS

DRILLING spiral-fluted

8

EB 100 EB 80 EB 800

DRILLING straight-fluted

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RF 100 GH 100 MINI-SLOT DRILLS GF 300 UNIVERSAL GF 500

MILLING

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TAPS FLUTELESS TAPS THREAD MILLING CUTTERS

THREADING

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NC-REAMER EXCLUSIVELINE HR 500

REAMING

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SHRINK FIT CHUCKS HPC-CLAMPING CHUCKS GISS 2000

CLAMPING DEVICES

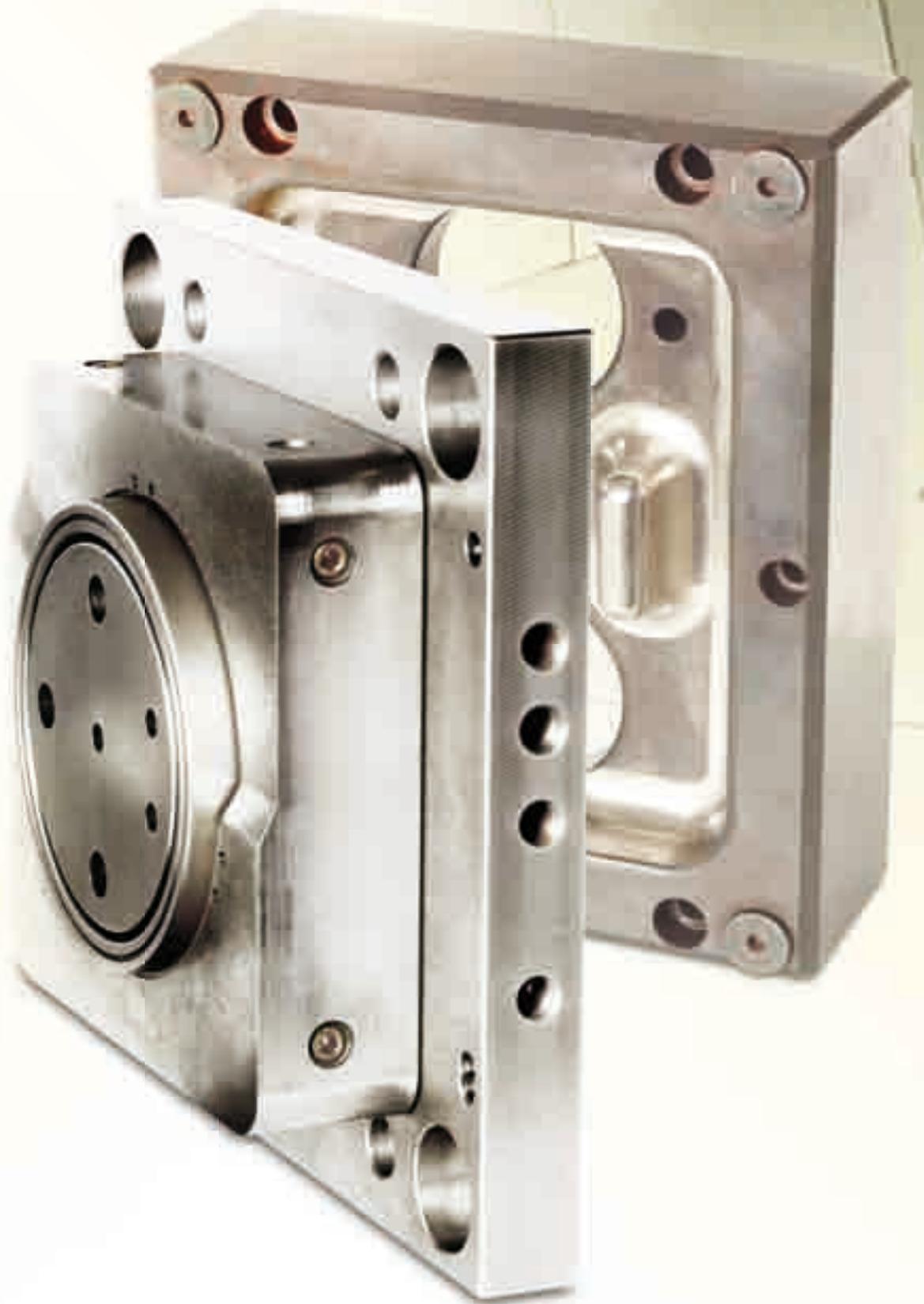
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GUHRING NAVIGATOR

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DRILLING spiral-fluted DIE MAKING





GUHRING

Solid carbide drilling

Standard	Type	Tool description	Drilling depth	Tool material	Surface finish	Diameter range	Guhring no.	Discount group	Standard range page
ExclusiveLine solid carbide micro-precision drills with internal cooling, for materials < 44 HRC									
Guhring std.	N		15 x D	Solid carbide	A	1.400 - 3.000	6412	164	13
Spiral-flute deep hole drills RT 100 T with internal cooling, for materials < 44 HRC									
Guhring std.	RT 100 T		15 x D	Solid carbide	A	3.000 - 14.000	6509	165	15
Guhring std.	RT 100 T		20 x D	Solid carbide	A	3.000 - 14.000	6511	165	16
Guhring std.	RT 100 T		25 x D	Solid carbide	A	3.000 - 12.000	6512	165	17
Guhring std.	RT 100 T		30 x D	Solid carbide	A	3.000 - 10.000	6513	165	18
Guhring std.	RT 100 T		40 x D	Solid carbide	A	3.000 - 8.000	6514	165	19
Ratio drills RT 100 U with internal cooling, for materials < 44 HRC									
DIN 6537 K	RT 100 U		3 x D	Solid carbide	F	3.000 - 20.000	2477	121	20
Twist drills for hard machining with external cooling, for materials < 62 HRC									
DIN 6537 K	H		3 x D	Solid carbide	A	2.600 - 14.100	1946	102	21
HT 800 WP Tooling system with internal cooling, for materials < 44 HRC									
Guhring std.	HT 800		10 x D			11.000 - 25.990	4110	140	23
Guhring std.	HT 800		-	Solid carbide	F	11.000 - 25.500	4112	141	25

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◐ nitrided lands

Ⓐ TiAlN SuperA

Ⓐ TiAlN

Ⓕ FIRE

HSS drilling

Standard	Type	Tool description	Drilling depth	Tool material	Surface finish	Diameter range	Guhring no.	Discount group	Standard range page
Twist drills GT 100 for materials < 1000 N/mm²									
DIN 340	GT 100		long series	HSCO		1.000 - 16.000	336	136	27
DIN 1869	GT 100		extra length series 1	HSCO		2.700 - 10.000	618	136	28
DIN 1869	GT 100		extra length series 2	HSCO		3.000 - 10.000	619	138	28
DIN 1869	GT 100		extra length series 3	HSS		2.500 - 13.000	504	136	29
Guhring std.	GT 100		extralong series	HSS		6.000 - 12.000	242	136	29
Guhring std.	GT 100		extralong series	HSS		8.000 - 12.000	243	138	30
Guhring std.	GT 100		extralong series	HSS		10.000 - 12.000	244	138	30
Center drills for materials < 1000 N/mm²									
DIN 333			-	HSS		0.500 - 12.500	581	132	31
NC-spotting drills 90° for materials < 1000 N/mm²									
Guhring std.	N		-	HSS		2.950 - 25.400	557	134	31

ExclusiveLine solid carbide micro-precision drills

We supply ExclusiveLine solid carbide micro-precision drills as standard tools for the drilling depths:

- 4 x D = Guh. no. 6400 without internal cooling
- 7 x D = Guh. no. 6401 without internal cooling
- 8 x D = Guh. no. 6408 with internal cooling
- 15 x D = Guh. no. 6412 with internal cooling

The entire range can be found in the ExclusiveLine solid carbide micro-precision drills brochure that can be downloaded as a PDF file at www.guehring.de or can be sent to you on request. Please contact Guhring!

Superior in every sense

ExclusiveLine micro-precision drills have proven their exceptional performance capabilities in various volume applications and tool life tests. The tables below document a few application examples with convincing results.

Machining examples of solid carbide micro-precision drills 8xD and 15xD with IC

Guhring no.	6408	6408	6412	6412
Diameter	1,4 mm	2.5 mm	2.5 mm	2.1 mm
Coating	SuperA	SuperA	SuperA	SuperA
Material group	cast iron	alloyed case hardened steel	alloyed heat-treatable steel	stainless steel
Material description	GG25	16MnCr5	42CrMo4	X6CrNiTi18 10
Drill. depth [mm]	8xD	8xD	15xD	15xD
Hole type	blind hole	blind hole	blind hole	blind hole
Cooling	IC 80 bar	IC 80 bar	IC 80 bar	IC 80 bar
Coolant	soluble oil	soluble oil	soluble oil	soluble oil
Machine type	machining centre	machining centre	machining centre	machining centre
v_c [mm/min]	80	120	100	60
f [mm/rev.]	0.1	0.14	0.1	0.03
Tool life [m]	150	110	60	60

ExclusiveLine special solid carbide micro-precision drills

For special applications: Special solutions to customer requirements

In addition to spiral-fluted standard micro-precision drills without internal cooling from 0.8 mm nominal diameter for drilling depths up to 4xD and 7xD as well as from 1.4 mm nominal diameter with internal cooling for up to 8xD and 15xD, Guhring also provides special tools as part of the ExclusiveLine range. Including

- intermediate sizes for the standard range
- stepped tools for multi-diameter holes or countersunk holes
- special lengths up to 30xD drilling depth
- other shank forms
- alternative coatings



Order no. = Guhring no. + Code no.	Guhring no.	6412			
	Standard	Guhring standard			
	Tool material	Solid carbide			
	Carbide grade	K30/K40			
	Surface	A			
	Type	N			
	Shank	HA			
	Drilling depth	15 x D			
	Cutting direction	right-hand			
	Tolerance	h7			
	Discount group	164			

Code no.	d1 mm	d2 h6 mm	l1 mm	l2 mm	Availability
1,400	1.400	4.000	62.000	25.000	●
1,500	1.500	4.000	62.000	27.000	●
1,590	1.590	4.000	62.000	29.000	●
1,600	1.600	4.000	62.000	29.000	●
1,700	1.700	4.000	70.000	31.000	●
1,800	1.800	4.000	70.000	32.000	●
1,900	1.900	4.000	70.000	34.000	●
1,980	1.980	4.000	70.000	36.000	●
2,000	2.000	4.000	70.000	36.000	●
2,100	2.100	4.000	78.000	38.000	●
2,200	2.200	4.000	78.000	40.000	●
2,300	2.300	4.000	78.000	42.000	●
2,380	2.380	4.000	78.000	44.000	●
2,400	2.400	4.000	78.000	44.000	●
2,500	2.500	4.000	78.000	45.000	●
2,600	2.600	4.000	87.000	47.000	●
2,700	2.700	4.000	87.000	48.000	●
2,780	2.780	4.000	87.000	50.000	●
2,800	2.800	4.000	87.000	50.000	●
2,900	2.900	4.000	87.000	52.000	●
3,000	3.000	4.000	87.000	54.000	●

Pilot hole
For the application of solid carbide micro-precision drills 15xD we recommend a pilot hole 1xD up to 2xD depth.
For this pilot hole, the solid carbide micro-precision drill 4xD is optimally suitable. Its point angle and its diameter tolerance are perfectly adapted.

Pilot drill: Guh. no. 6400

Available diameters:
0.8 mm up to 3.0 mm

The spiral-flute deep hole drill RT 100 T

Available ex-stock now: The spiral-flute deep hole drill RT 100 T. The program includes standard drills for drilling depths up to $20 \times D$, $25 \times D$, $30 \times D$ and $40 \times D$. The RT 100 T ex-stock range offers an outstanding cost-performance-ratio as well as availability. Moreover, the RT 100 T drills permit highest cutting and feed rates and subsequently achieve a considerable reduction in machining time.

These advantages are achieved thanks to the following attributes:

Optimised flute geometry

The spiral-flute deep hole drills possess a special flute geometry that is optimised to the specific demand for optimal chip evacuation from the deep hole. (fig. 1)

Maximised coolant duct profile

To provide the cutting edge with an optimum coolant supply, the tools possess a maximised coolant duct profile. It ensures an efficient coolant supply to the cutting edge as well as excellent chip evacuation. (fig. 2)

Problem-free swarf

The factors described above – in combination with the cutting parameters optimally adapted to the application task – result in chips that are evacuated problem-free even from deep holes. Chip congestion and a subsequent jamming of the tool is effectively prevented. (fig. 3)

RT 100 T - on deep hole drilling machines

After checking the clamping and the total length, the application of RT 100 T is possible on deep hole drilling machines with a guide bush.

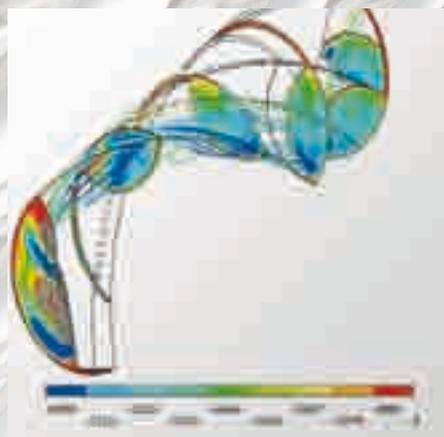


Fig. 1: Optimised flute geometry for optimal chip evacuation.



Fig. 2: Maximised coolant duct profile for effective cooling/lubrication.



Fig. 3: Problem-free chips preventing chip congestion and jamming of the tool.

Ratio drills RT 100 U

Solid carbide Guhring Ratio drill RT 100 U $3 \times D$ is the ideal pilot drill for the spiral-flute deep hole drill RT 100 T:

$3 \times D$ = Guh. no. 2480 (HA) / Guh. no. 2472 (HE)

$3 \times D$ with IC = Guh. no. 2477 (HA) / Guh. no. 2469 (HE)

In addition, Ratio drills RT 100 U are also available for the following depths:

$5 \times D$ = Guh. no. 2996 (HA) / Guh. no. 2719 (HE)

$5 \times D$ with IC = Guh. no. 2479 (HA) / Guh. no. 2471 (HE)

$7 \times D$ with IC = Guh. no. 4044 (HA) / Guh. no. 4045 (HE)

The complete range can be found in our main catalogue that we will send to you on request. Please contact us!



Spiral-flute deep hole drill RT 100 T

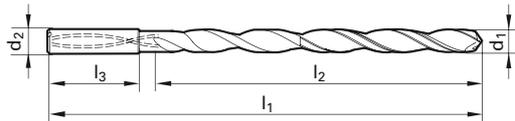
Drilling spiral-fluted

Order no. = Guhring no. + Code no.

Guhring no.	6509
Standard	Guhring standard
Tool material	Solid carbide
Carbide grade	K30/K40
Surface	
Type	RT 100 T
Shank	HA
Drilling depth	15 x D
Cutting direction	right-hand
Tolerance	h7
Discount group	165

6509
Guhring standard
Solid carbide
K30/K40

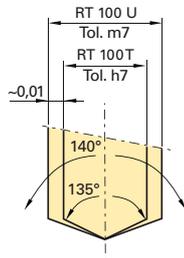
RT 100 T
HA
15 x D
right-hand
h7
165



Code no.	d1 inch	d1 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm
3,000	13/64	3.000	6.000	95.00	55.00	36.00
3,500		3.500	6.000	116.00	76.00	36.00
4,000		4.000	6.000	116.00	76.00	36.00
4,500		4.500	6.000	133.00	93.00	36.00
5,000		5.000	6.000	133.00	93.00	36.00
5,500		5.500	6.000	150.00	110.00	36.00
6,000		6.000	6.000	150.00	110.00	36.00
6,500		6.500	8.000	167.00	127.00	36.00
7,000		7.000	8.000	167.00	127.00	36.00
7,500		7.500	8.000	183.00	143.00	36.00
8,000		8.000	8.000	183.00	143.00	36.00
8,500		8.500	10.000	204.00	160.00	40.00
9,000		9.000	10.000	204.00	160.00	40.00
10,000		10.000	10.000	221.00	177.00	40.00
11,000		11.000	12.000	247.00	198.00	45.00
12,000		12.000	12.000	263.00	214.00	45.00
12,700	1/2	12.700	14.000	297.00	248.00	45.00
14,000		14.000	14.000	297.00	248.00	45.00

Availability	
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Pilot hole
For the application of spiral-flute deep hole drills RT 100T we recommend a pilot hole 1xD up to 2xD depth.
For this pilot hole, the Ratio drill RT 100 U with internal cooling 3xD is optimally suitable. Its point angle and its diameter tolerance are perfectly adapted.



Pilot drill: Guh. no. 2477



Available diameters:
3.0 mm up to 20.0 mm

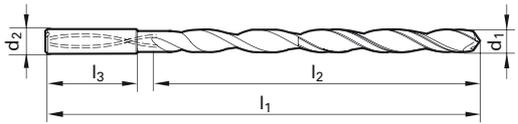
Spiral-flute deep hole drill RT 100 T

Drilling spiral-fluted

Order no. = Guhring no. + Code no.

- Guhring no.**
- Standard**
- Tool material**
- Carbide grade**
- Surface**
- Type**
- Shank**
- Drilling depth**
- Cutting direction**
- Tolerance**
- Discount group**

6511
Guhring standard
Solid carbide
K30/K40
A
RT 100 T
HA
20 x D
right-hand
h7
165

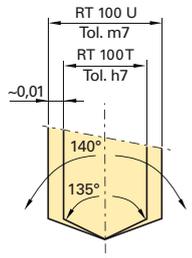


Code no.	d1 inch	d1 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm
3,000		3.000	6.000	110.00	70.00	36.00
3,500		3.500	6.000	136.00	96.00	36.00
4,000		4.000	6.000	136.00	96.00	36.00
4,500		4.500	6.000	158.00	118.00	36.00
5,000		5.000	6.000	158.00	118.00	36.00
5,500		5.500	6.000	180.00	140.00	36.00
6,000		6.000	6.000	180.00	140.00	36.00
6,500		6.500	8.000	202.00	162.00	36.00
7,000		7.000	8.000	202.00	162.00	36.00
7,500		7.500	8.000	223.00	183.00	36.00
8,000		8.000	8.000	223.00	183.00	36.00
8,500		8.500	10.000	249.00	205.00	40.00
9,000		9.000	10.000	249.00	205.00	40.00
10,000		10.000	10.000	271.00	227.00	40.00
11,000		11.000	12.000	302.00	253.00	45.00
12,000		12.000	12.000	323.00	274.00	45.00
12,700	1/2	12.700	14.000	367.00	318.00	45.00
14,000		14.000	14.000	367.00	318.00	45.00

Availability

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Pilot hole
 For the application of spiral-flute deep hole drills RT 100 T we recommend a pilot hole 1xD up to 2xD depth.
 For this pilot hole, the Ratio drill RT 100 U with internal cooling 3xD is optimally suitable. Its point angle and its diameter tolerance are perfectly adapted.



Pilot drill: Guh. no. 2477



Available diameters:
 3.0 mm up to 20.0 mm

Spiral-flute deep hole drill RT 100 T

Order no. = Guhring no. + Code no.

Guhring no.

6512

Standard

Guhring standard

Tool material

Solid carbide

Carbide grade

K30/K40

Surface

Type

RT 100 T

Shank

HA

Drilling depth

25 x D

Cutting direction

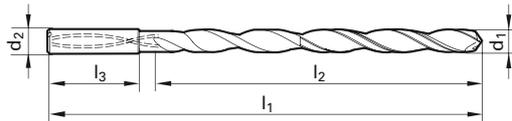
right-hand

Tolerance

h7

Discount group

165



Code no.	d1 inch	d1 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm
3,000		3.000	6.000	125.00	85.00	36.00
3,500		3.500	6.000	156.00	116.00	36.00
4,000		4.000	6.000	156.00	116.00	36.00
4,500		4.500	6.000	183.00	143.00	36.00
5,000		5.000	6.000	183.00	143.00	36.00
5,500		5.500	6.000	210.00	170.00	36.00
6,000		6.000	6.000	210.00	170.00	36.00
6,500		6.500	8.000	237.00	197.00	36.00
7,000		7.000	8.000	237.00	197.00	36.00
7,500		7.500	8.000	263.00	223.00	36.00
8,000		8.000	8.000	263.00	223.00	36.00
8,500		8.500	10.000	294.00	250.00	40.00
9,000		9.000	10.000	294.00	250.00	40.00
10,000		10.000	10.000	321.00	277.00	40.00
11,000		11.000	12.000	359.00	310.00	45.00
12,000		12.000	12.000	386.00	337.00	45.00

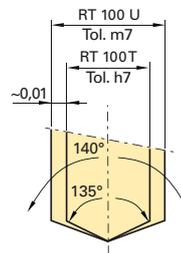
Availability



Pilot hole

For the application of spiral-flute deep hole drills RT 100T we recommend a pilot hole 1xD up to 2xD depth.

For this pilot hole, the Ratio drill RT 100 U with internal cooling 3xD is optimally suitable. Its point angle and its diameter tolerance are perfectly adapted.



Pilot drill: Guh. no. 2477



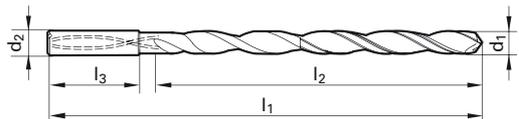
Available diameters:
3.0 mm up to 20.0 mm

Spiral-flute deep hole drill RT 100T

Order no. = Guhring no. + Code no.

Guhring no.
Standard
Tool material
Carbide grade
Surface
Type
Shank
Drilling depth
Cutting direction
Tolerance
Discount group

6514
Guhring standard
Solid carbide
K30/K40
A
RT 100 T
HA
40 x D
right-hand
h7
165



Drilling spiral-fluted

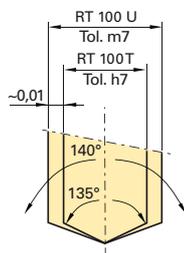
Code no.	d1 inch	d1 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm
3,000		3.000	6.000	170.00	130.00	36.00
3,500		3.500	6.000	193.00	153.00	36.00
4,000		4.000	6.000	216.00	176.00	36.00
4,500		4.500	6.000	238.00	198.00	36.00
5,000		5.000	6.000	258.00	218.00	36.00
5,500		5.500	6.000	280.00	240.00	36.00
6,000		6.000	6.000	300.00	260.00	36.00
6,500		6.500	8.000	322.00	282.00	36.00
7,000		7.000	8.000	342.00	302.00	36.00
7,500		7.500	8.000	363.00	323.00	36.00
8,000		8.000	8.000	383.00	343.00	36.00

Availability

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Pilot hole

For the application of spiral-flute deep hole drills RT 100T we recommend a pilot hole 1xD up to 2xD depth.
 For this pilot hole, the Ratio drill RT 100 U with internal cooling 3xD is optimally suitable. Its point angle and its diameter tolerance are perfectly adapted.



Pilot drill: Guh. no. 2477



Available diameters:
 3.0 mm up to 20.0 mm

A TiAIN head coated

Further diameters ex-stock can be found in our main catalogue..

Ratio drills RT 100 U with internal cooling for materials < 44 HRC

Drilling spiral-fluted

Order no. = Guhring no. + Code no.	Guhring no.					2477
	Standard					DIN 6537 K
	Tool material					Solid carbide
	Carbide grade					K / P
	Surface finish					F
	Type					RT 100 U
	Shank					HA
	Drilling depth					3 x D
	Cutting direction					right-hand
	Tolerance					m7
	Discount group					121
	Code no.	d1	d2	l1	l2	l3
	mm	mm	mm	mm	mm	
3,000	3.000	6.000	62.00	20.00	36.00	●
3,300	3.300	6.000	62.00	20.00	36.00	●
3,500	3.500	6.000	62.00	20.00	36.00	●
3,700	3.700	6.000	62.00	20.00	36.00	●
3,800	3.800	6.000	66.00	24.00	36.00	●
4,000	4.000	6.000	66.00	24.00	36.00	●
4,200	4.200	6.000	66.00	24.00	36.00	●
4,500	4.500	6.000	66.00	24.00	36.00	●
4,650	4.650	6.000	66.00	24.00	36.00	●
4,800	4.800	6.000	66.00	28.00	36.00	●
5,000	5.000	6.000	66.00	28.00	36.00	●
5,500	5.500	6.000	66.00	28.00	36.00	●
5,550	5.550	6.000	66.00	28.00	36.00	●
5,800	5.800	6.000	66.00	28.00	36.00	●
6,000	6.000	6.000	66.00	28.00	36.00	●
6,500	6.500	8.000	79.00	34.00	36.00	●
6,800	6.800	8.000	79.00	34.00	36.00	●
7,000	7.000	8.000	79.00	34.00	36.00	●
7,400	7.400	8.000	79.00	41.00	36.00	●
7,500	7.500	8.000	79.00	41.00	36.00	●
7,800	7.800	8.000	79.00	41.00	36.00	●
8,000	8.000	8.000	79.00	41.00	36.00	●
8,500	8.500	10.000	89.00	47.00	40.00	●
8,800	8.800	10.000	89.00	47.00	40.00	●
9,000	9.000	10.000	89.00	47.00	40.00	●
9,300	9.300	10.000	89.00	47.00	40.00	●
9,500	9.500	10.000	89.00	47.00	40.00	●
9,800	9.800	10.000	89.00	47.00	40.00	●
10,000	10.000	10.000	89.00	47.00	40.00	●
10,200	10.200	12.000	102.00	55.00	45.00	●
10,800	10.800	12.000	102.00	55.00	45.00	●
11,000	11.000	12.000	102.00	55.00	45.00	●
11,800	11.800	12.000	102.00	55.00	45.00	●
12,000	12.000	12.000	102.00	55.00	45.00	●
12,500	12.500	14.000	107.00	60.00	45.00	●
12,700	12.700	14.000	107.00	60.00	45.00	●

Order no. = Guhring no. + Code no.	Guhring no.					2477
	Standard					DIN 6537 K
	Tool material					Solid carbide
	Carbide grade					K / P
	Surface finish					F
	Type					RT 100 U
	Shank					HA
	Drilling depth					3 x D
	Cutting direction					right-hand
	Tolerance					m7
	Discount group					121
	Code no.	d1	d2	l1	l2	l3
	mm	mm	mm	mm	mm	
13,000	13.000	14.000	107.00	60.00	45.00	●
13,500	13.500	14.000	107.00	60.00	45.00	●
13,700	13.700	14.000	107.00	60.00	45.00	●
14,000	14.000	14.000	107.00	60.00	45.00	●
14,500	14.500	16.000	115.00	65.00	48.00	●
14,700	14.700	16.000	115.00	65.00	48.00	●
15,000	15.000	16.000	115.00	65.00	48.00	●
15,500	15.500	16.000	115.00	65.00	48.00	●
15,700	15.700	16.000	115.00	65.00	48.00	●
16,000	16.000	16.000	115.00	65.00	48.00	●
16,500	16.500	18.000	123.00	73.00	48.00	●
17,000	17.000	18.000	123.00	73.00	48.00	●
17,500	17.500	18.000	123.00	73.00	48.00	●
18,000	18.000	18.000	123.00	73.00	48.00	●
18,500	18.500	20.000	131.00	79.00	50.00	●
19,000	19.000	20.000	131.00	79.00	50.00	●
19,500	19.500	20.000	131.00	79.00	50.00	●
20,000	20.000	20.000	131.00	79.00	50.00	●

F FIRE

Further diameters ex-stock can be found in our main catalogue.

With the new HT 800 WP interchangeable drilling system Guhring provides high-performance and cost-efficient holders for holes in the diameter range from 11.00 to 25.5 mm that excel thanks to the following advantages:

Extended tool life

Thanks to special, micro-machined cutting edges and the application oriented surface finish the interchangeable inserts of the HT 800 WP drilling system are especially wear resistant. The holders of the HT 800 WP drilling system also possess a very high wear resistance. This is based on the optimised holder material with nickel plated surface as well as incremental holder sizes in steps of 0.5 mm. This leads to less wear on the holder body.

Optimised chip flow

Thanks to their flute cross section the holders of the HT 800 WP drilling system ensure optimal chip evacuation from the hole even with larger drilling depths.

Highly accurate and rigid insert seat

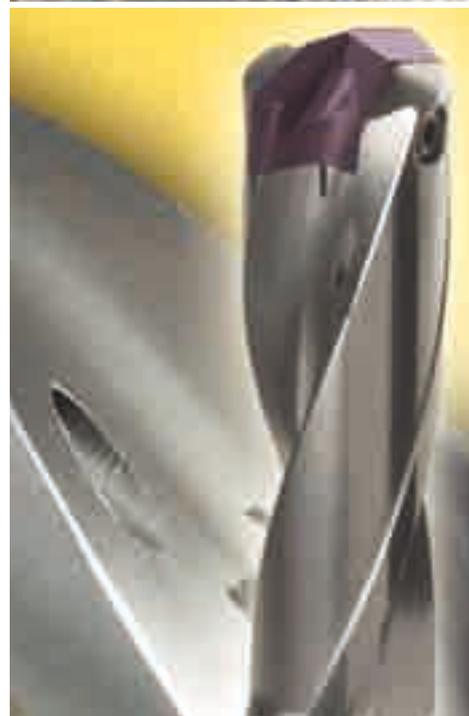
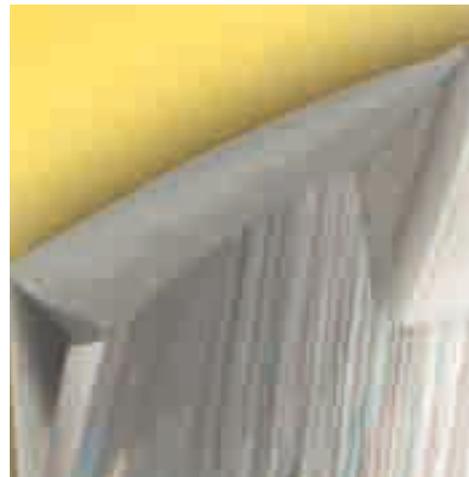
The accurate insert seat enables the insert change in the machine in only a few, simple steps with a standard Torx screw driver. Thanks to the optimised material for the holders of the HT 800 WP drilling system, the insert can be changed more frequently than with conventional systems before the holder needs to be replaced due to wear of the insert seat. The clamping screws with screw lock ensure a secure holding of the interchangeable insert in the holder even with machines subject to high levels of vibration.

Rigid holders

The close stepped diameter jumps of 0.5 mm with the holder sizes not only reduce wear. Through the better guidance of the tool in the hole they also increase the rigidity of the HT 800 WP drilling system. Subsequently, resulting in longer tool life as well as improved workpiece surfaces.

Perfect cooling lubrication

A perfect cooling lubrication is ensured by coolant ducts with maximum cross section, exiting in the flute. Thereby enabling an optimal cooling lubrication of the cutting edges and additionally support the chip evacuation from the hole.



HT 800 WP program

Interchangeable insert holders

1 x D = Guh. no. 4105
1,5 x D = Guh. no. 4106
3 x D = Guh. no. 4107
5 x D = Guh. no. 4108
7 x D = Guh. no. 4109
10 x D = Guh. no. 4110

Interchangeable inserts

for steel: Guh. no. 4112
for stainless steel: Guh. no. 4115
for grey cast iron: Guh. no. 4113
for aluminium: Guh. no. 4114
for pilot drilling: Guh. no. 4111

The complete program can be found in the current HT 800 brochure that can be downloaded as a PDF file at www.guehring.de or sent to you on request. Please contact Guhring!

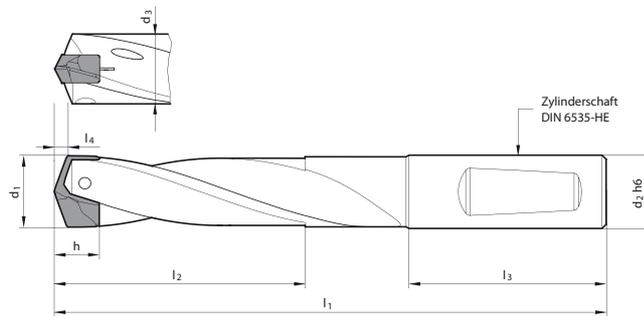
Order no. = Guhring no. + Code no.

Guhring no.

Discount group

4110

140



* I1 with drilling insert Guh. no. 4112



Drilling
spiral-fluted

Code no.	Holder size	d1 mm	d2 h6 mm	d3 mm	incl. insert l1* mm	l2 max mm	l3 mm	Availability
11,000	110	11.00 - 11.49	12.00	10.70	182.00	117.10	45.00	●
11,005	110	11.00 - 11.49	12.70	10.70	182.00	117.10	45.00	●
11,500	115	11.50 - 11.99	12.00	11.20	187.00	122.10	45.00	●
11,505	115	11.50 - 11.99	12.70	11.20	187.00	122.10	45.00	●
12,000	120	12.00 - 12.49	12.00	11.70	194.00	127.20	45.00	●
12,005	120	12.00 - 12.49	12.70	11.70	194.00	127.20	45.00	●
12,500	125	12.50 - 12.99	14.00	12.20	199.00	132.30	45.00	●
12,505	125	12.50 - 12.99	15.875	12.20	199.00	132.30	45.00	●
13,000	130	13.00 - 13.49	14.00	12.70	205.00	137.50	45.00	●
13,005	130	13.00 - 13.49	15.875	12.70	205.00	137.50	45.00	●
13,500	135	13.50 - 13.99	14.00	13.20	211.00	142.50	45.00	●
13,505	135	13.50 - 13.99	15.875	13.20	211.00	142.50	45.00	●
14,000	140	14.00 - 14.49	14.00	13.70	217.00	147.70	45.00	●
14,005	140	14.00 - 14.49	15.875	13.70	217.00	147.70	45.00	●
14,500	145	14.50 - 14.99	16.00	14.20	225.00	152.80	48.00	●
14,505	145	14.50 - 14.99	15.875	14.20	225.00	152.80	48.00	●
15,000	150	15.00 - 15.49	16.00	14.70	232.00	157.80	48.00	●
15,005	150	15.00 - 15.49	15.875	14.70	232.00	157.80	48.00	●
15,500	155	15.50 - 15.99	16.00	15.20	237.00	162.90	48.00	●
15,505	155	15.50 - 15.99	15.875	15.20	237.00	162.90	48.00	●
16,000	160	16.00 - 16.49	16.00	15.70	243.00	168.00	48.00	●
16,005	160	16.00 - 16.49	15.875	15.70	243.00	168.00	48.00	●
16,500	165	16.50 - 16.99	18.00	16.20	249.00	173.10	48.00	●
16,505	165	16.50 - 16.99	19.05	16.20	249.00	173.10	48.00	●
17,000	170	17.00 - 17.49	18.00	16.70	255.00	178.30	48.00	●
17,005	170	17.00 - 17.49	19.05	16.70	255.00	178.30	48.00	●
17,500	175	17.50 - 17.99	18.00	17.20	260.00	183.50	48.00	●
17,505	175	17.50 - 17.99	19.05	17.20	260.00	183.50	48.00	●
18,000	180	18.00 - 18.49	18.00	17.70	267.00	188.40	48.00	●
18,005	180	18.00 - 18.49	19.05	17.70	267.00	188.40	48.00	●
18,500	185	18.50 - 18.99	20.00	18.20	274.00	193.50	50.00	●
18,505	185	18.50 - 18.99	19.05	18.20	274.00	193.50	50.00	●
19,000	190	19.00 - 19.49	20.00	18.70	280.00	198.70	50.00	●
19,005	190	19.00 - 19.49	19.05	18.70	280.00	198.70	50.00	●
19,500	195	19.50 - 19.99	20.00	19.20	286.00	203.70	50.00	●
19,505	195	19.50 - 19.99	19.05	19.20	286.00	203.70	50.00	●

Holders are always supplied with clamping screw, Guhring no. 4071, and clamping key, Guhring no. 1612

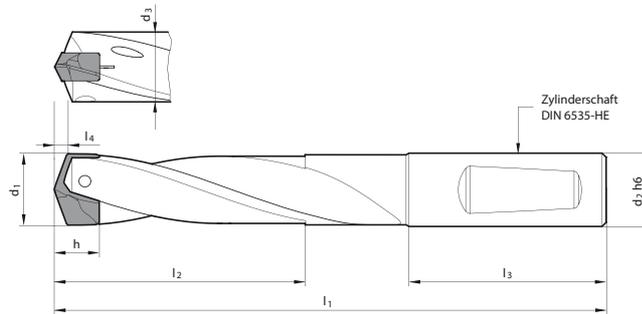
Order no. = Guhring no. + Code no.

Guhring no.

Discount group

4110

140



* I1 with drilling insert Guh. no. 4112



Code no.	Holder size	d1 mm	d2 h6 mm	d3 mm	incl. insert l1* mm	l2 max mm	l3 mm
20,000	200	20.00 - 20.49	20.00	19.70	292.00	208.90	50.00
20,005	200	20.00 - 20.49	19.05	19.70	292.00	208.90	50.00
20,500	205	20.50 - 20.99	25.00	20.20	306.00	214.00	56.00
20,505	205	20.50 - 20.99	25.40	20.20	306.00	214.00	56.00
21,000	210	21.00 - 21.49	25.00	20.70	312.00	219.10	56.00
21,005	210	21.00 - 21.49	25.40	20.70	312.00	219.10	56.00
21,500	215	21.50 - 21.99	25.00	21.20	317.00	224.20	56.00
21,505	215	21.50 - 21.99	25.40	21.20	317.00	224.20	56.00
22,000	220	22.00 - 22.49	25.00	21.70	323.00	229.30	56.00
22,005	220	22.00 - 22.49	25.40	21.70	323.00	229.30	56.00
22,500	225	22.50 - 22.99	25.00	22.20	329.00	234.40	56.00
22,505	225	22.50 - 22.99	25.40	22.20	329.00	234.40	56.00
23,000	230	23.00 - 23.49	25.00	22.70	335.00	239.50	56.00
23,005	230	23.00 - 23.49	25.40	22.70	335.00	239.50	56.00
23,500	235	23.50 - 23.99	25.00	23.20	341.00	244.60	56.00
23,505	235	23.50 - 23.99	25.40	23.20	341.00	244.60	56.00
24,000	240	24.00 - 24.49	25.00	23.70	347.00	249.70	56.00
24,005	240	24.00 - 24.49	25.40	23.70	347.00	249.70	56.00
24,500	245	24.50 - 24.99	25.00	24.20	352.00	254.80	56.00
24,505	245	24.50 - 24.99	25.40	24.20	352.00	254.80	56.00
25,000	250	25.00 - 25.49	25.00	24.70	359.00	259.90	56.00
25,005	250	25.00 - 25.49	25.40	24.70	359.00	259.90	56.00
25,500	255	25.50 - 25.99	32.00	25.20	369.00	265.00	60.00
25,505	255	25.50 - 25.99	31.75	25.20	369.00	265.00	60.00

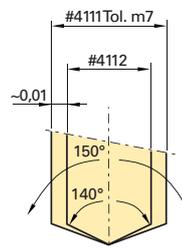
Availability



Pilot hole/centering

For the application of HT 800 WP Interchangeable insert holders 10xD we recommend a pilot hole 1xD depth.

For this pilot hole HT 800 WP Interchangeable insert holder 1xD with pilot insert is optimally suitable. Its point angle and its diameter tolerance are perfectly adapted.



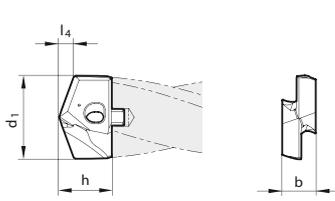
Pilot drill/center drill:

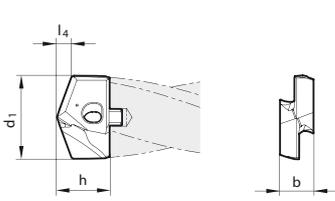
Holder 1xD, Guhring no. 4105
Pilot insert Guh. no. 4111



Available diameters:
1.0 mm up to 25.99 mm

Holders are always supplied with clamping screw, Guhring no. 4071, and clamping key, Guhring no. 1612

Order no. = Guhring no. + Code no.								Guhring no.		
								4112		
								Guhring std.		
								Solid carbide		
								Surface finish		
Discount group										
141										
										
										
Code no.	for drill. holder size	for pilot holder size	d1 h7 inch mm	l4 mm	b mm	h mm	Availability			
11,000	110	110		11.00	2.1	4.5	7.5	●		
11,200	110	110		11.20	2.1	4.5	7.5	●		
11,500	115	110		11.50	2.1	4.5	7.5	●		
11,510	115	110	29/64	11.51	2.1	4.5	7.5	●		
11,700	115	110		11.70	2.1	4.5	7.5	●		
11,800	115	110		11.80	2.1	4.5	7.5	●		
11,910	115	110	15/32	11.91	2.2	4.5	7.5	●		
12,000	120	120		12.00	2.2	5.0	7.7	●		
12,100	120	120		12.10	2.2	5.0	7.7	●		
12,200	120	120		12.20	2.2	5.0	7.7	●		
12,300	120	120	31/64	12.30	2.2	5.0	7.7	●		
12,500	125	120		12.50	2.3	5.0	7.7	●		
12,600	125	120		12.60	2.3	5.0	7.7	●		
12,700	125	120	1/2	12.70	2.3	5.0	7.7	●		
12,800	125	120		12.80	2.3	5.0	7.7	●		
12,900	125	120		12.90	2.3	5.0	7.7	●		
13,000	130	130		13.00	2.4	5.5	8.5	●		
13,100	130	130	33/64	13.10	2.4	5.5	8.5	●		
13,490	130	130	17/32	13.49	2.4	5.5	8.5	●		
13,500	135	130		13.50	2.4	5.5	8.5	●		
13,600	135	130		13.60	2.4	5.5	8.5	●		
13,700	135	130		13.70	2.4	5.5	8.5	●		
13,800	135	130		13.80	2.5	5.5	8.5	●		
13,890	135	130	35/64	13.89	2.5	5.5	8.5	●		
14,000	140	140		14.00	2.5	6.0	9.6	●		
14,100	140	140		14.10	2.5	6.0	9.6	●		
14,290	140	140	9/16	14.29	2.6	6.0	9.6	●		
14,400	140	140		14.40	2.6	6.0	9.6	●		
14,500	145	140		14.50	2.6	6.0	9.6	●		
14,600	145	140		14.60	2.7	6.0	9.6	●		
14,680	145	140	37/64	14.68	2.7	6.0	9.6	●		
14,700	145	140		14.70	2.7	6.0	9.6	●		
14,800	145	140		14.80	2.7	6.0	9.6	●		
15,000	150	140		15.00	2.7	6.0	9.8	●		
15,080	150	140	19/32	15.08	2.7	6.0	9.8	●		
15,100	150	140		15.10	2.7	6.0	9.8	●		
15,200	150	140		15.20	2.8	6.0	9.8	●		
15,300	150	140		15.30	2.8	6.0	9.8	●		
15,480	150	140	39/64	15.48	2.8	6.0	9.8	●		
15,500	155	140		15.50	2.8	6.0	9.8	●		
15,600	155	140		15.60	2.9	6.0	9.8	●		
15,700	155	140		15.70	2.9	6.0	9.8	●		
15,800	155	140		15.80	2.9	6.0	9.8	●		
15,870	155	140	5/8	15.87	2.9	6.0	9.8	●		
16,000	160	160		16.00	2.9	7.0	11	●		
16,270	160	160	41/64	16.27	3.0	7.0	11	●		
16,500	165	160		16.50	3.0	7.0	11	●		
16,670	165	160	21/32	16.67	3.0	7.0	11	●		
17,000	170	160		17.00	3.1	7.0	11	●		
17,070	170	160	43/64	17.07	3.1	7.0	11	●		
17,460	170	160	11/16	17.46	3.1	7.0	11	●		
17,500	175	160		17.50	3.2	7.0	11	●		
17,600	175	160		17.60	3.2	7.0	11	●		
17,860	175	160	45/64	17.86	3.3	7.0	11	●		

Order no. = Guhring no. + Code no.								Guhring no.		
								4112		
								Guhring std.		
								Solid carbide		
								Surface finish		
Discount group										
141										
										
										
Code no.	for drill. holder size	for pilot holder size	d1 h7 inch mm	l4 mm	b mm	h mm	Availability			
18,000	180	180		18.00	3.3	8.0	12.6	●		
18,260	180	180	23/32	18.26	3.3	8.0	12.6	●		
18,500	185	180		18.50	3.4	8.0	12.6	●		
18,650	185	180	47/64	18.65	3.4	8.0	12.6	●		
19,000	190	180		19.00	3.5	8.0	12.6	●		
19,050	190	180	3/4	19.05	3.5	8.0	12.6	●		
19,450	190	180	49/64	19.45	3.5	8.0	12.6	●		
19,500	195	180		19.50	3.5	8.0	12.6	●		
19,600	195	180		19.60	3.6	8.0	12.6	●		
19,840	195	180	25/32	19.84	3.6	8.0	12.6	●		
20,000	200	200		20.00	3.6	9.0	13.9	●		
20,240	200	200	51/64	20.24	3.6	9.0	13.9	●		
20,500	205	200		20.50	3.7	9.0	13.9	●		
20,640	205	200	13/16	20.64	3.8	9.0	13.9	●		
21,000	210	200		21.00	3.8	9.0	13.9	●		
21,030	210	200	53/64	21.03	3.8	9.0	13.9	●		
21,100	210	200		21.10	3.9	9.0	13.9	●		
21,430	210	200	27/32	21.43	3.9	9.0	13.9	●		
21,500	215	200		21.50	3.9	9.0	13.9	●		
21,830	215	200	55/64	21.83	4.0	9.0	13.9	●		
22,000	220	220		22.00	4.0	10.0	15.3	●		
22,220	220	220	7/8	22.22	4.0	10.0	15.3	●		
22,500	225	220		22.50	4.1	10.0	15.3	●		
22,620	225	220	57/64	22.62	4.1	10.0	15.3	●		
23,000	230	220		23.00	4.2	10.0	15.3	●		
23,020	230	220	29/32	23.02	4.2	10.0	15.3	●		
23,420	230	220	59/64	23.42	4.3	10.0	15.3	●		
23,500	235	220		23.50	4.3	10.0	15.3	●		
23,810	235	220	15/16	23.81	4.3	10.0	15.3	●		
24,000	240	240		24.00	4.4	11.0	15.8	●		
24,100	240	240		24.10	4.4	11.0	15.8	●		
24,210	240	240	61/64	24.21	4.4	11.0	15.8	●		
24,500	245	240		24.50	4.5	11.0	15.8	●		
24,610	245	240	31/32	24.61	4.5	11.0	15.8	●		
25,000	250	240		25.00	4.5	11.0	15.8	●		
25,400	250	240	1	25.40	4.6	11.0	15.8	●		
25,500	255	240		25.50	4.6	11.0	15.8	●		

F FIRE

Inserts are always supplied with clamping screw, Guhring no. 4071.

Twist drills GT 100

Deep holes in high-strength materials up to 1000 N/mm² - that is the strength of Guhring's GT 100 drills. To accomplish this task GT 100 drills possess:

- ground, bright flutes with large chip space for good cooling and easy chip evacuation
- a strengthened core for high rigidity
- nitrided lands for increased wear resistance (from diameter 2.36 mm, up to a flute length of 500 mm)

The user benefits from:

- simple and secure machining processes
- highly accurate holes
- favourable tooling costs thanks to long tool life
- low process costs especially thanks to reduced pecking processes

Furthermore, Guhring supplies GT 100 drills in limitless variety:

Short length twist drills to DIN 338/DIN 345

- made of HSS and HSCO
- right- or left-hand drills
- with nitrided lands from diameter 2.36 mm as well as TiN-, TiAlN-, TiCN- or FIRE-coated
- with a diameter range from 0.6 up to 16.0 mm

Long series twist drills to DIN 340/bushing length drills to DIN 341

- in HSS and HSCO
- right- or left-hand drills
- with nitrided lands from diameter 2.36 mm as well as TiN- or FIRE-coated
- in a diameter range from 1.0 up to 16.0 mm

Extra length twist drills to DIN1896/1870 series 1 and series 2

- in HSS and HSCO
- with nitrided lands from diameter 2.36 mm as well as TiN-coated
- in a diameter range from 1.95 up to 13.0 mm

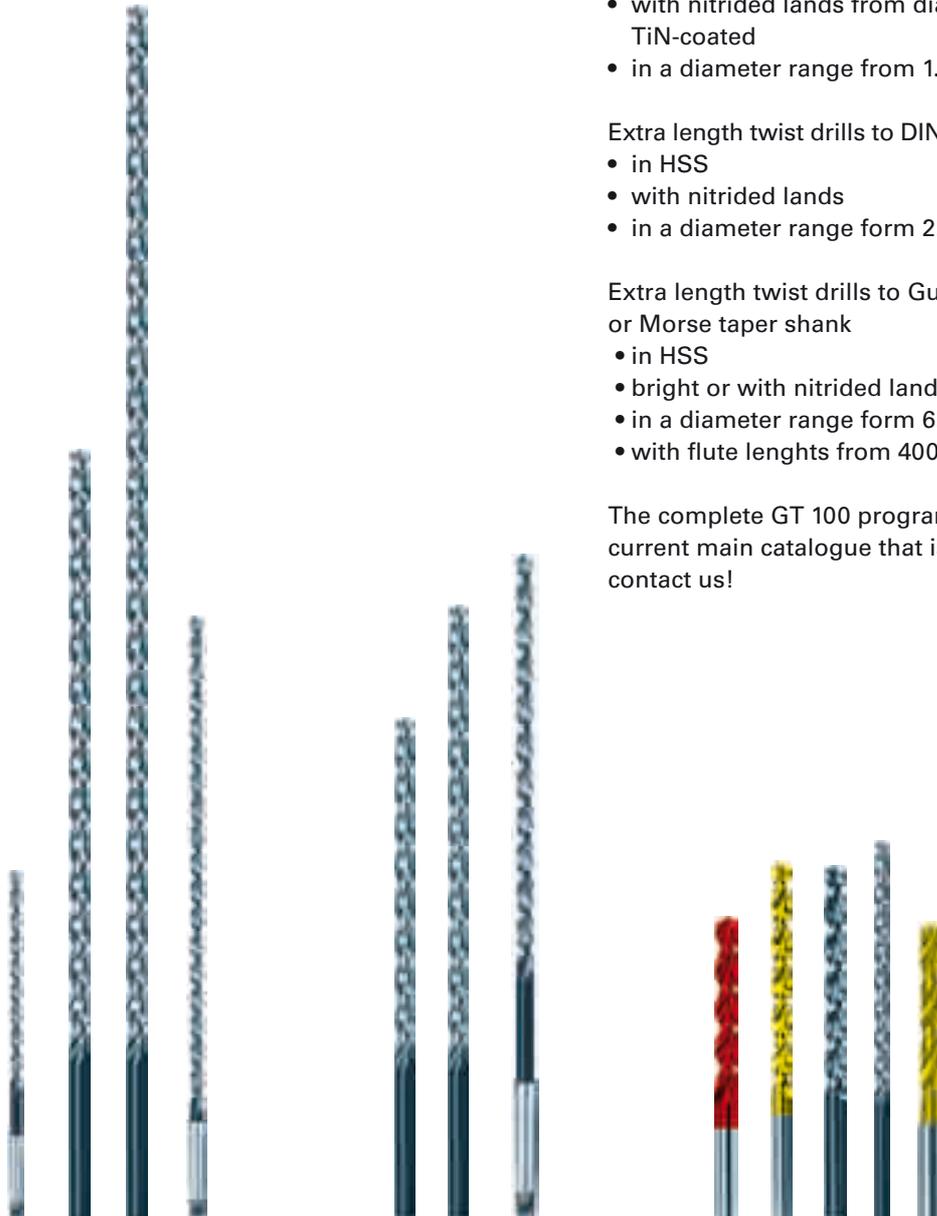
Extra length twist drills to DIN1896 series 3

- in HSS
- with nitrided lands
- in a diameter range from 2.5 up to 13.0 mm

Extra length twist drills to Guhring std. with straight shank or Morse taper shank

- in HSS
- bright or with nitrided lands
- in a diameter range from 6.0 up to 12.0 mm
- with flute lengths from 400 up to 850 mm

The complete GT 100 program can be found in Guhring's current main catalogue that is available on request. Please contact us!



Order no. = Guhring no. + Code no.	Guhring no.				336
	Standard				DIN 340
	Tool material				HSCO
	Surface finish				
	Type				GT 100
	Cutting direction				right-hand
	Tolerance				h8
	Discount group				136
Code	d1	d1	l1	l2	Availability
no.	inch	mm	mm	mm	
1,000		1.000	56.00	33.00	●
1,500		1.500	70.00	45.00	●
2,000		2.000	85.00	56.00	●
2,500		2.500	95.00	62.00	●
2,800		2.800	100.00	66.00	●
3,000		3.000	100.00	66.00	●
3,300		3.300	106.00	69.00	●
3,500		3.500	112.00	73.00	●
3,700		3.700	112.00	73.00	●
3,800		3.800	119.00	78.00	●
4,000		4.000	119.00	78.00	●
4,200		4.200	119.00	78.00	●
4,500		4.500	126.00	82.00	●
4,700		4.700	126.00	82.00	●
4,800		4.800	132.00	87.00	●
5,000		5.000	132.00	87.00	●
5,500		5.500	139.00	91.00	●
5,560	7/32	5.560	139.00	91.00	●
5,800		5.800	139.00	91.00	●
6,000		6.000	139.00	91.00	●
6,500		6.500	148.00	97.00	●

Order no. = Guhring no. + Code no.	Guhring no.				336
	Standard				DIN 340
	Tool material				HSCO
	Surface finish				
	Type				GT 100
	Cutting direction				right-hand
	Tolerance				h8
	Discount group				136
Code	d1	d1	l1	l2	Availability
no.	inch	mm	mm	mm	
6,800		6.800	156.00	102.00	●
7,000		7.000	156.00	102.00	●
7,400		7.400	156.00	102.00	●
7,500		7.500	156.00	102.00	●
7,800		7.800	165.00	109.00	●
8,000		8.000	165.00	109.00	●
8,500		8.500	165.00	109.00	●
8,800		8.800	175.00	115.00	●
9,000		9.000	175.00	115.00	●
9,300		9.300	175.00	115.00	●
9,500		9.500	175.00	115.00	●
9,800		9.800	184.00	121.00	●
10,000		10.000	184.00	121.00	●
10,200		10.200	184.00	121.00	●
10,800		10.800	195.00	128.00	●
11,000		11.000	195.00	128.00	●
11,800		11.800	195.00	128.00	●
12,000		12.000	205.00	134.00	●

This drill is also available with Morse taper shank:
Guh. no. 551 (HSS) or 623 (HSCO)

Centering

For the application of long series GT 100-drills we recommend centering.

For centering, the center drill DIN 333 or the NC-spotting drill 90° are optimally suitable.

Center drill: Guh. no. 581

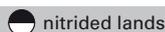


available diameters:
0.5 up to 12.5 mm

NC-spotting drills: Guh. no. 557



available diameters:
2.95 up to 25.40 mm



Further diameters ex-stock can be found in our main catalogue.

Extra length twist drill, series 1, < 1000 N/mm²

Extra length twist drill, series 2, < 1000 N/mm²

Drilling
spiral-fluted

Order no. = Guhring no. + Code no.	Guhring no.			618
	Standard			DIN 1869
	Tool material			HSCO
	Surface finish			
	Type			GT 100
	Cutting direction			right-hand
	Tolerance			h8
	Discount group			136
				
				
Code	d1	l1	l2	Availability
no.	mm	mm	mm	
3,000	3.000	150.00	100.00	●
3,500	3.500	165.00	115.00	●
4,000	4.000	175.00	120.00	●
4,500	4.500	185.00	125.00	●
5,000	5.000	195.00	135.00	●
5,500	5.500	205.00	140.00	●
6,000	6.000	215.00	150.00	●
6,500	6.500	225.00	155.00	●
7,000	7.000	225.00	155.00	●
7,500	7.500	225.00	155.00	●
8,000	8.000	240.00	165.00	●
8,500	8.500	240.00	165.00	●
9,000	9.000	250.00	175.00	●
9,500	9.500	250.00	175.00	●
10,000	10.000	265.00	185.00	●

Order no. = Guhring no. + Code no.	Guhring no.			619
	Standard			DIN 1869
	Tool material			HSCO
	Surface finish			
	Type			GT 100
	Cutting direction			right-hand
	Tolerance			h8
	Discount group			138
				
				
Code	d1	l1	l2	Availability
no.	mm	mm	mm	
3,000	3.000	190.00	130.00	●
3,500	3.500	210.00	145.00	●
4,000	4.000	220.00	150.00	●
4,500	4.500	235.00	160.00	●
5,000	5.000	245.00	170.00	●
5,500	5.500	260.00	180.00	●
6,000	6.000	260.00	180.00	●
6,500	6.500	275.00	190.00	●
7,000	7.000	290.00	200.00	●
7,500	7.500	290.00	200.00	●
8,000	8.000	305.00	210.00	●
8,500	8.500	305.00	210.00	●
9,000	9.000	320.00	220.00	●
9,500	9.500	320.00	220.00	●
10,000	10.000	340.00	235.00	●

This drill is also available with Morse taper shank:
series 1: Guh. no. 620
series 2: Guh. no. 621

Centering

For the application of long series GT 100-drills we recommend a pilot hole 1xD up to 2xD depth or alternatively centering.

The short GT 100-drill, the center drill to DIN 333 or the NC-spotting drill 90° are therefore optimally suitable.

Pilot drill: Guh. no.336



available diameters: 1.0 up to 12.0 mm

Center drill: Guh. no. 581



available diameters: 0.5 up to 12.5 mm

NC-spotting drill: Guh. no. 557



available diameters: 2.95 up to 25.40 mm

Order no. = Guhring no. + Code no.	Guhring no.			504
	Standard			DIN 1869
	Tool material			HSS
	Surface finish			
	Type			GT 100
	Cutting direction			right-hand
	Tolerance			h8
	Discount group			136
				
				
Code	d1	l1	l2	Availability
no.	mm	mm	mm	
2,500	2.500	225.00	150.00	●
3,000	3.000	240.00	160.00	●
3,500	3.500	265.00	180.00	●
4,000	4.000	280.00	190.00	●
4,500	4.500	295.00	200.00	●
5,000	5.000	315.00	210.00	●
5,500	5.500	330.00	225.00	●
6,000	6.000	330.00	225.00	●
6,500	6.500	350.00	235.00	●
7,000	7.000	370.00	250.00	●
7,500	7.500	370.00	250.00	●
8,000	8.000	390.00	265.00	●
8,500	8.500	390.00	265.00	●
9,000	9.000	410.00	280.00	●
9,500	9.500	410.00	280.00	●
10,000	10.000	430.00	295.00	●
11,000	11.000	430.00	295.00	●
12,000	12.000	480.00	330.00	●

Order no. = Guhring no. + Code no.	Guhring no.			242
	Standard			Guhring std.
	Tool material			HSS
	Surface finish			
	Type			GT 100
	Cutting direction			right-hand
	Tolerance			h8
	Discount group			136
				
				
Code	d1	l1	l2	Availability
no.	mm	mm	mm	
6,000	6.000	500.00	400.00	●
8,000	8.000	500.00	400.00	●
10,000	10.000	600.00	500.00	●
11,000	11.000	600.00	500.00	●
12,000	12.000	600.00	500.00	●

This drill is also available with Morse taper shank:
Guh. no. 566 or 293

Centering

For the application of long series GT 100-drills we recommend a pilot hole 1xD up to 2xD depth or alternatively centering.

The short GT 100-drill, the center drill to DIN 333 or the NC-spotting drill 90° are therefore optimally suitable.

Pilot drill: Guh. no.336



available diameters: 1.0 up to 12.0 mm

Center drill: Guh. no. 581



available diameters: 0.5 up to 12.5 mm

NC-spotting drill: Guh. no. 557

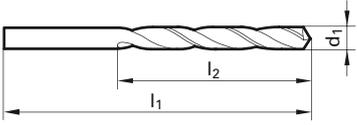


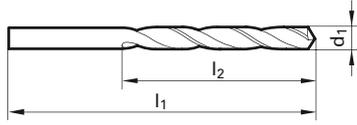
available diameters: 2.95 up to 25.40 mm

Extra length twist drill, < 1000 N/mm²

Extra length twist drill, < 1000 N/mm²

Drilling
spiral-fluted

Order no. = Guhring no. + Code no.	Guhring no.			243
	Standard			Guhring std.
	Tool material			HSS
	Surface finish			○
	Type			GT 100
	Cutting direction			right-hand
	Tolerance			h8
	Discount group			138
				
				
Code	d1	l1	l2	Availability
no.	mm	mm	mm	
8,000	8.000	750.00	650.00	●
9,800	9.800	750.00	650.00	○
10,000	10.000	750.00	650.00	●
11,000	11.000	750.00	650.00	●
12,000	12.000	750.00	650.00	●

Order no. = Guhring no. + Code no.	Guhring no.			244
	Standard			Guhring std.
	Tool material			HSS
	Surface finish			○
	Type			GT 100
	Cutting direction			right-hand
	Tolerance			h8
	Discount group			138
				
				
Code	d1	l1	l2	Availability
no.	mm	mm	mm	
10,000	10.000	1000.00	850.00	●
11,000	11.000	1000.00	850.00	●
12,000	12.000	1000.00	850.00	●

This drill is also available with Morse taper shank:
Guh. no. 298 or 299

Centering

For the application of long series GT 100-drills we recommend a pilot hole 1xD up to 2xD depth or alternatively centering.

The short GT 100-drill, the center drill to DIN 333 or the NC-spotting drill 90° are therefore optimally suitable.

Pilot drill: Guh. No. 336



available diameter: 1.0 up to 12.0 mm

Center drill: Guh. no. 581



available diameter: 0.5 up to 12.5 mm

NC-spotting drill: Guh. no. 557



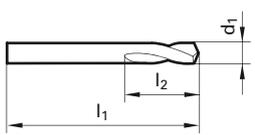
available diameter: 2.95 up to 25.40 mm

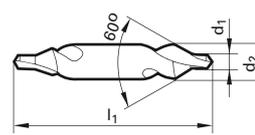
○ bright

Further diameters ex-stock can be found in our main catalogue.

NC-spotting drills 90°, < 1000 N/mm²

Center drills without flat, < 1000 N/mm²

Order no. = Guhring no. + Code no.	Guhring no.				557
	Standard				Guhring std.
	Tool material				HSS
	Surface finish				○
	Type				N
	Point angle°				90
	Cutting direction				right-hand
	Tolerance				h6
	Discount group				134
					
					
Code no.	d1 inch	d1 mm	l1 mm	l2 mm	Availability
2,950		2.950	46.00	12.00	●
3,000		3.000	46.00	12.00	●
4,000		4.000	55.00	12.00	●
5,000		5.000	62.00	14.00	●
6,000		6.000	66.00	16.00	●
6,350	1/4	6.350	70.00	17.00	●
8,000		8.000	79.00	21.00	●
9,000		9.000	84.00	22.00	●
9,520	3/8	9.520	89.00	25.00	●
10,000		10.000	89.00	25.00	●
12,000		12.000	102.00	30.00	●
12,700	1/2	12.700	102.00	30.00	●
13,000		13.000	102.00	30.00	●
14,000		14.000	107.00	33.50	●
15,870	5/8	15.870	115.00	37.50	●
16,000		16.000	115.00	37.50	●
19,050	3/4	19.050	131.00	45.00	●
20,000		20.000	131.00	45.00	●
25,000	63/64	25.000	151.00	53.00	●
25,400	1	25.400	156.00	53.00	●

Order no. = Guhring no. + Code no.	Guhring no.			581
	Standard			DIN 333
	Tool material			HSS
	Surface finish			○
	Form			A
	Cutting direction			right-hand
	Discount group			132
				
				
	Code no.	d1 mm	d2 mm	l1 mm
0,500	0.500	3.150	25.00	●
0,800	0.800	3.150	25.00	●
1,000	1.000	3.150	31.50	●
1,250	1.250	3.150	31.50	●
1,600	1.600	4.000	35.50	●
2,000	2.000	5.000	40.00	●
2,500	2.500	6.300	45.00	●
3,150	3.150	8.000	50.00	●
4,000	4.000	10.000	56.00	●
5,000	5.000	12.500	63.00	●
6,300	6.300	16.000	71.00	●
8,000	8.000	20.000	80.00	●
10,000	10.000	25.000	100.00	●
12,500	12.500	31.500	125.00	●

Drilling spiral-fluted

○ bright

DRILLING straight fluted

DIE AND MOLD MAKING





GUHRING

Single-fluted gun drills

They are the classic solution for the machining of deep holes from 20 x D and in particular excel with their extreme accuracy: Single-fluted gun drills from Guhring. Their strengths in detail are:

- standard tolerances up to IT5 depending on machine conditions and material
- excellent hole straightness
- surface quality up to Ra 0.3 µm/ roughness class N5
- optimal hole straightness deviation

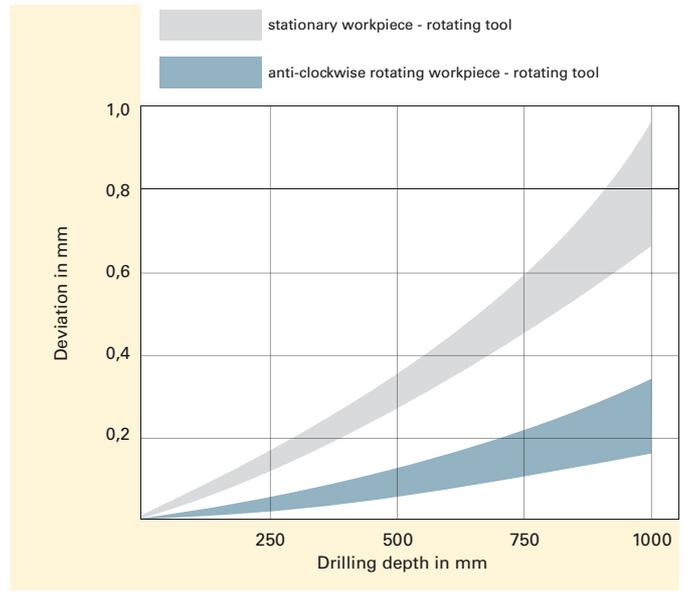
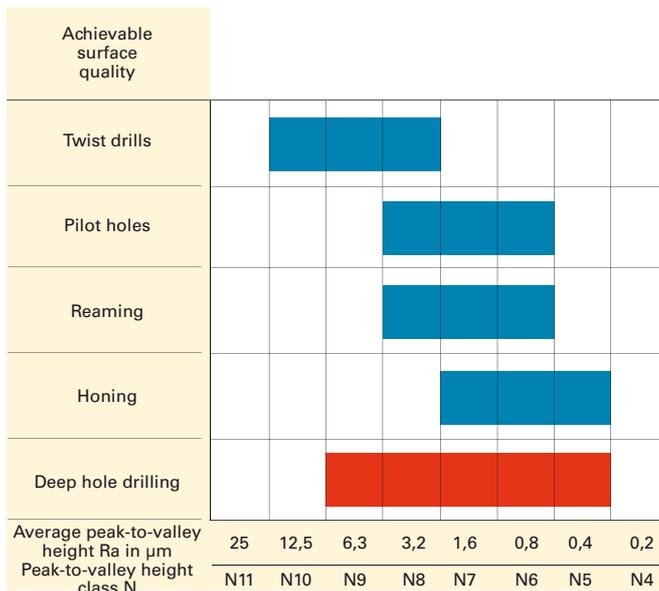
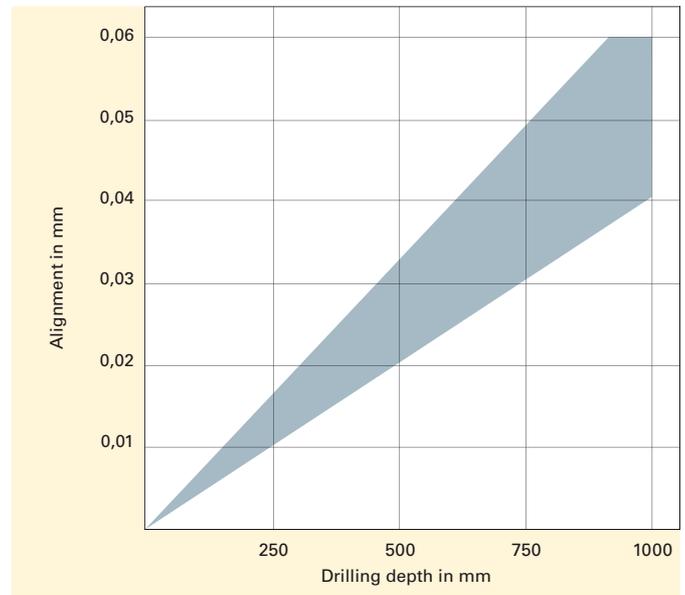
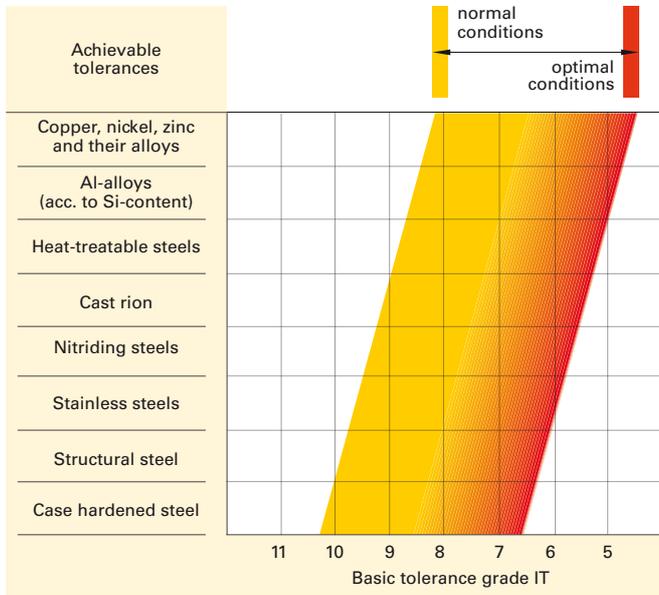
Guhring provides single-fluted deep hole drills in an extensive standard range for the machining of most materials:

- solid carbide single-fluted gun drills EB 100 in the diameter range from 1.0 to 12.0 mm for drilling depths up to 75 x D with flute lengths up to 160 mm, bright or TiAlN-coated
- single-fluted carbide-tipped gun drills EB 80 in the diameter range from 4.0 to 12.7 mm for drilling depths up to 80 x D, TiN- or TiCN-

coated

- single-fluted gun drills with interchangeable components EB 800 in the diameter range from 16.0 to 24.0 mm for drilling depths up to 30 x D, TiN-coated

Guhring's complete drilling tools range for drilling depths from 10 x D can be found in the current gun drill brochure which can be downloaded as a PDF file at www.guehring.de or sent on request. Please contact us!



Standard	Type	Tool description	Flute length/ drilling depth	Tool material	Surface finish	Diameter range	Guhring no.	Discount group	Standard range page
Single-fluted gun drills EB 100 with fixed flute lengths for materials < 44 HRC									
Guhring std.	EB 100		45	Solid carbide	A	2.000 - 3.200	5632	123	36
Guhring std.	EB 100		80	Solid carbide	A	2.000 - 5.000	5633	123	36
Guhring std.	EB 100		120	Solid carbide	A	2.000 - 5.000	5637	123	37
Guhring std.	EB 100		160	Solid carbide	A	2.000 - 8.000	5638	123	37
Single-fluted gun drills EB 80 for materials < 44 HRC									
Guhring std.	EB 80		20 x D	Carbide	C	3.970 - 12.700	5639	123	38
Guhring std.	EB 80		30 x D	Carbide	C	3.970 - 12.700	5640	123	38
Guhring std.	EB 80		40 x D	Carbide	C	3.970 - 12.700	5641	123	39
Guhring std.	EB 80		80 x D	Carbide	C	3.970 - 12.700	5642	123	39
Single-fluted gun drills EB 800 for materials < 44 HRC									
Guhring std.	EB 800		30 x D	Carbide	S	16.000 - 24.000	5644	123	40

Drilling
straight fluted

Single-fluted gun drill special solutions

In addition to the comprehensive standard gun drill range, Guhring also produces all single-fluted gun drills as a special solution for your specific application task.

- special solution solid carbide single-fluted gun drills EB 100 from diameter 0.9 to 12.0 mm up to a maximum flute length of 500 mm with various coatings
- special solution carbide-tipped single-fluted gun drills EB 80 from diameter 2.0 to 40.0 mm up to a maximum

- overall length of 3000 mm with various coatings
- special solution single-fluted gun drills EB 800 with interchangeable components from diameter 12.0 to 40.0 mm up to a maximum total length of 3000 mm with various coatings

A TiAlN SuperA

C TiCN

S TiN

Order no. = Guhring no. + code no.

Guhring no.	5632				
Standard	Guhring std.				
Tool material	Solid carbide				
Carbide grade	K30/K40				
Surface finish	A				
Flute length	45,00				
Cutting direction	right-hand				
Tolerance	h5				
Discount group	123				

Code no.	d1 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	Availability
2,000	2.000	4.000	90.00	45.00	28.00	●
2,500	2.500	10.000	100.00	45.00	40.00	●
2,700	2.700	10.000	100.00	45.00	40.00	●
3,000	3.000	10.000	100.00	45.00	40.00	●
3,200	3.200	10.000	100.00	45.00	40.00	●

Order no. = Guhring no. + code no.

Guhring no.	5633				
Standard	Guhring std.				
Tool material	Solid carbide				
Carbide grade	K30/K40				
Surface finish	A				
Flute length	80,00				
Cutting direction	right-hand				
Tolerance	h5				
Discount group	123				

Code no.	d1 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	Availability
2,000	2.000	4.000	125.00	80.00	28.00	●
2,500	2.500	10.000	135.00	80.00	40.00	●
2,700	2.700	10.000	135.00	80.00	40.00	●
3,000	3.000	10.000	135.00	80.00	40.00	●
3,200	3.200	10.000	135.00	80.00	40.00	●
3,500	3.500	10.000	135.00	80.00	40.00	●
4,000	4.000	10.000	135.00	80.00	40.00	●
4,200	4.200	10.000	135.00	80.00	40.00	●
4,500	4.500	10.000	135.00	80.00	40.00	●
5,000	5.000	10.000	135.00	80.00	40.00	●

Pilot hole

For the application of single-fluted gun drill EB 100 we recommend a pilot hole 1xD up to 2xD depth. For this pilot hole, the solid carbide micro-precision drill 4xD and the Ratio drill RT 100 U 3xD are optimally suitable.

Pilot drill: Guh. no. 6400



Available diameters:
0.8 up to 3.0 mm

Pilot drill: Guh. no. 2477



Available diameters:
3.0 up to 20.0 mm

Order no. = Guhring no. + code no.	Guhring no.	5637
	Standard	Guhring std.
	Tool material	Solid carbide
	Carbide grade	K30/K40
	Surface finish	A
	Flute length	120,00
	Cutting direction	right-hand
	Tolerance	h5
	Discount group	123

Order no. = Guhring no. + code no.	Guhring no.	5638
	Standard	Guhring std.
	Tool material	Solid carbide
	Carbide grade	K30/K40
	Surface finish	A
	Flute length	160,00
	Cutting direction	right-hand
	Tolerance	h5
	Discount group	123

Code no.	d1 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	Availability
2,000	2.000	4.000	165.00	120.00	28.00	●
2,500	2.500	10.000	175.00	120.00	40.00	●
2,700	2.700	10.000	175.00	120.00	40.00	●
3,000	3.000	10.000	175.00	120.00	40.00	●
3,200	3.200	10.000	175.00	120.00	40.00	●
3,500	3.500	10.000	175.00	120.00	40.00	●
4,000	4.000	10.000	175.00	120.00	40.00	●
4,200	4.200	10.000	175.00	120.00	40.00	●
4,500	4.500	10.000	175.00	120.00	40.00	●
5,000	5.000	10.000	175.00	120.00	40.00	●

Code no.	d1 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	Availability
2,000	2.000	4.000	205.00	160.00	28.00	●
2,500	2.500	10.000	215.00	160.00	40.00	●
2,700	2.700	10.000	215.00	160.00	40.00	●
3,000	3.000	10.000	215.00	160.00	40.00	●
3,200	3.200	10.000	215.00	160.00	40.00	●
3,500	3.500	10.000	215.00	160.00	40.00	●
4,000	4.000	10.000	215.00	160.00	40.00	●
4,200	4.200	10.000	215.00	160.00	40.00	●
4,500	4.500	10.000	215.00	160.00	40.00	●
5,000	5.000	10.000	215.00	160.00	40.00	●
6,000	6.000	16.000	225.00	160.00	48.00	●
8,000	8.000	16.000	225.00	160.00	48.00	●

Pilot hole
 For the application of single-fluted gun drill EB 100 we recommend a pilot hole 1xD up to 2xD depth.
 For this pilot hole, the solid carbide micro-precision drill 4xD and the Ratio drill RT 100 U 3xD are optimally suitable.

Pilot drill: Guh. no. 6400

 Available diameters:
 0.8 up to 3.0 mm

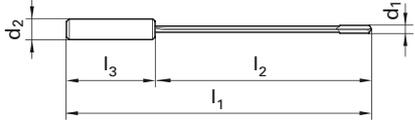
Pilot drill: Guh. no. 2477

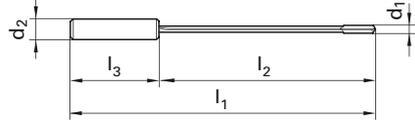
 Available diameters:
 33.0 up to 20.0 mm

Drilling straight fluted

Single-fluted gun drills EB 80 for materials < 44 HRC

Drilling
straight fluted

Order no. = Guhring no. + code no.	Guhring no.	5639
	Standard	Guhring std.
	Tool material	Carbide
	Carbide grade	K30/K40
	Surface finish	C
	Bohrtiefe	20 x D
	Cutting direction	right-hand
	Tolerance	h5
	Discount group	123
		

Order no. = Guhring no. + code no.	Guhring no.	5640
	Standard	Guhring std.
	Tool material	Carbide
	Carbide grade	K30/K40
	Surface finish	C
	Bohrtiefe	30 x D
	Cutting direction	right-hand
	Tolerance	h5
	Discount group	123
		

Code no.	d1 inch	d1 mm	d2 mm	h6	l1 mm	l2 mm	l3 mm	Availability
3,970	5/32	3.970	10	150	100	40	●	
4,000		4.000	10	150	100	40	●	
5,000		5.000	16	180	130	48	●	
5,156	13/64	5.156	16	180	130	48	●	
6,000		6.000	16	210	160	48	●	
6,350	1/4	6.350	16	220	170	48	●	
7,000		7.000	16	235	185	48	●	
7,938	15/16	7.938	16	260	210	48	●	
8,000		8.000	16	260	210	48	●	
9,000		9.000	16	280	230	48	●	
9,525	3/8	9.525	16	290	240	48	●	
10,000		10.000	20	320	260	50	●	
11,000		11.000	20	340	290	50	●	
11,113	7/16	11.113	20	340	290	50	●	
12,000		12.000	20	370	310	50	●	
12,700	1/2	12.700	20	385	330	50	●	

Code no.	d1 inch	d1 mm	d2 mm	h6	l1 mm	l2 mm	l3 mm	Availability
3,970	5/32	3.970	10	200	155	40	●	
4,000		4.000	10	200	155	40	●	
5,000		5.000	16	230	182	48	●	
5,156	13/64	5.156	16	230	182	48	●	
6,000		6.000	16	260	212	48	●	
6,350	1/4	6.350	16	275	227	48	●	
7,000		7.000	16	290	242	48	●	
7,938	15/16	7.938	16	320	272	48	●	
8,000		8.000	16	320	272	48	●	
9,000		9.000	16	350	302	48	●	
9,525	3/8	9.525	16	380	330	48	●	
10,000		10.000	20	400	350	50	●	
11,000		11.000	20	430	380	50	●	
11,113	7/16	11.113	20	430	380	50	●	
12,000		12.000	20	450	400	50	●	
12,700	1/2	12.700	20	500	450	50	●	

Pilot hole

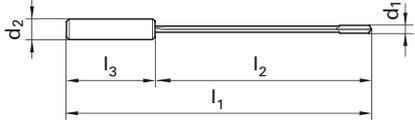
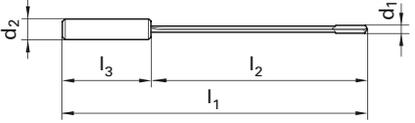
For the application of single-fluted gun drill EB 100 we recommend a pilot hole 1xD up to 2xD depth. For this pilot hole, the Ratio drill RT 100 U 3xD is optimally suitable.

Pilot drill: Guh. no. 2477



Available diameters:
3.0 up to 20.0 mm

Single-fluted gun drills EB 80 for materials < 44 HRC

Order no. = Guhring no. + code no.	Guhring no. 5641						Order no. = Guhring no. + code no.	Guhring no. 5642												
	Standard							Standard												
	Tool material							Tool material												
	Carbide grade							Carbide grade												
	Surface finish							Surface finish												
	Bohrtiefe							Bohrtiefe												
	Cutting direction							Cutting direction												
	Tolerance							Tolerance												
	Discount group							Discount group												
																				
Code	d1	d1	d2 h6	l1	l2	l3	Code	d1	d1	d2 h6	l1	l2	l3	Code	d1	d1	d2 h6	l1	l2	l3
no.	inch	mm	mm	mm	mm	mm	no.	inch	mm	mm	mm	mm	mm	no.	inch	mm	mm	mm	mm	mm
3,970	5/32	3.970	10	230	185	40	4,950		4.950	16	480	432	48	4,950		4.950	16	480	432	48
4,000		4.000	10	230	185	40	5,106	13/64	5.106	16	480	432	48	5,106	13/64	5.106	16	480	432	48
5,000		5.000	16	280	232	48	5,950		5.950	16	560	512	48	5,950		5.950	16	560	512	48
5,156	13/64	5.156	16	280	232	48	6,300	1/4	6.300	16	590	542	48	6,300	1/4	6.300	16	590	542	48
6,000		6.000	16	320	272	48	6,450		6.450	16	590	542	48	6,450		6.450	16	590	542	48
6,350	1/4	6.350	16	340	292	48	6,950		6.950	16	650	602	48	6,950		6.950	16	650	602	48
7,000		7.000	16	370	322	48	7,888	15/16	7.888	16	740	692	48	7,888	15/16	7.888	16	740	692	48
7,938	15/16	7.938	16	430	372	48	7,950		7.950	16	740	692	48	7,950		7.950	16	740	692	48
8,000		8.000	16	430	372	48	8,950		8.950	16	820	772	48	8,950		8.950	16	820	772	48
9,000		9.000	16	450	402	48	9,475	3/8	9.475	16	870	822	48	9,475	3/8	9.475	16	870	822	48
9,525	3/8	9.525	16	480	432	48	9,950		9.950	20	910	860	50	9,950		9.950	20	910	860	50
10,000		10.000	20	510	460	50	10,950		10.950	20	995	945	50	10,950		10.950	20	995	945	50
11,000		11.000	20	550	500	50	11,063	7/16	11.063	20	995	945	50	11,063	7/16	11.063	20	995	945	50
11,113	7/16	11.113	20	550	500	50	11,950		11.950	20	1080	1030	50	11,950		11.950	20	1080	1030	50
12,000		12.000	20	600	550	50	12,650	1/2	12.650	20	1140	1090	50	12,650	1/2	12.650	20	1140	1090	50
12,700	1/2	12.700	20	635	585	50														

Drilling straight fluted

Pilot hole
 For the application of single-fluted gun drill EB 100 we recommend a pilot hole 1xD up to 2xD depth.
 For this pilot hole, the Ratio drill RT 100 U 3xD is optimally suitable.

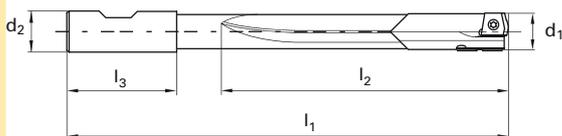
Pilot drill: Guh. no. 2477

 Available diameters:
 3.0 up to 20.0 mm

Order no. = Guhring no. + code no.

Guhring no.
Standard
Tool material
Carbide grade
Surface finish
Bohrtiefe
Cutting direction
Tolerance
Discount group

5644
Guhring std.
Carbide
K20/K40
S
30 x D
right-hand
h8
123



Code	d1	d2 h6	l1	l2	l3
no.	mm	mm	mm	mm	mm
16,000	16.000	25.000	580.00	512.00	56.00
18,000	18.000	25.000	644.00	576.00	56.00
20,000	20.000	32.000	712.00	640.00	60.00
24,000	24.000	32.000	840.00	768.00	60.00

Availability
●
●
●
●

Pilot hole

For the application of single-fluted gun drill EB 800 we recommend a pilot hole 1xD up to 2xD depth. For this pilot hole, the Ratio drill RT 100 U 3xD and the tooling system HT 800 WP are optimally suitable.

Pilot drill: Guh. no. 2477



Available diameters: 3.0 up to 20.0 mm

Pilot drill: Holder no. 4105 + insert no. 4111



Available diameters: 11.0 up to 25.99 mm

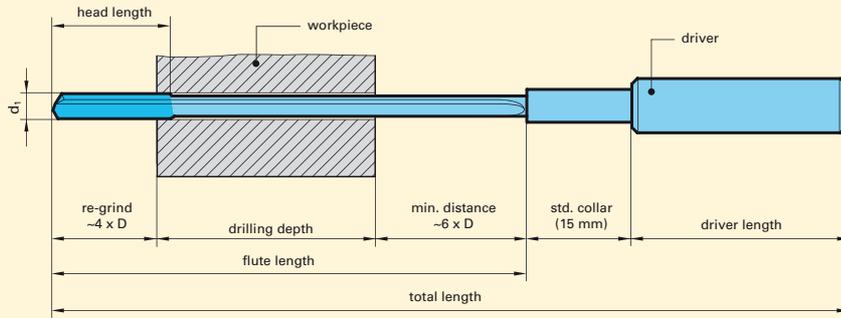
Accessories

The initial EB 800 gun drill with interchangeable inserts order is delivered as a complete tool including interchangeable inserts, supporting strips and accessories. For your repeat order please use the following Guhring numbers:

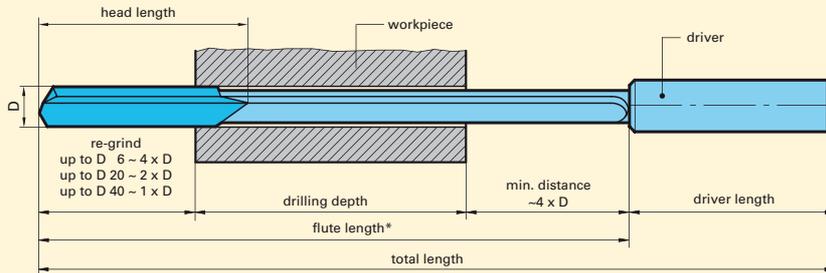
Ø	Interchangeable insert	Screw for insert	Screwdriver for insert	Supporting strips	Screw for supporting strips	Screwdriver for supporting strips
16	No. 5029 Ø 16,0 + TiN	9040710030028	1612 9.001	No. 5030 Ø 16,0 + TiN	9040710022038	1612 7.001
18	No. 5029 Ø 18,0 + TiN	9040710030028	1612 9.001	No. 5030 Ø 18,0 + TiN	9040710022038	1612 7.001
20	No. 5029 Ø 20,0 + TiN	9040710040018	1612 15.001	No. 5030 Ø 20,0 + TiN	9040710025028	1612 8.001
24	No. 5029 Ø 24,0 + TiN	9040710040018	1612 15.001	No. 5030 Ø 24,0 + TiN	9040710025028	1612 8.001

Single-fluted gun drills

The dimensions required to calculate the length for conventional machine tools EB 100



The dimensions required to calculate the length for conventional machine tools EB 80



* max. flute length per tool $40 \times D$, for larger drilling depths apply two tools. (i.e. $\varnothing 10 \times 450$ and $\varnothing 9.95 \times 850$ mm)

Quick service for brazed single-fluted gun drills EB 80

In addition to the ex-stock range Guhring provides a quick service for the following dimensions. Delivery time maximum 3 weeks.

Tool material: Solid carbide/K15

Surface finish: \bigcirc / $\text{\textcircled{S}}$ / $\text{\textcircled{C}}$

Standard head lengths (mm)

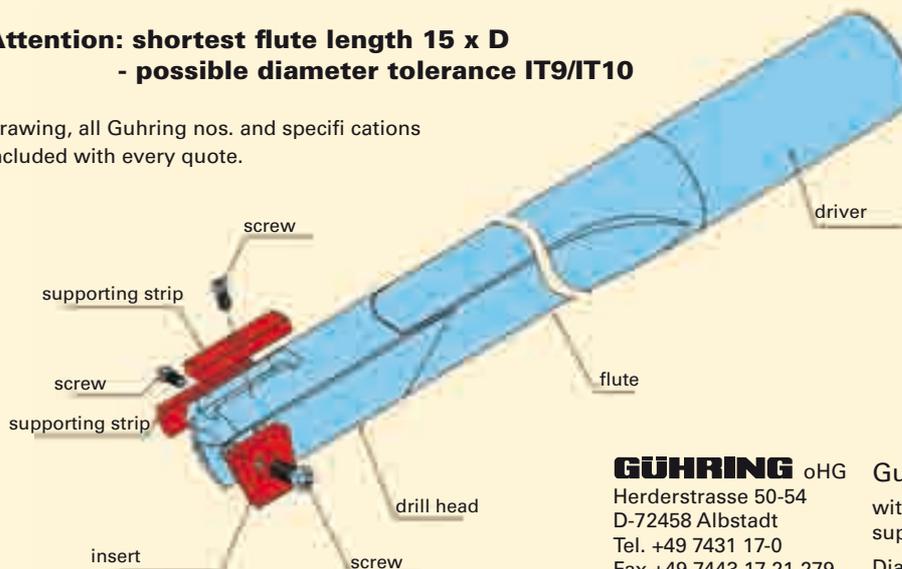
\varnothing nom. mm	in increments of mm	head form	total length	Prices on inquiry	\varnothing range	length	\varnothing range	length
2.00...13.90	0.1	G	$\leq 7,5$ mm \varnothing 650 max			2.00...2.49	15	10.00...10.99
4.00...13.90	0.1	C	$> 7,5$ mm \varnothing 1200 max	2.50...2.99		18	11.00...17.00	40
14.00...22.00	0.5	G	1200 max	3.00...3.99	20	17.01...20.00	45	
14.00...22.00	0.5	C	1200 max	4.00...5.19	25	20.01...23.00	50	
				5.20...6.99	30	23.01...26.00	55	
				7.00...9.99	35	26.01...40.00	65	

Flute length: min. $20 \times D$

GUHRING EB 800 for your application

Attention: shortest flute length $15 \times D$ - possible diameter tolerance IT9/IT10

Drawing, all Guhring nos. and specifications included with every quote.



GUHRING oHG
Herderstrasse 50-54
D-72458 Albstadt
Tel. +49 7431 17-0
Fax +49 7443 17-21 279

Gun drills

with interchangeable insert and supporting strip, internal cooling

Diameter range: 12.00 mm - 40.00 mm

MILLING MOULDED AND DIE MAKING





GUHRING

RF 100 U - high-performance roughing end mills for materials up to 1600 N/mm² (48 HRC)

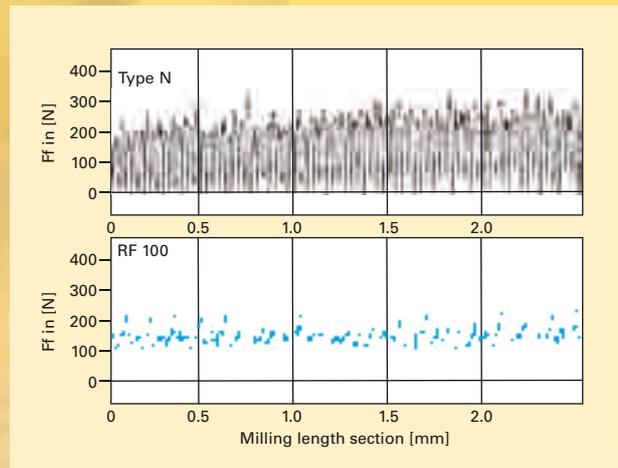


RF 100 U high-performance end mills excel thanks to unequal helix angles which considerably reduce vibration. The uneven helix angle vastly improves surface quality with finishing operations and considerably higher feed rates with slot drilling and roughing operations are also achieved.

With many applications, the complete milling process can be covered with one RF 100, which as well as increasing tool life and dimensional accuracy of the workpiece generates a considerable cost advantage.

Summary of advantages

- suitable for roughing and finishing
- up to 60% higher feed rates
- up to 4-times longer tool life
- vibration-free operation
- improved workpiece surface quality



The cutting force comparison between a conventional milling cutter type N and a RF100 clearly shows the quieter, more rigid operation of the RF100.

Material (ISO-code)	Steel	Cast iron	Stainless steel	Aluminium	Ti-special alloys	Hardened steel
	up to 850 N/mm ²	above 850 N/mm ² up to 180 HB 30	above 180 HB 30 up to 750 N/mm ²	above 750 N/mm ² up to 3% Si	above 3% Si Ti-based Ni-based	up to 52 HRC above 52 HRC
RF 100 U	○	●	●		●	○
RF 100 U/HF		●	●		○	○
RF 100 F	●	○		●		
RF 100 VA	○		●	●	○	
RF 100 VA/NF	●		●	●	○	
RF 100 A				●	●	
RF 100 A/WF				●	●	
RF 100 Ti	○				●	○
RF 100 H	○	○				●
RF 100 SF	●	●	●	○	○	○

● = optimal suitability ○ = limited suitability

Standard	Type	Shank form	Tool description	Tool material	Surface finish	Diameter range	Gühring no.	Discount group	Standard range page
RF 100 U - High-performance end mills for materials < 48 HRC, centre cutting									
DIN 6527 L	N	HA		Solid carbide	F	4.000 - 25.000	3736	106	48
DIN 6527 L	N	HB		Solid carbide	F	4.000 - 25.000	3732	106	48
Gühring std.	N	HA		Solid carbide	F	6.000 - 20.000	3837	106	49
Gühring std.	N	HB		Solid carbide	F	6.000 - 20.000	3838	106	49
Gühring std.	N	HA		Solid carbide	F	6.000 - 20.000	3839	106	49
Gühring std.	N	HB		Solid carbide	F	6.000 - 20.000	3871	106	49
RF 100 SF - High-performance end mills (5-fluted) for materials < 48 HRC, centre cutting									
Gühring std.	NH	HA		Solid carbide	F	4.000 - 20.000	3897	106	50
Gühring std.	NH	HB		Solid carbide	F	4.000 - 20.000	3898	106	50
RF 100 H - High-performance end mills for materials < 62 HRC, centre cutting									
DIN 6527 L	H	HA		Solid carbide	A	6.000 - 20.000	3895	106	51
DIN 6527 L	H	HB		Solid carbide	A	6.000 - 20.000	3896	106	51
GH 100 H - Hard multi-tooth end mill for superfine finishing of materials < 62 HRC									
Gühring std.	H	HA		DK 500 UF	F	3.000 - 20.000	3715	106	52
Gühring std.	H	HA		DK 500 UF	F	6.000 - 20.000	3716	106	53

Standard	Type	Schaft-form	Tool description	Tool material	Surface finish	Diameter range	Guhring no.	Discount group	Standard range page
Mini slot drills (3-fluted) for materials < 1000 N/mm², centre cutting									
Guhring std.	N	Ø<2,0 HA/HB		Solid carbide	F	0.300 - 20.000	3684	117	53
GF 500 B - HSC-ball nose profile cutter for materials < 54 HRC, centre cutting									
Guhring std.	N	cyl.		Solid carbide	A	2.000 - 12.000	3848	106	54
Guhring std.	N	cyl.		Solid carbide	A	2.000 - 12.000	3849	106	54
Guhring std.	N	cyl.		Solid carbide	A	2.000 - 8.000	3853	106	54
Guhring std.	N	cyl.		Solid carbide	A	6.000 - 12.000	3855	106	55
Guhring std.	N	cyl.		Solid carbide	A	6.000 - 12.000	3854	106	55
Guhring std.	N	cyl.		Solid carbide	A	4.000 - 12.000	3866	106	55
GF 300 B - HSC-ball nose profile cutter for materials < 62 HRC, centre cutting									
Guhring std.	H	HA		DK 500 UF	F	0.500 - 16.000	3359	106	56
Guhring std.	H	HA		DK 500 UF	F	3.000 - 16.000	3360	106	56
Ball nose slot drill (2-fluted) for materials < 1200 N/mm², centre cutting									
DIN 6527 L	N	HA		Solid carbide	F	0.500 - 20.000	3679	106	57

Standard	Type	Schaft-form	Tool description	Tool material	Surface finish	Diameter range	Guhring no.	Discount group	Standard range page
GF 500 T - HSC-profile cutter with Torus grind for materials < 54 HRC, centre cutting									
Guhring std.	N	cyl.		Solid carbide	A	2.000 - 12.000	3856	106	58
Guhring std.	N	cyl.		Solid carbide	A	2.000 - 12.000	3859	106	58
Guhring std.	N	cyl.		Solid carbide	A	2.000 - 8.000	3860	106	58
Guhring std.	N	cyl.		Solid carbide	A	6.000 - 12.000	3865	106	59
Guhring std.	N	cyl.		Solid carbide	A	4.000 - 12.000	3863	106	59
RF 100 Ti - High-performance end mills for materials < 48 HRC, centre cutting									
DIN 6527 L	N	HA		Solid carbide	A	6.000 - 25.000	3498	106	60
DIN 6527 L	N	HB		Solid carbide	A	6.000 - 25.000	3499	106	60
GF 300 T - Hard profile cutter with Torus grind for materials < 62 HRC, centre cutting									
Guhring std.	H	HA		DK 500 UF	F	3.000 - 16.000	3361	106	61
Guhring std.	H	HB		DK 500 UF	F	6.000 - 16.000	3362	106	61
GH 100 H - Hard multi-tooth end mill corner radius for superfine finishing of materials < 62 HRC									
Guhring std.	H	HA		DK 500 UF	F	6.000 - 16.000	3363	106	62
GH 100 U - Multi-tooth end mill corner radius for materials < 48 HRC, centre cutting									
DIN 6527 L	N	HA		Solid carbide	F	6.000 - 20.000	3563	106	63

A TiAlN SuperA

A TiAlN

F FIRE

RF 100 U - high-performance end mills for materials up to 1600 N/mm² (48 HRC)

RF 100 high-performance end mills excel thanks to unequal helix angles which considerably reduce vibration. The uneven helix angle vastly improves surface quality with finishing operations and considerably higher feed rates with slot drilling and roughing operations are also achieved.

With many applications, the complete milling process can be covered with one RF 100, which as well as increasing tool life and dimensional accuracy of the workpiece generates a considerable cost advantage.

Summary of advantages

- suitable for roughing and finishing
- up to 60% higher feed rates
- up to 4-times longer tool life
- vibration-free operation
- improved workpiece surface quality

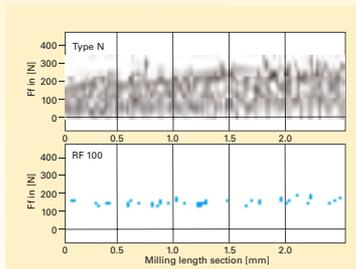
Material (ISO-code)	Steel	Cast Iron	Stainless steel	Aluminium	Ti-special alloys	Hardened steel
Hardness tensile strength	up to 850 N/mm ² above 850 N/mm ²	up to 180 HB 30 above 180 HB 30	up to 750 N/mm ² above 750 N/mm ²	up to 3% Si above 3% Si	Ti-based Ni-based	up to 52 HRC über 52 HRC
RF 100 U	●	●	●	○	○	○
RF 100 U/HF	●	●	●	○	○	○
RF 100 F	○	○	●	○	○	○
RF 100 VA	○	○	●	○	○	○
RF 100 VA/NF	●	○	●	○	○	○
RF 100 A	○	○	○	●	○	○
RF 100 A/WF	○	○	○	●	○	○
RF 100 Ti	○	○	○	○	●	○
RF 100 H	○	○	○	○	○	●
RF 100 SF	●	●	●	○	○	○

● = optimal suitability ○ = limited suitability

with neck clearance



micro-corner protection for longer tool life



The cutting force comparison between a conventional milling cutter type N and the RF 100 shows a clearly quieter, more rigid operation of the RF 100.

for materials < 48 HRC, centre cutting

Order no. = Guhring no. + code no.	Guhring no.		Standard		Tool material		Surface finish		Type		Shank form		Helix angle		Tolerance		Discount group			
	3736	3732	DIN 6527 L		Solid carbide		F F		N N		HA HB		35°/38°		h10 h10		106 106			
																			Availability	
																			● ●	
	Code		d1 h10	d2 h6	d3*	l1	l2	l3	Availability											
	no.		mm	mm	mm	mm	mm	mm	● ●											
	4,000		4.000	6.000	3.700	57.00	11.00	18.00	● ●											
	5,000		5.000	6.000	4.700	57.00	13.00	18.00	● ●											
	6,000		6.000	6.000	5.500	57.00	13.00	21.00	● ●											
	8,000		8.000	8.000	7.500	63.00	19.00	27.00	● ●											
10,000		10.000	10.000	9.200	72.00	22.00	32.00	● ●												
12,000		12.000	12.000	11.200	83.00	26.00	38.00	● ●												
14,000		14.000	14.000	13.200	83.00	26.00	38.00	● ●												
16,000		16.000	16.000	15.000	92.00	32.00	44.00	● ●												
18,000		18.000	18.000	17.000	92.00	32.00	44.00	● ●												
20,000		20.000	20.000	19.000	104.00	38.00	54.00	● ●												
25,000		25.000	25.000	23.500	121.00	45.00	65.00	● ●												

* technical change 2009: Remaining pre-change stock will be supplied without neck clearance

for materials < 48 HRC, centre cutting

Order no. = Guhring no. + code no.	Guhring no.						3837	3838
	Standard						Guhring std.	
	Tool material						Solid carbide	
	Surface finish						F	F
	Type						N	N
	Shank form						HA	HB
	Helix angle						35°/38°	
	Tolerance						h10	h10
	Discount group						106	106
Code	d1 h10	d2 h6	d3	l1	l2	l3	Availability	
no.	mm	mm	mm	mm	mm	mm		
6,000	6.000	6.000	5.500	65.00	18.00	29.00	●	●
8,000	8.000	8.000	7.500	75.00	24.00	39.00	●	●
10,000	10.000	10.000	9.200	80.00	30.00	40.00	●	●
12,000	12.000	12.000	11.200	93.00	36.00	48.00	●	●
16,000	16.000	16.000	15.000	108.00	48.00	60.00	●	●
20,000	20.000	20.000	19.000	126.00	60.00	76.00	●	●

Order no. = Guhring no. + code no.	Guhring no.						3839	3871
	Standard						Guhring std.	
	Tool material						Solid carbide	
	Surface finish						F	F
	Type						N	N
	Shank form						HA	HB
	Helix angle						35°/38°	
	Tolerance						h10	h10
	Discount group						106	106
Code	d1 h10	d2 h6	d3	l1	l2	l3	Availability	
no.	mm	mm	mm	mm	mm	mm		
6,000	6.000	6.000	5.500	65.00	18.00	29.00	●	●
8,000	8.000	8.000	7.500	75.00	24.00	39.00	●	●
10,000	10.000	10.000	9.200	80.00	30.00	40.00	●	●
12,000	12.000	12.000	11.200	93.00	36.00	48.00	●	●
16,000	16.000	16.000	15.000	108.00	48.00	60.00	●	●
20,000	20.000	20.000	19.000	126.00	60.00	76.00	●	●

RF 100 S/F (5-fluted)

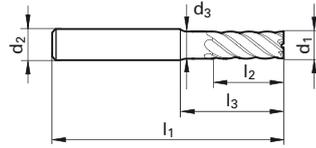
for materials < 48 HRC, centre cutting

Milling

Order no. = Guhring no. + code no.

Guhring no.
Standard
Tool material
Surface finish
Type
Shank form
Helix angle
Tolerance
Discount group

3897	3898
Guhring std.	
Solid carbide	
F	F
NH	NH
HA	HB
45°	
h10	h10
106	106
	



Code	d1 h10	d2 h6	d3	l1	l2	l3
no.	mm	mm	mm	mm	mm	mm
4.000	4.000	6.000	3.700	65.00	12.00	23.00
5.000	5.000	6.000	5.700	65.00	15.00	26.00
6.000	6.000	6.000	5.500	65.00	18.00	29.00
8.000	8.000	8.000	7.500	75.00	24.00	39.00
10.000	10.000	10.000	9.200	80.00	30.00	40.00
12.000	12.000	12.000	11.200	93.00	36.00	48.00
16.000	16.000	16.000	15.000	108.00	48.00	60.00
20.000	20.000	20.000	19.000	126.00	60.00	76.00

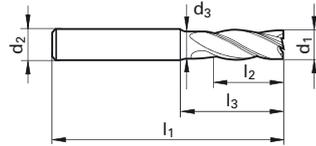
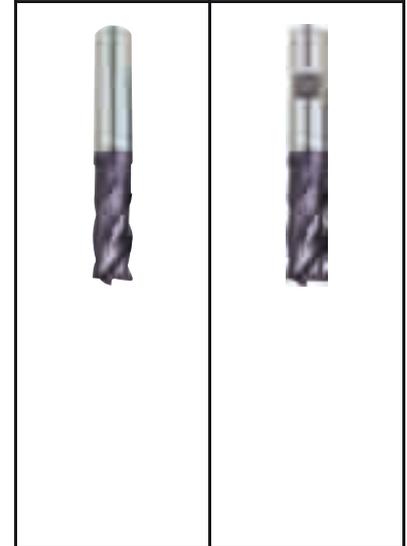
Availability	
●	●
●	●
●	●
●	●
●	●
●	●
●	●
●	●
●	●

for materials < 62 HRC, centre cutting

Order no. = Guhring no. + code no.

Guhring no.
Standard
Tool material
Surface finish
Type
Shank form
Helix angle
Tolerance
Discount group

3895	3896
DIN 6527 L	
Solid carbide	
A	A
H	H
HA	HB
40°/42°	
h10	h10
106	106



Code	d1 h10	d2 h6	d3	l1	l2	l3
no.	mm	mm	mm	mm	mm	mm
6,000	6.000	6.000	5.500	57.00	13.00	21.00
8,000	8.000	8.000	7.500	63.00	19.00	27.00
10,000	10.000	10.000	9.200	72.00	22.00	32.00
12,000	12.000	12.000	11.200	83.00	26.00	38.00
16,000	16.000	16.000	15.000	92.00	32.00	44.00
20,000	20.000	20.000	19.000	104.00	38.00	54.00

Availability	
●	●
●	●
●	●
●	●
●	●
●	●

Milling

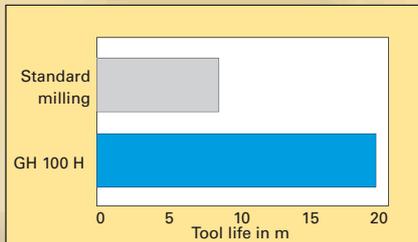
for superfine finishing of materials < 62 HRC

GH 100 H: The optimal tool for hard milling in the die and mould industry

Guhring's hard milling cutters optimally satisfy the requirements for time- and cost-saving machining of hardened workpieces. Different geometries as well as the carbide grade DK500UF with its high hardness and toughness are optimally adapted for the various milling operations. Subsequently, Guhring's hard milling cutters achieve highest contour accuracy for cutting depths up to 3xD.

Advantages:

- application up to 62 HRC
- high tool rigidity
- optimal surface quality
- high feed rates and tool life



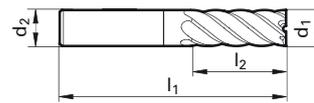
Tool life comparison between Guhring GH 100 H milling cutters and conventional milling cutters for finish machining tool steel hardened to 57 HRC.



Milling

Order no. = Guhring no. + code no.

Guhring no.	3715
Standard	Guhring std.
Tool material	DK 500 UF
Surface finish	F
Type	H
Shank form	HA
Helix angle	55°
Tolerance	h10
Discount group	106



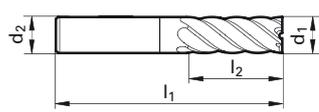
Code no.	d1 mm	d2 h6 mm	l1 mm	l2 mm	Z
3,000	3.000	6.000	57.00	8.00	6
4,000	4.000	6.000	57.00	11.00	6
5,000	5.000	6.000	57.00	13.00	6
6,000	6.000	6.000	57.00	13.00	6
8,000	8.000	8.000	63.00	19.00	6
10,000	10.000	10.000	72.00	22.00	6
12,000	12.000	12.000	83.00	26.00	6
14,000	14.000	14.000	83.00	26.00	6
14,001	14.000	16.000	92.00	32.00	6
16,000	16.000	16.000	92.00	32.00	6
18,000	18.000	18.000	92.00	32.00	8
18,001	18.000	20.000	104.00	38.00	8
20,000	20.000	20.000	104.00	38.00	8

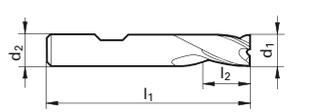
Availability



for superfine finishing of materials < 62 HRC

for materials < 1000 N/mm², centre cutting

Order no. = Guhring no. + code no.	Guhring no. 3716					
	Standard Guhring std.					
	Tool material DK 500 UF					
	Surface finish F					
	Type H					
	Shank form HA					
	Helix angle 55°					
	Tolerance h10					
	Discount group 106					
						
						
Code no.	d1 mm	d2 h6 mm	l1 mm	l2 mm	Z	Availability
no.	mm	mm	mm	mm		
6,000	6.000	6.000	75.00	30.00	6	●
8,000	8.000	8.000	100.00	40.00	6	●
10,000	10.000	10.000	100.00	40.00	6	●
12,000	12.000	12.000	150.00	45.00	6	●
16,000	16.000	16.000	150.00	65.00	6	●
20,000	20.000	20.000	150.00	65.00	8	●

Order no. = Guhring no. + code no.	Guhring no. 3684					
	Standard Guhring std.					
	Tool material Solid carbide					
	Surface finish F					
	Type N					
	Shank form Ø<2,0 HA/HB					
	Helix angle 30°					
	Tolerance e8					
	Discount group 117					
						
						
Code no.	d1 mm	d2 h6 mm	l1 mm	l2 mm	Z	Availability
no.	mm	mm	mm	mm		
0,300	0.300	3.000	38.00	1.00	3	●
0,400	0.400	3.000	38.00	1.00	3	●
0,500	0.500	3.000	38.00	1.50	3	●
0,600	0.600	3.000	38.00	1.50	3	●
0,800	0.800	3.000	38.00	2.00	3	●
1,000	1.000	3.000	38.00	2.00	3	●
1,200	1.200	3.000	38.00	2.00	3	●
1,500	1.500	3.000	38.00	2.00	3	●
1,800	1.800	3.000	38.00	2.00	3	●
2,000	2.000	6.000	38.00	4.00	3	●
2,500	2.500	6.000	38.00	5.00	3	●
3,000	3.000	6.000	38.00	5.00	3	●
3,500	3.500	6.000	38.00	6.00	3	●
4,000	4.000	6.000	38.00	7.00	3	●
4,500	4.500	6.000	38.00	8.00	3	●
5,000	5.000	6.000	38.00	8.00	3	●
5,500	5.500	6.000	38.00	8.00	3	●
5,750	5.750	6.000	38.00	8.00	3	●
6,000	6.000	6.000	38.00	8.00	3	●
6,750	6.750	8.000	42.00	10.00	3	●
7,000	7.000	8.000	42.00	10.00	3	●
7,750	7.750	8.000	42.00	10.00	3	●
8,000	8.000	8.000	43.00	11.00	3	●
8,700	8.700	10.000	48.00	11.00	3	●
9,000	9.000	10.000	48.00	11.00	3	●
9,700	9.700	10.000	48.00	11.00	3	●
10,000	10.000	10.000	50.00	13.00	3	●
12,000	12.000	12.000	55.00	15.00	3	●
14,000	14.000	14.000	58.00	15.00	3	●
16,000	16.000	16.000	62.00	18.00	3	●
18,000	18.000	18.000	70.00	20.00	3	●
20,000	20.000	20.000	75.00	22.00	3	●

for materials < 54 HRC, centre cutting

Order no. = Guhring no. + code no.									Guhring no.																										
									3855 3854 3866																										
									Standard																										
									Tool material																										
									Surface finish																										
									Type																										
									Shank form																										
									Helix angle																										
Tolerance																																			
Discount group																																			
									<table border="1"> <tr><td colspan="3">Guhring std.</td></tr> <tr><td colspan="3">Solid carbide</td></tr> <tr><td>A</td><td>A</td><td>A</td></tr> <tr><td>N</td><td>N</td><td>N</td></tr> <tr><td>cyl.</td><td>cyl.</td><td>cyl.</td></tr> <tr><td>30°</td><td>30°</td><td>30°</td></tr> <tr><td>h8</td><td>h8</td><td>h8</td></tr> <tr><td>106</td><td>106</td><td>106</td></tr> </table>			Guhring std.			Solid carbide			A	A	A	N	N	N	cyl.	cyl.	cyl.	30°	30°	30°	h8	h8	h8	106	106	106
Guhring std.																																			
Solid carbide																																			
A	A	A																																	
N	N	N																																	
cyl.	cyl.	cyl.																																	
30°	30°	30°																																	
h8	h8	h8																																	
106	106	106																																	
Code	d1	d2 h6	d3	l1	l2	l4	r	Z	Availability																										
no.	mm	mm	mm	mm	mm	mm	mm																												
6,000	6.000	6.000	5.600	80.00	6.00	40.00	3.00	2	●																										
8,000	8.000	8.000	7.600	100.00	7.00	60.00	4.00	2	●																										
10,000	10.000	10.000	9.600	120.00	8.00	75.00	5.00	2	●																										
12,000	12.000	12.000	11.500	120.00	10.00	70.00	6.00	2	●																										
6,000	6.000	6.000	-	57.00	12.00	24.00	3.00	2	●																										
8,000	8.000	8.000	-	63.00	16.00	29.00	4.00	2	●																										
10,000	10.000	10.000	-	72.00	20.00	35.00	5.00	2	●																										
12,000	12.000	12.000	-	83.00	24.00	42.00	6.00	2	●																										
4,000	4.000	4.000	-	80.00	8.00	17.50	2.00	2	●																										
6,000	6.000	6.000	-	100.00	12.00	24.00	3.00	2	●																										
8,000	8.000	8.000	-	100.00	16.00	29.00	4.00	2	●																										
10,000	10.000	10.000	-	100.00	20.00	35.00	5.00	2	●																										
12,000	12.000	12.000	-	120.00	24.00	42.00	6.00	2	●																										

Milling

A TiAlN SuperA A TiAlN F FIRE

GF 300 B - HSC-ball nose profile cutters

for materials < 62 HRC, centre cutting

Milling

Order no. = Guhring no. + code no.

Guhring no.

Standard

Tool material

Surface finish

Type

Shank form

Helix angle

Tolerance

Discount group

3359

3360

Guhring std.

DK 500 UF

F

F

H

H

HA

HA

30°

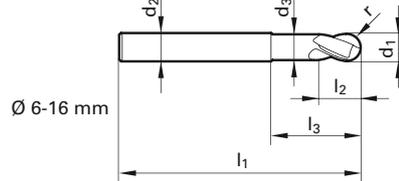
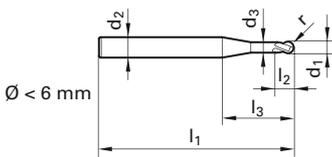
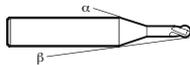
30°

h8

h8

106

106



Code	d1	d2 h6	d3	l1	l2	l3	r	Z
no.	mm	mm	mm	mm	mm	mm	mm	
0,500	0.500	3.000	0.400	38.00	0.75	10.00	0.25	2
0,800	0.800	3.000	0.700	38.00	1.20	10.00	0.40	2
1,000	1.000	3.000	0.900	38.00	1.50	10.00	0.50	2
1,500	1.500	3.000	1.400	38.00	2.25	10.00	0.75	2
2,000	2.000	6.000	1.900	57.00	3.00	21.00	1.00	2
3,000	3.000	6.000	2.700	57.00	5.00	21.00	1.50	2
4,000	4.000	6.000	3.700	57.00	6.00	21.00	2.00	2
5,000	5.000	6.000	4.700	57.00	8.00	21.00	2.50	2
6,000	6.000	6.000	5.700	57.00	9.00	21.00	3.00	2
8,000	8.000	8.000	7.700	63.00	12.00	27.00	4.00	2
10,000	10.000	10.000	9.500	72.00	15.00	32.00	5.00	2
12,000	12.000	12.000	11.500	83.00	18.00	38.00	6.00	2
16,000	16.000	16.000	15.500	92.00	24.00	44.00	8.00	2
3,000	3.000	6.000	2.700	75.00	5.00	39.00	1.50	2
4,000	4.000	6.000	3.700	75.00	6.00	39.00	2.00	2
5,000	5.000	6.000	4.700	75.00	8.00	39.00	2.50	2
6,000	6.000	6.000	5.700	75.00	9.00	39.00	3.00	2
8,000	8.000	8.000	7.700	100.00	12.00	64.00	4.00	2
10,000	10.000	10.000	9.500	100.00	15.00	60.00	5.00	2
12,000	12.000	12.000	11.500	150.00	18.00	105.00	6.00	2
16,000	16.000	16.000	15.500	150.00	24.00	102.00	8.00	2

Availability



Ball nose slot drills (2-fluted)

for materials < 1200 N/mm², centre cutting

Order no. = Guhring no. + code no.	Guhring no.					3679
	Standard					DIN 6527 L
	Tool material					Solid carbide
	Surface finish					F
	Type					N
	Shank form					HA
	Helix angle					30°
	Tolerance					h10
	Discount group					106
Code	d1	d2 h6	l1	l2	Z	Availability
no.	mm	mm	mm	mm		
0,500	0.500	3.000	38.00	1.00	2	
0,800	0.800	3.000	38.00	1.00	2	
1,000	1.000	3.000	38.00	2.00	2	
1,500	1.500	3.000	38.00	3.00	2	
2,000	2.000	6.000	57.00	6.00	2	
3,000	3.000	6.000	57.00	7.00	2	
4,000	4.000	6.000	57.00	8.00	2	
5,000	5.000	6.000	57.00	10.00	2	
6,000	6.000	6.000	57.00	10.00	2	
8,000	8.000	8.000	63.00	16.00	2	
10,000	10.000	10.000	72.00	19.00	2	
12,000	12.000	12.000	83.00	22.00	2	
14,000	14.000	14.000	83.00	22.00	2	
14,001	14.000	16.000	92.00	26.00	2	
16,000	16.000	16.000	92.00	26.00	2	
18,000	18.000	18.000	92.00	26.00	2	
18,001	18.000	20.000	104.00	32.00	2	
20,000	20.000	20.000	104.00	32.00	2	

Ball nose milling cutters: Satisfying the highest demands on accuracy and tool life



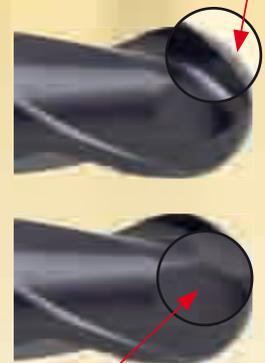
Especially the die and mould industry places ever higher demands on milling cutters – primarily with regard to accuracy and tool life. Therefore, Guhring's cutting tool program now includes radius milling cutters that are perfectly adapted to satisfy these demands and provide optimal machining results thanks to application orientated geometries, carbide grades and coatings. The advantages are especially high form and contour accuracy of the workpiece, minimal wear and therefore excellent tool life.

The special features of Guhring's ball nose milling cutters are:

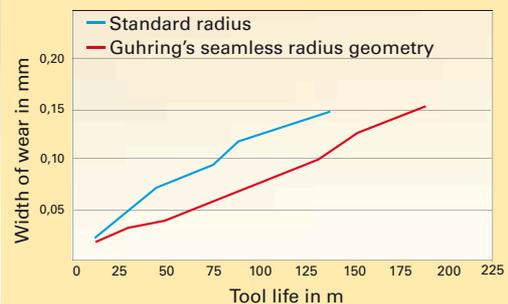
- outside diameter and the radius is ground in one-pass
- radius point geometry with constant helix-radius-correction
- reduced neck ground for collision reduction with protruding edges

Reduced neck ground for collision reduction

High wear protection thanks to radius geometry with constant rake angle and continuous spiral.



Seamless radius area provides high form and contour accuracy.



Wear comparison: Guhring's seamless radius geometry reduces wear and provides a considerably longer tool life in comparison with tools ground with conventional full radius.

GF 500 T - HSC-profile cutters with Torus grind

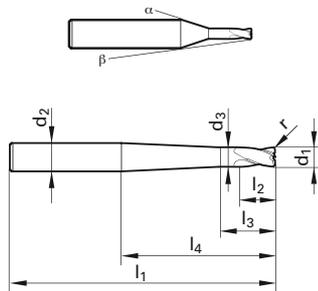
for materials < 54 HRC, centre cutting

Milling

Order no. = Guhring no. + code no.

- Guhring no.**
- Standard**
- Tool material**
- Surface finish**
- Type**
- Shank form**
- Helix angle**
- Tolerance**
- Discount group**

3856	3859	3860
Guhring std.		
Solid carbide		
A	A	A
N	N	N
cyl.	cyl.	cyl.
30°	30°	30°
h8	h8	h8
106	106	106
		



Code	d1	d2 h6	d3	l1	l2	l3	l4	r	β	Z
no.	mm	mm	mm	mm	mm	mm	mm	mm	°	
2,000	2.000	6.000	1.800	57.00	3.00	6.20	20.00	0.50	5.70	2
3,000	3.000	6.000	2.800	57.00	3.50	8.40	20.00	0.50	4.30	2
4,000	4.000	6.000	3.800	57.00	4.00	9.40	20.00	1.00	2.90	2
6,000	6.000	6.000	5.600	57.00	6.00	-	20.00	2.00	-	2
8,000	8.000	8.000	7.600	63.00	7.00	-	26.00	2.00	-	2
10,000	10.000	10.000	9.600	72.00	8.00	-	30.00	3.00	-	2
12,000	12.000	12.000	11.500	83.00	10.00	-	35.00	4.00	-	2
2,000	2.000	6.000	1.800	80.00	3.00	8.00	40.00	0.50	2.90	2
3,000	3.000	6.000	2.800	80.00	3.50	12.00	40.00	0.50	2.20	2
4,000	4.000	6.000	3.800	80.00	4.00	20.00	40.00	1.00	1.40	2
6,000	6.000	8.000	5.600	100.00	6.00	25.00	60.00	2.00	1.00	2
8,000	8.000	10.000	7.600	120.00	7.00	30.00	75.00	2.00	0.80	2
10,000	10.000	12.000	9.600	120.00	8.00	30.00	70.00	3.00	0.80	2
12,000	12.000	16.000	11.500	150.00	10.00	35.00	100.00	4.00	1.20	2
2,000	2.000	6.000	1.800	80.00	3.00	8.00	40.00	0.50	1.00	2
3,000	3.000	6.000	2.800	80.00	3.50	12.00	45.00	0.50	1.00	2
4,000	4.000	6.000	3.800	100.00	4.00	20.00	60.00	0.50	1.00	2
6,000	6.000	8.000	5.600	120.00	6.00	25.00	80.00	1.00	1.00	2
8,000	8.000	10.000	7.600	150.00	7.00	20.00	105.00	1.00	0.60	2

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

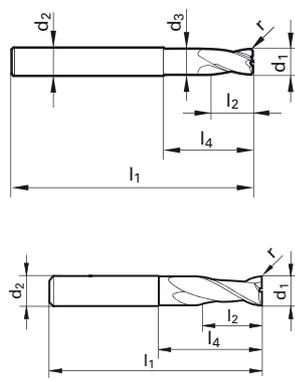
A TiAlN SuperA A TiAlN F FIRE

GF 500 T - HSC-profile cutters with Torus grind

for materials < 54 HRC, centre cutting

Order no. = Guhring no. + code no.

Guhring no.
Standard
Tool material
Surface finish
Type
Shank form
Helix angle
Tolerance
Discount group



3865	3863
Guhring std.	
Solid carbide	
A	A
N	N
cyl.	cyl.
30°	30°
h8	h8
106	106
	

Code		d1	d2 h6	d3	l1	l2	l4	r	Z	Availability	
no.		mm	mm	mm	mm	mm	mm	mm			
6,000	6,000	6,000	6,000	5,600	80,00	6,00	40,00	2,00	2	●	
8,000	8,000	8,000	8,000	7,600	100,00	7,00	60,00	2,00	2	●	
10,000	10,000	10,000	10,000	9,600	120,00	8,00	75,00	3,00	2	●	
12,000	12,000	12,000	12,000	11,500	120,00	10,00	70,00	4,00	2	●	
4,000	4,000	4,000	-	-	80,00	8,00	17,50	0,50	2		●
6,000	6,000	6,000	-	-	100,00	12,00	24,00	1,00	2		●
8,000	8,000	8,000	-	-	100,00	16,00	29,00	1,00	2		●
10,000	10,000	10,000	-	-	100,00	20,00	35,00	1,00	2		●
12,000	12,000	12,000	-	-	120,00	24,00	42,00	1,50	2		●

Milling

RF 100 Ti - High-performance end mills

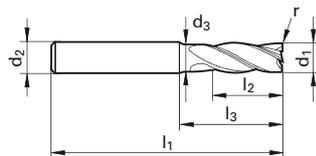
for materials < 48 HRC, centre cutting

Milling

Order no. = Guhring no. + code no.

Guhring no.
Standard
Tool material
Surface finish
Type
Shank form
Helix angle
Tolerance
Discount group

3498	3499
DIN 6527 L	
Solid carbide	
A	A
N	N
HA	HB
35°/38°	35°/38°
h10	h10
106	106



Code	d1 h10	d2 h6	d3	l1	l2	l3	r
no.	mm	mm	mm	mm	mm	mm	mm
6,005	6.000	6.000	5.500	57.00	13.00	21.00	0.50
6,010	6.000	6.000	5.500	57.00	13.00	21.00	1.00
6,015	6.000	6.000	5.500	57.00	13.00	21.00	1.50
6,020	6.000	6.000	5.500	57.00	13.00	21.00	2.00
8,005	8.000	8.000	7.500	63.00	19.00	27.00	0.50
8,010	8.000	8.000	7.500	63.00	19.00	27.00	1.00
8,015	8.000	8.000	7.500	63.00	19.00	27.00	1.50
8,020	8.000	8.000	7.500	63.00	19.00	27.00	2.00
10,005	10.000	10.000	9.200	72.00	22.00	32.00	0.50
10,010	10.000	10.000	9.200	72.00	22.00	32.00	1.00
10,015	10.000	10.000	9.200	72.00	22.00	32.00	1.50
10,020	10.000	10.000	9.200	72.00	22.00	32.00	2.00
12,005	12.000	12.000	11.200	83.00	26.00	38.00	0.50
12,010	12.000	12.000	11.200	83.00	26.00	38.00	1.00
12,015	12.000	12.000	11.200	83.00	26.00	38.00	1.50
12,020	12.000	12.000	11.200	83.00	26.00	38.00	2.00
12,030	12.000	12.000	11.200	83.00	26.00	38.00	3.00
12,040	12.000	12.000	11.200	83.00	26.00	38.00	4.00
16,005	16.000	16.000	15.000	92.00	32.00	44.00	0.50
16,010	16.000	16.000	15.000	92.00	32.00	44.00	1.00
16,015	16.000	16.000	15.000	92.00	32.00	44.00	1.50
16,020	16.000	16.000	15.000	92.00	32.00	44.00	2.00
16,030	16.000	16.000	15.000	92.00	32.00	44.00	3.00
20,005	20.000	20.000	19.000	104.00	38.00	54.00	0.50
20,010	20.000	20.000	19.000	104.00	38.00	54.00	1.00
20,015	20.000	20.000	19.000	104.00	38.00	54.00	1.50
20,020	20.000	20.000	19.000	104.00	38.00	54.00	2.00
20,025	20.000	20.000	19.000	104.00	38.00	54.00	2.50
20,030	20.000	20.000	19.000	104.00	38.00	54.00	3.00
20,040	20.000	20.000	19.000	104.00	38.00	54.00	4.00
25,015	25.000	25.000	23.500	121.00	45.00	65.00	1.50
25,020	25.000	25.000	23.500	121.00	45.00	65.00	2.00
25,025	25.000	25.000	23.500	121.00	45.00	65.00	2.50
25,030	25.000	25.000	23.500	121.00	45.00	65.00	3.00
25,040	25.000	25.000	23.500	121.00	45.00	65.00	4.00
25,050	25.000	25.000	23.500	121.00	45.00	65.00	5.00

Availability	
●	●
●	●
○	○
●	●
●	●
○	○
●	●
●	●
○	○
●	●
●	●
○	○
●	●
●	●
○	○
●	●
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○	○
●	●
●	●
●	●
○	○
●	●
●	●
●	●

A TiAlN SuperA **A** TiAlN **F** FIRE End mills with 0.8 - 2.5 - 3.17 - 4.0 radii are also available ex-stock

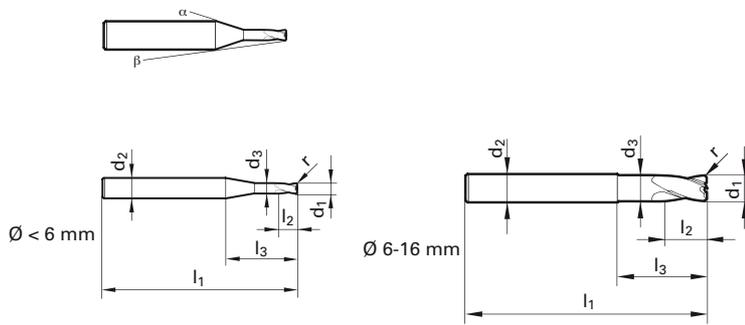
GF 300 T - Hard profile cutters with Torus grind

for materials < 62 HRC, centre cutting

Order no. = Guhring no. + code no.

Guhring no.
Standard
Tool material
Surface finish
Type
Shank form
Helix angle
Tolerance
Discount group

3361	3362
Guhring std.	
DK 500 UF	
F	F
H	H
HA	HA
30°	30°
h8	h8
106	106



Code no.	d1 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	r mm	Z
3,000	3.000	6.000	2.700	57.00	5.00	21.00	0.50	4
4,000	4.000	6.000	3.700	57.00	6.00	21.00	0.50	4
5,000	5.000	6.000	4.700	57.00	8.00	21.00	0.50	4
6,000	6.000	6.000	5.700	57.00	9.00	21.00	1.00	4
8,000	8.000	8.000	7.700	63.00	12.00	27.00	1.00	4
10,000	10.000	10.000	9.500	72.00	15.00	32.00	1.50	4
12,000	12.000	12.000	11.500	83.00	18.00	38.00	1.50	4
16,000	16.000	16.000	15.500	92.00	24.00	44.00	2.00	4
6,000	6.000	6.000	5.700	75.00	9.00	39.00	1.00	4
8,000	8.000	8.000	7.700	100.00	12.00	64.00	1.00	4
10,000	10.000	10.000	9.500	100.00	15.00	60.00	1.50	4
12,000	12.000	12.000	11.500	150.00	18.00	105.00	1.50	4
16,000	16.000	16.000	15.500	150.00	24.00	102.00	2.00	4

Availability
●
●
●
●
●
●
●
●
●
●
●
●

Milling

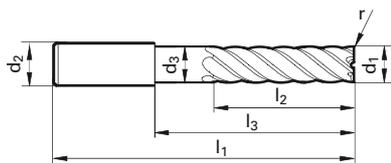
for superfine finishing of materials < 62 HRC

Milling

Order no. = Guhring no. + code no.

Guhring no.
Standard
Tool material
Surface finish
Type
Shank form
Helix angle
Tolerance
Discount group

3363
Guhring std.
DK 500 UF
F
H
HA
55°
h10
106



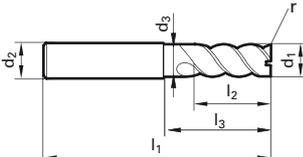
Code	d1	d2 h6	d3	l1	l2	l3	r	Z
no.	mm	mm	mm	mm	mm	mm	mm	
6,000	6.000	6.000	5.700	75.00	13.00	39.00	0.50	6
8,000	8.000	8.000	7.700	100.00	19.00	64.00	0.50	6
10,000	10.000	10.000	9.500	100.00	22.00	60.00	0.50	6
12,000	12.000	12.000	11.500	150.00	26.00	105.00	1.00	6
16,000	16.000	16.000	15.500	150.00	32.00	102.00	1.00	6

Availability
●
●
●
●
●

A TiAlN SuperA **A** TiAlN **F** FIRE

GH 100 U - Multi-tooth end mills with corner radius

for materials < 48 HRC, centre cutting

Order no. = Guhring no. + code no.	Guhring no.								3563
	Standard								DIN 6527 L
	Tool material								Solid carbide
	Surface finish								F
	Type								NH
	Shank form								HA
	Helix angle								45°
	Tolerance								h10
	Discount group								106
									
Code	d1	d2 h6	d3	l1	l2	l3	r	Z	Availability
no.	mm	mm	mm	mm	mm	mm	mm		
6,005	6.000	6.000	5.700	57.00	13.00	21.00	0.50	6	●
6,010	6.000	6.000	5.700	57.00	13.00	21.00	1.00	6	●
8,005	8.000	8.000	7.700	63.00	19.00	27.00	0.50	6	●
8,010	8.000	8.000	7.700	63.00	19.00	27.00	1.00	6	●
8,015	8.000	8.000	7.700	63.00	19.00	27.00	1.50	6	●
8,020	8.000	8.000	7.700	63.00	19.00	27.00	2.00	6	●
10,005	10.000	10.000	9.500	72.00	22.00	32.00	0.50	6	●
10,010	10.000	10.000	9.500	72.00	22.00	32.00	1.00	6	●
10,015	10.000	10.000	9.500	72.00	22.00	32.00	1.50	6	●
10,020	10.000	10.000	9.500	72.00	22.00	32.00	2.00	6	●
12,005	12.000	12.000	11.500	83.00	26.00	38.00	0.50	6	●
12,010	12.000	12.000	11.500	83.00	26.00	38.00	1.00	6	●
12,015	12.000	12.000	11.500	83.00	26.00	38.00	1.50	6	●
12,020	12.000	12.000	11.500	83.00	26.00	38.00	2.00	6	●
16,005	16.000	16.000	15.500	92.00	32.00	44.00	0.50	6	●
16,010	16.000	16.000	15.500	92.00	32.00	44.00	1.00	6	●
16,015	16.000	16.000	15.500	92.00	32.00	44.00	1.50	6	●
16,020	16.000	16.000	15.500	92.00	32.00	44.00	2.00	6	●
20,005	20.000	20.000	19.500	104.00	38.00	54.00	0.50	6	●
20,010	20.000	20.000	19.500	104.00	38.00	54.00	1.00	8	●
20,015	20.000	20.000	19.500	104.00	38.00	54.00	1.50	8	●
20,020	20.000	20.000	19.500	104.00	38.00	54.00	2.00	8	●

Milling

THREADING

MOULD AND DIE MAKING





GUHRING

Threading tools

Guhring's current threading tool program offers suitable taps, fluteless taps and thread milling cutters for all materials and a multitude of thread types:

- HSS-E, HSS-E PM and solid carbide taps with and without internal cooling
- HSS-E, HSS-E PM and solid carbide fluteless taps with and without internal cooling
- Solid carbide thread milling cutters with and without internal cooling as drill thread milling cutters, thread milling cutters with and without chamfer or universal thread milling cutters



The current threading tool program - including dies and tapping chucks - can be found in our current threading tool catalogue that we will send to you on request. Please contact Guhring!

This brochure includes a compilation of tool examples for the production of metric and metric fine threads in through and blind holes specifically for tasks in the mould and die industry. Furthermore, Guhring's threading tool program for the mould and die industry also provides tools for the following thread types:

Oil feed fluteless taps

- for ISO metric threads M12 up to M20, Guh. no. 1931
- for ISO metric fine threads M10x1 up to M24x1.5, Guh. no. 1581
- for ISO metric threads M3 up to M10 with short chamfer (form E), Guh. no. 1927

TMC SP thread milling cutters with chamfer

- for ISO metric threads M3 up to M20, Guh. no. 3525 (1.5xD) and Guh. no. 3560 (2.5xD)
- for ISO metric fine threads M4x0.5 up to M16x1.5, Guh. no. 3527 (1.5xD), Guh. no. 3528 (2xD) and Guh. no. 3763 (2.5xD)
- for UNC-threads 1/4-20 up to 1/2-13, Guh. no. 3524 (1.5xD) and Guh. no. 3535 (2xD)
- for UNF-threads 1/4-28 up to 1/2-20, Guh. no. 3536 (1.5xD) and Guh. no. 3537 (2xD)
- for BSP-threads G1/8 up to G3/8, Guh. no. 3529 (1.5xD), Guh. no. 3533 (2xD) and Guh. no. 3766 (2.5xD)
- for NPT-threads 1/8 up to 3/8, Guh. no. 3538 (standard length)
- for NPTF-threads 1/8 up to 3/8, Guh. no. 3539 (standard length)

TMU SP universal thread milling cutters

- for UNC- and UNF-threads $\geq 1/2$ up to $\geq 1 1/4$, Guh. no. 3596
- for BSP-threads $\geq 1/4$ up to ≥ 1 , Guh. no. 3542
- for NPT-threads $\geq 1/2$ up to ≥ 1 , Guh. no. 3769
- for NPTF-threads $\geq 1/2$ up to ≥ 1 , Guh. no. 3772



Threading tools

Standard	Type	Form	Tolerance	Tool description	Thread depth	Tool material	Surface finish	Diameter range	Guhring no.	Discount group	Standard range page
Taps for ISO metric threads for materials < 54/62 HRC											
DIN 371	H	D	6HX			HSS-E-PM		M 6 - M12	1201	103	70
~ DIN 371	H	D	ISO 2 / 6H ≤ M12 ☒			Solid carbide		M 3 - M16	2944	103	68
Taps for ISO metric fine threads for materials < 62 HRC											
Guhring std.	H	D	ISO 2 / 6H			Solid carbide		M 6 X0.50 - M12 X1.50	1161	103	69
Oil feed fluteless taps for ISO metric fine threads for materials < 1200 N/mm²											
~ DIN 371	N	C	6HX			Solid carbide		M 3 - M10	1972	103	71
Thread milling cutters for ISO metric threads for materials < 54 HRC											
Guhring std.	TMC SP				2 x D	Solid carbide		M 3 - M20	3526	108	72
Guhring std.	TMU SP					Solid carbide		>=14 - >=30	3541	108	73

Special tapping size hole diameter for ISO metric threads for hard machining with Guhring no. 2944 and 1201

Thread size	Tapping size hole Ø		Core diameter of int. thread			
			min.		max.	
	to DIN 336 mm	with Guh. no. 2944 mm	to DIN 336 mm	with Guh. no. 2944 mm	to DIN 336 mm	with Guh. no. 2944 mm
M3	2.50	2.60	2.495	2.559	2.599	2.699
M4	3.30	3.40	3.242	3.342	3.422	3.522
M5	4.20	4.30	4.134	4.234	4.334	4.434
M6	5.00	5.10	4.917	5.017	5.153	5.253
M8	6.80	6.90	6.647	6.747	6.912	7.012
M10	8.50	8.60	8.376	8.476	8.676	8.776
M12	10.20	10.40	10.106	10.206	10.441	10.541
M16	12.00	14.10	13.835	15.935	14.210	16.310

Special tapping size hole diameter for ISO metric fine threads for hard machining with Guhring no. 1161

Thread size	Tapping size hole Ø		Core diameter of int. thread			
			min.		max.	
	to DIN 336 mm	with Guh. no. 2944 mm	to DIN 336 mm	with Guh. no. 2944 mm	to DIN 336 mm	with Guh. no. 2944 mm
M6x0.5	5.50	5.60	5.459	5.559	5.599	5.699
M8x1	7.00	7.10	6.917	7.017	7.153	7.253
M10x1	9.00	9.10	8.917	9.017	9.153	9.253
M12x1	11.00	11.10	10.917	11.017	11.153	11.253
M12x1.5	10.50	10.60	10.376	10.476	10.676	10.776

 TiCN

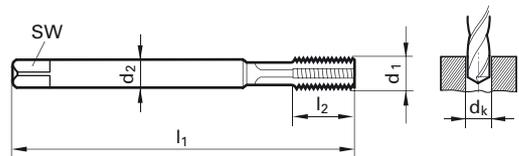
 external cooling

Through and blind holes

Order no. = Guhring no. + code no.

Guhring no.
Standard
Standard
Tool material
Surface finish
Type
Form
Cutting direction
Tolerance
Discount group

2944
Guhring std.
~ DIN 371
Solid carbide
C
H
D
right-hand
ISO 2 / 6H
103



Code no.	d1	P	d2 h6	SW	dk	l1	l2
		mm	mm		mm	mm	mm
3,000	M 3	0.50	3.500	2.70	2.600	56.00	12.00
4,000	M 4	0.70	4.500	3.40	3.400	63.00	14.00
5,000	M 5	0.80	6.000	4.90	4.300	70.00	17.00
6,000	M 6	1.00	6.000	4.90	5.100	80.00	20.00
8,000	M 8	1.25	8.000	6.20	6.900	90.00	20.00
10,000	M10	1.50	10.000	8.00	8.600	100.00	24.00
12,000	M12	1.75	12.000	9.00	10.400	110.00	28.00
16,000	M16	2.00	16.000	12.00	14.250	110.00	40.00

Availability
●
●
●
●
●
●
●

Tapping drill: Guh. no. 1946



available diameters: 2.6 mm up to 14.1 mm

This hard twist drill is not only designed to satisfy the demands of machining hardened steels up to 62 HRC, but it is also available as a standard tool in special tapping size hole diameters for hard machining.

Application recommendations for Guh. no. 2944

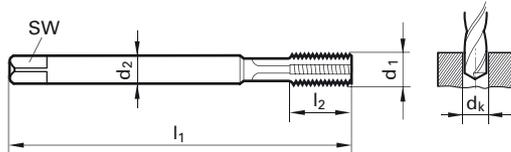
$v_c \leq 2$ m/min

Through and blind holes

Order no. = Guhring no. + code no.

Guhring no.
Standard
Standard
Tool material
Surface finish
Type
Form
Cutting direction
Tolerance
Discount group

1161
Guhring std.
Guhring std.
Solid carbide
C
H
D
right-hand
ISO 2 / 6H
103



Code no.	d1 X P	d2 h6	SW	dk	l1	l2
		mm		mm	mm	mm
6,003	M 6 X0.50	6.000	4.90	5.600	80.00	15.00
8,005	M 8 X1	8.000	6.20	7.100	90.00	18.00
10,005	M10 X1	10.000	8.00	9.100	90.00	22.00
12,005	M12 X1	12.000	9.00	11.100	110.00	25.00
12,007	M12 X1.50	12.000	9.00	10.600	110.00	28.00

Availability



Tapping drill: Guh. no. 1946



available diameter: 2.6 mm up to 14.1 mm

This hard twist drill is not only designed to satisfy the demands of machining hardened steels up to 62 HRC, but it is also available as a standard tool in special tapping size hole diameters for hard machining.

Application recommendations for

Guh. no. 1161

$v_c \leq 2 \text{ m/min}$

Through and blind holes

Order no. = Guhring no. + code no.

Guhring no.

1201

Standard

DIN 2184-1

Standard

DIN 371

Tool material

HSS-E-PM

Surface finish

C

Type

H

Form

D

Cutting direction

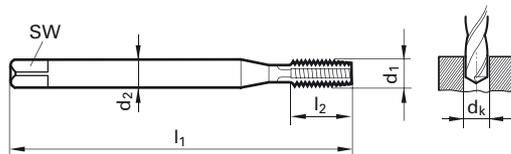
right-hand

Tolerance

6HX

Discount group

103



Threading

Code	d1	P	d2 h6	SW	dk	l1	l2
no.		mm	mm		mm	mm	mm
6,000	M 6	1.00	6.000	4.90	5.100	80.00	16.00
8,000	M 8	1.25	8.000	6.20	6.900	90.00	18.00
10,000	M10	1.50	10.000	8.00	8.600	100.00	20.00
12,000	M12	1.75	12.000	9.00	10.400	110.00	24.00

Availability
● ● ● ●

Tapping drill: Guh. no. 1946



available diameters: 2.6 mm up to 14.1 mm

This hard twist drill is not only designed to satisfy the demands of machining hardened steels up to 62 HRC, but it is also available as a standard tool in special tapping size hole diameters for hard machining.

Application recommendations for Guh. no. 1201

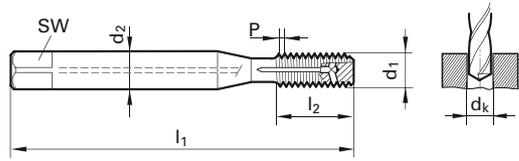
$v_c \leq 2 - 8$ m/min

Through and blind holes

Order no. = Guhring no. + code no.

Guhring no.
Standard
Standard
Tool material
Surface finish
Type
Form
Cutting direction
Tolerance
Discount group

1972
DIN 2184
~ DIN 371
Solid carbide
C
N
C
right-hand
6HX
103



Code no.	d1	P	d2 h6	SW	dk	l1	l2
		mm	mm		mm	mm	mm
3,000	M 3	0.50	3.500	2.70	2.800	56.00	6.00
4,000	M 4	0.70	4.500	3.40	3.700	63.00	7.50
5,000	M 5	0.80	6.000	4.90	4.650	70.00	8.50
6,000	M 6	1.00	6.000	4.90	5.550	80.00	11.00
8,000	M 8	1.25	8.000	6.20	7.400	90.00	14.00
10,000	M10	1.50	10.000	8.00	9.300	100.00	16.00

Availability
●
●
●
●
●
●

Threading

Solid carbide tapping drill: RT 100 U - Guh. no. 2477

 available diameters: 3.0 mm up to 20.0 mm

HSS-E tapping drill: GT 100 - Guh. no. 336

 available diameters: 1.0 mm up to 12.0 mm

Application recommendations for Guh. no. 1972
 $v_c \leq 4 - 8$ m/min

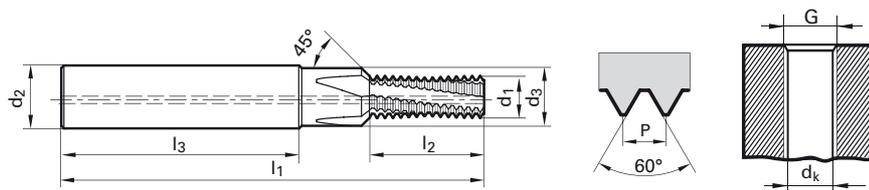
for ISO metric threads

Order no. = Guhring no. + code no.

Guhring no.
Standard
Tool material
Carbide grade
Surface finish
Type
Thread depth
Cooling
Shank form
Cutting direction
Discount group

3526
Guhring std.
Solid carbide
K

TMC SP
2 x D
axial >=M4
HA
right-hand
108



Code no.	G	P	d1	d2 h6	d3	dk	l1	l2	l3	z
3,000	M 3	0.50	2.300	6.000	3.400	2.500	48.00	6.70	36.00	3
4,000	M 4	0.70	3.000	6.000	4.500	3.300	48.00	8.70	36.00	3
5,000	M 5	0.80	4.000	6.000	5.500	4.200	54.00	10.80	36.00	3
6,000	M 6	1.00	4.800	8.000	6.600	5.000	62.00	13.50	36.00	3
8,000	M 8	1.25	6.400	10.000	9.000	6.800	74.00	18.10	40.00	3
10,000	M10	1.50	7.950	12.000	11.000	8.500	80.00	21.70	45.00	4
12,000	M12	1.75	9.950	14.000	13.500	10.200	90.00	25.40	45.00	4
14,000	M14	2.00	11.200	16.000	15.500	12.000	102.00	31.00	48.00	4
16,000	M16	2.00	12.800	18.000	17.500	14.000	102.00	35.00	48.00	4
20,000	M20	2.50	14.500	20.000	21.500	17.500	125.00	41.20	50.00	4

Availability

●
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Solid carbide tapping drill: RT 100 U - Guh. no. 2477



available diameters: 3.0 mm up to 20.0 mm

HSS-E tapping drill: GT 100 - Guh. no. 336



available diameter: 1.0 mm up to 12.0 mm

Tapping drill: HT800 holder - Guh. no. 4106 to 4110

Interchangeable insert - Guh. no. 4112



available diameters: 11.0 up to 25.99 mm

Application recommendations for Guh. no. 3526

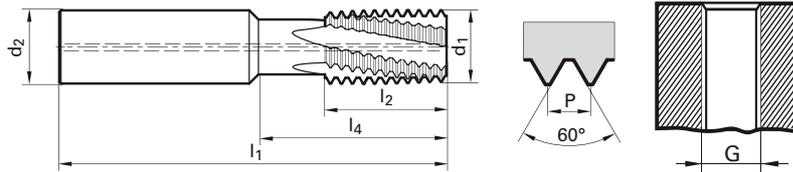
$v_c \leq 20 - 40$ m/min

$f_z = 0.005 - 0.02$ mm/tooth

for ISO metric threads

Order no. = Guhring no. + code no.

Guhring no.	3541
Standard	Guhring std.
Tool material	Solid carbide
Carbide grade	K
Surface finish	Ⓢ
Type	TMU SP
Thread depth	
Cooling	axial
Shank form	HA
Cutting direction	right-hand
Discount group	108



Threading

Code no.	G	P	d1	d2 h6	l1	l2	l4	z	Availability
10,100	>=14	1.00	9.950	10.000	70.00	16.00	25.00	4	●
10,125	>=14	1.25	9.950	10.000	70.00	16.00	25.00	4	●
10,150	>=14	1.50	9.950	10.000	70.00	16.00	25.00	4	●
12,100	>=18	1.00	11.950	12.000	80.00	20.00	31.00	4	●
12,125	>=18	1.25	11.950	12.000	80.00	20.00	31.00	4	●
12,150	>=18	1.50	11.950	12.000	80.00	20.00	31.00	4	●
16,100	>=24	1.00	15.950	16.000	90.00	25.00	40.00	5	●
16,150	>=24	1.50	15.950	16.000	90.00	25.00	40.00	5	●
16,200	>=24	2.00	15.950	16.000	90.00	25.00	40.00	5	●
20,100	>=30	1.00	19.950	20.000	105.00	33.00	50.00	5	●
20,150	>=30	1.50	19.950	20.000	105.00	33.00	50.00	5	●
20,200	>=30	2.00	19.950	20.000	105.00	33.00	50.00	5	●
20,250	>=30	2.50	19.950	20.000	105.00	33.00	50.00	5	●
20,300	>=30	3.00	19.950	20.000	105.00	33.00	50.00	5	●
20,350	>=30	3.50	19.950	20.000	105.00	33.00	50.00	5	●

Circular milling cutter: RF 100 U - Guh. no. 3732



available diameters: 4.0 up to 25.0 mm

Application recommendations for Guh. no. 3541

$v_c \leq 20 - 40 \text{ m/min}$
 $f_z = 0.005 - 0.02 \text{ mm/tooth}$

Tapping drill: HT800 holder - Guh. no. 4106 to 4110

Interchangeable insert - Guh. no. 4112



available diameters: 11.0 up to 25.99 mm

REAMING

MOULD AND DIE MAKING





GUHRING

Reaming tools

Guhring has a comprehensive range of HSS and solid carbide reaming, countersinking and de-burring tools for the finish machining of holes. No matter what solution is chosen, the customer always benefits from:

- maximum performance and process reliability
- optimal machining quality
- favourable tooling costs
- low process costs

Application example HR 500

Reaming instead of eroding - 1 second instead of 35 minutes!

Guhring's HR 500 HPC reamer for hard reaming instead of eroding in the mould and die industry offers an interesting alternative to conventional machining processes. Because it was able to reduce the machining times for the finish machining of holes in injection moulds made of hardened steel from a 35 minute eroding process to a 1 second reaming process – per hole!

For the in total 82 highly accurate through holes the overall machining time of in excess of 48 hours could be reduced to just 1.5 minutes. In addition, the reaming process can run on the same set-up as the drilling process. Thus, there is not only a saving in pure machining time but also in machine change. The higher accuracy when reaming and the superior repeatability of the machining results across countless holes are further arguments in favour of the HR 500 reamer.



Machine de-burring

Guhring's solid carbide de-burring tools offer new possibilities for the de-burring of hole entries and exits. They transform an often labour intensive manual reworking into a operating process that is fully integrated into the machining process. It is possible to select the optimal tool for every de-burring task:

- hole entry
- hole exit
- cross holes through the main hole
- cross holes through the side hole

Detailed information on Guhring's solid carbide de-burring tools in the standard and semi-standard program

- de-burring fork EW 100 G
- front/back de-burrer EW 100 VR
- de-burring spiral EW 100 S

as well as on special solutions

- de-burring lance EW 100 L
- de-burring milling cutter EW 100 F

can be found in our current de-burring tool brochure that can be downloaded as a PDF file at www.guehring.de or will be sent to you on request. Please contact Guhring!

Reaming tools

Standard	Type	Shank form	Tool description and application	Tool material	Surface finish	Diameter range	Guhring no.	Discount group	Page
NC machine reamers									
for materials < 1000 N/mm²									
Guhring std.			 tolerance H7	HSS-E		1.500 - 20.000	490	105	78
High-performance reamers HR 500 S									
for blind holes in materials < 62 HRC									
Guhring std.	HR 500 S	zyl. h6	 tolerance H7	Solid carbide		4.000 - 20.000	1685	166	81
High-performance reamers HR 500 D									
for through holes in materials < 62 HRC									
Guhring std.	HR 500 D	zyl. h6	 tolerance H7	Solid carbide		4.000 - 20.000	1686	166	81

Stock allowance (recommended values in mm)

Material	Ø up to 6 mm	Ø up to 10 mm	Ø up to 16 mm	Ø up to 25 mm	Ø over 25 mm
steel up to 700 N/mm ²	0.1 - 0.2	0.2	0.2 - 0.3	0.3 - 0.4	0.4
steel 700 -1000 N/mm ²	0.1 - 0.2	0.2	0.2	0.3	0.3 - 0.4
hardened steels up to 62 HRC	0.1 - 0.2	0.1 - 0.2	0.1 - 0.2	0.1 - 0.2	0.1 - 0.2

Optimal clamping devices from our current GM 300 program can be found in the chapter clamping devices.



Dramatic time reduction up to factor 50

With the comprehensive HR 500 range Guhring provides high-performance reamers for virtually any application task. Countless technical innovations give HR 500 high-performance reamers their exceptional properties, from which the user benefits from maximum cutting rates and therefore shortest machining times as well as optimum hole qualities.

New ways of machining through holes

The specially developed straight-flute geometry is unique with reamers for through holes. It enables extremely high cutting rates also for deep holes. At the same time, the straight-flute geometry combined with the exceptional coolant delivery supports the problem-free chip evacuation ahead of the cutting edge. Subsequently, the excellent reamed surface remains preserved, as chips do not return back within the flutes.



The optimal coolant supply is ensured by patent applied for longitudinal grooves ground in the re-inforced HA shank, their position exactly synchronised to the spacing of the reamer flute. This version of external cooling has more than one advantage over internal cooling via radial coolant ducts: The solid portion is considerably more rigid and a flow restriction is not created through eroded or sintered cooling ducts. In addition, chips cannot become lodged - with this solution non-existent - exit holes of the

coolant ducts. Furthermore, the optimal coolant delivery is unconditionally maintained even with re-ground tools. By the way, the user need not fear a negative influence on the clamping in hydraulic or shrink fit chucks due to the oil grooves. The remaining bearing surface is more than sufficient for a secure clamping.

Maximum performance in blind holes

HR 500 high-performance reamers for the machining of blind holes are internally cooled with a central coolant duct. Its especially large cross-section ensures the optimal delivery of the coolant to the cutting edge of the tool. The straight-fluted tool geometry combined with the outstanding coolant supply again ensure the safe evacuation of the optimally formed chips.



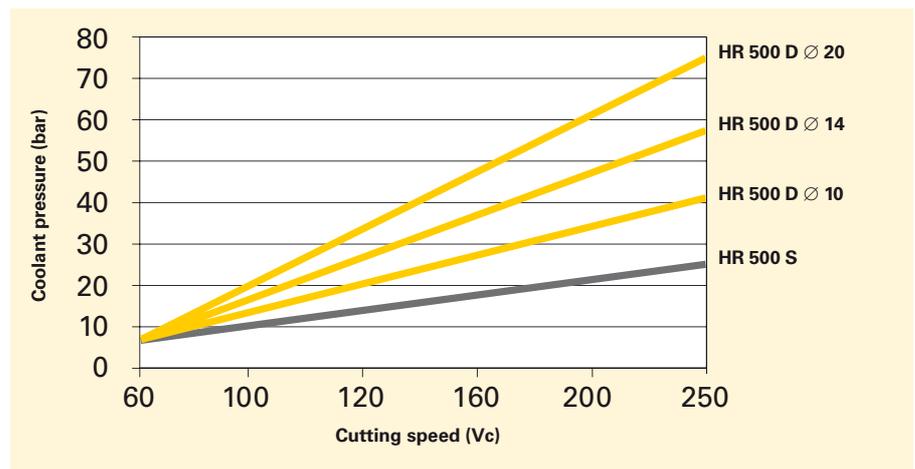
Better than cermet, but without its disadvantages: HR 500 solid carbide high-performance reamers

The performance level of solid carbide HPC reamers HR 500 could so far only be achieved with cermet tools and had to be acquired with several disadvantages. Cermet reamers are only suitable for the machining of few materials, whilst solid carbide reamers HR 500 can be applied in close to all materials including soft and stainless steels as well as aluminium and AISi-alloys.

Machining with interrupted cut or non-rigid machining conditions are not possible at all with cermet tools but with solid carbide in most cases this is not a problem. In addition, generally cermet reamers are comparatively more expensive.

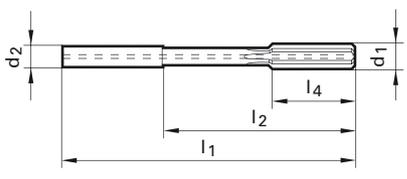
The user gains multiple benefits with the new Guhring HR 500 reamer:

- extremely high cutting rates,
- considerable time saving and therefore cost saving in the production
- broad range of application
- a standard program with favourable prices as well as excellent stock availability
- intermediate dimensions, that can be produced quickly and cost-effectively at any time.
- HR 500 ACTIVE special range with 4 weeks delivery for intermediate sizes and stepped tools.



Coolant pressure - cutting speed valid for standard dimensions

Solid carbide high-performance reamers HR 500 for materials < 62 HRC

Order no. = Guhring no. + code no.	Guhring no.						1685	1686
	Standard						Guhring std.	
	Tool material						Solid carbide	
	Surface finish						A	A
	Type						HR 500 S	HR 500 D
	Form							
	Cutting direction						right-hand	right-hand
	Tolerance						H7	H7
	Discount group						166	166
								
Code	d1	d2 h6	l1	l2	l4	Z	Availability	
No.		mm	mm	mm	mm			
4,000	4.000	4.000	68.00	40.00	12.00	4	●	●
5,000	5.000	6.000	76.00	40.00	12.00	4	●	●
6,000	6.000	6.000	76.00	40.00	12.00	4	●	●
7,000	7.000	8.000	101.00	65.00	16.00	6	●	●
8,000	8.000	8.000	101.00	65.00	16.00	6	●	●
9,000	9.000	10.000	101.00	61.00	19.00	6	●	●
10,000	10.000	10.000	101.00	61.00	19.00	6	●	●
11,000	11.000	12.000	130.00	85.00	19.00	6	●	●
12,000	12.000	12.000	130.00	85.00	19.00	6	●	●
13,000	13.000	14.000	130.00	85.00	22.00	6	●	●
14,000	14.000	14.000	130.00	85.00	22.00	6	●	●
15,000	15.000	16.000	150.00	102.00	22.00	6	●	●
16,000	16.000	16.000	150.00	102.00	22.00	6	●	●
17,000	17.000	18.000	150.00	102.00	25.00	6	●	●
18,000	18.000	18.000	150.00	102.00	25.00	6	●	●
19,000	19.000	20.000	150.00	100.00	25.00	6	●	●
20,000	20.000	20.000	150.00	100.00	25.00	6	●	●

Solid carbide drill: RT 100 U - Guh. no. 2477



available diameters: 3.0 mm up to 20.0 mm

HSS-E drill: GT 100 - Guh. no. 622



available diameters: 1.0 mm up to 16.0 mm

In addition, our standard range includes:

HR 500 S, tolerance + 0.005, Guh. no. 1675

HR 500 D, tolerance + 0.005, Guh. no. 1676

HR 500 GS, Ø 22.0 up to 40.0 mm, tol. H7,

Guh. no. 1680

HR 500 GD, Ø 22.0 up to 40.0 mm, tol. H7,

Guh. no. 1681

○ bright

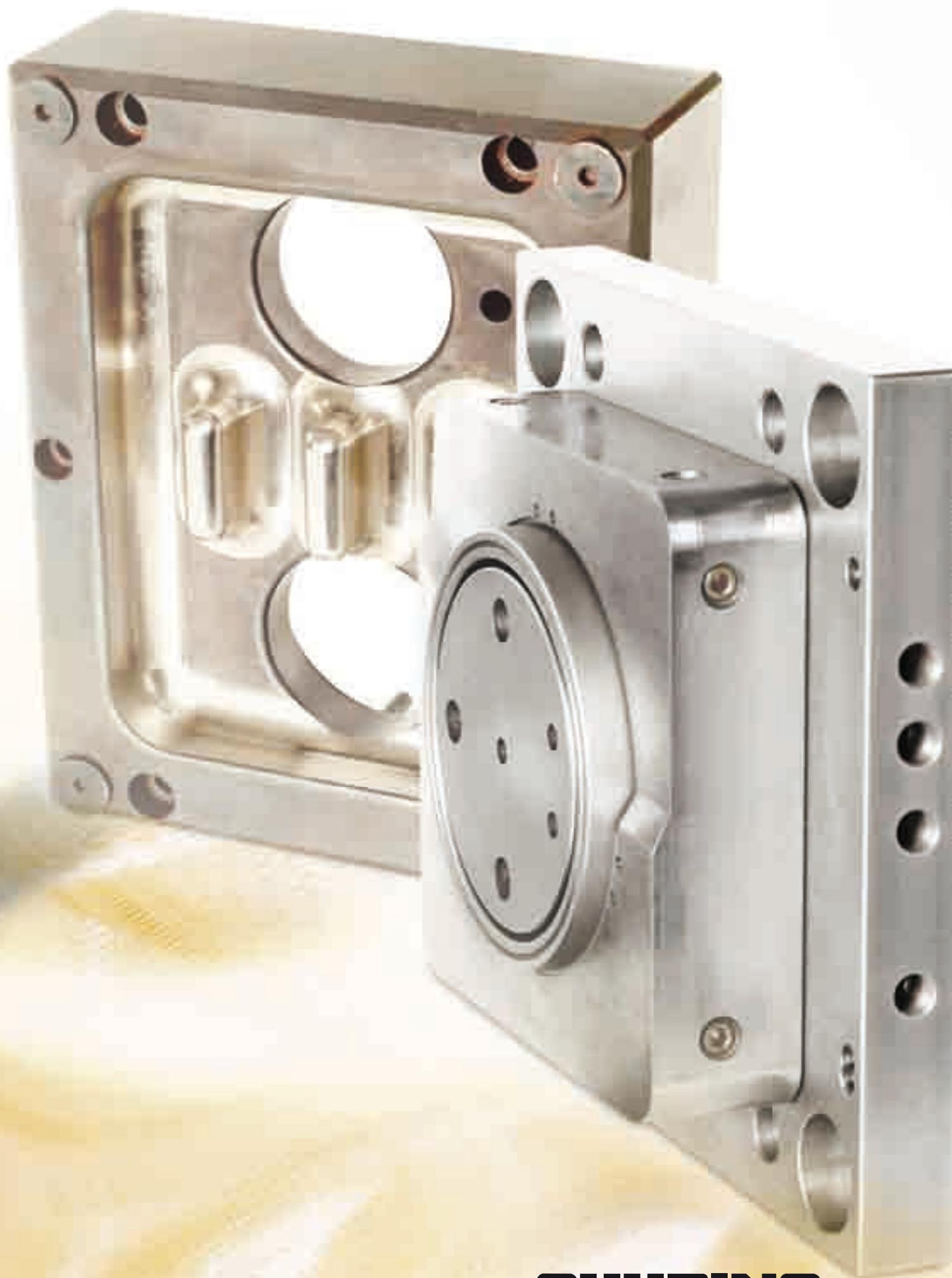
● TiAlN

Reaming

CLAMPING DEVICES

MOULD AND DIE MAKING





GUHRING

GM 300 is a entirely modular tooling system including tool holders, clamping systems and accessories.

The first step was the development of the GM 300 coupling in 1987 that became the standard DIN 69893 in 1991. Since 12/2001 the HSK-interface is also standard to ISO 12164-1/-2.

Furthermore, Guhring is leading in the field of minimum quantity lubrication MQL.

Alongside the MQL-suitable design of cutting tool geometries we focus especially on the optimal delivery of the cooling lubricant in the tool holder area. Therefore, we have developed a MQL suitable shank end for our cutting tools and a MQL suitable coolant delivery system for application in our tool holders. The GM 300 program includes numerous tool holders as standard solutions specifically for MQL machining.

The current GM 300 program includes - for conventional cooling lubrication as well as for MQL:

- basic adaptors for automatic and manual tool clamping
- hydraulic chucks
- shrink fit chucks
- collets
- straight shank and Morse taper holders
- chucks for special applications such as NC drilling chucks or tapping chucks
- accessories such as coolant delivery sets, measuring instruments etc.
- shrink fit systems



Clamping devices

Cone type	Tool description	Kegelgröße/ Nenngröße	Diameter range	Guhring no.	Discount group	Standard range page
Shrink fit chucks						
HSK-A		32...100	6.000 - 32.000	4736	148	86
HSK-E		32...63	3.000 - 32.000	4737	148	90
ISO taper		40...50	3.000 - 32.000	4738	148	88
Shrink fit extension						
-		16...25	3.000 - 16.000	4719	148	89
HPC clamping chucks						
HSK-A		63	3.000 - 20.000	4300	114	91
ISO taper		40	3.000 - 20.000	4301	114	92
Clamping sleeve for HPC clamping chucks						
-		20	6.000 - 20.000	4302	114	92
GISS 2000 induction shrink fit system						
-		-	3.000 - 32.000	4742	-	93

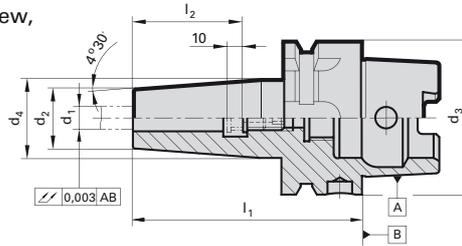
Order no. = Guhring no. + code no.

Product information

- balancing quality G6.3 at 15,000 rev./min
- MQL suitable
- for tool shank tolerance h6
- to DIN 69882-8
- also available in the lengths l1 = 120 mm and 160 mm (concentricity 5 µm)

Scope of delivery

- incl. setting screw, Guhring no. 4977 or 4904
- for conventional cooling order coolant delivery set, Guhring no. 4949, separately
- for MQL application order as special tool holder with coolant delivery set, Guhring no. 4924 and setting screw, Guhring no. 4919
- special dimensions on request



Guhring no.
Discount group

4736
148

Code no.	HSK-A d3	for clamping-Ø d1 h6 mm	d2 mm	d4 mm	l1 mm	l2 mm	incl. setting screw Guh. no. Code no.		kg	Availability*
6,032	32	6	21	25.5	70	36	4977	6,014	0.29	●
8,032	32	8	21	25.5	70	36	4977	8,014	0.28	●
10,032	32	10	24	30.0	75	41	4977	10,014	0.33	●
12,032	32	12	24	30.0	80	46	4977	12,014	0.33	●
6,040	40	6	21	27.0	80	36	4977	6,014	0.40	●
8,040	40	8	21	27.0	80	36	4977	8,014	0.40	●
10,040	40	10	24	32.0	80	41	4977	10,014	0.47	●
12,040	40	12	24	32.0	90	46	4977	12,014	0.51	●
14,040	40	14	27	33.5	90	46	4977	12,014	0.56	●
16,040	40	16	27	33.5	90	49	4977	16,014	0.54	●
6,050	50	6	21	27.0	80	36	4977	6,014	0.57	●
8,050	50	8	21	27.0	80	36	4977	8,014	0.58	●
10,050	50	10	24	32.0	85	41	4977	10,014	0.65	●
12,050	50	12	24	32.0	90	46	4977	12,014	0.67	●
14,050	50	14	27	34.0	90	46	4977	12,014	0.72	●
16,050	50	16	27	34.0	95	49	4977	16,014	0.73	●
18,050	50	18	33	41.5	95	49	4977	16,014	0.90	●
20,050	50	20	33	41.5	100	51	4977	20,114	0.92	●
3,063	63	3	10	18.0	80	30	4904	5,016	0.70	●
4,063	63	4	10	18.0	80	35	4904	6,016	0.70	●
5,063	63	5	10	18.0	80	40	4904	8,018	0.70	●
6,063	63	6	21	27.0	80	36	4977	6,014	0.83	●
8,063	63	8	21	27.0	80	36	4977	8,014	0.82	●
10,063	63	10	24	32.0	85	41	4977	10,014	0.91	●
12,063	63	12	24	32.0	90	46	4977	12,014	0.92	●
14,063	63	14	27	34.0	90	46	4977	12,014	0.97	●
16,063	63	16	27	34.0	95	49	4977	16,014	0.98	●
18,063	63	18	33	42.0	95	49	4977	16,014	1.16	●
20,063	63	20	33	42.0	100	51	4977	20,114	1.18	●
25,063	63	25	44	52.5	115	57	4977	20,114	1.77	●
32,063	63	32	44	52.5	120	61	4977	20,114	1.69	●
203,063	63	3	10	25.0	120	30	4904	5,016	0.80	●
204,063	63	4	10	25.0	120	35	4904	6,016	0.80	●
205,063	63	5	10	25.0	120	40	4904	8,018	0.80	●
206,063	63	6	21	27.0	120	36	4977	6,014	0.90	●
208,063	63	8	21	27.0	120	36	4977	8,014	0.95	●
210,063	63	10	24	32.0	120	41	4977	10,014	1.10	●
212,063	63	12	24	32.0	120	46	4977	12,014	1.20	●
103,063	63	3	10	31.0	160	30	4904	5,016	0.90	●
104,063	63	4	10	31.0	160	35	4904	6,016	0.90	●
105,063	63	5	10	31.0	160	40	4904	8,018	0.90	●
106,063	63	6	21	27.0	160	36	4977	6,014	0.83	●
108,063	63	8	21	27.0	160	36	4977	8,014	0.82	●

Clamping devices

* Price list 61, as of 1st February 2010

Shrink fit chucks HSK-A

Order no. = Guhring no. + Code no.								Guhring no.	4736
								Discount group	148
Code no.	HSK-A d ₃	for clamping-Ø d ₁ h6 mm	d ₂ mm	d ₄ mm	l ₁ mm	l ₂ mm	incl. setting screw Guh. no. Code no.	kg	Availability*
110,063	63	10	24	32.0	160	41	4977 10,014	0.91	●
112,063	63	12	24	32.0	160	46	4977 12,014	0.92	●
114,063	63	14	27	34.0	160	46	4977 12,014	0.97	●
116,063	63	16	27	34.0	160	49	4977 16,014	0.98	●
118,063	63	18	33	42.0	160	49	4977 16,014	1.16	●
120,063	63	20	33	42.0	160	51	4977 20,114	1.18	●
125,063	63	25	44	52.5	160	57	4977 20,114	1.77	●
132,063	63	32	44	52.5	160	61	4977 20,114	1.69	●
6,080	80	6	21	27.0	85	36	4977 6,014	1.29	●
8,080	80	8	21	27.0	85	36	4977 8,014	1.28	●
10,080	80	10	24	32.0	90	41	4977 10,014	1.38	●
12,080	80	12	24	32.0	95	46	4977 12,014	1.39	●
14,080	80	14	27	34.0	95	46	4977 12,014	1.45	●
16,080	80	16	27	34.0	100	49	4977 16,014	1.46	●
18,080	80	18	33	42.0	100	49	4977 16,014	1.65	●
20,080	80	20	33	42.0	105	51	4977 20,114	1.67	●
25,080	80	25	44	53.0	115	57	4977 20,114	2.21	●
32,080	80	32	44	53.0	120	61	4977 20,114	2.13	●
106,080	80	6	21	27.0	160	36	4977 6,014	1.64	●
108,080	80	8	21	27.0	160	36	4977 8,014	1.63	●
110,080	80	10	24	32.0	160	41	4977 10,014	1.82	●
112,080	80	12	24	32.0	160	46	4977 12,014	1.80	●
114,080	80	14	27	34.0	160	46	4977 12,014	1.90	●
116,080	80	16	27	34.0	160	49	4977 16,014	1.90	●
118,080	80	18	33	42.0	160	49	4977 16,014	2.30	●
120,080	80	20	33	42.0	160	51	4977 20,114	2.30	●
125,080	80	25	44	53.0	160	57	4977 20,114	3.00	●
132,080	80	32	44	53.0	160	61	4977 20,114	2.81	●
6,100	100	6	21	27.0	85	36	4977 6,014	2.18	●
8,100	100	8	21	27.0	85	36	4977 8,014	2.17	●
10,100	100	10	24	32.0	90	41	4977 10,014	2.27	●
12,100	100	12	24	32.0	95	46	4977 12,014	2.28	●
14,100	100	14	27	34.0	95	46	4977 12,014	2.33	●
16,100	100	16	27	34.0	100	49	4977 16,014	2.34	●
18,100	100	18	33	42.0	100	49	4977 16,014	2.52	●
20,100	100	20	33	42.0	105	51	4977 20,114	2.54	●
25,100	100	25	44	53.0	115	57	4977 20,114	3.06	●
32,100	100	32	44	53.0	120	61	4977 20,114	2.98	●
106,100	100	6	21	27.0	160	36	4977 6,014	2.55	●
108,100	100	8	21	27.0	160	36	4977 8,014	2.54	●
110,100	100	10	24	32.0	160	41	4977 10,014	2.72	●
112,100	100	12	24	32.0	160	46	4977 12,014	2.70	●
114,100	100	14	27	34.0	160	46	4977 12,014	2.80	●
116,100	100	16	27	34.0	160	49	4977 16,014	2.80	●
118,100	100	18	33	42.0	160	49	4977 16,014	3.20	●
120,100	100	20	33	42.0	160	51	4977 20,114	3.14	●
125,100	100	25	44	53.0	160	57	4977 20,114	3.90	●
132,100	100	32	44	53.0	160	61	4977 20,114	3.70	●

Clamping devices

For roughing we recommend "Gührojet chucks" with peripheral cooling, Guh. no. 4755 (HSK-A) or 4729 (ISO taper)



Suitable for all roughing end mills with HA-shank to DIN 6535



* Price list 61, as of 1st February 2010

Order no. = Guhring no. + code no.

Guhring no.
Discount group

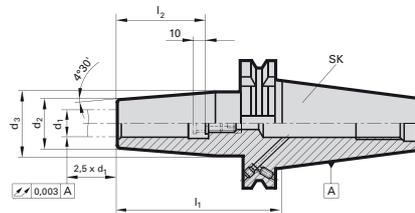
4738
148

Product information

- balancing quality G6.3 / 15,000 rev./min
- for ISO40/50 to DIN 69871 form AD/B
- form B supplied with threaded pins in bores
- for tool shank tolerance h6
- also available in the lengths $l_1 = 120$ mm and 160 mm (concentricity 5 μ m)

Scope of delivery

- incl. setting screw Guhring no. 4977 or 4904 respectively
- order draw bolt Guhring nos. 4925, 4926 separately
- special dimensions on request



Code no.	ISO taper	for clamping- \varnothing d_1 h6 mm	d_2 mm	d_4 mm	l_1 mm	l_2 mm	incl. setting screw Guh. no. Code no.		kg	Availability*
3,040	40	3	10	18	80	30	4904	5,016	0.90	●
4,040	40	4	10	18	80	35	4904	6,016	0.90	●
5,040	40	5	10	18	80	40	4904	8,018	0.90	●
6,040	40	6	21	27	80	36	4977	6,014	1.00	●
8,040	40	8	21	27	80	36	4977	8,014	1.00	●
10,040	40	10	24	32	80	41	4977	10,014	1.10	●
12,040	40	12	24	32	80	46	4977	12,014	1.00	●
16,040	40	16	27	34	80	49	4977	16,014	1.10	●
20,040	40	20	33	42	80	51	4977	20,114	1.50	●
203,040	40	3	10	24	120	30	4904	5,016	1.00	●
204,040	40	4	10	24	120	35	4904	6,016	1.00	●
205,040	40	5	10	24	120	40	4904	8,018	1.00	●
206,040	40	6	21	27	120	36	4977	6,014	1.10	●
208,040	40	8	21	27	120	36	4977	8,014	1.10	●
210,040	40	10	24	32	120	41	4977	10,014	1.20	●
212,040	40	12	24	32	120	46	4977	12,014	1.20	●
216,040	40	16	27	34	120	49	4977	16,014	1.35	●
220,040	40	20	33	42	120	51	4977	20,114	1.50	●
103,040	40	3	10	31	160	30	4904	5,016	1.10	●
104,040	40	4	10	31	160	35	4904	6,016	1.10	●
105,040	40	5	10	31	160	40	4904	8,018	1.10	●
106,040	40	6	21	27	160	36	4977	6,014	1.30	●
108,040	40	8	21	27	160	36	4977	8,014	1.30	●
110,040	40	10	24	32	160	41	4977	10,014	1.50	●
112,040	40	12	24	32	160	46	4977	12,014	1.50	●
116,040	40	16	27	34	160	49	4977	16,014	1.70	●
120,040	40	20	33	42	160	51	4977	20,114	1.90	●
3,050	50	3	10	18	80	30	4904	5,016	2.60	●
4,050	50	4	10	18	80	35	4904	6,016	2.60	●
5,050	50	5	10	18	80	40	4904	8,018	2.60	●
6,050	50	6	21	27	80	36	4977	6,014	2.90	●
8,050	50	8	21	27	80	36	4977	8,014	2.90	●
10,050	50	10	24	32	80	41	4977	10,014	2.90	●
12,050	50	12	24	32	80	46	4977	12,014	2.90	●
16,050	50	16	27	34	80	49	4977	16,014	3.00	●
20,050	50	20	33	42	80	51	4977	20,114	3.00	●
106,050	50	6	21	27	160	36	4977	6,014	3.10	●
108,050	50	8	21	27	160	36	4977	8,014	3.10	●
110,050	50	10	24	32	160	41	4977	10,014	3.40	●
112,050	50	12	24	32	160	46	4977	12,014	3.40	●
116,050	50	16	27	34	160	49	4977	16,014	3.70	●
120,050	50	20	33	42	160	51	4977	20,114	4.10	●

Diameters 14, 18, 25 and 32 mm are also available ex-stock.

* Price list 61, as of 1st February 2010

Clamping devices

Order no. = Guhring no. + code no.

Guhring no.

4737

Discount group

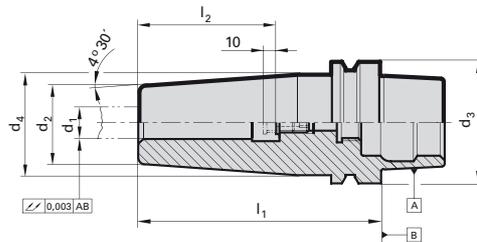
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Product information

- balancing quality G6.3 / 15.000 rev./min
- for tool shank tolerance h6

Scope of delivery

- incl. setting screw Guhring no. 4977 or 4904 respectively
- for conventional cooling, order coolant delivery set Guhring no. 4949, separately
- special dimensions on request



Code no.	HSK-E d ₃	for clamping-Ø d ₁ h6 mm	d ₂ mm	d ₄ mm	l ₁ mm	l ₂ mm	incl. setting screw Guh. no. Code no.		kg	Availability*
3,032	32	3	10	16	60	-	-	-	0.16	●
4,032	32	4	10	16	60	-	-	-	0.16	●
5,032	32	5	10	16	60	-	-	-	0.16	●
6,032	32	6	21	26	70	36	4977	6,014	0.18	●
8,032	32	8	21	26	70	36	4977	8,014	0.20	●
10,032	32	10	24	29	75	41	4977	10,014	0.25	●
12,032	32	12	24	29	80	46	4977	12,014	0.25	●
3,040	40	3	10	19	80	-	-	-	0.28	●
4,040	40	4	10	19	80	-	-	-	0.28	●
5,040	40	5	10	19	80	-	-	-	0.27	●
6,040	40	6	21	27	80	36	4977	6,014	0.41	●
8,040	40	8	21	27	80	36	4977	8,014	0.41	●
10,040	40	10	24	32	80	41	4977	10,014	0.48	●
12,040	40	12	24	32	90	46	4977	12,014	0.52	●
14,040	40	14	27	34	90	46	4977	12,014	0.57	●
16,040	40	16	27	34	90	49	4977	16,014	0.55	●
3,050	50	3	10	18	80	30	4904	5,016	0.49	●
4,050	50	4	10	18	80	35	4904	6,016	0.49	●
5,050	50	5	10	18	80	-	-	-	0.49	●
6,050	50	6	21	27	80	36	4977	6,014	0.59	●
8,050	50	8	21	27	80	36	4977	8,014	0.58	●
10,050	50	10	24	32	85	41	4977	10,014	0.57	●
12,050	50	12	24	32	90	46	4977	12,014	0.69	●
14,050	50	14	27	34	90	46	4977	12,014	0.74	●
16,050	50	16	27	34	95	49	4977	16,014	0.75	●
18,050	50	18	33	42	95	49	4977	16,014	0.92	●
20,050	50	20	33	42	100	51	4977	20,114	0.94	●
6,063	63	6	21	27	80	36	4977	6,014	0.86	●
8,063	63	8	21	27	80	36	4977	8,014	0.85	●
10,063	63	10	24	32	85	41	4977	10,014	0.94	●
12,063	63	12	24	32	90	46	4977	12,014	0.96	●
14,063	63	14	27	34	90	46	4977	12,014	1.01	●
16,063	63	16	27	34	95	49	4977	16,014	1.02	●
18,063	63	18	33	42	95	49	4977	16,014	1.19	●
20,063	63	20	33	42	100	51	4977	20,114	1.21	●
25,063	63	25	44	53	115	57	4977	20,114	1.80	●
32,063	63	32	44	53	120	61	4977	20,114	1.73	●

Clamping devices

* Price list 61, as of 1st February 2010

HPC clamping chucks

Technology and advantages

Guhring's precision clamping chucks offer highest clamping force particularly for milling operations but also for drilling and reaming as well as under HSC and HPC conditions.

The special clamping sleeve is clamped via a worm gear and optimally transfers the enormous clamping force onto the clamped tool. This enables clamping forces of, for example, > 200 Nm for 12 mm shank diameters or > 300 Nm for 16 mm shank diameters. This system offers the following advantages:

- increased cutting depths in comparison to conventional tool holders
- increased radial engagement and subsequently higher material removal rate
- maintenance-free technology
- suitable for straight shanks to DIN 1835 A and B as well as to 6535 HA, HB and HE
- concentricity 3 µm with 2.5 x D



RF 100 U + HPC clamping chuck = the perfect combination for high-performance roughing

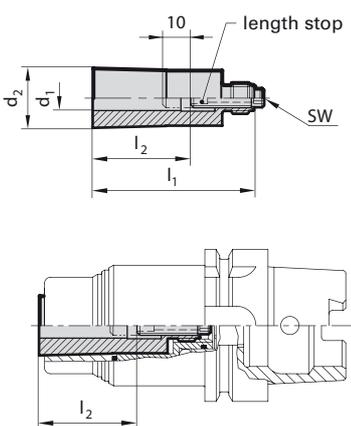


HPC clamping chucks HSK-A

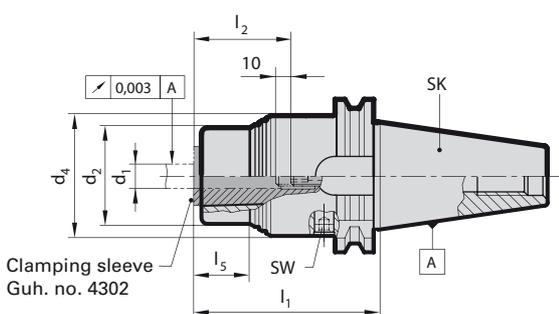
Guhring no.								4300
Discount group								114
Order no. = Guhring no. + code no.	Product information <ul style="list-style-type: none"> • for heavy-duty cutting as well as HSC and HPC • balancing quality G6.3/15,000 rev./min • highest clamping force and stability thanks to mech. tension gearing • suitable for internal cooling up to 80 bar 							
	<p>Clamping sleeve Guh. no. 4302</p>							
Code no.	HSK-A d ₃	for clamping-Ø d ₁ h6 mm	d ₂ mm	d ₄ mm	l ₁ mm	l ₂ mm	kg	Availability*
20,063	63	3-20	40	50	92	20	0.54	●

* Price list 61, as of 1st February 2010

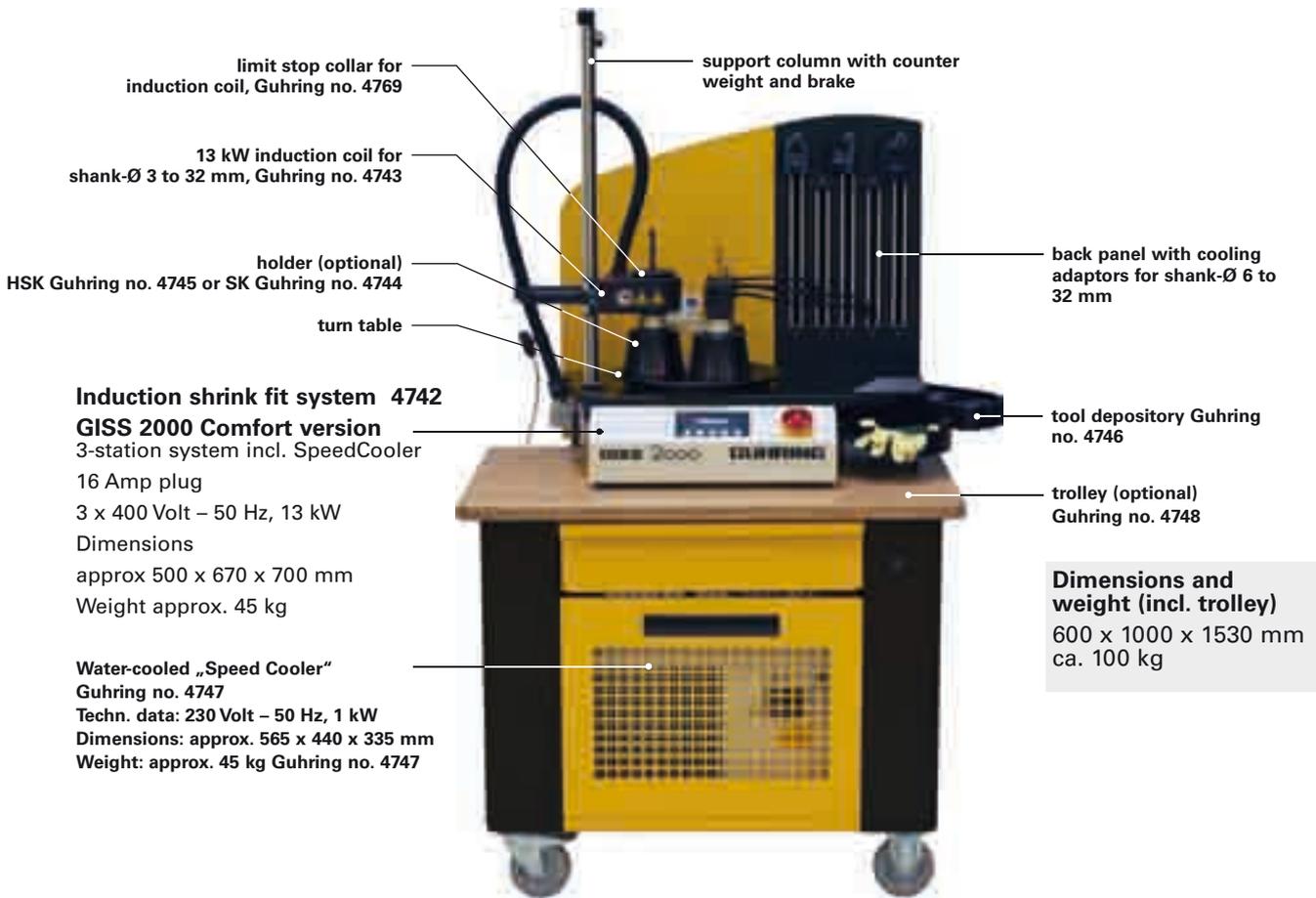
Clamping sleeves for HPC clamping chucks

Order no. = Guhring no. + code no.	Guhring no.						4302
	Discount group						114
	<p>Product information</p> <ul style="list-style-type: none"> • for clamping tools with shank-Ø d1 h6 • for maximum holding torque • design with peripheral cooling • with length setting 						
Code no.	Nominal size	d1 mm	d2 mm	l1 mm	l2 mm	SW	Availability*
6,020	20	6	24.6	66	36	4	●
8,020	20	8	24.6	66	36	4	●
10,020	20	10	24.6	66	40	4	●
12,020	20	12	24.6	66	45	4	●
14,020	20	14	24.6	66	45	4	●
16,020	20	16	24.6	66	48	4	●
18,020	20	18	24.6	66	48	4	●
20,020	20	20	24.6	66	50	4	●

HPC clamping chucks ISO taper-A

Order no. = Guhring no. + code no.	Guhring no.							4301
	Discount group							114
	<p>Product information</p> <ul style="list-style-type: none"> • for heavy-duty cutting as well as HSC and HPC • balancing quality G6.3/15,000 rev./min • highest clamping force and stability thanks to mech. tension gearing • with length setting • suitable for internal cooling up to 80 bar 							
Code no.	ISO taper	for clamping-Ø d1 h6 mm	d2 mm	d4 mm	l1 mm	l2 mm	kg	Availability*
20,040	40	3-20	40	50	63	20	0.54	●

Induction shrink fit system GISS 2000



limit stop collar for induction coil, Guhring no. 4769

support column with counter weight and brake

13 kW induction coil for shank-Ø 3 to 32 mm, Guhring no. 4743

back panel with cooling adaptors for shank-Ø 6 to 32 mm

holder (optional) HSK Guhring no. 4745 or SK Guhring no. 4744

turn table

tool depository Guhring no. 4746

Induction shrink fit system 4742

GISS 2000 Comfort version

3-station system incl. SpeedCooler

16 Amp plug

3 x 400 Volt – 50 Hz, 13 kW

Dimensions

approx 500 x 670 x 700 mm

Weight approx. 45 kg

trolley (optional) Guhring no. 4748

Dimensions and weight (incl. trolley)

600 x 1000 x 1530 mm
ca. 100 kg

Water-cooled „Speed Cooler“

Guhring no. 4747

Techn. data: 230 Volt – 50 Hz, 1 kW

Dimensions: approx. 565 x 440 x 335 mm

Weight: approx. 45 kg Guhring no. 4747

GISS 2000 Comfort version

		Guhring no.	4742
Order no. = Guhring no. + Code no.	Product information <ul style="list-style-type: none"> • Comfort version • 3-station system with turntable Scope of delivery <ul style="list-style-type: none"> • incl. base system with turntable, induction coil Guh. no. 4743, 1 limit stop collar set Guh. no. 4769, SpeedCooler (230V) Guh. no. 4747, 1 pair of gloves Guh. no. 4750, • order HSK-/ISO-holders Guh. nos. 4745, 4744 separately! 		
	Code no.		Availability
10,000 20,000	European version 50/60 Hz, 400-480 V, cooler 230 V US version 50/60 Hz, 400-480 V, cooler 115 V		● ●

Clamping devices

* Price list 61, as of 1st February 2010

MOULD AND DIE MAKING

GUHRING NAVIGATOR





Gehring Navigator

Google

http://www.guehring.de/guehringguide/guehringguide/index.php?mod=pb&act=wss

Werkstoffdatenbank

Untergruppe:

Automatenstähle

Werkstoffnorm:

DIN

Werkstoffe:

9SMn36

Suche

Werkstoff: ---

Alle Vergleichswerkstoffe

Temperatur: 700

1000

Temperatur: 200

GUHRING

Procedure

In order to achieve optimal machining results when producing deep holes with type RT 100T especially spotting on radii or on an uneven surface structure, we recommend the following machining steps:

1. Initial milling of surface, i.e. with Guhring's centre cutting Ratio end mill RF 100 U. The surface must be machined at right angles to the entry angle of the drilling operation.
2. Production of a cylindrical pilot hole (tolerance F9) with a minimum drilling depth of 1 x D. For this operation we recommend our Ratio drills RT 100 U or RT 100 F respectively. Thanks to a 140° point angle and a m7 tolerance on diameter these Ratio drills are especially suitable for this machining task.
3. Entry of spiral-flute deep hole drill RT 100T in the pilot hole at a speed of approx. 300 rev./min and with a feed rate of approx. 500 mm/min.
4. Setting of coolant pressure and speed.
5. Continuous drilling to complete hole depth without wood pecking.
6. For through holes with plain - i.e. 90° - exit, reduce feed rate v_f to 50 % approx. 1 mm prior to break-through.
7. For through holes with oblique exit, reduce the feed rate v_f to 40% approx. 1 mm prior to break-through.
8. After reaching hole depth stop machine spindle and coolant supply, with-drawal in top gear.



All deep hole drills must have support for the pilot hole. Deep hole drills must never operate at full speed without support in the machine shop.



Ratio end mill type RF 100 U, Guhring no. 3736

Thanks to its unequal helix angle, Guhring's FIRE-coated Ratio end mill RF 100 U offers highest feed rates and tool life for finishing and roughing operations in steel and cast materials as well as Ti- and Ni-alloys. Further information about the range can be found in Guhring's current main catalogue.



Ratio drill RT 100 U, Guhring no. 2477
Ratio drill RT 100 F, Guhring no. 1660

Thanks to their special cutting edge geometry, Guhring's Ratio drills excel with very good self-centering characteristics and alignment accurate holes. Type U is especially suitable for the machining of steel and high-alloyed AlSi-alloys, type F for high-alloyed, stainless, acid- and heat-resistant steels, Al and Al-alloys, Mg and Mg-alloys as well as Ti and Ti-alloys.

drill Ø mm	Feed column no.								
	1	2	3	4	5	6	7	8	9
	f (mm/rev)								
2.50	0.025	0.032	0.040	0.050	0.063	0.080	0.100	0.125	0.160
3.15	0.032	0.040	0.050	0.063	0.080	0.100	0.125	0.160	0.160
4.00	0.040	0.050	0.063	0.080	0.100	0.125	0.160	0.200	0.200
5.00	0.040	0.050	0.063	0.080	0.100	0.125	0.160	0.200	0.250
6.30	0.050	0.063	0.080	0.100	0.125	0.160	0.200	0.250	0.315
8.00	0.063	0.080	0.100	0.125	0.160	0.200	0.250	0.315	0.315
10.00	0.080	0.100	0.125	0.160	0.200	0.250	0.315	0.400	0.400
12.50	0.080	0.100	0.125	0.160	0.200	0.250	0.315	0.400	0.500
16.00	0.100	0.125	0.160	0.200	0.250	0.315	0.400	0.500	0.630

Tool cooling:

- with internal cooling

Material dependent coolants

- air
- neat oil
- soluble oil

Please note the coolant values on page 102!

Tool material	Material examples <i>Figures in bold = material no. to DIN EN</i>	Tensile strength MPa (N/mm ²)	Hard- ness	Coolant
Common structural steels	1.0035 S185, 1.0486 StE P275N, 1.0345 P235GH, 1.0425 P265GH 1.0050 E295, 1.0070 E360, 1.8937 P500NH	≤ 500 > 500-850		●●
Free-cutting steels	1.0718 11SMnPb30, 1.0736 115Mn37 1.0727 46 S20, 1.0728 60 S20, 1.0757 46SPb20	≤850 850-1000		●●
Unalloyed heat-treatable steels	1.0402 C22, 1.1178 C30E 1.0503 C45, 1.1191 C45E 1.0601 C60, 1.1221 C60E	≤700 700-850 850-1000		●●●
Alloyed heat-treatable steels	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-1000 1000-1200		●●
Unalloyed case hardened steels	1.0301 C10, 1.1121 C10E	≤750		●●
Alloyed case hardened steels	1.7043 38Cr4 1.5752 14NiCr14, 1.7131 16MnCr5, 1.7264 20CrMo5	850-1000 1000-1200		●●
Nitriding steels	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	850-1000 1000-1200		●●
Tool steels	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 850-1000		●●
High speed steels	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 61CrV4	≥650-1000		●●
Spring steels	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4	≤330 HB		●●
Stainless steels, sulphured austenitic martensitic	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4301 X5CrNi18 10, 1.4541 X6CrNiTi18 10, 1.4571 X6CrNiMoTi 17 12 2 1.4057 X17CrNi16-1, 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18 2	≤850 ≤850 ≤850		●●●
Hardened steels Special alloys	- Nimonic, Inconel, Monel, Hastelloy	≤40-60 HRC ≤1200		●●
Cast iron	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20) 0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35) EN-GJV250 (GGV25), EN-GJV350 (GGV35)	≤240 HB <300 HB		●●●
New cast materials CGI	EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6			●●●
New cast materials ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		●●●
Spheroidal graphite iron and malleable cast iron Chilled cast iron	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35) 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70) -	≤240 HB <300 HB ≤350 HB		●●●
Ti and Ti-alloys	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7164 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, -TiAl8Mo1V1 3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1 3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si	≤850 850-1200 ≤400 ≤450		●●●
Aluminium and Al-alloys	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9 > 10% Si 3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg MgMn2, G-MgAl8Zn1, G-MgAl6Zn3	≤600 ≤600 ≤450		●●●
Magnesium alloys	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤400		●●
Copper, low-alloyed	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		●●
Brass, short-chipping langspanend	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5 2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600 ≤600		●●
Bronze, short-chipping	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5 2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	>600-850 ≤850		●●●
Bronze, long-chipping	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	850-1000		●●●

15 x D

20 x D

25 x D

30 x D

40 x D

Guhring no.	6509				6511				6512				6513				6514			
Standard	Guhring standard				Guhring standard				Guhring standard				Guhring standard				Guhring standard			
Tool material	Solid carbide				Solid carbide				Solid carbide				Solid carbide				Solid carbide			
Carbide grade	K30/K40				K30/K40				K30/K40				K30/K40				K30/K40			
Surface	A TiAlN head coated				A TiAlN head coated				A TiAlN head coated				A TiAlN head coated				A TiAlN head coated			
Type	RT 100 T				RT 100 T				RT 100 T				RT 100 T				RT 100 T			
Shank	HA				HA				HA				HA				HA			
Cutting direction	right-hand				right-hand				right-hand				right-hand				right-hand			
Coolant	■				■				■				■				■			
	conventional cooling min. 40 bar				MQL by GÜHRING Lic. HORKOS CORP				conventional cooling min. 40 bar				MQL by GÜHRING Lic. HORKOS CORP				conventional cooling min. 40 bar			
	Vc (m/min)	Feed col.no.	Vc (m/min)	Feed col.no.	Vc (m/min)	Feed col.no.	Vc (m/min)	Feed col.no.	Vc (m/min)	Feed col.no.	Vc (m/min)	Feed col.no.	Vc (m/min)	Feed col.no.	Vc (m/min)	Feed col.no.	Vc (m/min)	Feed col.no.		
	110	8			110	8			100	8			80	7			80	7		
	110	8			110	8			100	8			80	7			80	7		
	120	8			120	8			120	8			100-120	8			100	8		
	120	8			120	8			100	8			100	8			100	8		
	110	6			110	6			110	6			110	6			110	6		
	110	8			110	8			100	8			80	7			80	7		
	100	7			100	7			100	7			80	7			80	7		
	110	7	80	7	110	7	80	7	100	7	70	7	80	7	60	6-7	80	6-7		
	110	6	80	7	110	6	80	7	100	6	70	7	80	6	60	6	80	6		
	110	8			110	8			100	8			80	7			80	7		
	110	7	80	6-7	110	7	80	6-7	100	7	70	6-7	80	6	60	6-7	80	6		
	110	6	80	6-7	110	6	80	6-7	100	6	70	6-7	80	6	60	6-7	80	6		
	100	5			100	5			80	5			80	5			80	5		
	80	5			80	5			60	5			60	5			60	5		
	100	6-7			100	6-7			90	6-7			80	6-7			80	6-7		
	80	5			80	5			70	4			70	4			70	4		
	50	5			50	5			50	4			50	4			50	4		
	50	5			50	5			50	4			50	4			50	4		
	100	5			100	5			100	5			80	5			80	5		
	60-80	2-3			60-80	2-3			60-80	2-3			60-80	2-3			60-80	2-3		
	100	5			100	5			100	5			80	5			80	5		
	50	4			50	4			50	4			50	4			50	4		
	30	2			30	2			30	2			30	2			30	2		
	140	8			140	8			130	8			120	8			120	8		
	100	8			100	8			90	8			80	8			80	8		
	100	6			100	6			90	6			80	6			80	6		
	100	6			100	6			90	6			80	6			80	6		
	90	8	90	8	90	8	90	8	80	8	80	8	70	8	70	8	70	8		
	140	8			140	8			130	8			120	8			120	8		
	100	8			100	8			90	8			80	8	65	8	80	8		
	120	1			120	1			120	1			120	1			120	1		
	120	8			120	8			110	8			100	8			100	8		

Solid carbide micro-precision drills

Tools with bold feed column no. are preferred choice.

General hints:

No play in spindle bearings, alignment accurate tool holders. We recommend the application of hydraulic chucks or shrink fit chucks.

Notes regarding cooling:

We recommend lubrication by soluble oil or neat oil, coolant pressure min. 40 bar. See pages 102!



All deep hole drills must have support for the pilot hole. Deep hole drills must never operate at full speed without support in the machine shop.

Solid carbide micro-precision drill, Guhring no. 6400

For piloting and centring we recommend the solid carbide micro-precision drill, Guhring no. 6400, 4 x D without internal cooling.

drill Ø mm	Feed column no.												
	56	57	58	59	60	61	62	63	64	65	66	67	68
	f (mm/rev)												
0,80	0,008	0,016	0,024	0,032	0,04	0,05	0,06	0,07	0,08	0,08	0,08	0,09	0,09
1,00	0,012	0,022	0,032	0,042	0,06	0,07	0,08	0,09	0,10	0,10	0,11	0,11	0,12
1,50	0,021	0,036	0,051	0,066	0,09	0,10	0,12	0,13	0,15	0,15	0,16	0,17	0,18
2,00	0,032	0,052	0,072	0,092	0,12	0,14	0,16	0,18	0,20	0,21	0,22	0,23	0,24
2,50	0,045	0,070	0,095	0,120	0,15	0,17	0,20	0,22	0,25	0,26	0,27	0,28	0,30
3,00	0,060	0,090	0,120	0,150	0,18	0,21	0,24	0,27	0,30	0,31	0,33	0,34	0,36

Tool cooling:
 with internal cooling

Material group	Material examples, new description (old description in brackets) <i>Figures in bold = material no. to DIN EN</i>	Tensile strength Hardness MPa (N/mm ²)
Common structural steels	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850
Free-cutting steels	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000
Unalloyed heat-treatable steels	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000
Alloyed heat-treatable steels	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850 ≤1000 1000-1200
Unalloyed case hardened steels	1.0301 (C10), 1.1121 C10E (Ck10)	≤750
Alloyed case hardened steels	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850 ≤1000 1000-1200
Nitriding steels	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850 ≤1000 >1000-1200
Tool steels	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000
High speed steels	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000
Spring steels	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)	≤330 HB
Stainless steels, sulphured austenitic martensitic	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi 17 2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850 ≤850 ≤850
Hardened steels	-	≤40-48 HRC >48-60 HRC
Special alloys	Nimonic, Inconel, Monel, Hastelloy	≤1200
Cast iron	0.6010 EN-GJL-100(GG10), 0.6020 EN-GJL-200(GG20) 0.6025 EN-GJL-250(GG25), 0.6035 EN-GJL-350(GG35)	≤240 HB <300 HB
Spheroidal graphite iron and malleable cast iron	0.7050 EN-GJS-500-7(GGG50), 0.8035 EN-GJMW-350-4(GTW35) 0.7070 EN-GJS-700-2(GGG70), 0.8170 EN-GJMB-700-2(GTS70)	≤240 HB <300 HB
Chilled cast iron	-	≤350 HB
Ti and Ti-alloys	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, -TiAl8Mo1V1	≤850 >850-1200
Aluminium and Al-alloys	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400
Al wrought alloys	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤450
Al cast alloys ≤ 10 % Si > 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9 3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600 ≤600
Magnesium alloys	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450
Copper, low-alloyed	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤400
Brass, short-chipping long-chipping	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600
Bronze, short-chipping	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 >600-850
Bronze, long-chipping	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000
Duroplastics	Bakelite, Resopal, Pertinax, Moltopren	-
Thermoplastics	Plexiglass, Hostalen, Novodur, Makralon	-
Kevlar	Kevlar	-
Glass, carbon concentrated plastics	GRP/CRP	-



Gühring Navigator

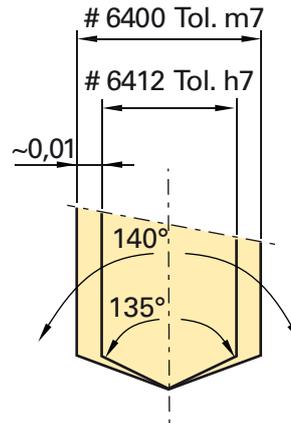
Guhring no.	6412
Standard	Guhring standard
Tool material	Solid carbide
Carbide grade	K30/K40
Surface	A TiAlN head coated
Type	N
Shank	HA
Drilling depth	15 x D
Cutting direction	right-hand
Cooling	



Vc m/min	Feed Col. no.
90-120	58
90-110	58
90-120	59
80-100	59
80-110	58
80-110	58
80-100	58
80-100	58
60-80	58
90-110	57
70-100	58
60-80	58
60-80	57
50-70	57
40-60	58
40-60	58
40-60	57
40-60	57
60-80	57
60	56
60-80	57
25	56
<150	60
<140	60
<140	60
<130	60
35	56
35	56
60-80	68
60-80	68
120-150	59
120-150	59

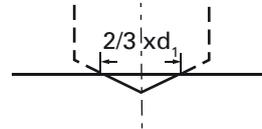
Pilot drilling

For the application of solid carbide micro-precision drills 15xD we recommend a pilot hole 1xD up to 2xD depth. For this pilot hole, the solid carbide micro-precision drill 4xD is optimally suitable. Its point angle and its diameter tolerance are perfectly adapted..



Centering

In order to achieve full performance with solid carbide micro-precision drills from 8xD drilling depth, we recommend centering. The ExclusiveLine solid carbide micro-precision drill up to 4xD, Guhring no. 6400, can be applied for this purpose. The centering diameter should be approximately 2/3xD.



Filter quality

When applying solid carbide micro-precision drills we recommend constant monitoring of the lubricant's filter quality due to the extremely small coolant duct diameters, for example with our check instrument CC 3000.



Gun drills

Drill Ø mm from	Feed column no.							
	11	12	13	14	15	16	17	18
	f (mm/rev)							
1.50	0.002	0.004	0.006	0.008	0.012	0.020	0.032	0.045
2.00	0.003	0.005	0.007	0.010	0.016	0.028	0.046	0.055
2.50	0.004	0.006	0.008	0.012	0.018	0.030	0.054	0.070
4.00	0.005	0.007	0.010	0.016	0.025	0.043	0.065	0.085
6.00	0.007	0.009	0.013	0.024	0.035	0.061	0.085	0.120
8.00	0.010	0.014	0.022	0.032	0.045	0.068	0.100	0.150
10.00	0.012	0.016	0.028	0.040	0.055	0.075	0.120	0.160
14.00	0.020	0.025	0.035	0.050	0.065	0.085	0.130	0.180
18.00	0.025	0.030	0.040	0.055	0.070	0.095	0.145	0.200
20.00	0.026	0.035	0.045	0.060	0.080	0.110	0.180	0.250
24.00	0.027	0.036	0.047	0.065	0.085	0.130	0.185	0.300
28.00	0.028	0.038	0.049	0.068	0.090	0.140	0.195	0.350
30.00	0.030	0.040	0.050	0.070	0.100	0.150	0.200	0.400
35.00	0.035	0.045	0.055	0.075	0.120	0.180	0.250	0.450
40.00	0.040	0.050	0.060	0.080	0.150	0.200	0.300	0.500

*The feed rates always relate to tools with the recommended coating. In some cases the successful application of un-coated tools cannot be guaranteed.

The sequence of operations for deep hole drilling

- production of pilot hole (L = 1.5 x D, tolerance H8)
- enter at low revolutions, approx. 200 rev./min, feed rate approx. 500 mm/min. With tools for drilling depths in excess than 40 x D enter the pilot hole revolving in left hand direction.
- setting of coolant pressure and revolutions
- uninterrupted drilling to required drilling depth without wood pecking. When applying gun drills with increased length-diameter-ratio, we recommend machining with reduced cutting parameters (approx. 75% of the optimal cutting speed) up to a drilling depth of approx. 25 mm.
- switching off coolant supply after reaching the required hole depth
- withdrawal in top gear with stationary spindle

Material dependent coolants

- air
- neat oil
- soluble oil

Please note the coolant values on page 102!

EB100
single-fluted gun drill
solid carbide
0.9 ... 12.0



≤35xD >35xD

Application advice

- For drilling depths in excess than 40 x D we recommend the use of two or more gun drills, e. g. Ø 10 x 400 mm and Ø 9.95 x 800 mm.
- Gun drills for drilling depths of more than 40 x D should enter the pilot hole revolving in the left hand direction.
- When changing tools for drilling depths of more than 40 x D, the tool can be damped by switching on coolant supply for just one second.
- For machining of long-chipping materials we recommend the use of gun drills with polished flutes.
- Generally we recommend the use of soluble oil with a minimum oil content of 10 %.
- Single-fluted gun drills for long-chipping aluminium should be supplied with point grind 180° and coolant chamber.
- When spotting in aluminium with an Si-content of less than 1%, i.e. with recommended cutting rates $v_c > 160$ m/min we recommend to advance to the final speed in several steps. In addition, a deeper pilot hole of approximately 3 x D should be produced.

Material group	Material examples <i>Figures in bold = material no. to DIN EN 10 027</i>	Tens. str. N/mm ²	Hard- ness	Cool- ant	recom- mended coating*	≤35xD		>35xD	
						v_c m/min	Feed col. no.	v_c m/min	Feed col. no.
Common structural steels	1.0035 S185, 1.0486 StE P275N, 1.0345 P235GH, 1.0425 1.0050 E295, 1.0070 E360, 1.8937 P500NH	≤500 >500-850		●		100 85	15 15	95 80	14 14
Free-cutting steels	1.0718 11SMnPb30, 1.0736 115Mn37 1.0727 46 S20, 1.0728 60 S20, 1.0757 46SPb20	≤850 850-1000		●		90 80	15 15	85 75	14 14
Unalloyed heat-treatable steels	1.0402 C22, 1.1178 C30E 1.0503 C45, 1.1191 C45E 1.0601 C60, 1.1221 C60E	≤ 700 700-850 850-1000		●		90 80 75	14 14 14	85 75 70	13 13 13
Alloyed heat-treatable steels	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-1000 1000-1200		●	Ⓐ	75 65	14 14	70 60	13 13
Unalloyed case hard. steels	1.0301 C10, 1.1121 C10E	≤750		●	Ⓐ	80	15	75	14
Alloyed case hardened steels	1.7043 38Cr4 1.5752 14NiCr14, 1.7131 16MnCr5, 1.7264 20CrMo5	850-1000 1000-1200		●		75 65	14 14	70 60	13 13
Nitriding steels	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850-1000 1000-1200		●	Ⓐ	75 65	14 14	70 60	13 13
Tool steels	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767	≤850 850-1000		●	Ⓐ	75 65	13 13	70 60	12 12
High speed steels	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 61CrV4	≥650-1000		●	Ⓐ	55	12	50	11
Spring steels	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4	≤330 HB		●	Ⓐ	65	13	60	12
Stainless steels, sulphured austenitic martensitic	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17 1.4301 X5CrNi18 10, 1.4541 X6CrNiTi18 10, 1.4571 1.4057 X17CrNi16-1, 1.4122 X39CrMo17-1, 1.4521	≤850 ≤850 ≤850		●	Ⓐ	55 45 35	14 14 14	50 40 35	13 13 13
Hardened steels	-	≤40-48 HRC >48-60 HRC		●		30 25	13 10	25 20	12 11
Special alloys	Nimonic, Inconel, Monel, Hastelloy	≤1200		●		35	12	30	11
Cast iron	EN-GJL100 ... EN-GJL200 EN-GJL250 ... EN-GJL350	≤240 HB <300 HB		●		85 80	16 16	80 75	15 15
Spheroidal graphite iron and malleable cast iron	EN-GJMW-350-4, EN-GJMB-550-4, EN-GJS-500-7 EN-GJMB-700-2, EN-GJS-700-2	≤240 HB <300 HB		●	Ⓐ	80 70	15 15	75 65	14 14
Chilled cast iron	-	≤350 HB		●		55	14	50	13
Ti and Ti alloys	3.7024 Ti99.5, 3.7114 TiAl5Sn2.5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7164 TiAl6V4, 3.7184 TiAl4Mo4Sn2.5	≤850 850-1200		●	Ⓐ	35 30	12 12	30 25	11 11
Al and Al-alloys	3.0255 Al99.5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		●		150	17	140	16
Al-wrought alloys	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365	≤450		●		120	17	115	16
Al-cast alloys ≤ 10 % Si > 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9 3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600 ≤600		●		150 130	18 18	140 120	17 17
Magnesium-alloys	MgMn2, G-MgAl8Zn1, G-MgAl6Zn3	≤450		○		110	17	100	16
Copper, low alloyed	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤400		●	Ⓐ	75	15	70	14
Brass, short-chipping long-chipping	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0.5	≤600 ≤600		●		120 90	18 18	115 85	17 17
Bronze, short-chipping	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 >600-850		●		95 75	17 17	90 70	16 16
Bronze, long-chipping	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 850-1000		●		70 60	17 17	65 55	16 16
Duroplastics Thermoplastics	Bakelit, Resopal, Pertinax, Moltopren Plexiglass, Hostalen, Novodur, Makralon	-		○		75 70	15 15	70 65	14 14
Kevlar	Kevlar	-		○		60	14	55	13
Glass/carbon fibre	GFK/CFK	-		○		50	14	45	13

- bright
- steam tempered
- nitrided lands
- nitrided
- golden brown
- Ⓐ TiAlN

Procedure

In order to achieve optimal machining results when producing deep holes with type RT 100T especially spotting on radii or on an uneven surface structure, we recommend the following machining steps:

1. Initial milling of surface, i.e. with Guhring's centre cutting Ratio end mill RF 100 U. The surface must be machined at right angles to the entry angle of the drilling operation.
2. Production of a cylindrical pilot hole (tolerance F9) with a minimum drilling depth of 1 x D. For this operation we recommend our Ratio drills RT 100 U or RT 100 F respectively. Thanks to a 140° point angle and a m7 tolerance on diameter these Ratio drills are especially suitable for this machining task.
3. Entry of spiral-flute deep hole drill RT 100T in the pilot hole at a speed of approx. 300 rev./min and with a feed rate of approx. 500 mm/min.
4. Setting of coolant pressure and speed.
5. Continuous drilling to complete hole depth without wood pecking.
6. For through holes with plain - i.e. 90° - exit, reduce feed rate v_f to 50 % approx. 1 mm prior to break-through.
7. For through holes with oblique exit, reduce the feed rate v_f to 40% approx. 1 mm prior to break-through.
8. After reaching hole depth stop machine spindle and coolant supply, with-drawal in top gear.



Ratio end mill type RF 100 U, Guhring no. 3736

Thanks to its unequal helix angle, Guhring's FIRE-coated Ratio end mill RF 100 U offers highest feed rates and tool life for finishing and roughing operations in steel and cast materials as well as Ti- and Ni-alloys. Further information about the range can be found in Guhring's current main catalogue.



Ratio drill RT 100 U, Guhring no. 2477

Ratio drill RT 100 F, Guhring no. 1660

Thanks to their special cutting edge geometry, Guhring's Ratio drills excel with very good self-centering characteristics and alignment accurate holes. Type U is especially suitable for the machining of steel and high-alloyed AISi-alloys, type F for high-alloyed, stainless, acid- and heat-resistant steels, Al and Al-alloys, Mg and Mg-alloys as well as Ti and Ti-alloys.

EB80

single-fluted gun drill
solid carbide head
2.0 ... 40.0

ZB80

two-fluted gun drill
solid carbide head
6.0 ... 27.0

EB800

single-fluted gun drill
with indexable inserts
12.0 ... 40.0



recom- mended coating*	≤35xD		>35xD		recom- mended coating*	≤35xD		>35xD		recom- mended coating*	≤35xD		>35xD	
	v_c m/min	Feed col. no.	v_c m/min	Feed col. no.		v_c m/min	Feed col. no.	v_c m/min	Feed col. no.		v_c m/min	Feed col. no.	v_c m/min	Feed col. no.
S	100	14	95	13						S	90	15	85	15
	85	14	80	13						S	80	15	75	15
S	90	14	85	13						S	85	16	80	16
	80	14	75	13						S	75	16	70	16
S	90	13	85	12						S	85	15	80	15
	80	13	75	12						S	80	15	75	15
	75	13	70	12						S	75	15	70	15
S	75	13	70	12						S	75	15	70	15
	65	13	60	12						S	65	15	60	15
S	80	14	75	13						S	80	15	75	15
	75	13	70	12						S	75	15	70	15
	65	13	60	12						S	70	15	65	15
C	75	13	70	12						S	70	15	65	15
	65	13	60	12						S	60	15	55	15
C	75	12	70	11						S	65	14	60	14
	65	12	60	11						S	60	14	55	14
C	55	11	50	11						S	55	14	50	14
	65	12	60	12						S	65	15	60	15
C	55	13	50	12						S	50	14	45	14
	45	13	40	12						F	45	14	40	14
	35	13	35	12							40	14	35	14
C	30	12	25	11						S	30	13	25	13
	25	11	20	11						S	25	12	20	12
C	35	11	30	11						F	25	13	20	13
	85	15	80	14							85	16	80	16
	80	15	75	14							80	16	75	16
	80	14	75	13						S	75	16	70	16
	70	14	65	13							70	16	65	16
	55	13	50	12							55	15	50	15
C	35	11	30	11						F	35	13	30	13
	30	11	25	11							30	12	25	12
	180	16	180	15							140	16	135	16
	200	15	200	14							125	16	120	16
	160	16	160	15							120	16	115	16
	120	16	120	15							170	17	165	17
	110	16	100	15							140	17	135	17
C	75	14	70	13							115	16	110	16
	120	17	115	16						F	75	15	70	15
	90	17	85	16							120	17	115	17
	95	16	90	15							90	17	85	17
	75	16	70	15							95	17	90	17
	70	16	65	15							75	17	70	17
	60	16	55	15							70	17	65	17
	75	14	70	13							60	17	55	17
	70	14	65	13							75	16	70	16
	60	13	55	12							70	16	65	16
	50	13	45	12							60	15	55	15
											50	15	45	15

A TiAlN SuperA

C TiCN

F FIRE

P AlCrN

S TiN

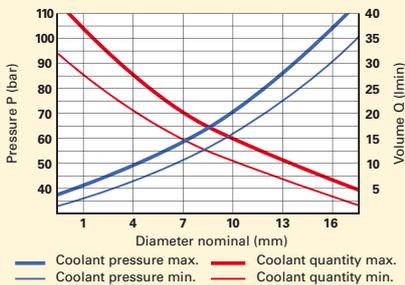
M MolyGlide

Please note:

- All gun drills must be applied with internal cooling, either air, water or oil. Without internal cooling the chips cannot be evacuated.
- All gun drills can be applied with oil as the medium for internal cooling. However, in this case a 30% higher pressure is required in order to achieve the same coolant volume.
- When MQL is applied with gun drills an increase in pressure may be necessary for smaller nominal diameters dependent on the pressure of the MQL system.
- If the cooling lubricant data is insufficient the cutting parameters may be reduced. Pressure boosting systems are also possible.

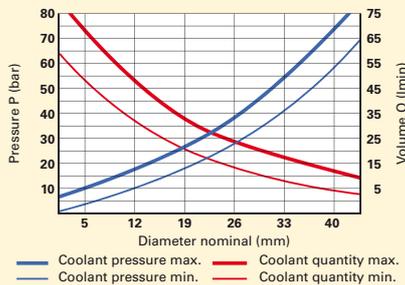
Coolant values EB 100

(Recommended values for soluble oil)



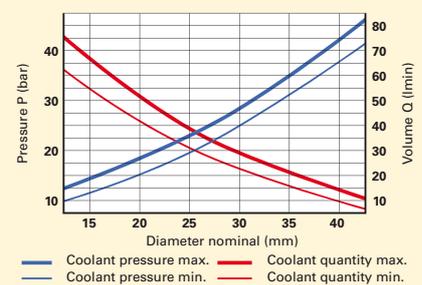
Coolant values EB 80

(Recommended values for soluble oil)



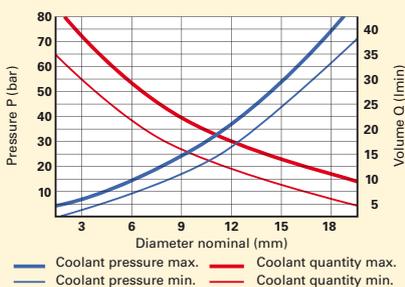
Coolant values EB 800

(Recommended values for soluble oil)



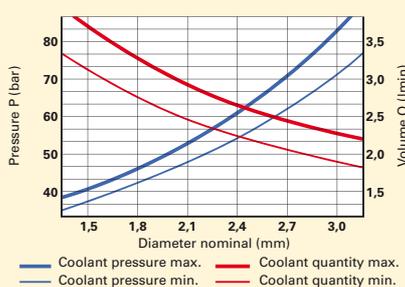
Coolant values RT 100 T

(Recommended values for soluble oil)



Coolant values micro-precision drills 15 x D

(Recommended values for soluble oil)



To monitor an optimal cooling lubrication we recommend our PQ 3000 inspection and measuring system to accurately check the pressure and the volume of the cooling lubricant flow as well as CC 3000 to accurately check the filter quality of the cooling lubricant system.



PQ 3000, Guh. no. 4068



CC 3000, Guh. no. 4076

fz-corrections:*
ap = 2 x d; fz -30%
fz-corrections:**
ap = 1-2 x d; fz +25%
fz-corrections:**
ap = 1-2 x d; fz +60%

Stable conditions:
- good cooling
- sufficient performance
- short-chipping



Application	Feed width (ae)	Feed depth (ap)
Slotting*	1 x d	0.5 to 1.0 x d
Roughing*	0.5 to 0.9 x d	0.5 to 1.0 x d
Finishing	0.05 to 0.1 x d	1.0 to 2.0 x d
HPC-roughing**	0.25 to 0.5 x d	1.0 to 2.0 x d
HSC-roughing***	0.1 to 0.25 x d	1.0 to 2.0 x d

Material	Hardness	recom- mended RF 100 type	Type of application	cut Vc	fz (mm/z) with nom. Ø								
					3	6	8	10	12	16	20	25	
Structural + free-cutting steels, unalloyed heat-treatable + case hardened steels 1.0035 S185, 1.0486 P275N, 1.0345 P235GH, 1.0050, 1.0070, 1.8937 1.0718 11SMnPb30, 1.0736 11SMn37 1.0402 C22, 1.1178 C30E 1.0503 C45, 1.1191 C30E 1.0301 C10, 1.1121 C10E 1.1750 C75W, 1.2076 102Cr6, 1.2307 29CrMoV9	up to 850 N/mm²	F	Slotting	180	0.018	0.035	0.045	0.06	0.07	0.09	0.1	0.15	
		F	Roughing	200	0.02	0.04	0.055	0.07	0.085	0.1	0.12	0.17	
		SF	Finishing	280	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14	
Free-cutting steels, unalloyed case hardened steels, nitriding steels 1.0727 46 S20, 1.0728 60 S20, 1.0757 46SPb20 1.0601 C60, 1.1221 C60E 1.7043 38Cr4 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5 1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	850- 1.200 N/mm²	F	Slotting	160	0.018	0.035	0.045	0.06	0.07	0.09	0.1	0.15	
		F	Roughing	180	0.02	0.04	0.055	0.07	0.085	0.1	0.12	0.17	
		SF	Finishing	220	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14	
Alloyed heat-treatable, tool and high speed steels 1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2379 X155CrVMo12-1 1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3 Spring steel = 1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4	850- 1.400 N/mm²	U	Slotting	135	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14	
		U	Roughing	160	0.02	0.04	0.05	0.065	0.08	0.095	0.11	0.16	
		SF	Finishing	200	0.015	0.03	0.04	0.05	0.06	0.07	0.09	0.13	
Hardened steel Tool steel, heat-treatable steel, spring steel, high-speed steel, case hardened steel, etc. Z.B.: 1.2344 X40CrMoV5-1; 1.2767 X45NiCrMo4; 1.2379 X155CrVMo12-1 ;1.2080 X210Cr12 1.3343 S 6-5-2	up to 54 HRC	U	Slotting	70	0.012	0.025	0.03	0.04	0.045	0.06	0.07	0.1	
		U	Roughing	110	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12	
		SF	Finishing	150	0.015	0.03	0.04	0.05	0.06	0.07	0.09	0.13	
	54-60 HRC		Slotting										
		H	Roughing										
		H	Finishing	110	0.01	0.015	0.025	0.035	0.042	0.05	0.08	0.09	
Stainless steel 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X10CrNiS18-9 USA = 303, 410, 420F, 430, 430F	up to 750 N/mm²	VA	Slotting	120	0.015	0.03	0.04	0.05	0.06	0.07	0.09	0.13	
		VA	Roughing	140	0.018	0.035	0.045	0.06	0.07	0.09	0.1	0.15	
		SF	Finishing	180	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14	
Stainless steel 1.4301X5CrNi18-10, 1.4303 X5CrNi18-12 1.4310 XCrNi18-8 USA = 304, 304L, 420	750-850 N/mm²	VA	Slotting	80	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12	
		VA	Roughing	120	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14	
		SF	Finishing	140	0.015	0.03	0.04	0.05	0.06	0.07	0.09	0.13	
Stainless steel 1.4438 X2CrNiMo18-15-4, 1.4404 X2CrNiMo17-12-2, 1.4571 X6CrNiTi18-10 USA = 310, 316, 316B, 316L, 317	above 850 N/mm²	VA/F	Slotting	70	0.012	0.025	0.03	0.04	0.045	0.06	0.07	0.1	
		VA/F	Roughing	100	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12	
		SF	Finishing	120	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12	
Special alloys (nickel based "Ni") Nimonic, Inconel, Monel, Hastelloy	up to 1.300 N/mm²	Ti/U	Slotting	30	0.01	0.015	0.02	0.025	0.03	0.04	0.05	0.06	
		Ti/U	Roughing	35	0.01	0.02	0.03	0.035	0.04	0.055	0.065	0.08	
		SF	Finishing	45	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12	
Titanium alloys ("Ti") 3.7024 Ti99.5, 3.7114 TiAl5Sn2.5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7164 TiAl6V4, 3.7184 TiAl4Mo4Sn2.5	up to 1.300 N/mm²	Ti/U	Slotting	60	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12	
		Ti/U	Roughing	90	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14	
		SF	Finishing	130	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14	
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	F	Slotting	160	0.02	0.04	0.05	0.065	0.08	0.095	0.11	0.16	
		F	Roughing	180	0.02	0.04	0.055	0.07	0.085	0.1	0.12	0.17	
		SF	Finishing	220	0.018	0.035	0.045	0.06	0.07	0.09	0.1	0.15	
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)	above 240 HB 30	U	Slotting	140	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14	
		U	Roughing	160	0.02	0.04	0.05	0.065	0.08	0.095	0.11	0.16	
		SF	Finishing	200	0.018	0.035	0.045	0.06	0.07	0.09	0.1	0.15	
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	A	Slotting	500	0.02	0.04	0.05	0.065	0.08	0.095	0.11	0.16	
		A	Roughing	600	0.02	0.04	0.055	0.07	0.085	0.1	0.12	0.17	
		A	Finishing	1000	0.018	0.035	0.045	0.06	0.07	0.09	0.1	0.15	
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	A	Slotting	230	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14	
		A	Roughing	280	0.02	0.04	0.05	0.065	0.08	0.095	0.11	0.16	
		A	Finishing	350	0.018	0.035	0.045	0.06	0.07	0.09	0.1	0.15	
Magnesium-alloys MgMn2, G-MgAl8Zn1, G-MgAl6Zn3	-	A	Slotting	180	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14	
		A	Roughing	220	0.02	0.04	0.05	0.065	0.08	0.095	0.11	0.16	
		A	Finishing	280	0.018	0.035	0.045	0.06	0.07	0.09	0.1	0.15	
Non-ferrous metals (copper, short- or long-chipping brass) 2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb 2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0.5 2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	up to 850 N/mm²	A	Slotting	250	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12	
		A	Roughing	300	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14	
		SF	Finishing	400	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14	

fz-corrections:*
ap = 2 x d; fz -30%
fz-corrections:**
ap = 1-2 x d; fz +25%
fz-corrections***
ap = 1-2 x d; fz +60%

Stable conditions:
- good cooling
- sufficient performance
- short-chipping

Application	Feed width (ae)	Feed depth (ap)
Slotting*	1 x d	0.5 to 1.0 x d
Roughing*	0.5 to 0.9 x d	0.5 to 1.0 x d
Finishing	0.05 to 0.1 x d	1.0 to 2.0 x d
HPC-roughing**	0.25 to 0.5 x d	1.0 to 2.0 x d
HSC-roughing***	0.1 to 0.25 x d	1.0 to 2.0 x d

Material	Hardness	recom- mended GH 100 type	Type of application	cut v _c	fz (mm/z) with nom. Ø								
					3	6	8	10	12	16	20	25	
Structural + free-cutting steels, unalloyed heat-treatable + case hardened steels 1.0035 S185, 1.0486 P275N, 1.0345 P235GH, 1.0050, 1.0070, 1.8937 1.0718 11SMnPb30, 1.0736 11SMn37 1.0402 C22, 1.1178 C30E 1.0503 C45, 1.1191 C30E 1.0301 C10, 1.1121 C10E 1.1750 C75W, 1.2076 102Cr6, 1.2307 29CrMoV9	up to 850 N/mm ²	U (3-fl.)	Slotting	180	0.016	0.032	0.041	0.054	0.063	0.081	0.090	0.135	
		U (3-fl.)	Roughing	200	0.018	0.036	0.050	0.063	0.077	0.090	0.108	0.153	
		U (6-/8-fl.)	Finishing	280	0.014	0.027	0.036	0.050	0.059	0.072	0.086	0.126	
Free-cutting steels, unalloyed case hardened steels, nitriding steels 1.0727 46 S20, 1.0728 60 S20, 1.0757 46SPb20 1.0601 C60, 1.1221 C60E 1.7043 38Cr4 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5 1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	850- 1,200 N/mm ²	U (3-fl.)	Slotting	160	0.016	0.032	0.041	0.054	0.063	0.081	0.090	0.135	
		U (3-fl.)	Roughing	180	0.018	0.036	0.050	0.063	0.077	0.090	0.108	0.153	
		U (6-/8-fl.)	Finishing	220	0.014	0.027	0.036	0.050	0.059	0.072	0.086	0.126	
Alloyed heat-treatable, tool and high speed steels 1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2379 X155CrVMo12-1 1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3 Spring steel = 1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4	850- 1,400 N/mm ²	U (3-fl.)	Slotting	120	0.013	0.024	0.032	0.044	0.052	0.064	0.076	0.112	
		U (3-fl.)	Roughing	150	0.016	0.032	0.040	0.052	0.064	0.076	0.088	0.128	
		U (6-/8-fl.)	Finishing	180	0.012	0.024	0.032	0.040	0.048	0.056	0.072	0.104	
Hardened steel Tool steel, heat-treatable steel, spring steel, high-speed steel, case hardened steel, etc. Z.B.: 1.2344 X40CrMoV5-1; 1.2767 X45NiCrMo4; 1.2379 X155CrVMo12-1; 1.2080 X210Cr12 1.3343 S 6-5-2	up to 54 HRC	U (3-fl.)	Slotting	60	0.008	0.018	0.021	0.028	0.032	0.042	0.049	0.070	
		H (6-/8-fl.)****	Roughing	90	0.011	0.018	0.025	0.032	0.035	0.046	0.056	0.084	
		H (6-/8-fl.)	Finishing	120	0.011	0.021	0.028	0.035	0.042	0.049	0.063	0.091	
	54-60 HRC		Slotting										
			Roughing										
		H (6-/8-fl.)	Finishing	90	0.01	0.015	0.025	0.035	0.042	0.05	0.08	0.09	
Stainless steel 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X10CrNiS18-9 USA = 303, 410, 420F, 430, 430F	up to 750 N/mm ²	U (3-fl.)	Slotting	100	0.014	0.027	0.036	0.045	0.054	0.063	0.081	0.117	
		U (3-fl.)	Roughing	115	0.016	0.032	0.041	0.054	0.063	0.081	0.090	0.135	
		U (6-/8-fl.)	Finishing	150	0.014	0.027	0.036	0.050	0.059	0.072	0.086	0.126	
Stainless steel 1.4301X5CrNi18-10, 1.4303 X5CrNi18-12 1.4310 XCrNi18-8 USA = 304, 304L, 420	750-850 N/mm ²	U (3-fl.)	Slotting	60	0.014	0.023	0.032	0.041	0.045	0.059	0.072	0.108	
		U (3-fl.)	Roughing	100	0.014	0.027	0.036	0.050	0.059	0.072	0.086	0.126	
		U (6-/8-fl.)	Finishing	110	0.014	0.027	0.036	0.045	0.054	0.063	0.081	0.117	
Stainless steel 1.4438 X2CrNiMo18-15-4, 1.4404 X2CrNiMo17-12-2, 1.4571 X6CrNiTi18-10 USA = 310, 316, 316B, 316L, 317	above 850 N/mm ²	U (3-fl.)	Slotting	60	0.011	0.023	0.027	0.036	0.041	0.054	0.063	0.090	
		U (3-fl.)	Roughing	80	0.014	0.023	0.032	0.041	0.045	0.059	0.072	0.108	
		U (6-/8-fl.)	Finishing	100	0.014	0.023	0.032	0.041	0.045	0.059	0.072	0.108	
Special alloys (nickel based "Ni") Nimonic, Inconel, Monel, Hastelloy	up to 1,300 N/mm ²	U (3-fl.)	Slotting	25	0.009	0.014	0.018	0.023	0.027	0.036	0.045	0.054	
		U (3-fl.)	Roughing	30	0.009	0.018	0.027	0.032	0.036	0.050	0.059	0.072	
		U (6-/8-fl.)	Finishing	35	0.014	0.023	0.032	0.041	0.045	0.059	0.072	0.108	
Titanium alloys ("Ti") 3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7164 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5	up to 1,300 N/mm ²	U (3-fl.)	Slotting	55	0.014	0.023	0.032	0.041	0.045	0.059	0.072	0.108	
		U (3-fl.)	Roughing	80	0.014	0.027	0.036	0.050	0.059	0.072	0.086	0.126	
		U (6-/8-fl.)	Finishing	120	0.014	0.027	0.036	0.050	0.059	0.072	0.086	0.126	
Cast iron, grey cast iron, spheroidal graphite and malleable cast iron 0.6010 EN-GL100 (GG10), 0.6020 EN-GJL200 (GG20), 0.7050 EN-GJS-500-7 (GGG50), 0.8535 EN-GJMW-350-4 (GTW35)	up to 240 HB 30	U (3-fl.)	Slotting	130	0.018	0.036	0.045	0.059	0.072	0.086	0.099	0.144	
		U (3-fl.)	Roughing	150	0.018	0.036	0.050	0.063	0.077	0.090	0.108	0.153	
		U (6-/8-fl.)	Finishing	180	0.016	0.032	0.041	0.054	0.063	0.081	0.090	0.135	
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)	above 240 HB 30	U (3-fl.)	Slotting	115	0.014	0.027	0.036	0.050	0.059	0.072	0.086	0.126	
		U (3-fl.)	Roughing	130	0.018	0.036	0.045	0.059	0.072	0.086	0.099	0.144	
		U (6-/8-fl.)	Finishing	160	0.016	0.032	0.041	0.054	0.063	0.081	0.090	0.135	
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	U (3-fl.)	Slotting	400	0.018	0.036	0.045	0.059	0.072	0.086	0.099	0.144	
		U (3-fl.)	Roughing	480	0.018	0.036	0.050	0.063	0.077	0.090	0.108	0.153	
		U (6-/8-fl.)	Finishing	800	0.016	0.032	0.041	0.054	0.063	0.081	0.090	0.135	
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	U (3-fl.)	Slotting	180	0.014	0.027	0.036	0.050	0.059	0.072	0.086	0.126	
		U (3-fl.)	Roughing	220	0.018	0.036	0.045	0.059	0.072	0.086	0.099	0.144	
		U (6-/8-fl.)	Finishing	280	0.016	0.032	0.041	0.054	0.063	0.081	0.090	0.135	
Magnesium-alloys MgMn2, G-MgAl8Zn1, G-MgAl6Zn3	-	U (3-fl.)	Slotting	150	0.014	0.027	0.036	0.050	0.059	0.072	0.086	0.126	
		U (3-fl.)	Roughing	180	0.018	0.036	0.045	0.059	0.072	0.086	0.099	0.144	
		U (6-/8-fl.)	Finishing	230	0.016	0.032	0.041	0.054	0.063	0.081	0.090	0.135	
Non-ferrous metals (copper, short- or long-chipping brass) 2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb 2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5 2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	up to 850 N/mm ²	U (3-fl.)	Slotting	200	0.014	0.023	0.032	0.041	0.045	0.059	0.072	0.108	
		U (3-fl.)	Roughing	240	0.014	0.027	0.036	0.050	0.059	0.072	0.086	0.126	
		U (6-/8-fl.)	Finishing	320	0.014	0.027	0.036	0.050	0.059	0.072	0.086	0.126	

**** trochoidal milling

Reach up to 3xD v_c and fz 100%
 Reach 3-5xD v_c and fz 80%
 Reach > 5-10xD v_c and fz 60%



Application	Width/depth	Nominal diameter (mm)									
		(mm)	2	3	4	6	8	10	12	16	
Roughing	ap	(mm)	0.1	0.15	0.2	0.4	0.6	0.75	1	1.2	
	ae	(mm)	0.15	0.15	0.3	0.5	0.75	1	1.5	1.5	
Finishing	ap	(mm)	0.05	0.07	0.1	0.14	0.16	0.18	0.2	0.3	
	ae	(mm)	0.05	0.05	0.07	0.1	0.15	0.2	0.25	0.3	

Material	Hardness	recom- mended GF Type	Type of application	cut v_c	fz (mm/z) with nom. Ø									
					2	3	4	6	8	10	12	16		
Structural + free-cutting steels, unalloyed heat-treatable + case hardened steels 1.0035 S185, 1.0486 P275N, 1.0345 P235GH, 1.0050, 1.0070, 1.8937 1.0718 11SMnPb30, 1.0736 11SMn37 1.0402 C22, 1.1178 C30E 1.0503 C45, 1.1191 C30E 1.0301 C10, 1.1121 C10E 1.1750 C75W, 1.2076 102Cr6, 1.2307 29CrMoV9	up to 850 N/mm ²	GF 500 B	Roughing	200	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15		
		GF 500 B	Finishing	300	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15		
Free-cutting steels, unalloyed case hardened steels, nitriding steels 1.0727 46 S20, 1.0728 60 S20, 1.0757 46SPb20 1.0601 C60, 1.1221 C60E 1.7043 38Cr4 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5 1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	850- 1,200 N/mm ²	GF 500 B	Roughing	200	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15		
		GF 500 B	Finishing	300	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15		
Alloyed heat-treatable, tool and high speed steels 1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2379 X155CrVMo12-1 1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3 Spring steel = 1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4	850- 1,400 N/mm ²	GF 300 B	Roughing	180	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15		
		GF 300 B	Finishing	280	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15		
Hardened steel Tool steel, heat-treatable steel, spring steel, high-speed steel, case hardened steel, etc. Z.B.: 1.2344 X40CrMoV5-1; 1.2767 X45NiCrMo4; 1.2379 X155CrVMo12-1; 1.2080 X210Cr12 1.3343 S 6-5-2	up to 54 HRC	GF 300 B	Roughing	140	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1		
		GF 300 B	Finishing	200	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15		
	54-60 HRC	GF 300 B	Roughing	80	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1		
		GF 300 B	Finishing	130	0.025	0.03	0.04	0.045	0.05	0.07	0.1	0.12		
Stainless steel 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X10CrNiS18-9 USA = 303, 410, 420F, 430, 430F	up to 750 N/mm ²	GF 500 B	Roughing	180	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15		
		GF 500 B	Finishing	280	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15		
Stainless steel 1.4301X5CrNi18-10, 1.4303 X5CrNi18-12 1.4310 XCrNi18-8 USA = 304, 304L, 420	750-850 N/mm ²	GF 500 B	Roughing	120	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1		
		GF 500 B	Finishing	180	0.025	0.03	0.04	0.045	0.05	0.07	0.1	0.12		
Stainless steel 1.4438 X2CrNiMo18-15-4, 1.4404 X2CrNiMo17-12-2, 1.4571 X6CrNiTi18-10 USA = 310, 316, 316B, 316L, 317	above 850 N/mm ²	GF 500 B	Roughing	80	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1		
		GF 500 B	Finishing	130	0.025	0.03	0.04	0.045	0.05	0.07	0.1	0.12		
Special alloys (nickel based "Ni") Nimonic, Inconel, Monel, Hastelloy	up to 1,300 N/mm ²	GF 500 B	Roughing	40	0.01	0.02	0.03	0.035	0.04	0.05	0.07	0.08		
		GF 500 B	Finishing	60	0.02	0.025	0.03	0.04	0.045	0.06	0.08	0.09		
Titanium alloys ("Ti") 3.7024Ti99,5, 3.7114TiAl5Sn2,5, 3.7124TiCu2 3.7154TiAl6Zr5, 3.7164TiAl6V4, 3.7184TiAl4Mo4Sn2,5	up to 1,300 N/mm ²	GF 500 B	Roughing	90	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1		
		GF 500 B	Finishing	150	0.025	0.03	0.04	0.045	0.05	0.07	0.1	0.12		
Cast iron, grey cast iron, spheroidal graphite and malleable cast iron 0.6010 EN-GL100 (GG10), 0.6020 EN-GJL200 (GG20), 0.7050 EN-GJS-500-7 (GGG50), 0.8535 EN-GJMW-350-4 (GTW35)	up to 240 HB 30	GF 500 B	Roughing	200	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15		
		GF 300 B	Finishing	300	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15		
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)	above 240 HB 30	GF 300 B	Roughing	150	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15		
		GF 300 B	Finishing	230	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15		
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	GF 500 B	Roughing	350	0.04	0.045	0.05	0.07	0.1	0.12	0.15	0.17		
		GF 500 B	Finishing	600	0.04	0.045	0.05	0.07	0.1	0.12	0.15	0.17		
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	GF 500 B	Roughing	280	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15		
		GF 500 B	Finishing	350	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15		
Magnesium-alloys MgMn2, G-MgAl8Zn1, G-MgAl6Zn3	-	GF 500 B	Roughing	250	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15		
		GF 500 B	Finishing	350	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15		
Non-ferrous metals (copper, short- or long-chipping brass) 2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb 2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5 2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	up to 850 N/mm ²	GF 500 B	Roughing	250	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15		
		GF 500 B	Finishing	400	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15		

P = steel & high-alloyed steel K = cast iron M = stainless steel N = aluminium & aluminium-alloys S = titanium-alloys & Ni-alloys H = hardened steel

Reach up to 3xD v_c and fz 100%
 Reach 3-5xD v_c and fz 80%
 Reach > 5-10xD v_c and fz 60%

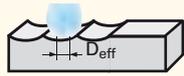


Application	Width/depth	Nominal diameter (mm)								
		2	3	4	6	8	10	12	16	
Roughing	ap (mm)	0,15	0,2	0,3	0,4	0,6	0,75	1	1,5	
	ae (mm)	1	1,5	2	3	4	5	6	8	
Finishing	ap (mm)	0,08	0,11	0,13	0,15	0,2	0,3	0,4	0,5	
	ae (mm)	0,2	0,3	0,4	0,7	1	1,5	2	3	

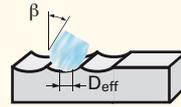
Material	Hardness	recom- mended GF Type	Type of application	cut v_c	fz (mm/z) with nom. Ø							
					2	3	4	6	8	10	12	16
Structural + free-cutting steels, unalloyed heat-treatable + case hardened steels 1.0035 S185, 1.0486 P275N, 1.0345 P235GH, 1.0050, 1.0070, 1.8937 1.0718 11SMnPb30, 1.0736 11SMn37 1.0402 C22, 1.1178 C30E 1.0503 C45, 1.1191 C30E 1.0301 C10, 1.1121 C10E 1.1750 C75W, 1.2076 102Cr6, 1.2307 29CrMoV9	up to 850 N/mm ²	GF 500 T	Roughing	200	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
		GF 500 T	Finishing	300	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
Free-cutting steels, unalloyed case hardened steels, nitriding steels 1.0727 46 S20, 1.0728 60 S20, 1.0757 46SPb20 1.0601 C60, 1.1221 C60E 1.7043 38Cr4 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5 1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	850- 1,200 N/mm ²	GF 500 T	Roughing	200	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
		GF 500 T	Finishing	300	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
Alloyed heat-treatable, tool and high speed steels 1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2379 X155CrVMo12-1 1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3 Spring steel = 1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4	850- 1,400 N/mm ²	GF 300 T	Roughing	180	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
		GF 300 T	Finishing	280	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
Hardened steel Tool steel, heat-treatable steel, spring steel, high-speed steel, case hardened steel, etc. Z.B.: 1.2344 X40CrMoV5-1; 1.2767 X45NiCrMo4; 1.2379 X155CrVMo12-1; 1.2080 X210Cr12 1.3343 S 6-5-2	up to 54 HRC	GF 300 T	Roughing	140	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
		GF 300 T	Finishing	200	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
	54-60 HRC	GF 300 T	Roughing	80	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
		GF 300 T	Finishing	130	0.025	0.03	0.04	0.045	0.05	0.07	0.1	0.12
Stainless steel 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X10CrNiS18-9 USA = 303, 410, 420F, 430, 430F	up to 750 N/mm ²	GF 500 T	Roughing	180	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
		GF 500 T	Finishing	280	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
Stainless steel 1.4301X5CrNi18-10, 1.4303 X5CrNi18-12 1.4310 XCrNi18-8 USA = 304, 304L, 420	750-850 N/mm ²	GF 500 T	Roughing	120	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
		GF 500 T	Finishing	180	0.025	0.03	0.04	0.045	0.05	0.07	0.1	0.12
Stainless steel 1.4438 X2CrNiMo18-15-4, 1.4404 X2CrNiMo17-12-2, 1.4571 X6CrNiTi18-10 USA = 310, 316, 316B, 316L, 317	above 850 N/mm ²	GF 500 T	Roughing	80	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
		GF 500 T	Finishing	130	0.025	0.03	0.04	0.045	0.05	0.07	0.1	0.12
Special alloys (nickel based "Ni") Nimonic, Inconel, Monel, Hastelloy	up to 1,300 N/mm ²	GF 500 T	Roughing	40	0.01	0.02	0.03	0.035	0.04	0.05	0.07	0.08
		GF 500 T	Finishing	60	0.02	0.025	0.03	0.04	0.045	0.06	0.08	0.09
Titanium alloys ("Ti") 3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7164 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5	up to 1,300 N/mm ²	GF 500 T	Roughing	90	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
		GF 500 T	Finishing	150	0.025	0.03	0.04	0.045	0.05	0.07	0.1	0.12
Cast iron, grey cast iron, spheroidal graphite and malleable cast iron 0.6010 EN-GL100 (GG10), 0.6020 EN-GJL200 (GG20), 0.7050 EN-GJS-500-7 (GGG50), 0.8535 EN-GJMW-350-4 (GTW35)	up to 240 HB 30	GF 500 T	Roughing	200	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
		GF 300 T	Finishing	300	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
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)	above 240 HB 30	GF 300 T	Roughing	150	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
		GF 300 T	Finishing	230	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
Aluminium, Al-wrought alloys, Al-alloys 3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1ed 3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	up to 3% Si	GF 500 T	Roughing	350	0.04	0.045	0.05	0.07	0.1	0.12	0.15	0.17
		GF 500 T	Finishing	600	0.04	0.045	0.05	0.07	0.1	0.12	0.15	0.17
Aluminium-cast alloys 3.2131 G-AISi5Cu1, 3.2153 G-AISi7Cu3, 3.2573 G-AISi9 3.2581 G-AISi12, 3.2583 G-AISi12Cu, - G-AISi12CuNiMg	above 3% Si	GF 500 T	Roughing	280	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
		GF 500 T	Finishing	350	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
Magnesium-alloys MgMn2, G-MgAl8Zn1, G-MgAl6Zn3	-	GF 500 T	Roughing	250	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
		GF 500 T	Finishing	350	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
Non-ferrous metals (copper, short- or long-chipping brass) 2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb 2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5 2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	up to 850 N/mm ²	GF 500 T	Roughing	250	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
		GF 500 T	Finishing	400	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15

P = steel & high-alloyed steel K = cast iron M = stainless steel N = aluminium & aluminium alloys S = titanium-alloys & Ni-alloys H = hardened steel

For cutting depths $a_p < 0.5 \times D$ the actual engaged effective diameter D_{eff} must be applied to calculate the revolutions. It is calculated when the spindle is in a vertical position according to the illustration below. To increase tool life we recommend machining with tilted spindle. The tilt angle must be taken into consideration when calculating the effective diameter D_{eff} .



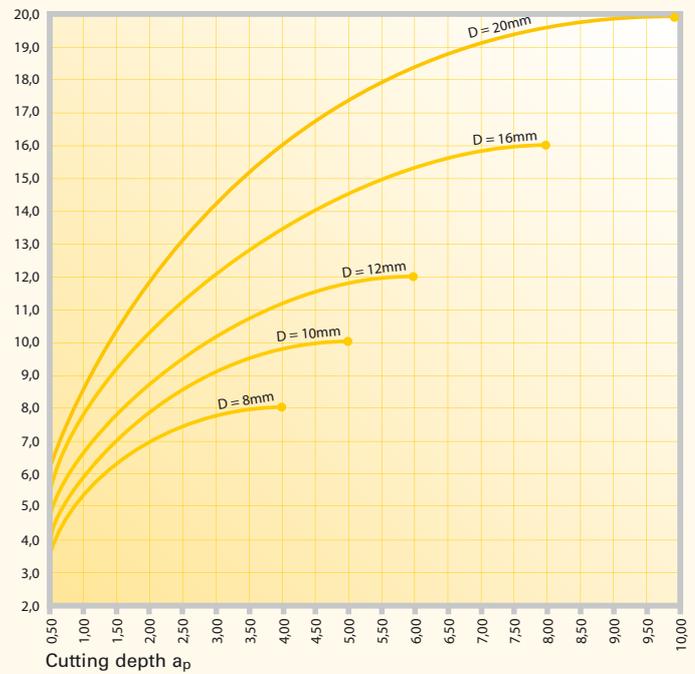
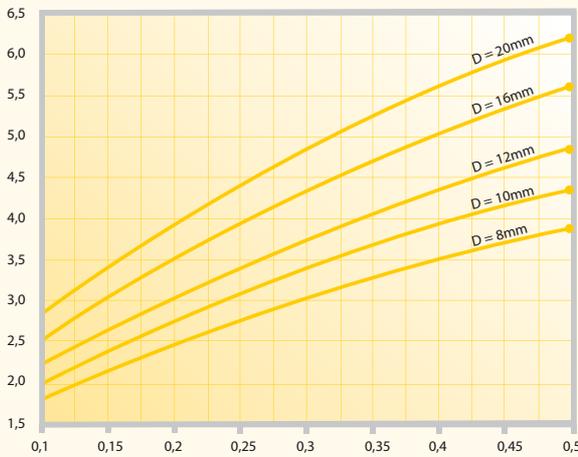
$$D_{(eff)} = 2 \cdot \sqrt{D \cdot a_p - a_p^2}$$



$$D_{(eff)} = D \cdot \sin \left[\beta + \arccos \left(\frac{D - 2a_p}{D} \right) \right]$$

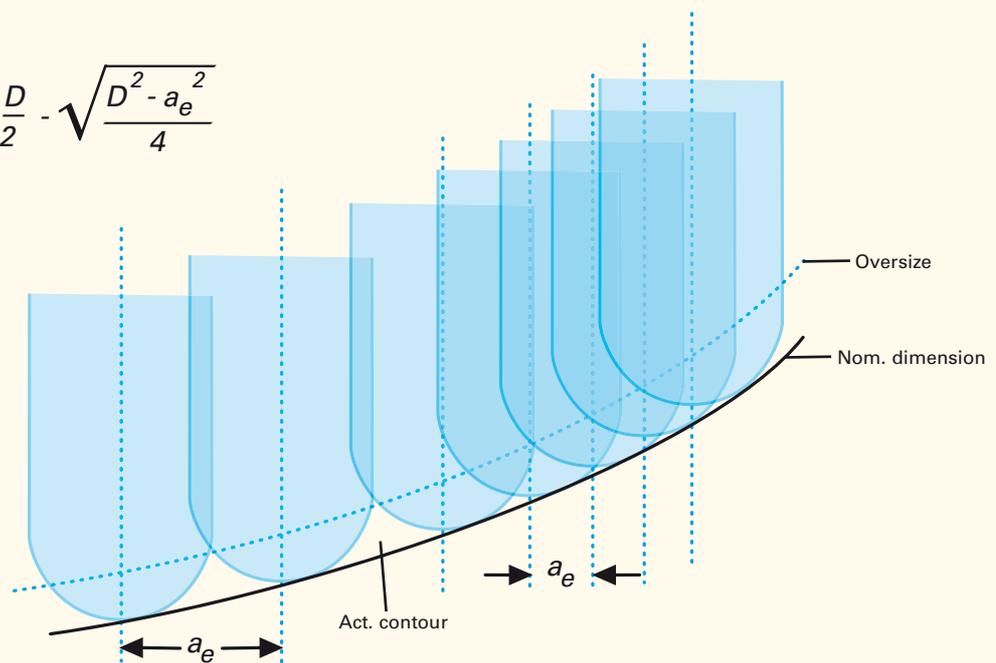
(range $a_p = 0.5 - 10.0\text{mm}$)

(range $a_p = 0.1 - 0.5\text{mm}$)



Modifying the cutting width a_e results in improved surface quality of the workpiece (reduced peak-to-valley height).

$$R_{th} = \frac{D}{2} - \sqrt{\frac{D^2 - a_e^2}{4}}$$



HT 800 WP Application Recommendations

All data are approximate values. The actually achievable cutting speeds and feed rates depend on the respective machining conditions. We recommend suitable drilling trials.

Drill-Ø mm	Feed column no.								
	1	2	3	4	5	6	7	8	9
	f (mm/rev.)								
0.50	0.004	0.006	0.007	0.008	0.010	0.012	0.014	0.016	0.019
1.00	0.006	0.008	0.012	0.014	0.016	0.018	0.020	0.023	0.025
2.00	0.020	0.025	0.032	0.040	0.050	0.063	0.080	0.100	0.125
2.50	0.025	0.032	0.040	0.050	0.063	0.080	0.100	0.125	0.160
3.15	0.032	0.040	0.050	0.063	0.080	0.100	0.125	0.160	0.160
4.00	0.040	0.050	0.063	0.080	0.100	0.125	0.160	0.200	0.200
5.00	0.040	0.050	0.063	0.080	0.100	0.125	0.160	0.200	0.250
6.30	0.050	0.063	0.080	0.100	0.125	0.160	0.200	0.250	0.315
8.00	0.063	0.080	0.100	0.125	0.160	0.200	0.250	0.315	0.315
10.00	0.080	0.100	0.125	0.160	0.200	0.250	0.315	0.400	0.400
12.50	0.080	0.100	0.125	0.160	0.200	0.250	0.315	0.400	0.500
16.00	0.100	0.125	0.160	0.200	0.250	0.315	0.400	0.500	0.630
20.00	0.125	0.160	0.200	0.250	0.315	0.400	0.500	0.630	0.630
25.00	0.160	0.200	0.250	0.315	0.400	0.500	0.630	0.800	0.800
31.50	0.160	0.200	0.250	0.315	0.400	0.500	0.630	0.800	1.000

Coolant:
 ○ air
 ● neat oil
 ● soluble oil

Material group	Material examples, new description (old description in brackets) Figures in bold = material no. to DIN EN	Tensile strength MPa (N/mm ²)	Hard- ness	Cool- ant
Common structural steels	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850		●●
Free-cutting steels	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000		●●
Unalloyed heat-treatable steels	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000		●●
Alloyed heat-treatable steels	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-≤1000 1000-1200		●●
Unalloyed case hardened steels	1.0301 (C10), 1.1121 C10E (Ck10)	≤750		●●
Alloyed case hardened steels	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850-≤1000 1000-1200		●●
Nitriding steels	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850-≤1000 >1000-1200		●●
Tool steels	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000		●●
High speed steels	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000		●●
Spring steels	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤330 HB	●●
Stainless steels, sulphured austenitic martensitic	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi 17 2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850 ≤850 ≤850		●●
Hardened steels	-		≤40-48 HRC >48-60 HRC	●●
Special alloys	Nimonic, Inconel, Monel, Hastelloy	≤1200		●●
Cast iron	0.6010 EN-GJL-100(GG10), 0.6020 EN-GJL-200(GG20) 0.6025 EN-GJL-250(GG25), 0.6035 EN-GJL-350(GG35)		≤240 HB <300 HB	●●
New cast materials CGI	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB <300 HB	●●
New cast materials ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		●●
Spheroidal graphite iron and malleable cast iron	0.7050 EN-GJS-500-7(GGG50), 0.8035 EN-GJMW-350-4(GTW35) 0.7070 EN-GJS-700-2(GGG70), 0.8170 EN-GJMB-700-2(GTS70)		≤240 HB <300 HB	●●
Chilled cast iron	-		≤350 HB	●●
Ti and Ti-alloys	3.7024 Ti99.5, 3.7114 TiAl5Sn2.5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2.5, -TiAl8Mo1V1	≤850 >850-1200		●●
Aluminium and Al-alloys	3.0255 Al99.5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		●●
Al wrought alloys	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1.5	≤450		●●
Al cast alloys ≤ 10 % Si > 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9 3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600 ≤600		●●
Magnesium alloys	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450		●●
Copper, low-alloyed	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤400		●●
Brass, short-chipping long-chipping	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0.5	≤600 ≤600		●●
Bronze, short-chipping	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 >600-850		●●
Bronze, long-chipping	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000		●●

Reamers Application Recommendations

Tools with **bold** feed column no. are preferred choice.

Reamer- Ø mm	Feed column no.						
	71	72	73	74	75	76	77
	f (mm/rev.)						
< 4.00	0.080	0.100	0.125	0.300	0.500	0.800	1.000
4.00	0.100	0.125	0.160	0.300	0.500	1.000	1.200
5.00	0.100	0.125	0.160	0.400	0.600	1.000	1.400
6.30	0.125	0.160	0.200	0.400	0.700	1.200	1.600
8.00	0.160	0.200	0.250	0.600	1.000	1.800	2.400
10.00	0.200	0.250	0.315	0.600	1.200	1.800	2.400
12.50	0.200	0.250	0.315	0.800	1.200	2.000	2.500
16.00	0.250	0.315	0.400	0.800	1.400	2.200	2.600
20.00	0.315	0.400	0.500	0.800	1.400	2.200	2.600
25.00	0.400	0.500	0.630	1.000	1.600	2.500	3.000
31.50	0.400	0.500	0.630	1.000	2.000	3.000	3.600
40.00	0.500	0.630	0.800	1.200	2.000	3.000	3.600
50.00	0.630	0.800	1.000	1.400	2.200	3.200	3.600
> 50.00	0.800	1.000	1.250	1.600	2.200	3.200	3.600

Coolant:
 ● soluble oil
 ● neat oil
 ○ air

Material group	Material examples, new description (old description in brackets) <i>Figures in bold = material no. to DIN EN</i>	Tensile strength Hardness MPa (N/mm ²)	Coolant
Common structural steels	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850	●
Free-cutting steels	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000	●
Unalloyed heat-treatable steels	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000	●
Alloyed heat-treatable steels	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850 ≤1000 1000-1200	●
Unalloyed case hardened steels	1.0301 (C10), 1.1121 C10E (Ck10)	≤750	●
Alloyed case hardened steels	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850 ≤1000 1000-1200	●
Nitriding steels	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850 ≤1000 >1000-1200	●
Tool steels	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000	●
High speed steels	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000	●
Spring steels	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)	≤330 HB	●
Stainless steels, sulphured austenitic martensitic	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi 17 2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850 ≤850 ≤850	●
Hardened steels	-	≤40-48 HRC >48-60 HRC	●
Special alloys	Nimonic, Inconel, Monel, Hastelloy	≤1200	●
Cast iron	0.6010 EN-GJL-100(GG10), 0.6020 EN-GJL-200(GG20) 0.6025 EN-GJL-250(GG25), 0.6035 EN-GJL-350(GG35)	≤240 HB <300 HB	●
Spheroidal graphite iron and malleable cast iron	0.7050 EN-GJS-500-7(GGG50), 0.8035 EN-GJMW-350-4(GTW35) 0.7070 EN-GJS-700-2(GGG70), 0.8170 EN-GJMB-700-2(GTS70)	≤240 HB <300 HB	●
Chilled cast iron	-	≤350 HB	●
Ti and Ti-alloys	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, -TiAl8Mo1V1	≤850 >850-1200	●
Aluminium and Al-alloys	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400	●
Al wrought alloys	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤450	●
Al cast alloys ≤ 10 % Si > 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9 3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600 ≤600	●
Magnesium alloys	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450	○
Copper, low-alloyed	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤400	●
Brass, short-chipping long-chipping	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600	●
Bronze, short-chipping	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 >600-850	●
Bronze, long-chipping	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000	●
Duroplastics Thermoplastics	Bakelit, Resopal, Pertinax, Moltopren Plexiglass, Hostalen, Novodur, Makralon	-	○
Kevlar	Kevlar	-	○
Glass, carbon concentrated plastics	GRP/CRP	-	○

Gühring Navigator

Gühring no.	490	1685 1686
Tool material	HSS-E	Carbide/K10
Standard	-	-
Type	-	HR500S/D
Form	-	-
Surface finish	○	ⓐ
Cooling	☒	■



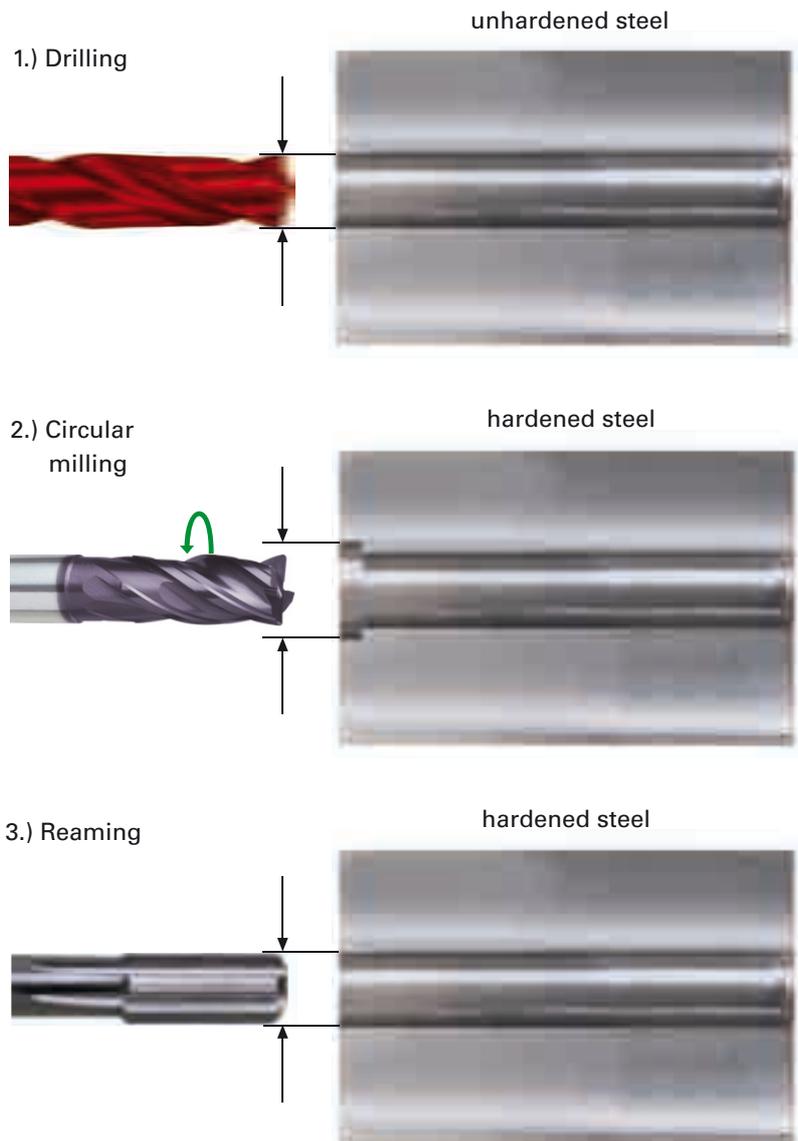
HR 500 D cooling notes

For an optimal cooling lubricant delivery to the cutting edges of HR 500 reamers type D for through holes we recommend clamping in hydraulic or shrink fit chucks to maximum clamping depth.

Procedure for the application of HR 500 high-performance reamers in hardened tool steel:

- 1.) Drilling with Ratio drill RT 100 U in unhardened condition with undersize 0.1 to 0.2 mm
- 2.) In order to reproduce the hole position for reaming following hardening we recommend circular milling of a start hole 0.5 to 1xD deep with min. 0.08 mm undersize.
- 3.) Reaming with HR 500 high-performance reamer to desired reaming depth.

V _c m/min	Feed col. no.	V _c m/min	Feed col. no.
16	72	120-250	75-76
12	72	120-250	75-76
12	72	120-250	75-76
10	71	120-250	75-76
14	72	120-250	75-76
12	71	120-250	75-76
10	71	120-250	75-76
10	71	120-250	75-76
8	71	120-250	75-76
16	72	120-250	75-76
10	71	120-250	75-76
8	71	120-250	75-76
10	71	120-250	75-76
8	71	120-250	75-76
14	72	120-250	75-76
10	71	120-250	75-76
10	71	60-120	75-76
		30-60	73-74
6	72	60-120	74-75
6	72	40-80	74-75
4	72	60-120	74-75
		40-60	73-74
		30-60	73-74
4	71	40-60	74-75
14	71	60-140	75-76
12	71	60-140	75-76
12	71	120-250	75-76
10	71	60-120	75-76
		30-50	74-75
6	71	40-80	74-75
4	71	40-80	74-75
18	73		
18	73		
20	72		
18	72		
20	72	80-160	75-76
18	72		
18	72	100-250	75-76
16	72		
20	72	100-250	75-76
18	72	100-250	75-76
18	72		
14	72		
12	73	80-200	75-76
14	73	80-200	75-76
10	73	80-200	75-76
8	73	80-200	75-76



○ bright ⓐ TiAlN ☒ external cooling ■ internal cooling



DRILLING



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MODULAR TOOLING SYSTEMS



PCD



TOOL RESTORATION SERVICE

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