



**NEW**  
now with IC  
for 5xD

## **SOLID CARBIDE MICRO-PRECISION DRILLS**

**Specialists for universal  
high-performance machining**

- without internal cooling from nominal diameter 0.5 mm for drilling depths up to 4xD and 7xD
- with internal cooling from nominal diameter 1.4 mm for drilling depths up to 5xD, 8xD, 15xD

**Edition 2012**

**EXCLUSIVELINE<sup>®</sup>**

**Made by Guhring**

## Solid carbide micro-precision drills Technical data and advantages

### Optimal tool design down to the smallest detail

The production of the smallest holes requires highest accuracy. Solid carbide micro-precision drills of Guhring's ExclusiveLine are designed to optimally satisfy these requirements.

They enable high-performance machining in the majority of materials. The 4 facet point grind with honed cutting edges offer high cutting rates and optimal chip breaking. The special flute profile provides problem free swarf evacuation from the hole.

Additional specifications are the reinforced shank for improved tool clamping and the SuperA-coating, which is especially designed for demanding applications like the machining of hardened steels or HSC.

Micro-precision drills with internal cooling are available with spiral coolant ducts thanks to the company's own carbide technology.

### Small but mighty - with and without internal cooling

Solid carbide micro-precision drills without internal cooling for drilling depths up to 4xD and 7xD are available in the diameter range from 0.5 to 3.0 mm.

Especially during the drilling of stainless steels and special alloys as well as deep holes, the solid carbide micro-precision drills with internal cooling for drilling depths up to 5xD, 8xD and 15xD give proof of their performance. Thanks to the optimised tool geometry, pecking is not required for holes up to 15xD with Guhring's solid carbide micro-precision drills.

The tool design makes the solid carbide micro-precision drill up to 4xD without internal cooling and 5xD with internal cooling optimally suitable as a pilot drill for the 15xD micro-precision drill with internal cooling (s. p. 11).



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

<b>Guhring no.</b>	6408	6408	6412	6412
<b>Diameter</b>	1.4 mm	2.5 mm	2.5 mm	2.1 mm
<b>Coating</b>	SuperA	SuperA	SuperA	SuperA
<b>Material group</b>	cast iron	alloyed case hardened steel	alloyed heat-treatable steel	stainless steel
<b>Material description</b>	GG25	16MnCr5	42CrMo4	X6CrNiTi18 10
<b>Drill. depth [mm]</b>	8xD	8xD	15xD	15xD
<b>Hole type</b>	blind hole	blind hole	blind hole	blind hole
<b>Cooling</b>	IC 80 bar	IC 80 bar	IC 80 bar	IC 80 bar
<b>Coolant</b>	soluble oil	soluble oil	soluble oil	soluble oil
<b>Machine type</b>	machining centre	machining centre	machining centre	machining centre
<b>v<sub>c</sub> [mm/min]</b>	80	120	100	60
<b>f [mm/rev.]</b>	0.1	0.14	0.1	0.03
<b>Tool life [m]</b>	150	110	60	60

## Solid carbide Micro-precision drills Special tools

### 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.

### For special applications: Special solutions to customer requirements

In addition to spiral-fluted standard micro-precision drills without internal cooling from 0.5 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 5xD, 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

A questionnaire for special tools can be found at the end of this brochure.



### Internal cooling increases tool life considerably!

A comparison between a conventional micro-precision drill w/o internal cooling for holes up to 7xD and a 8xD drill with

internal cooling 6408 demonstrates the advantages of internal cooling: Tool life increases considerably.

Guhring no.	Competitor without internal cooling	6408 with internal cooling
Diameter	2.6 mm	2.6 mm
Coating	TiAlN	SuperA
Material group	stainless steel	stainless steel
Material description	105CrMo17	105CrMo17
Drill. depth [mm]	7xD	8xD
Hole type	blind hole	blind hole
Cooling	external	internal 100 bar
Coolant	neat oil	neat oil
Machine type	machining centre	machining centre
$v_c$ [mm/min]	53	53
$f$ [mm/rev.]	0.08	0.06
Tool life	100 workpieces	500 workpieces, end of tool life not reached!

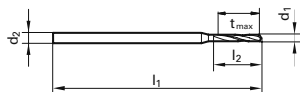
## Solid carbide micro-precision drills 4 x D with external cooling Technical data and dimensions

Tool material	<b>Solid carbide</b>
Surface finish	Super A
Cooling	☒
Discount group	164
<b>Guhring no.</b>	<b>6400</b>

DIN	<b>Guhring std.</b>
Shank design	<b>reinforced</b>
Shank tol.	<b>h6</b>
Type	<b>N</b>

### Product information

- drilling depth ~ 4 x D
- right-hand cutting
- 2-facet point grind
- 140° point angle
- special flute form
- Ø tolerance m7
- pilot drill for 6412



d <sub>1</sub>	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	Availability
0.500	3.000	47.00	3.00	
0.550	3.000	47.00	3.30	
0.600	3.000	47.00	3.60	
0.650	3.000	47.00	3.90	
0.700	3.000	47.00	4.20	
0.750	3.000	47.00	4.50	
0.800	3.000	47.00	4.80	
0.850	3.000	47.00	5.10	
0.900	3.000	47.00	5.40	
0.950	3.000	47.00	5.70	
1.000	3.000	47.00	6.00	
1.050	3.000	47.00	6.30	
1.100	3.000	47.00	6.60	
1.150	3.000	47.00	6.90	
1.200	3.000	47.00	7.20	
1.250	3.000	47.00	7.50	
1.300	3.000	47.00	7.80	
1.350	3.000	47.00	8.10	
1.400	3.000	47.00	8.40	
1.450	3.000	47.00	8.70	
1.500	3.000	47.00	9.00	
1.550	3.000	47.00	9.30	
1.590	3.000	47.00	9.60	
1.600	3.000	47.00	9.60	
1.650	3.000	47.00	9.90	
1.700	3.000	47.00	10.20	
1.750	3.000	47.00	10.50	
1.800	3.000	52.00	10.80	
1.850	3.000	52.00	11.10	
1.900	3.000	52.00	11.40	
1.950	3.000	52.00	11.70	
1.980	4.000	59.00	12.00	
2.000	4.000	59.00	12.00	
2.050	4.000	59.00	12.30	
2.100	4.000	59.00	12.60	
2.150	4.000	59.00	12.90	
2.200	4.000	59.00	13.20	
2.250	4.000	59.00	13.50	
2.300	4.000	59.00	13.80	

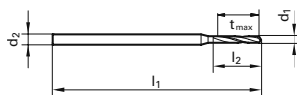


## Solid carbide micro-precision drills 7 x D with external cooling Technical data and dimensions

Tool material	<b>Solid carbide</b>
Surface finish	Super A
Cooling	☒
Discount group	164
<b>Guhring no.</b>	<b>6401</b>

DIN	<b>Guhring std.</b>
Shank design	<b>reinforced</b>
Shank tol.	<b>h6</b>
Type	<b>N</b>

- Product information**
- drilling depth ~ 7 x D
  - right-hand cutting
  - 2-facet point grind
  - 140° point angle
  - special flute form
  - Ø tolerance m7



d1	d2	l1	l2	Availability
0.500	3.000	47.00	4.00	
0.550	3.000	47.00	4.40	
0.600	3.000	47.00	4.80	
0.650	3.000	47.00	5.20	
0.700	3.000	47.00	5.60	
0.750	3.000	47.00	6.00	
0.800	3.000	47.00	6.40	
0.850	3.000	47.00	6.80	
0.900	3.000	47.00	7.20	
0.950	3.000	47.00	7.60	
1.000	3.000	47.00	8.00	
1.050	3.000	47.00	8.40	
1.100	3.000	47.00	8.80	
1.150	3.000	47.00	9.20	
1.200	3.000	52.00	10.80	
1.250	3.000	52.00	11.30	
1.300	3.000	52.00	11.70	
1.350	3.000	52.00	12.20	
1.400	3.000	52.00	12.60	
1.450	3.000	52.00	13.10	
1.500	3.000	52.00	13.50	
1.550	3.000	52.00	14.00	
1.590	3.000	52.00	14.40	
1.600	3.000	52.00	14.40	
1.650	3.000	52.00	14.90	
1.700	3.000	52.00	15.30	
1.750	3.000	52.00	15.80	
1.800	3.000	52.00	16.20	
1.850	3.000	52.00	16.70	
1.900	3.000	52.00	17.10	
1.950	3.000	52.00	17.60	
1.980	4.000	63.00	18.00	
2.000	4.000	63.00	18.00	
2.050	4.000	63.00	18.50	
2.100	4.000	63.00	18.90	
2.150	4.000	63.00	19.40	
2.200	4.000	63.00	19.80	
2.250	4.000	63.00	20.30	
2.300	4.000	63.00	20.70	



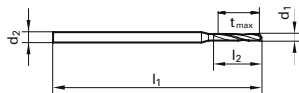
## Solid carbide micro-precision drills 5 x D with internal cooling Technical data and dimensions

Tool material	<b>Solid carbide</b>
Surface finish	Super A
Cooling	■
Discount group	164
<b>Guhring no.</b>	<b>6405</b>

DIN	<b>Guhring std.</b>
Shank design	<b>reinforced</b>
Shank tol.	<b>h6</b>
Type	<b>N</b>

### Product information

- drilling depth ~ 8 x D
- right-hand cutting
- 2-facet point grind
- 140° point angle
- special flute form
- Ø tolerance m7
- pilot drill for 6412



d1	d2	l1	l2	Availability
1.4000	4.000	52.00	11.00	
1.450	4.000	52.00	12.00	
1.500	4.000	52.00	12.00	
1.550	4.000	52.00	12.00	
1.590	4.000	52.00	13.00	
1.600	4.000	52.00	13.00	
1.650	4.000	52.00	13.00	
1.700	4.000	56.00	14.00	
1.750	4.000	56.00	14.00	
1.800	4.000	56.00	14.00	
1.850	4.000	56.00	15.00	
1.900	4.000	56.00	15.00	
1.950	4.000	56.00	16.00	
1.980	4.000	56.00	16.00	
2.000	4.000	56.00	16.00	
2.050	4.000	56.00	16.00	
2.100	4.000	62.00	17.00	
2.150	4.000	62.00	17.00	
2.200	4.000	62.00	18.00	
2.250	4.000	62.00	18.00	
2.300	4.000	62.00	18.00	
2.350	4.000	62.00	19.00	
2.380	4.000	62.00	19.00	
2.400	4.000	62.00	19.00	
2.450	4.000	62.00	20.00	
2.500	4.000	62.00	20.00	
2.550	4.000	62.00	20.00	
2.600	4.000	66.00	21.00	
2.650	4.000	66.00	21.00	
2.700	4.000	66.00	22.00	
2.750	4.000	66.00	22.00	
2.780	4.000	66.00	22.00	
2.800	4.000	66.00	22.00	
2.850	4.000	66.00	23.00	
2.900	4.000	66.00	23.00	
2.950	4.000	66.00	24.00	
3.000	4.000	66.00	24.00	

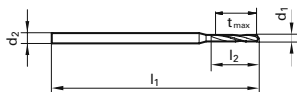
## Solid carbide micro-precision drills 8 x D with internal cooling Technical data and dimensions

Tool material	<b>Solid carbide</b>
Surface finish	Super A
Cooling	■
Discount group	164
<b>Guhring no.</b>	<b>6408</b>

DIN	<b>Guhring std.</b>
Shank design	<b>reinforced</b>
Shank tol.	<b>h6</b>
Type	<b>N</b>

### Product information

- drilling depth ~ 8 x D
- right-hand cutting
- 2-facet point grind
- 135° point angle
- special flute form
- Ø tolerance h7



$d_1$	$d_2$	$l_1$	$l_2$	Availability
1.400	4.000	52.00	15.00	
1.450	4.000	52.00	16.00	
1.500	4.000	52.00	17.00	
1.550	4.000	52.00	17.00	
1.590	4.000	52.00	18.00	
1.600	4.000	52.00	18.00	
1.650	4.000	52.00	18.00	
1.700	4.000	56.00	19.00	
1.750	4.000	56.00	19.00	
1.800	4.000	56.00	20.00	
1.850	4.000	56.00	20.00	
1.900	4.000	56.00	21.00	
1.950	4.000	56.00	21.00	
1.980	4.000	56.00	22.00	
2.000	4.000	56.00	22.00	
2.050	4.000	56.00	23.00	
2.100	4.000	62.00	23.00	
2.150	4.000	62.00	24.00	
2.200	4.000	62.00	24.00	
2.250	4.000	62.00	25.00	
2.300	4.000	62.00	25.00	
2.350	4.000	62.00	26.00	
2.380	4.000	62.00	26.00	
2.400	4.000	62.00	26.00	
2.450	4.000	62.00	27.00	
2.500	4.000	62.00	28.00	
2.550	4.000	62.00	28.00	
2.600	4.000	66.00	29.00	
2.650	4.000	66.00	29.00	
2.700	4.000	66.00	30.00	
2.750	4.000	66.00	30.00	
2.780	4.000	66.00	31.00	
2.800	4.000	66.00	31.00	
2.850	4.000	66.00	31.00	
2.900	4.000	66.00	32.00	
2.950	4.000	66.00	32.00	
3.000	4.000	66.00	33.00	

■ with internal cooling

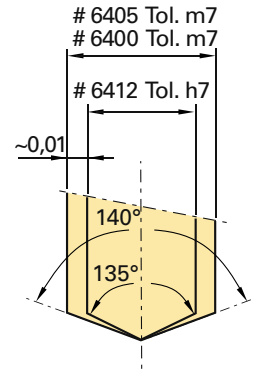


## Solid carbide micro-precision drills General recommendations

### Pilot drilling

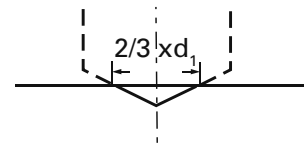
For the application of solid carbide micro-precision drills 15xD we recommend a pilot hole 1xD up to 2xD depth.

For this pilot hole, the solid carbide micro-precision drill 4xD without internal cooling and 5xD with internal cooling are optimally suitable, the solid carbide micro-precision drill 5xD with internal cooling especially for stainless steels and special alloys. Their point angle and their 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  $\frac{2}{3}xD$ .



### 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.



### Tool clamping

For the clamping of the solid carbide micro-precision drills we recommend our HMC 3000 hydraulic chucks. They permit the direct clamping of tools with shank diameters from 3 mm. Advantages are the fast, easy and precise length adjustment and the perfect concentricity  $R < 3 \mu\text{m}$  at drilling depth 10xD.



## Solid carbide micro-precision drills Application recommendations

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.

### Cooling hints:

We recommend lubrication by  
soluble oil or neat oil, coolant  
pressure min. 40 bar.

☒ with external cooling

■ with internal cooling

drill-Ø mm	Feed column no.												
	56	57	58	59	60	61	62	63	64	65	66	67	68
	f (mm/rev.)												
<b>0.50</b>	0.006	0.012	0.018	0.022	0.030	0.035	0.040	0.045	0.050	0.050	0.055	0.060	0.060
<b>0.80</b>	0.008	0.016	0.024	0.032	0.040	0.050	0.060	0.070	0.080	0.080	0.080	0.090	0.090
<b>1.00</b>	0.012	0.022	0.032	0.042	0.060	0.070	0.080	0.090	0.100	0.100	0.110	0.110	0.120
<b>1.50</b>	0.021	0.036	0.051	0.066	0.090	0.100	0.120	0.130	0.150	0.150	0.160	0.170	0.180
<b>2.00</b>	0.032	0.052	0.072	0.092	0.120	0.140	0.160	0.180	0.200	0.210	0.220	0.230	0.240
<b>2.50</b>	0.045	0.070	0.095	0.120	0.150	0.170	0.200	0.220	0.250	0.260	0.270	0.280	0.300
<b>3.00</b>	0.060	0.090	0.120	0.150	0.180	0.210	0.240	0.270	0.300	0.310	0.330	0.340	0.360



All drilling tools from 8xD must be  
guided during spot drilling. They  
must never operate at full speed  
without support in the machine shop

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

Tool material	Solid carbide	
Surface finish	Super A	
Cooling	☒	
Drilling depth	~ 4 x D	~ 7 x D
Guhring no.	6400	6401



Solid carbide		
Super A		
■		
~ 5 x D	~ 8 x D	~ 15 x D
6405	6408	6412



V <sub>c</sub> m/min	Feed column no.	
90-120	64	62
90-110	64	62
90-120	64	62
80-100	63	61
80-110	64	62
80-110	64	62
80-100	63	61
80-100	63	61
60-80	62	60
90-110	63	61
70-100	63	61
60-80	62	60
60-80	62	60
50-70	62	60
40-60	62	60
40-60	62	60
40-60	57	57
40-60	57	57
30	57	57
15	56	56
30	57	57
10	56	56
<150	68	66
<140	68	66
<140	68	66
<130	67	65
15	56	56
15	56	56
60-80	68	68
60-80	68	68
120-150	59	59
120-150	59	59

V <sub>c</sub> m/min	Feed column no.		
90-120	62	58	58
90-110	62	58	58
90-120	62	59	59
80-100	61	59	59
80-110	62	58	58
80-110	62	58	58
80-100	61	58	58
80-100	61	58	58
60-80	60	58	58
90-110	61	57	57
70-100	61	58	58
60-80	60	58	58
60-80	60	57	57
50-70	60	57	57
40-60	60	58	58
40-60	60	58	58
40-60	57	57	57
40-60	57	57	57
60-80	57	57	57
60	56	56	56
60-80	57	57	57
25	56	56	56
<150	60	60	60
<140	60	60	60
<140	60	60	60
<130	60	60	60
35	56	56	56
35	56	56	56
60-80	68	68	68
60-80	68	68	68
120-150	59	59	59
120-150	59	59	59

## Solid carbide micro-precision drills - special tools questionnaire

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**Order**  **Inquiry**

Name/customer no. if available New customer

Street no.

Telephone

Date

Contact for queries

Order no.

Town/post code

Fax

Signature

<b>Quantity</b>	<input type="text"/>
<b>Dimensions</b>	<p> <math>d_3 \text{ h}6 =</math> <input type="text"/>  <math>l_1 =</math> <input type="text"/>  <math>l_2 =</math> <input type="text"/>  <math>d_1 =</math> <input type="text"/>  <math>\Delta 1 =</math> <input type="text"/> °                  Tol <input type="checkbox"/> h7  <input type="checkbox"/> m7             </p>
<b>Step</b>	<p> <math>d_2 =</math> <input type="text"/> Tol <input type="checkbox"/> h7  <input type="checkbox"/> m7  <math>d_1 =</math> <input type="text"/> Tol <input type="checkbox"/> h7  <input type="checkbox"/> m7  <math>\Delta 2 =</math> <input type="text"/> °  <math>l_3 =</math> <input type="text"/> </p>
<b>Machining</b>	<input type="checkbox"/> Step hole <input type="checkbox"/> Drilling and countersinking
<b>Shank form</b>	<input type="checkbox"/> HA <input type="checkbox"/> HE
<b>Internal cooling</b>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<b>Coating</b>	<input type="checkbox"/> bright <input type="checkbox"/> SuperA

## High-tech tools for especially demanding machining tasks

### RT 100 R - The specialist for the machining of cast materials

Specialist for the machining of cast materials with patented radius point geometry. Especially suitable for CGI and ADI: Available as standard drills for drilling depths 5xD and 7xD with internal cooling and FIRE-coating in the ExclusiveLine range.

We also produce RT 100 R with steps and in intermediate sizes according to your requirements as special solutions.

### RT 100 T - For deep holes in steels

RT 100 T spiral-flute extra length drills provide highest economic efficiency for the production of deep holes up to 40xD in steels. In the standard range they are available in the diameter range from 3 to maximum 14 mm for the drilling depths 15xD, 20xD, 25xD, 30xD and 40xD.

Intermediate sizes up to 30xD or maximum 400 mm total length as well as designs optimised for MQL machining are available as special solutions.

### HR 500 - Reaming higher than cermet performance level

Solid carbide HPC reamers provide cermet performance level but without the disadvantages of cermet. HR 500 D are designed for through holes whilst HR 500 S are available for blind holes both included in Guhring's ExclusiveLine range. They enable first machining of nearly all materials from soft steels up to high tensile alloy steels at the highest possible cutting rates - often in conditions where interrupted cutting or lack of rigidity is present.

In addition to the standard range from 4 to 40 mm diameter, we produce intermediate sizes of HR 500 D and HR 500 S HPC reamers as special tools on request.



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**EXCLUSIVELINE®**

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