

HR 500

HR 500

Solid carbide high-performance reamers up to Ø 20 mm for universal application

HR 500 T NEW

Solid carbide head reamer for Ø 16-38 mm

HR 500 Guss

Solid carbide high-performance reamers for the machining of GG and GGG achieving optimal surface quality and efficiency

HR 500 Alu

Solid carbide high-performance reamers for the machining of aluminium and AlSi-alloys

HR 500 G

Carbide- or cermet-tipped high-performance reamers from Ø 20 mm up to 40 mm

HR 500 GT

Carbide- or cermet-tipped high-performance reamers from Ø 40 mm up to 76.2 mm



























Edition 2016

EXCLUSIVELINE®

Made by Guhring

EXCLUSIVE[®]LINE

HR 500 high-performance reamers Pictograms

Tool material	 Solid carbide	 Carbide	 Cermet									
	Solid carbide	Carbide-tipped										
Internal cooling												
Standard												
	to Guhring standard											
Type	 HR 500 S	 HR 500 TS	 HR 500 Guss S	 HR 500 Alu S	 HR 500 GS	 HR 500 GTS	 HR 500 D	 HR 500 TD	 HR 500 Guss D	 HR 500 Alu D	 HR 500 GD	 HR 500 GTD
	Blind hole (S)						Through hole (D)					
Cutting direction												
	r-h											
Tolerance												
	H7	+0,005										
Hole type												
	Through hole	Blind hole										
No. of cutting edges												
Shank form												
	HA											
Helix angle												
	straight-fluted											
Spacing												
	extremely unequal											

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Guhring KG
P.O. Box 10 02 47 · D-72423 Albstadt
Herderstrasse 50-54 · D-72458 Albstadt

Tel.: +49 74 31 17-0
Fax: +49 74 31 17-21 279

Internet: www.guehring.de
E-Mail: info@guehring.de

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EXCLUSIVE LINE®

HR 500 high-performance reamers



HR 500 HIGH-PERFORMANCE REAMERS

Perfect reaming in all diameters

HR 500 high-performance reamers are the optimal tooling solution for all diameters from 2.97 to 76.2 mm.

To apply the optimally designed HR 500 high-performance reamer a range of various HR 500 options is available.

- Solid carbide reamers up to diameter 38.00 mm
- Carbide and cermet-tipped reamers up to diameter 76.2 mm
- Solid carbide reamers for intermediate dimensions and stepped tools in HR 500 Active programme




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HR 500 high-performance reamers Program summary

Standard	Type	Tool illustration	Tool material	Surface finish	d1	Guhring no	Discount group	Standard range page
	HR 500 S		Solid carbide		3.000 - 20.000	1685	166	8
	HR 500 S		Solid carbide		2.970 - 12.030	1675	166	9
	HR 500 D		Solid carbide		3.000 - 20.000	1686	166	8
	HR 500 D		Solid carbide		2.970 - 12.030	1676	166	9
	HR 500 T S		Solid carbide		16.000 - 38.000	1548	166	11
	HR 500 T D		Solid carbide		16.000 - 38.000	1549	166	11
	HR 500 Guss S		Solid carbide		3.000 - 20.000	1036	166	13
	HR 500 Guss D		Solid carbide		3.000 - 20.000	1037	166	13
	HR 500 Alu S		Solid carbide		4.000 - 20.000	1678	166	14
	HR 500 Alu D		Solid carbide		4.000 - 20.000	1679	166	14
	HR 500 G S		Carbide		22.000 - 40.000	1680	166	15
	HR 500 G S		Cermet tipped		22.000 - 40.000	1682	166	16
	HR 500 G D		Carbide		22.000 - 40.000	1681	166	15
	HR 500 G D		Cermet tipped		22.000 - 40.000	1683	166	16
	HR 500 GT S	Semi-standard	Carbide		41.000 - 76.200	1038	166	18
	HR 500 GT S	Semi-standard	Cermet tipped		41.000 - 76.200	1040	166	19
	HR 500 GT D	Semi-standard	Carbide		41.000 - 76.200	1039	166	18

EXCLUSIVE[®]LINE

HR 500 high-performance reamers Program summary

Standard	Type	Tool illustration	Tool material	Surface finish	d1	Guhring no	Discount group	Standard range page
	HR 500 GT D	 Semi-standard	Cermet tipped		41.000 - 76.200	1041	166	19

HSK-A hydraulic chucks, extra length, for HR 500 GT

		HSK-A 63	4290	114	20
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Shrink fit extension for HR 500 T

		4719	148	20
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Tool selection for optimal economy and quality

			Ø ≤ 20 mm			Ø > 20 mm		
			Solid carbide HR 500 Universal	Solid carbide HR500 Guss	Solid carbide HR500 Alu	Carbide tipped HR500	Cermet tipped HR500	
			1675	1676	1036	1678	1680/1038	1682/1040
			1685	1686	1037	1679	1681/1039	1683/1041
Steel	P	up to 1200 N/mm ²	●	●			○	●
Stainless steel	M		●	●			●	
Cast iron	K	GG	○	○	●		●	
		GGG 40/50	○	○	●		○	●
		GGG 60/70	○	○	●		●	
Aluminium	N				●			
Ti-special alloys	S	Ti-Basis	●	●			●	
		Ni-Basis	●	●			●	
Hardened steel	H	up to 48 HRC	●	●			○	
		up to 63 HRC	●	●				

● optimal suitability ○ limited suitability

Optimal diameters of pre-drilled holes

Recommended stock allowance, in mm

			up to Ø6	up to Ø10	up to Ø16	up to Ø25	up to Ø40	above Ø40
all materials			Ø 0.1 - 0.2	Ø 0.2	Ø 0.2 - 0.3	Ø 0.3	Ø 0.3 - 0.4	Ø 0.4 - 0.5
Hardened steel	H	up to 48 HRC	Ø 0.1 - 0.2	Ø 0.2	Ø 0.2	Ø 0.2	Ø 0.3	Ø 0.3
		up to 63 HRC	Ø 0.1	Ø 0.1	Ø 0.1 - 0.2	Ø 0.2	Ø 0.2	Ø 0.2

EXCLUSIVE LINE®

HR 500 T – solid carbide head solution

now available
as standard tool

HR 500 T

With HR 500 T Guhring provides a solid carbide head reamer from 16 to 39.1 mm diameter.

With HR 500 T reamers the successful solid carbide design of HR 500 T is being extended to 39.1 mm diameter. It's short and compact solution ensures an economical production. Nevertheless, one can fall back on the multi-faceted possibilities of HR 500.

Thanks to the universal HA shank HR 500 T can be flexibly combined with standard chucks and numerous extensions. This essential advantage makes expensive special holders unnecessary. This enables a cost-efficient and a very high quality reaming operation.



An overview of your advantages

- High-performance reamer ensures especially economical machining
- Flexible holder options thanks to HA shank
- Simple extension thanks to shrink fit extension or hydraulic chuck
- Available as universal, cast iron or aluminium design options

3 options

- a** Standard option for universal application is NanoA coated
- K** Cast iron option with Signum-coating is available as a special solution for the application in all cast irons
- N** With the carbo-coated special solution for the application in aluminium, aluminium wrought alloys or AlSi cast alloys can be machined.

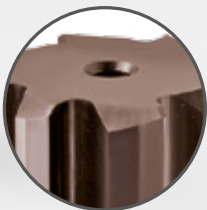
Wide-ranging extension possibilities


For the application with large reaming depths and for the simple bridging of projecting edges HR 500 T can be combined with numerous extensions. With a cost-efficient price-performance ratio the **shrink fit extension (Guhring no. 4719)**, for example, scores points. When a slender holder is required and cannot be shrink fitted, Guhring can provide the new **hydraulic chuck from clamping-Ø 10 mm**.


NEW!
Hydraulic chuck as a special holder from clamping-Ø 10 mm.

Concentricity check position

Internal cooling



 **Blind hole design**
with central coolant exit

 **Through hole design**
with radial coolant delivery

Flexible combination possibilities

For short reaming depths HR 500 T can be clamped in conventional hydraulic chucks, shrink fit chucks or other accurate concentric clamping chucks thanks to the standardised shank to DIN 6535-HA.

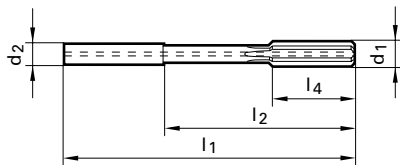
Shrink fit extension (Guhring no. 4719), p. 20)

High-performance reamers



The solid carbide HPC reamer HR 500 operates with highest cutting rates and produces extremely high-quality holes. Therefore, it often enables considerable savings in the process costs. In addition, it provides very high process reliability.

Intermediate dimensions from Ø 2.0-20.1 mm possible on request.



Code no.	d1	d2 h6	l1	l2	l4	
	mm	mm				
3.000	3.000	4.000	68.00	40.00	12.00	4
3.500	3.500	4.000	68.00	40.00	12.00	4
4.000	4.000	4.000	68.00	40.00	12.00	4
4.500	4.500	6.000	76.00	40.00	12.00	4
5.000	5.000	6.000	76.00	40.00	12.00	4
5.500	5.500	6.000	76.00	40.00	12.00	4
6.000	6.000	6.000	76.00	40.00	12.00	4
6.500	6.500	8.000	101.00	65.00	16.00	6
7.000	7.000	8.000	101.00	65.00	16.00	6
7.500	7.500	8.000	101.00	65.00	16.00	6
8.000	8.000	8.000	101.00	65.00	16.00	6
8.500	8.500	10.000	101.00	61.00	19.00	6
9.000	9.000	10.000	101.00	61.00	19.00	6
9.500	9.500	10.000	101.00	61.00	19.00	6
10.000	10.000	10.000	101.00	61.00	19.00	6
10.500	10.500	12.000	130.00	85.00	19.00	6
11.000	11.000	12.000	130.00	85.00	19.00	6
11.500	11.500	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



Guhring no.

1685

1686

Surface finish

a

a

Discount group

166

166



Availability





**Cast iron machining
with only one tool**

APPLICATION EXAMPLES

GG-30 brake housing

Ø 18.00 mm H7
Surface finish requirement $R_a = 0.8$
 $v_c = 200$ m/min
 $f_u = 1.2$ mm/rev.
Tool life: 48 m

GGG-50 transmission housing

Ø 20.00 mm
Surface finish requirement $R_z = 10$
 $v_c = 195$ m/min
 $f_u = 1.1$ mm/rev.
Tool life: 66 m

The customer also machines GG-25 with the same tool and achieves optimal machining results.

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HR 500 G high-performance reamers

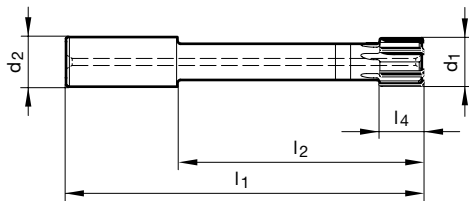
High-performance reamers



The carbide- or cermet-tipped HR 500 G produces first-class hole qualities with highest cutting rates. In addition, it provides a very high process reliability and considerably reduces process costs.

Further advantages:

- Intermediate dimensions from Ø 20.1 mm can be supplied at short notice
- Carbide-tipped tools with "Signum"-coating for GG machining meeting highest demands on surface quality of hole (cutting rates see Guhring no. 1036/1037)



Code no.	d1	d2 h6	l1	l2	l4	
	mm	mm	mm	mm	mm	
22.000	22.000	20.000	160.00	110.00	22.00	6
24.000	24.000	25.000	180.00	124.00	22.00	6
25.000	25.000	25.000	180.00	124.00	22.00	6
26.000	26.000	25.000	180.00	124.00	22.00	6
28.000	28.000	25.000	180.00	124.00	25.00	6
30.000	30.000	25.000	180.00	124.00	25.00	6
32.000	32.000	32.000	200.00	140.00	25.00	6
34.000	34.000	32.000	200.00	140.00	25.00	6
36.000	36.000	32.000	200.00	140.00	25.00	8
38.000	38.000	32.000	200.00	140.00	25.00	8
40.000	40.000	32.000	200.00	140.00	25.00	8

Carbide



Guhring no.

1680

1681

Surface finish

a

a

Discount group

166


166



Availability



HR 500 GT high-performance reamers



HR 500 GT high-performance reamers top performance above Ø 40.00 mm

Also for diameters above 40.00 mm Guhring's HR 500 technology is first choice for high-performance reaming. Numerous intelligent solutions ensure also with large diameters maximum cutting rates and optimal quality:

Variety for perfect machining results

The HR 500 GT tool heads are available in the semi-standard range with short delivery times in the diameter range > 40.0 to 76.2 mm for the following material specific ranges:

- Carbide-tipped with nanoA-coating for stainless steels, GGG 60, GG, special alloys and non-ferrous metals
- Carbide-tipped with Signum-coating with high demands on surface quality for GG and GGG 60
- Carbide-tipped with Carbo-coating for Al machining
- Cermet-tipped for steels and GGG 40/50

In addition, we manufacture special tools to customer specific requirements on request.

Optimal cooling lubrication

Thanks to the newly developed, patent applied for, re-direction screw at the face side of the HR 500 GT tool heads, the cooling lubricant process reliably reaches the cutting edges. It is impossible for chips to clog up the cooling lubricant exits. Thanks to the especially flat design of the re-direction screw the machining of blind holes is possible right up to the base of the hole.

If necessary, the re-direction screw can be removed for the machining of blind holes.



EXCLUSIVE LINE®

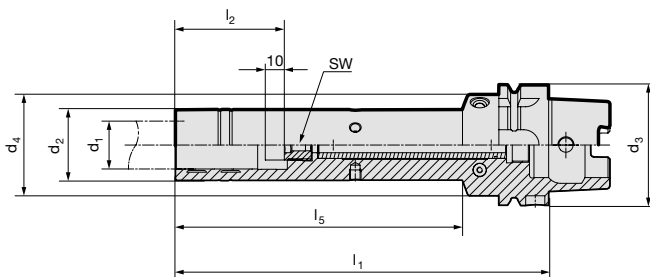
HSK-A hydraulic chucks, extra length, for HR 500 GT Shrink fit extension



For high precision reamers HR 500 GT with tang.

Scope of delivery:

- incl. adjustment screw Guhring no. 4900
- incl. hexagon chuck key Guhring no. 4912
- order coolant delivery set Guhring no. 4949 separately



Guhring no. 4290

Surface finish

Discount group

114

Code no.	d3	f. d1 h6	d2	d4	l1	l2	l5	inc.	SW	kg
	HSK-A	mm	mm	mm	mm	mm	mm	4900 ...		
25.063	63	25	37	53	195	57	150	20.114	5.0	1.9
25.163	63	25	37	53	295	57	250	20.114	5.0	2.7
32.063	63	32	44	53	195	61	150	20.114	5.0	2.2
32.163	63	32	44	53	295	61	250	20.114	5.0	3.4

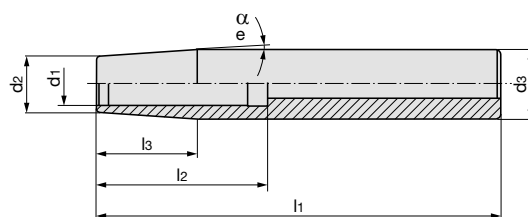
Availability



Shrink fit extension for HR 500 T



For clamping in hydraulic or shrink fit chuck.



Guhring no. 4719

Surface finish

Discount group

148

Code no.	for shank-Ø	d2	d3 h6	l1	l2	l3	α
	d1 h6 mm	mm	mm	mm	mm	mm	e
6.012	6	10	12	125	38	19.1	3
8.014	8	12	14	125	38	19.1	3
10.116	10	14	16	160	42	19.1	3
12.120	12	16	20	160	47	38.2	3
16.225	16	22	25	160	50	28.6	3
20.332	20	27	32	160	52	47.7	3

Availability

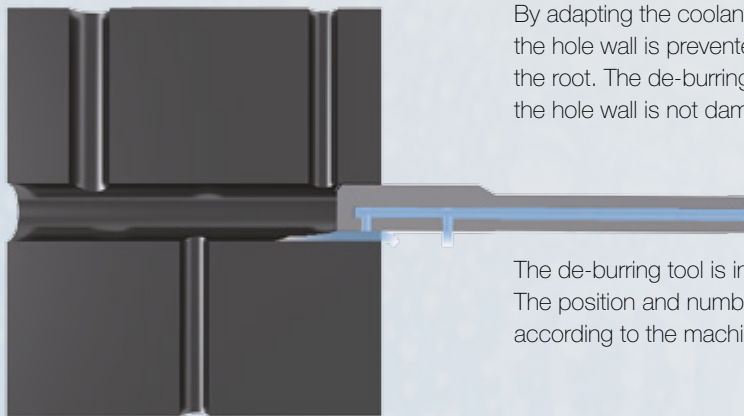


EWR 500 de-burring reamer

Simple and efficient

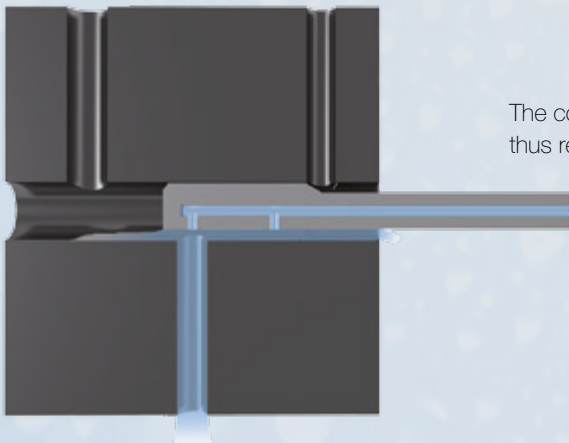
➤ De-burring cross holes with EWR 500

With conventional reamers the burr at the cross hole is only folded down. The surface finish quality and the hole quality is reduced. The new EWR 500 de-burring reamer de-burrs cross holes with process reliability.



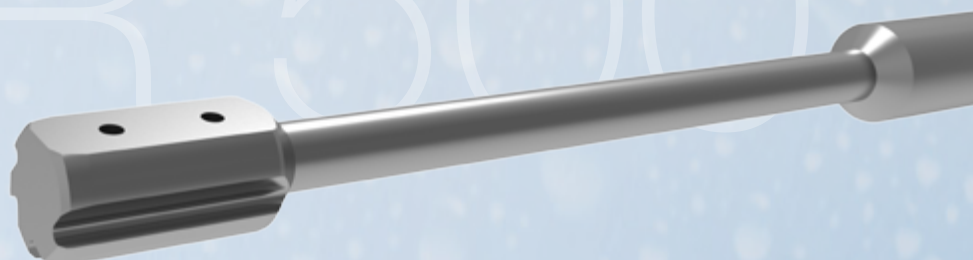
By adapting the coolant pressure, the gap between reamer and the hole wall is prevented. This enables a clean cut of the burr at the root. The de-burring reamer can also be applied for fits because the hole wall is not damaged.

The de-burring tool is individually designed by Guhring. The position and number of coolant exits is co-ordinated according to the machining task.



The contact pressure is ensured through several coolant exits thus reducing the drop in pressure.

EWR 500

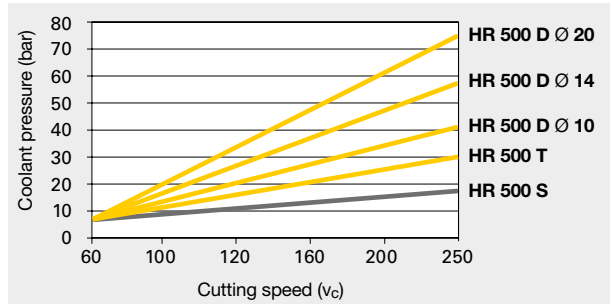


GÜHRING NAVIGATOR

HR 500 reamers up to 20.00 mm

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

Counter-sink 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



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

Material group	Material examples, new description (old description in brackets) Figures in bold = material no. to DIN EN	Tensile str. MPa (N/mm ²)	Hard- ness	Coolant
Common structural steels	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2)	≤500		○
	1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤1000		○
Free-cutting steels	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36)	≤850		○
	1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤1000		○
Unalloyed heat-treatable steels	1.0402 C22, 1.1178 C30E (Ck30)	≤700		○
	1.0503 C45, 1.1191 C45E (Ck45)	≤850		○
	1.0601 C60, 1.1221 C60E (Ck60)	≤1000		○
Alloyed heat-treatable steels	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4	≤1000		○
	1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1400		○
Unalloyed case hard. steels	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		○
Alloyed case hardened steels	1.7276 10CrMo11, 1.5125 11MnSi6	≤1000		●
	1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1400		●
Nitriding steels	1.8504 34CrAl6	≤1000		○
	1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1400		●
Tool steels	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9	≤850		○
	1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤1400		●
High speed steels	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		●
Spring steels	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	●
Stainless steels, sulphured	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤900		●
austenitic	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤1100		●
martensitic	1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤1500		●
Hardened steels	-		≤48 HRC	●
			≤66 HRC	●
Special alloys	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Cast iron	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20)		≤240 HB	○
	0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤350 HB	○
Spheroidal graphite iron and malleable cast iron	0.7040 EN-GJS-400-15 (GGG40), 0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35)		≤240 HB	○
	0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤350 HB	○
Chilled cast iron	-		≤350 HB	○
Ti and Ti-alloys	3.7024 Ti99.5, 3.7114 TiAl5Sn2.5, 3.7124 TiCu2	≤850		●
	3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2.5, - TiAl8Mo1V1	≤1400		●
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	≤650		○
Al cast alloys ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		○
≤ 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		○
Magnesium alloys	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		○
Copper, low-alloyed	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		○
Brass, short-chipping	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		○
long-chipping	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0.5	≤600		○
Bronze, short-chipping	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn	≤600		○
	2.0790 CuNi18Zn19Pb	≤850		●
Bronze, long-chipping	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	≤850		●
	2.0980 CuAl11Ni, 2.1247 CuBe2	≤1000		●
Duroplastics	Bakelit, Resopal, Pertinax, Moltopren	≤150		○
Thermoplastics	Plexiglass, Hostalen, Novodur, Makralon	≤100		○
New cast materials GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35)		≤220 HB	○
	EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤300 HB	○
New cast materials ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000)	≤1000		○
	EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1400		○
Kevlar	Kevlar	≤1000		○
Glass, carbon conc. plastics	GFK/CFK	≤1000		○

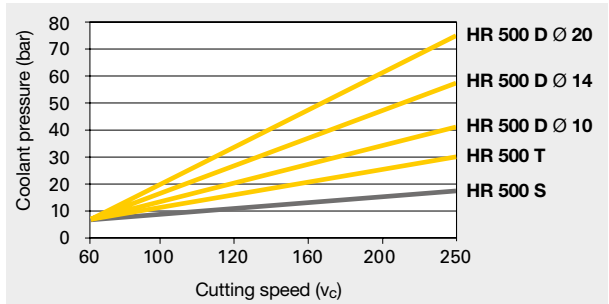
Air ○
Neat oil ●
Soluble oil ○

GÜHRING NAVIGATOR

HR 500 Reamers from Ø 20.00 mm up to 40.00 mm

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

Counter-sink 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



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

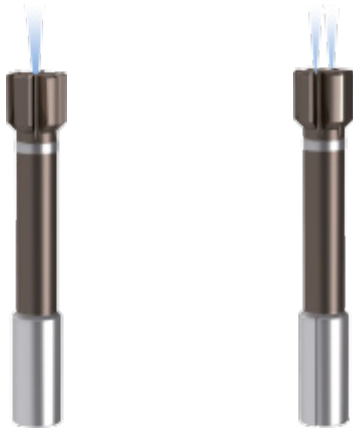
Material group	Material examples, new description (old description in brackets) Figures in bold = material no. to DIN EN	Tensile str. MPa (N/mm ²)	Hard- ness	Coolant
Common structural steels	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2)	≤500		○
	1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤1000		○
Free-cutting steels	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36)	≤850		○
	1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤1000		○
Unalloyed heat-treatable steels	1.0402 C22, 1.1178 C30E (Ck30)	≤700		○
	1.0503 C45, 1.1191 C45E (Ck45)	≤850		○
	1.0601 C60, 1.1221 C60E (Ck60)	≤1000		○
Alloyed heat-treatable steels	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4	≤1000		○
	1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1400		○
Unalloyed case hard. steels	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		○
Alloyed case hardened steels	1.7276 10CrMo11, 1.5125 11MnSi6	≤1000		●
	1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1400		●
Nitriding steels	1.8504 34CrAl6	≤1000		○
	1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1400		●
Tool steels	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9	≤850		○
	1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤1400		●
High speed steels	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		●
Spring steels	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	●
Stainless steels, sulphured	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤900		●
austenitic	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤1100		●
martensitic	1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤1500		●
Hardened steels	-		≤48 HRC	●
			≤66 HRC	●
Special alloys	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Cast iron	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20)		≤240 HB	○
	0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤350 HB	○
Spheroidal graphite iron and malleable cast iron	0.7040 EN-GJS-400-15 (GGG40), 0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35)		≤240 HB	○
	0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤350 HB	○
Chilled cast iron	-		≤350 HB	○
Ti and Ti-alloys	3.7024 Ti99.5, 3.7114 TiAl5Sn2.5, 3.7124 TiCu2	≤850		●
	3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2.5, - TiAl8Mo1V1	≤1400		●
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	≤650		○
Al cast alloys ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		○
≤ 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		○
Magnesium alloys	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		○
Copper, low-alloyed	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		○
Brass, short-chipping	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		○
long-chipping	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0.5	≤600		○
Bronze, short-chipping	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn	≤600		○
	2.0790 CuNi18Zn19Pb	≤850		●
Bronze, long-chipping	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	≤850		●
	2.0980 CuAl11Ni, 2.1247 CuBe2	≤1000		●
Duroplastics	Bakelit, Resopal, Pertinax, Moltopren	≤150		○
Thermoplastics	Plexiglass, Hostalen, Novodur, Makralon	≤100		○
New cast materials GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35)		≤220 HB	○
	EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤300 HB	○
New cast materials ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000)	≤1000		○
	EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1400		○
Kevlar	Kevlar	≤1000		○
Glass, carbon conc. plastics	GFK/CFK	≤1000		○

Air ○
Neat oil ●
Soluble oil ○

EXCLUSIVE LINE®

HR 500 G high-performance reamers

1680	1681
Solid carbide	
TiAlN nanoA	
HR 500 G S	HR 500 G D



1682	1683
Cermet tipped	
bright	
HR 500 G S	HR 500 G D



V _c m/min	Feed column no.	
25-40	74-75	74-75
25-40	74-75	74-75
25-40	74-75	74-75
25-40	74-75	74-75
25-40	74-75	74-75
25-40	74-75	74-75
25-40	74-75	74-75
25-40	74	74
25-40	74-75	74-75
25-40	74-75	74-75
25-40	74	74
25-40	74-75	74-75
25-40	74	74
25-40	74-75	74-75
25-40	74-75	74-75
20-30	74	74
20-30	74-75	74-75
30-60	74-75	74-75
20-30	74-75	74-75
20-30	74-75	74-75
10-20	72-73	72-73
20-30	73-74	73-74
40-100	75-76	75-76
40-100	75-76	75-76
50-120	75-76	75-76
50-100	75-76	75-76
20-40	74-75	74-75
20-40	73-74	73-74
20-40	73-74	73-74
80-160	75-76	75-76
40-120	74-75	74-75
50-120	74-75	74-75
50-120	74-75	74-75
40-120	74-75	74-75
40-120	74-75	74-75
60-80	74-75	74-75
40-80	74-75	74-75
80	71	71
80	71	71

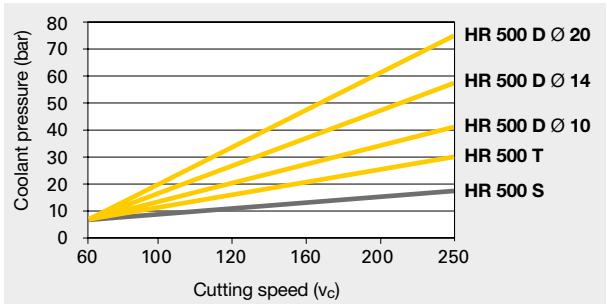
V _c m/min	Feed column no.	
100-180	75-76	75-76
100-180	75-76	75-76
100-180	75-76	75-76
100-180	75-76	75-76
100-180	75-76	75-76
100-180	75-76	75-76
100-180	75-76	75-76
100-180	75-76	75-76
100-180	75-76	75-76
80-120	75-76	75-76
100-180	75-76	75-76
100-180	75-76	75-76
100-180	75-76	75-76
80-120	75-76	75-76
100-180	75-76	75-76
80-120	75-76	75-76
100-120	74-75	74-75
120-300	72-75	72-75

GÜHRING NAVIGATOR

HR 500 Reamers from Ø 41.00 mm up to 76.00 mm

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

Counter-sink 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



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

Material group	Material examples, new description (old description in brackets) Figures in bold = material no. to DIN EN	Tensile str. MPa (N/mm ²)	Hard- ness	Coolant
Common structural steels	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2)	≤500		○
	1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤1000		○
Free-cutting steels	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36)	≤850		○
	1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤1000		○
Unalloyed heat-treatable steels	1.0402 C22, 1.1178 C30E (Ck30)	≤700		○
	1.0503 C45, 1.1191 C45E (Ck45)	≤850		○
	1.0601 C60, 1.1221 C60E (Ck60)	≤1000		○
Alloyed heat-treatable steels	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4	≤1000		○
	1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1400		○
Unalloyed case hard. steels	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		○
Alloyed case hardened steels	1.7276 10CrMo11, 1.5125 11MnSi6	≤1000		●
	1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1400		●
Nitriding steels	1.8504 34CrAl6	≤1000		○
	1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1400		●
Tool steels	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9	≤850		○
	1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤1400		●
High speed steels	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		●
Spring steels	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	●
Stainless steels, sulphured	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤900		●
austenitic	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤1100		●
martensitic	1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤1500		●
Hardened steels	-		≤48 HRC	●
			≤66 HRC	●
Special alloys	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Cast iron	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20)		≤240 HB	○
	0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤350 HB	○
Spheroidal graphite iron and malleable cast iron	0.7040 EN-GJS-400-15 (GGG40), 0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35)		≤240 HB	○
	0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤350 HB	○
Chilled cast iron	-		≤350 HB	○
Ti and Ti-alloys	3.7024 Ti99.5, 3.7114 TiAl5Sn2.5, 3.7124 TiCu2	≤850		●
	3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2.5, - TiAl8Mo1V1	≤1400		●
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	≤650		○
Al cast alloys ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		○
≤ 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		○
Magnesium alloys	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		○
Copper, low-alloyed	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		○
Brass, short-chipping	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		○
long-chipping	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0.5	≤600		○
Bronze, short-chipping	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn	≤600		○
	2.0790 CuNi18Zn19Pb	≤850		●
Bronze, long-chipping	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	≤850		●
	2.0980 CuAl11Ni, 2.1247 CuBe2	≤1000		●
Duroplastics	Bakelit, Resopal, Pertinax, Moltopren	≤150		○
Thermoplastics	Plexiglass, Hostalen, Novodur, Makralon	≤100		○
New cast materials GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35)		≤220 HB	○
	EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤300 HB	○
New cast materials ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000)	≤1000		○
	EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1400		○
Kevlar	Kevlar	≤1000		○
Glass, carbon conc. plastics	GFK/CFK	≤1000		○

Air ○
Neat oil ●
Soluble oil ○

EXCLUSIVE LINE®

HR 500 GT high-performance reamers

1038	1039
Solid carbide	Solid carbide
TiAlN nanoA	TiAlN nanoA
HR 500 GT S	HR 500 GT D

1040	1041
Cermet	Cermet
bright	bright
HR 500 GT S	HR 500 GT D



V _c m/min	Feed column no.	
25-40	74-75	74-75
25-40	74-75	74-75
25-40	74-75	74-75
25-40	74-75	74-75
25-40	74-75	74-75
25-40	74-75	74-75
25-40	74-75	74-75
25-40	74	74
25-40	74-75	74-75
25-40	74-75	74-75
25-40	74	74
25-40	74-75	74-75
25-40	74	74
25-40	74-75	74-75
25-40	74	74
25-40	74-75	74-75
25-40	74	74
20-30	74	74
20-30	74-75	74-75
30-60	74-75	74-75
20-30	74-75	74-75
20-30	74-75	74-75
10-20	72-73	72-73
20-30	73-74	73-74
40-100	75-76	75-76
40-100	75-76	75-76
50-120	75-76	75-76
50-100	75-76	75-76
20-40	74-75	74-75
20-40	73-74	73-74
20-40	73-74	73-74
80-160	75-76	75-76
40-120	74-75	74-75
50-120	74-75	74-75
50-120	74-75	74-75
40-120	74-75	74-75
40-120	74-75	74-75
60-80	74-75	74-75
40-80	74-75	74-75
40-120	71	71
40-120	71	71

V _c m/min	Feed column no.	
100-180	75-76	75-76
100-180	75-76	75-76
100-180	75-76	75-76
100-180	75-76	75-76
100-180	75-76	75-76
100-180	75-76	75-76
100-180	75-76	75-76
100-180	75-76	75-76
100-180	75-76	75-76
100-180	75-76	75-76
80-120	74	74
100-180	75-76	75-76
100-180	75-76	75-76
100-180	75-76	75-76
80-120	74	74
100-180	75-76	75-76
80-120	74	74
100-180	75-76	75-76
80-120	74	74
100-120	74-75	74-75
120-300	72-75	72-75

Application examples

Application examples for Guhring's HR 500 S and HR 500 D solid carbide high-performance reamers with highest feed rates and tool life.

The HR 500 S and HR 500 D solid carbide high-performance reamers have shown their performance in several applications, see following table:

Tool type	HR 500 S	HR 500 D	HR 500 D	HR 500 S	HR 500 Cast D
Guhring no.	1685	1686	special reamer for tighter tolerances	1685	1037
component machined	hinge	ring	valve body	ring	cylinder head
workpiece material	gen. steel	alloyed steel	gen. steel	alloyed steel	GG 30
hole diameter (mm)	9	8	5,9	15	20.2
hole tolerance	H7	H7	H6	IT 5	H7
reaming depth (mm)	30	25	48	20	60
cutting speed v_c (m/min.)	120	200	190	250	200
feed rate v_f (mm/min.)	4200	12700	6100	7200	6300
tool life (m)	60	100	55	200	150

Application examples for Guhring special high-performance reamers HR 500 G

Carbide- or cermet-tipped special high-performance reamers HR 500 G S and HR 500 G D have already been able to demonstrate their efficiency in numerous applications. The following table contains some examples.

Tool type	HR 500 G D	HR 500 G D	HR 500 G D
Guhring no.	1683 (shortened)	1681	1683
tool material/coating	Cermet	HM + TiAlN nanoA	Cermet
component machined	universal joint	wheel flange	differential housing
workpiece material	steel	cast iron	cast iron
hole diameter (mm)	25	22	32
hole tolerance	F7	H8	H7
reaming depth (mm)	18	20	50
cutting speed v_c (m/min.)	130	120	120
feed rate v_f (mm/min.)	2000	2600	3000
tool life (m)	175	120	160

EXCLUSIVE^{LINE}[®]

HR 500 ACTIVE

Special range of HR 500 solid carbide high-performance reamers



Ever since their introduction, Guhring's solid carbide high-performance reamers HR 500 D for through holes and HR 500 S for blind holes have impressed customers with their outstanding performance. Even under difficult machining conditions such as interrupted cutting or unstable machines they ream holes at cutting rates higher than cermet levels with maximum tool life and optimal quality in almost all materials.

So the user can also fully utilise the advantages of HR 500 high-performance reamers for the machining of the special applications Guhring has developed the HR 500 ACTIVE range.

There is a choice of four HR 500 ACTIVE types:

- for cylindrical blind holes
- for cylindrical through holes
- for stepped blind holes
- for stepped through holes

The four HR 500 ACTIVE types are available in the following designs:

- with or without internal cooling
- short or long version
- with different coatings or bright finish
- to hole tolerance or reamer manufacturing tolerance

You have the choice of designing the optimal HR 500 reamer for your specific application! Simply complete the questionnaire.

HR 500 ACTIVE

Solid carbide reamers in special dimensions



Order **Inquiry**

Name/customer no. if available New customer

Street no.

Telephone

Date

Contact for questions

Order no.

Town/post code

Fax

Signature

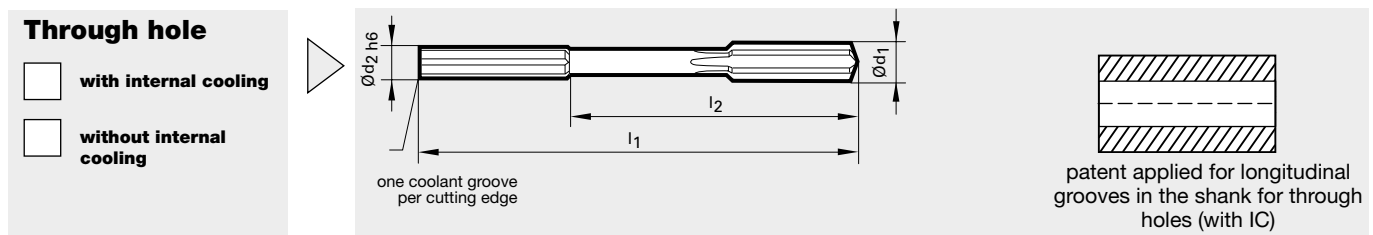
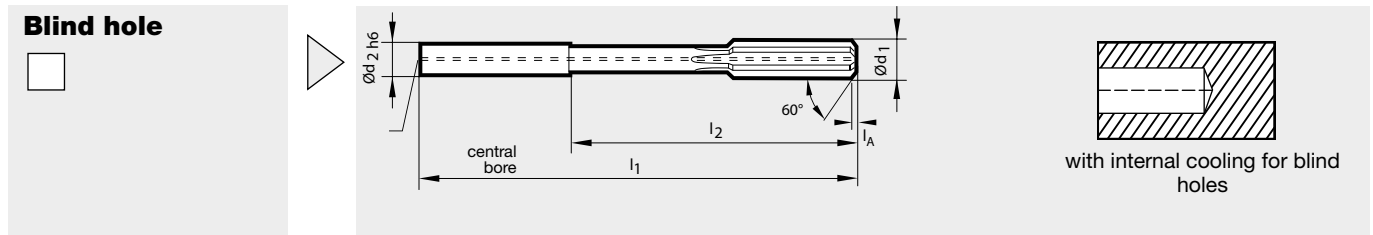
Quantity Minimum order quantity 5 tools

Hole Ø / tol. **Example** **Example**

or

Reamers manufact. Ø / tol. **Example**

Nom.-Ø d₁ Tolerance Nom.-Ø d₁ upper/lower limit



Dimensions

long version

short version

Further dimensions on request

Nom.-Ø [mm] from - to d ₁	long version		short version		Chamfer length l _a (only blind holes)	Shank-Ø h6 DIN 6535 d ₂
	l ₁	Reach l ₂	l ₁	Reach l ₂		
2.950 - 4.1	68	40	-	-	0.4	4
4.101 - 6.1	76	40	-	-	0.4	6
6.101 - 8.1	101	65	76	40	0.4	8
8.101 - 10.1	101	61	76	36	0.4	10
10.101 - 12.1	130	85	80	35	0.5	12
12.101 - 14.1	130	85	90	45	0.5	14
14.101 - 16.1	150	102	90	42	0.5	16
16.101 - 18.1	150	102	100	52	0.5	18
18.101 - 20.1	150	100	100	50	0.5	20

Coating

TiAlN (optimal for the machining of steel and universal application)

Zenit (optimal for the machining of titanium)

Signum (optimal for the machining of GG/GGG)

Carbo (optimal for the machining of Al)

Material

steel/hardened steel/ special alloys/VA

GG/ GGG

HR 500 CAST: Delivery time appr. 4 weeks

Al-wrought-cast alloys

Delivery time appr. 5 weeks

HR 500 ACTIVE

Solid carbide step reamers made to measure

www.guehring.de

Order **Inquiry**

Name/customer no. if available New customer

Street no.

Telephone

Date

Contact for questions

Order no.

Town/post code

Fax

Signature

Quantity

Minimum order quantity 5 tools

Hole Ø / tol.

or

**Reamers
manufact. Ø / tol.**

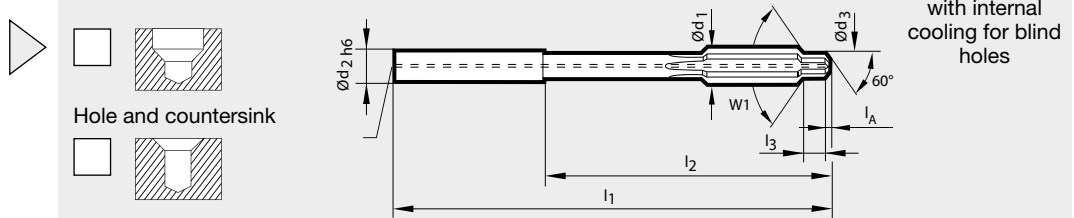
Example Example

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
nom.-Ø d ₁	upper/lower limit	step Ø d ₃	upper/lower limit	Example	Example		
				Ø 12 F8 Ø 10 H7	Ø 12 ^{+0,02} / _{-0,004} Ø 10 0,2		
				Example			
				Ø 12 ^{+0,004} / _{-0,004} Ø 10 ^{+0,004} / _{-0,004}			

**cyl. step length/
countersink angle**

Step length l₃ ±0.1

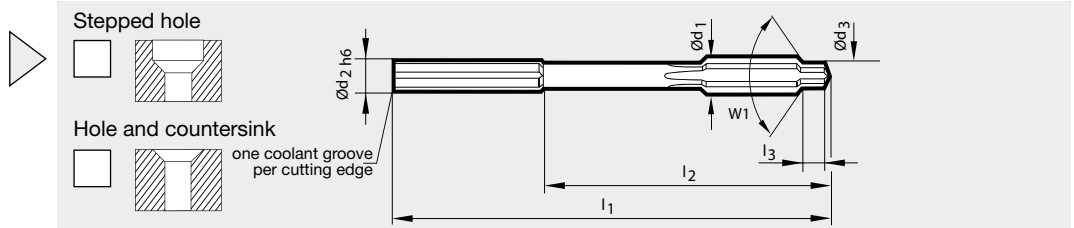
Blind hole



Through hole

with internal cooling

without internal cooling



Dimensions

long version

short version

Further dimensions on request

Nom.-Ø [mm] from - to d ₁	smallest poss. step-Ø d ₃	long version		short version		Chamfer length l _A (only blind holes)	Shank-Ø h6 DIN 6535 d ₂
		l ₁	Reach l ₂	l ₁	Reach l ₂		
2.950 - 4.1	d1x0.7 (min.Ø2.95)	68	40	-	-	0.4	4
4.101 - 6.1	d1x0.7 (min.Ø2.95)	76	40	-	-	0.4	6
6.101 - 8.1	d1 x 0.8	101	65	76	40	0.4	8
8.101 - 10.1	d1 x 0.8	101	61	76	36	0.4	10
10.101 - 12.1	d1 x 0.8	130	85	80	35	0.5	12
12.101 - 14.1	d1 x 0.8	130	85	90	45	0.5	14
14.101 - 16.1	d1 x 0.8	150	102	90	42	0.5	16
16.101 - 18.1	d1 x 0.8	150	102	100	52	0.5	18
18.101 - 20.1	d1 x 0.8	150	100	100	50	0.5	20

Coating

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Material

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GG/ GGG

HR 500 CAST: Delivery time appr. 4 weeks

Al-wrought-cast alloys

Delivery time appr. 5 weeks

Guhring KG

P.O. Box 100247 • D-72423 Albstadt
Herderstr. 50-54 • D-72458 Albstadt
Telephone: +49 74 31 17-0 • www.guehring.de

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