GUHRING

2012

Deep Hole Drills

Deep drilling from 10xD to 3000 mm with classic gun drills and spiral-fluted tools

- EB100
- ZB 80
- RT 100T
- RT 150
- EB 80
- EB 800
- solid carbide micro-precision drills

suitable for almost every material	• Stock program Ø 1.2 - 12.0 mm • Special solutions Ø 0.9 - 12.0 mm	**NEW:** Also for 25/50/75 x D
suitable for almost every material	• Stock program Ø 3.97 - 12.7 mm • Special solutions Ø 2.0 - 40.0 mm • Quick service Ø 2.0 - 22.0 mm	
suitable for cast iron, aluminium and short-chipping non-ferrous metals	• Stock program Ø 8.0 - 12.0 mm • Special solutions Ø 6.0 - 27.0 mm	
suitable for almost every material	• Stock program Ø 16.0 - 24.0 mm • Special solutions Ø 12.0 - 40.0 mm	**NEW:** Now special solutions from Ø 12.0 mm
suitable for steel and cast iron	• Stock program Ø 3.0 - 14.0 mm • Special solutions Ø 3.0 - 20.0 mm • Special solutions for aluminium	
suitable for steel and cast iron	• Stock program Ø 1.4 - 3.0 mm • Special solutions Ø 1.4 - 3.0 mm	
suitable for cast iron, aluminium and short-chipping non-ferrous metals	• Stock program RT 150 GG Ø 3.0 - 14.0 mm • Stock program RT 150 GN Ø 5.0 - 14.0 mm • Special solutions Ø 3.0 - 30.0 mm	
for re-grinding single-flute drills and for application on deep hole drilling machines	• grinding equipment for single-flute drills • drilling bushes and sealing discs • whipguide bushes and formed whipguide bushes • set screws	
deep hole drilling from A to Z	• procedure on conventional machines • drill procedure • hole accuracy • drivers for conventional gun drills	
for special solutions for your specific application task	• EB 100, EB 800 • EB 80, ZB 80 • RT 100 T, RT 100 T Alu • Micro-precision drills, RT150	
application recommendations for all gun drills and materials	• cutting rate recommendations • cooling lubricant data	

SINGLE-FLUTED GUN DRILL EB 100 SOLI

D CARBIDE

EB 100

GUHRING

Single-fluted gun drills EB 100

Standard	Type	Tool ilustration	Flute length	Tool material	Surface	Diameter range	Guhring no.	Discount group	Standard range. page
Single-fluted gun drills EB 100, flute length dependent on drilling depth									
Guhring std.	EB 100		25xD	**Solid carbide**	a	2.500 - 12.000	**5646**	123	8
Guhring std.	EB 100		50xD	**Solid carbide**	a	2.500 - 8.000	**5647**	123	9
Guhring std.	EB 100		75xD	**Solid carbide**	a	2.500 - 6.000	**5648**	123	10

TiAlN nanoA-coated design for almost every material

Solid carbide solid shank with conical MQL shank end*

a TiAlN nanoA *Conical MQL shank end from d1 = 3 mm/d2 = 6 mm

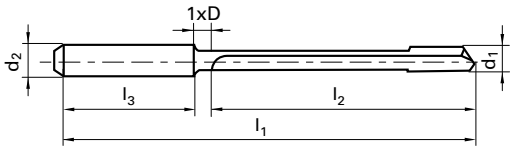
Standard	Type	Tool illustration	Flute length	Tool material	Surface	Diameter range	Guhring no.	Discount group	Standard range. page
Single-fluted gun drills EB 100 with fixed flute lengths									
Guhring std.	EB 100		45	**Solid carbide**	◯	1.200 - 3.200	**5024**	123	11
Guhring std.	EB 100		45	**Solid carbide**	Ⓐ	2.000 - 3.200	**5632**	123	11
Guhring std.	EB 100		80	**Solid carbide**	◯	1.200 - 5.000	**5020**	123	12
Guhring std.	EB 100		80	**Solid carbide**	Ⓐ	2.000 - 5.000	**5633**	123	12
Guhring std.	EB 100		120	**Solid carbide**	◯	1.500 - 5.000	**5026**	123	13
Guhring std.	EB 100		120	**Solid carbide**	Ⓐ	2.000 - 5.000	**5637**	123	13
Guhring std.	EB 100		160	**Solid carbide**	◯	1.500 - 8.000	**5021**	123	14
Guhring std.	EB 100		160	**Solid carbide**	Ⓐ	2.000 - 8.000	**5638**	123	14

TiAlN SuperA-coated design for alloyed and high-alloyed steels

Bright design for all other materials

◯ bright Ⓐ TiAlN SuperA

Order no. = Guhring no. + Code no.	Guhring no.	5646
	Standard	Guhring standard
	Tool material	Solid carbide
	Carbide grade	K30/K40
	Surface	a
	Drilling depth	25xD
	Cutting direction	right-hand
	Tolerance	h5
	Discount group	123

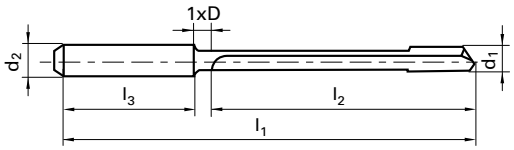


Code no.	d1 mm	d2 mm	l1 mm	l2 mm	l3 mm	Availability
2.500	2.500	4.000	115.00	85.00	28.00	●
2.780	2.780	4.000	115.00	85.00	28.00	●
3.000	3.000	6.000	145.00	105.00	36.00	●
3.170	3.170	6.000	145.00	105.00	36.00	●
3.500	3.500	6.000	145.00	105.00	36.00	●
3.970	3.970	6.000	160.00	120.00	36.00	●
4.000	4.000	6.000	160.00	120.00	36.00	●
5.000	5.000	6.000	220.00	180.00	36.00	●
5.560	5.560	6.000	220.00	180.00	36.00	●
6.000	6.000	6.000	220.00	180.00	36.00	●
6.350	6.350	8.000	260.00	210.00	36.00	●
7.000	7.000	8.000	260.00	210.00	36.00	●
7.140	7.140	8.000	285.00	240.00	36.00	●
8.000	8.000	8.000	285.00	240.00	36.00	●
9.000	9.000	10.000	350.00	300.00	40.00	●
10.000	10.000	10.000	350.00	300.00	40.00	●
11.000	11.000	12.000	420.00	360.00	45.00	●
12.000	12.000	12.000	420.00	360.00	45.00	●

a TiAlN nanoA

Guhring no.	5647
Standard	Guhring standard
Tool material	Solid carbide
Carbide grade	K30/K40
Surface	a
Drilling depth	50xD
Cutting direction	right-hand
Tolerance	h5
Discount group	123

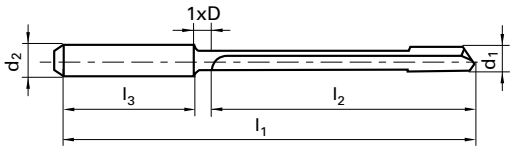
Order no. = Guhring no. + Code no.



Code	d1	d2	l1	l2	l3	Availability
no.	mm	mm	mm	mm	mm	
2.500	2.500	4.000	185.00	155.00	28.00	●
2.780	2.780	4.000	185.00	155.00	28.00	●
3.000	3.000	6.000	230.00	190.00	36.00	●
3.170	3.170	6.000	230.00	190.00	36.00	●
3.500	3.500	6.000	230.00	190.00	36.00	●
3.970	3.970	6.000	260.00	220.00	36.00	●
4.000	4.000	6.000	260.00	220.00	36.00	●
5.000	5.000	6.000	370.00	330.00	36.00	●
5.560	5.560	6.000	370.00	330.00	36.00	●
6.000	6.000	6.000	370.00	330.00	36.00	●
6.350	6.350	8.000	430.00	385.00	36.00	●
7.000	7.000	8.000	430.00	385.00	36.00	●
7.140	7.140	8.000	485.00	440.00	36.00	●
8.000	8.000	8.000	485.00	440.00	36.00	●

a TiAlN nanoA

Order no. = Guhring no. + Code no.	Guhring no.	5648
	Standard	Guhring standard
	Tool material	Solid carbide
	Carbide grade	K30/K40
	Surface	a
	Drilling depth	75xD
	Cutting direction	right-hand
	Tolerance	h5
	Discount group	123

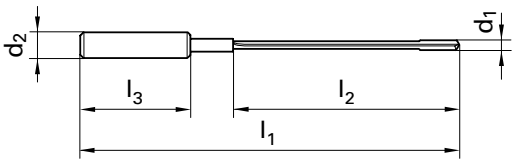


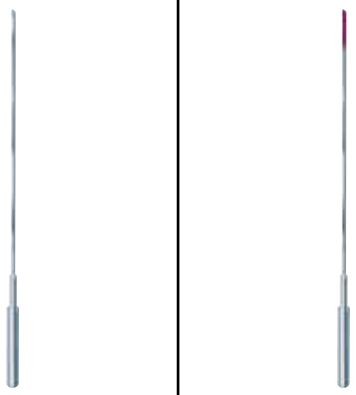
Code no.	d1 mm	d2 mm	l1 mm	l2 mm	l3 mm	Availability
2.500	2.500	4.000	255.00	220.00	28.00	●
2.780	2.780	4.000	255.00	220.00	28.00	●
3.000	3.000	6.000	320.00	280.00	36.00	●
3.170	3.170	6.000	320.00	280.00	36.00	●
3.500	3.500	6.000	320.00	280.00	36.00	●
3.970	3.970	6.000	360.00	320.00	36.00	●
4.000	4.000	6.000	360.00	320.00	36.00	●
5.000	5.000	6.000	525.00	485.00	36.00	●
5.560	5.560	6.000	525.00	485.00	36.00	●
6.000	6.000	6.000	525.00	485.00	36.00	●

a TiAlN nanoA

Order no. = Guhring no. + Code no.

Guhring no.	5024	5632
Standard	Guhring standard	Guhring standard
Tool material	Solid carbide	Solid carbide
Carbide grade	K30/K40	K30/K40
Surface	◯	Ⓐ
Flute length (mm)	45,00	45,00
Cutting direction	right-hand	right-hand
Tolerance	h5	h5
Discount group	123	123





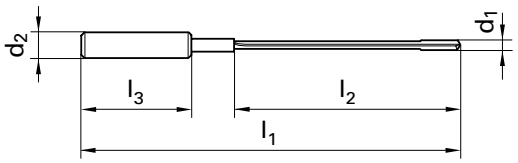
Code no.	d1 mm	d2 mm	l1 mm	l2 mm	l3 mm	Availability	
1,200	1.200	4.000	90.00	45.00	28.00	●	
1,500	1.500	4.000	90.00	45.00	28.00	●	
1,600	1.600	4.000	90.00	45.00	28.00	●	
2,000	2.000	4.000	90.00	45.00	28.00	●	●
2,500	2.500	10.000	100.00	45.00	40.00	●	●
2,700	2.700	10.000	100.00	45.00	40.00	●	●
3,000	3.000	10.000	100.00	45.00	40.00	●	●
3,200	3.200	10.000	100.00	45.00	40.00	●	●

◯ bright Ⓐ TiAlN SuperA

Single-fluted gun drills EB 100

Order no. = Guhring no. + Code no.

Guhring no.	5020	5633
Standard	Guhring standard	Guhring standard
Tool material	Solid carbide	Solid carbide
Carbide grade	K30/K40	K30/K40
Surface	◯	Ⓐ
Flute length (mm)	80,00	80,00
Cutting direction	right-hand	right-hand
Tolerance	h5	h5
Discount group	123	123

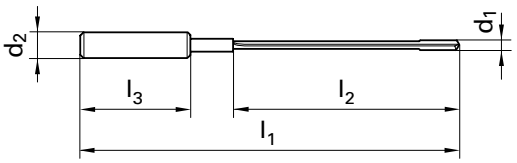


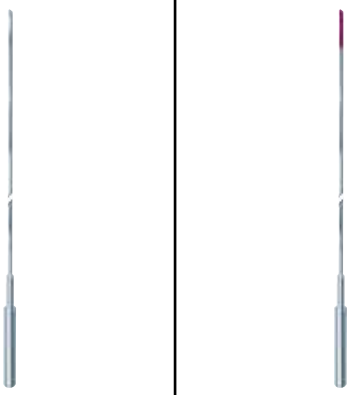
Code no.	d1 mm	d2 mm	l1 mm	l2 mm	l3 mm	Availability	
1,200	1.200	4.000	125.00	80.00	28.00	●	
1,500	1.500	4.000	125.00	80.00	28.00	●	
1,600	1.600	4.000	125.00	80.00	28.00	●	
2,000	2.000	4.000	125.00	80.00	28.00	●	●
2,500	2.500	10.000	135.00	80.00	40.00	●	●
2,700	2.700	10.000	135.00	80.00	40.00	●	●
3,000	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	●	●

◯ bright Ⓐ TiAlN SuperA

Order no. = Guhring no. + Code no.

Guhring no.	5026	5637
Standard	Guhring standard	Guhring standard
Tool material	Solid carbide	Solid carbide
Carbide grade	K30/K40	K30/K40
Surface	◯	Ⓐ
Flute length (mm)	120,00	120,00
Cutting direction	right-hand	right-hand
Tolerance	h5	h5
Discount group	123	123





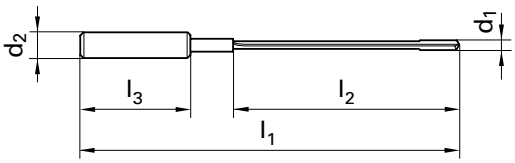
Code no.	d1 mm	d2 mm	l1 mm	l2 mm	l3 mm	Availability	
1,500	1.500	4.000	165.00	120.00	28.00	●	
1,600	1.600	4.000	165.00	120.00	28.00	●	
2,000	2.000	4.000	165.00	120.00	28.00	●	●
2,500	2.500	10.000	175.00	120.00	40.00	●	●
2,700	2.700	10.000	175.00	120.00	40.00	◯	●
3,000	3.000	10.000	175.00	120.00	40.00	●	●
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	●	●

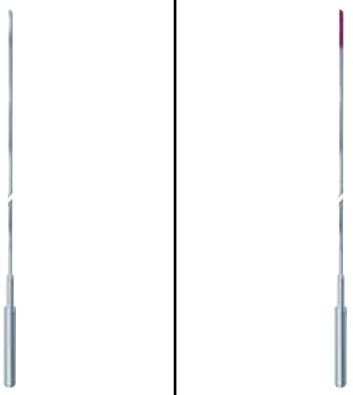
◯ bright Ⓐ TiAlN SuperA

Single-fluted gun drills EB 100

Order no. = Guhring no. + Code no.

Guhring no.	5021	5638
Standard	Guhring standard	Guhring standard
Tool material	Solid carbide	Solid carbide
Carbide grade	K30/K40	K30/K40
Surface	○	Ⓐ
Flute length (mm)	160,00	160,00
Cutting direction	right-hand	right-hand
Tolerance	h5	h5
Discount group	123	123





Code no.	d1 mm	d2 mm	l1 mm	l2 mm	l3 mm	Availability	
1,500	1.500	4.000	205.00	160.00	28.00	●	
1,600	1.600	4.000	205.00	160.00	28.00	●	
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	●	●

○ bright Ⓐ TiAlN SuperA

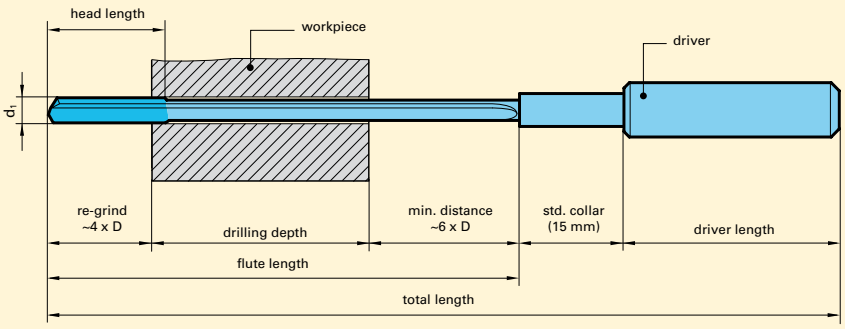
suitable for almost every material,

Stock program from Ø 1,2 to 12,0 mm
Special solutions from Ø 0,9 to 12,0 mm, flute length max. 500 mm
Inquiry form see page 68

For certain materials a coating is required, as the successful application of gun drills with a bright surface finish cannot be guaranteed.
For coating definitions see GuhringNavigator.

(S) TiN-coat (F) FIRE (M) MolyGlide (A) TiAlN SuperA (a) TiAlN nanoA

The dimensions required to calculate the length for conventional machine tools



EB 100 Head forms

(Position of supporting strips. Special head forms on request.)

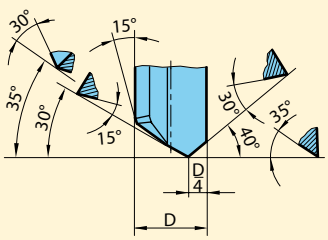
suitable for all materials, but for smaller hole tolerances

suitable for difficult-to-machine materials, i. e. high-alloyed steel

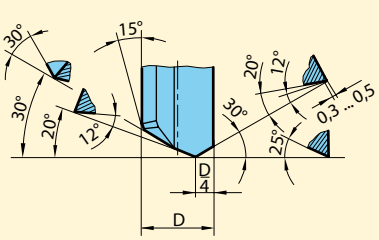
EB 100 Standard point grinds

(special point grinds on request)

Ø 2...4.00 mm



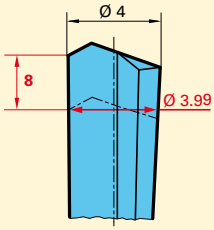
Ø > 4.01...20 mm



EB 100 Back taper ratio

1:800 (standard)

(dimensions in mm)



SINGLE-FLUTED GUN DRILL EB 80 WITH B

BRAZED CARBIDE HEAD

EB 80

GUHRING

Single-fluted gun drill EB 80

Standard	Type	Tool illustration	Drilling depth	Tool material	Surface	Diameter range	Guhring no.	Discount group	Standard range. page
Single fluted gun drills EB 80									
Guhring std.	EB 80		20 x D	**Carbide**	S	4.000 - 12.000	**5018**	123	19
Guhring std.	EB 80		20 x D	**Carbide**	C	4.000 - 12.000	**5639**	123	19
Guhring std.	EB 80		30 x D	**Carbide**	S	4.000 - 12.000	**5460**	123	20
Guhring std.	EB 80		30 x D	**Carbide**	C	4.000 - 12.000	**5640**	123	20
Guhring std.	EB 80		40 x D	**Carbide**	S	4.000 - 12.000	**5022**	123	21
Guhring std.	EB 80		40 x D	**Carbide**	C	4.000 - 12.000	**5641**	123	21
Guhring std.	EB 80		80 x D	**Carbide**	S	4.950 - 11.950	**5023**	123	22
Guhring std.	EB 80		80 x D	**Carbide**	C	4.950 - 11.950	**5642**	123	22

TiN-coated design with chip breaker for long-chipping steels

TiCN-coated design without chip breaker for alloyed and high-alloyed steels

Quick service for brazed single-fluted gun drills

In addition to the stock range Guhring provides a quick service for the following dimensions. Delivery time maximum 3 weeks. Please complete the form on page 71 for your inquiry/order.

Ø nominal mm	in increments of mm	head form	total length	
2.00…13.90	0.1	G	≤ 7.5 mm Ø 650 max	Prices on inquiry
4.00…13.90	0.1	C	> 7.5 mm Ø 1200 max	
14.00…22.00	0.5	G	1200 max	
14.00…22.00	0.5	C		

Tool material:	VHM/K15
Surface:	◯ / S / C

Standard head lengths (mm)

Ø-range	length	Ø-range	length
2.00…2.49	15	10.00…10.99	35
2.50…2.99	18	11.00…17.00	40
3.00…3.99	20	17.01…20.00	45
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

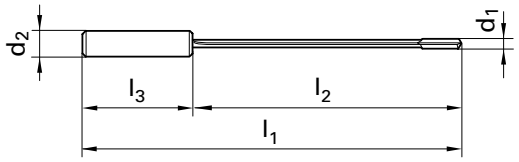
Flute length: min. 20 x D

INCH sizes are also available within our quick service. Please do not hesitate to contact us!

S TiN C TiCN

Order no. = Guhring no. + Code no.

Guhring no.	5018	5639
Standard	Guhring standard	
Tool material	Carbide	
Carbide grade	K15	K30/K40
Surface	S	C
Drilling depth	20 x D	20 x D
Cutting direction	right-hand	right-hand
Tolerance	h5	h5
Discount group	123	123

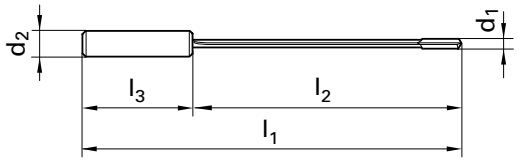


Code	d1	d1	d2	l1	l2	l3	Availability	
no.	inch	mm	mm	mm	mm	mm		
3,970	5/32	3.970	10.000	150.00	100.00	40.00		●
4,000		4.000	12.000	150.00	100.00	40.00	❍	●
4,200		4.200	12.000	160.00	110.00	40.00	❍	
4,500		4.500	12.000	170.00	120.00	40.00	●	
5,000		5.000	16.000	180.00	130.00	48.00	●	●
5,156	13/64	5.156	16.000	180.00	130.00	48.00		●
5,500		5.500	16.000	190.00	140.00	48.00	●	
6,000		6.000	16.000	210.00	160.00	48.00	●	●
6,350	1/4	6.350	16.000	220.00	170.00	48.00		●
6,500		6.500	16.000	220.00	170.00	48.00	●	
7,000		7.000	16.000	235.00	185.00	48.00	●	●
7,938	15/16	7.938	16.000	260.00	210.00	48.00		●
8,000		8.000	16.000	260.00	210.00	48.00	●	●
9,000		9.000	16.000	280.00	230.00	48.00	●	●
9,525	3/8	9.525	16.000	290.00	240.00	48.00		●
10,000		10.000	20.000	320.00	260.00	50.00	●	●
11,000		11.000	20.000	340.00	290.00	50.00		●
11,113	7/16	11.113	20.000	340.00	290.00	50.00		●
12,000		12.000	20.000	370.00	310.00	50.00	●	●
12,700	1/2	12.700	20.000	385.00	330.00	50.00		●

S TiN C TiCN

Order no. = Guhring no. + Code no.

Guhring no.	5460	5640
Standard	Guhring standard	
Tool material	Carbide	
Carbide grade	K15	K30/K40
Surface	S	C
Drilling depth	30 x D	30 x D
Cutting direction	right-hand	right-hand
Tolerance	h5	h5
Discount group	123	123



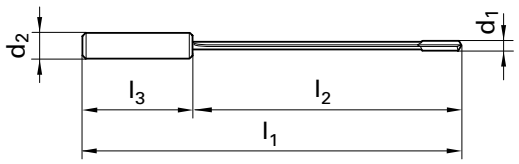
Code no.	d1 inch	d1 mm	d2 mm	l1 mm	l2 mm	l3 mm	Availability 5460	Availability 5640
3,970	5/32	3.970	10.000	200.00	155.00	40.00		●
4,000		4.000	12.000	200.00	155.00	40.00	●	●
4,200		4.200	12.000	210.00	165.00	40.00	❍	
4,500		4.500	12.000	220.00	175.00	40.00	●	
5,000		5.000	16.000	230.00	182.00	48.00	●	●
5,156	13/64	5.156	16.000	230.00	182.00	48.00		●
5,500		5.500	16.000	245.00	197.00	48.00	❍	
6,000		6.000	16.000	260.00	212.00	48.00	●	●
6,350	1/4	6.350	16.000	275.00	227.00	48.00		●
6,500		6.500	16.000	275.00	227.00	48.00	●	
7,000		7.000	16.000	290.00	242.00	48.00	●	●
7,938	15/16	7.938	16.000	320.00	272.00	48.00		●
8,000		8.000	16.000	320.00	272.00	48.00	●	●
9,000		9.000	16.000	350.00	302.00	48.00	●	●
9,525	3/8	9.525	16.000	380.00	330.00	48.00		●
10,000		10.000	20.000	400.00	350.00	50.00	●	●
11,000		11.000	20.000	430.00	380.00	50.00		●
11,113	7/16	11.113	20.000	430.00	380.00	50.00		●
12,000		12.000	20.000	450.00	400.00	50.00	●	●
12,700	1/2	12.700	20.000	500.00	450.00	50.00		●

Availability

(S) TiN (C) TiCN

Order no. = Guhring no. + Code no.

Guhring no.	5022	5641
Standard	Guhring standard	
Tool material	Carbide	
Carbide grade	K15	K30/K40
Surface	S	C
Drilling depth	40 x D	40 x D
Cutting direction	right-hand	right-hand
Tolerance	h5	h5
Discount group	123	123



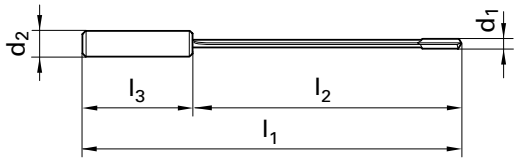
Code	d1	d1	d2	l1	l2	l3	Availability	
no.	inch	mm	mm	mm	mm	mm		
3,970	5/32	3.970	10.000	230.00	185.00	40.00		●
4,000		4.000	12.000	230.00	185.00	40.00	●	●
4,200		4.200	12.000	240.00	195.00	40.00	●	
4,500		4.500	12.000	250.00	205.00	40.00	●	
5,000		5.000	16.000	280.00	232.00	48.00	●	●
5,156	13/64	5.156	16.000	280.00	232.00	48.00		●
5,500		5.500	16.000	300.00	252.00	48.00	●	
6,000		6.000	16.000	320.00	272.00	48.00	●	●
6,350	1/4	6.350	16.000	340.00	292.00	48.00		●
6,500		6.500	16.000	340.00	292.00	48.00	●	
7,000		7.000	16.000	370.00	322.00	48.00	●	●
7,938	15/16	7.938	16.000	430.00	372.00	48.00		●
8,000		8.000	16.000	430.00	372.00	48.00	●	●
9,000		9.000	16.000	450.00	402.00	48.00	❍	●
9,525	3/8	9.525	16.000	480.00	432.00	48.00		●
10,000		10.000	20.000	510.00	460.00	50.00	●	●
11,000		11.000	20.000	550.00	500.00	50.00		●
11,113	7/16	11.113	20.000	550.00	500.00	50.00		●
12,000		12.000	20.000	600.00	550.00	50.00	●	●
12,700	1/2	12.700	20.000	635.00	585.00	50.00		●

S TiN C TiCN

Order no. = Guhring no. + Code no.

Guhring no.	5023	5642
Standard	Guhring standard	
Tool material	Carbide	
Carbide grade	K15	K30/K40
Surface	S	C
Drilling depth	80 x D	80 x D
Cutting direction	right-hand	right-hand
Tolerance	h5	h5
Discount group	123	123

Maximal flute length per tool 40 x D, for larger drilling depths apply Guhring no. 5022 or 5641 as first tool!



Code	d1	d1	d2	l1	l2	l3	Availability	
no.	inch	mm	mm	mm	mm	mm		
4.950		4.950	16.000	480.00	432.00	48.00	●	●
5.106		5.106	16.000	480.00	432.00	48.00		●
5.950	15/64	5.950	16.000	560.00	512.00	48.00	●	●
6.300		6.300	16.000	590.00	542.00	48.00		●
6.950		6.950	16.000	650.00	602.00	48.00		●
7.888		7.888	16.000	740.00	692.00	48.00		●
7.950		7.950	16.000	740.00	692.00	48.00	●	●
8.950		8.950	16.000	820.00	772.00	48.00		●
9.475		9.475	16.000	870.00	822.00	48.00		●
9.950		9.950	20.000	910.00	860.00	50.00	●	●
10.950		10.950	20.000	995.00	945.00	50.00		●
11.063		11.063	20.000	995.00	945.00	50.00		●
11.950		11.950	20.000	1080.00	1030.00	50.00	●	●
12.650		12.650	20.000	1140.00	1090.00	50.00		●

S TiN C TiCN

suitable for almost every material,

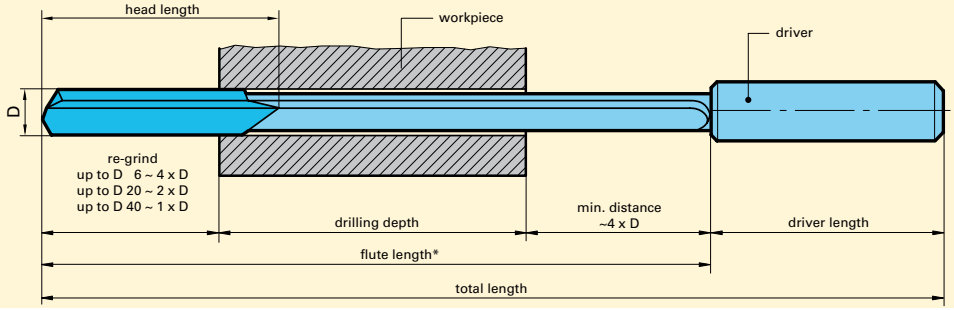
Stock program from Ø 3,97 to 12,7 mm
Special solutions from Ø 2,0 to 40,0 mm, total length max. 3000 mm
Inquiry form see page 70 and 71 (Quickservice)

For certain materials a coating is required, as the successful application of gun drills with a bright surface finish cannot be guaranteed.
For coating definitions see GuhringNavigator.
On request we can apply PCD or PCB cutting edges from Ø 6.0 – 20.00 mm. This improves the tool life in AlSi alloys many times over.

(S) TiN (F) FIRE (M) MolyGlide (C) TiCN

The dimensions required to calculate the length for conventional machine tools

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



EB 80 Head forms (position of supporting strips)

Standard designs

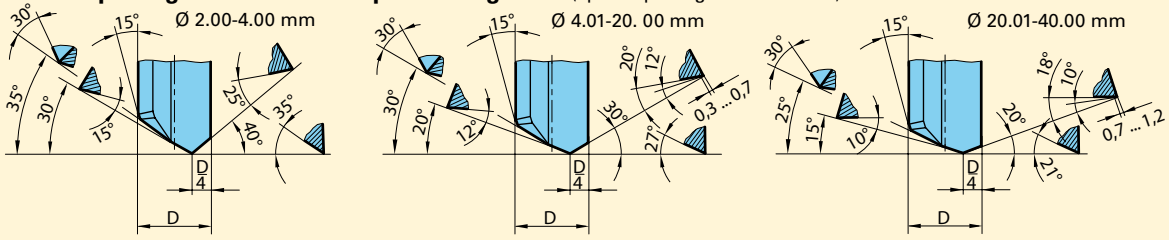
G Suitable for all materials, but for smaller hole tolerances

C Primarily suitable for aluminium. Nominal tool diameter measurable.

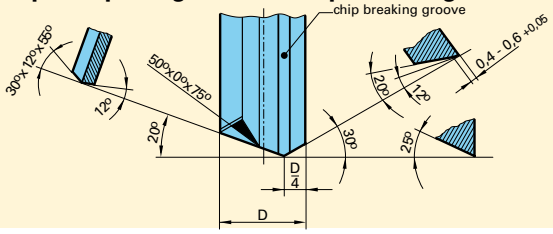
Special designs e.g.

E **A** **D**

EB 80 standard point grinds without chip breaker groove (special point grinds available)



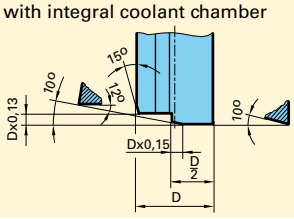
EB 80 special point grind with chip breaker groove (standard Guhring no. 5018, 5460, 5022 and 5023)



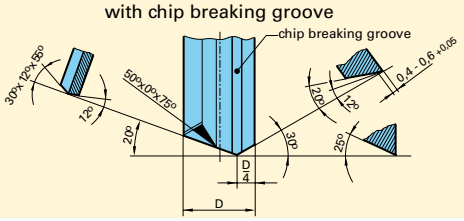
Standard head lengths (mm)			
Ø-range	length	Ø-range	length
2.00…2.49	15	10.00…10.99	35
2.50…2.99	18	11.00…17.00	40
3.00…3.99	20	17.01…20.00	45
4.00…5.19	25	20.01…23.00	50
5.20…6.99	30	23.01…26.00	55
7.00…9.99	35	26.01…40.00	65

Special point grind examples for single-fluted EB 80 (additional point grinds on request)

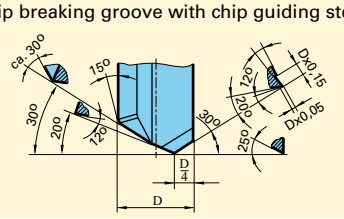
with integral coolant chamber



with chip breaking groove



chip breaking groove with chip guiding step



DOUBLE-FLUTED GUN DRILL ZB 80 WITH

BRAZED CARBIDE HEAD

ZB 80

GUHRING

Standard	Type	Tool illustration	Drilling depth	Tool material	Surface	Diameter range	Guhring no.	Discount group	Standard range. page
Double-fluted gun drills ZB 80									
Guhring std.	ZB 80	 Aluminium	30 x D	**Carbide**	◯	8.000 - 12.000	**5019**	123	27
Guhring std.	ZB 80	 Cast materials	30 x D	**Carbide**	◯	8.000 - 12.000	**5643**	123	27

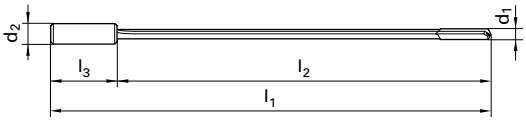
Point grind for cast materials

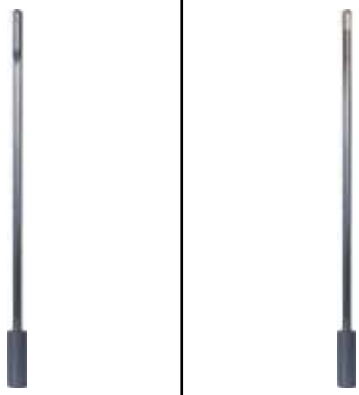
Point grind for aluminium

◯ bright

Order no. = Guhring no. + Code no.

Guhring no.	5019	5643
Standard	Guhring standard	
Tool material	Carbide	
Carbide grade	K15	K 15
Surface	◯	◯
Drilling depth	30 x D	30 x D
Cutting direction	right-hand	right-hand
Tolerance	h5	h5
Discount group	123	123



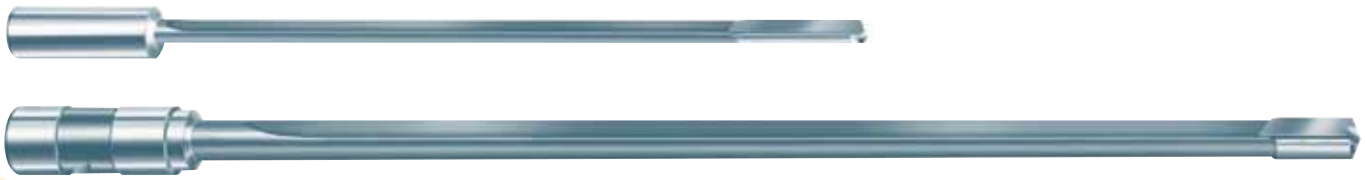


Code no.	d1 mm	d2 mm	l1 mm	l2 mm	l3 mm	Availability	
8,000	8,000	16,000	330,00	280,00	48,00	●	●
10,000	10,000	20,000	390,00	340,00	50,00	●	●
12,000	12,000	20,000	450,00	400,00	50,00	●	●

◯ bright

suitable for cast iron, aluminium and short-chipping non-ferrous metals

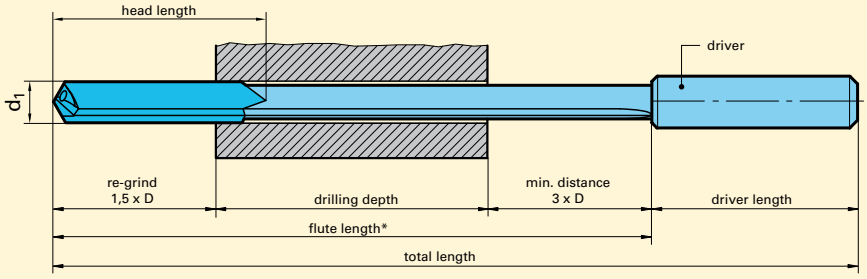
Stock program from Ø 8,0 to 12 mm for drilling depth to 30 x D
Special solutions from Ø 6,0 to 27,0 mm, total length max. 1000 mm
Inquiry form see page 72



Ⓜ MolyGlide
For certain materials a coating is required, as the successful application of gun drills with a bright surface finish cannot be guaranteed. For chilled cast iron and Al cast alloys with a Si-content above 10% we recommend our MolyGlide-coating. However, two-fluted gun drills type ZB80 can only be coated with MolyGlide up to an overall length of maximum 500 mm due to the technical production process. See also the GuhringNavigator.

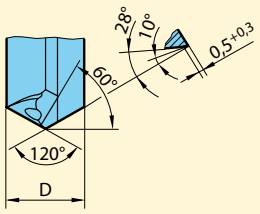
The dimensions required to calculate the length for conventional machine tools

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

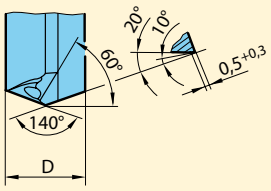


ZB 80
Standard point grinds
(special point grinds available)

Point grind G for machining cast iron

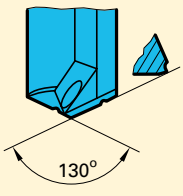


Point grind A for machining aluminium

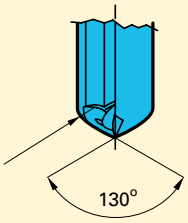


ZB 80
Special point grinds, e.g.:

Aluminium



Cast iron



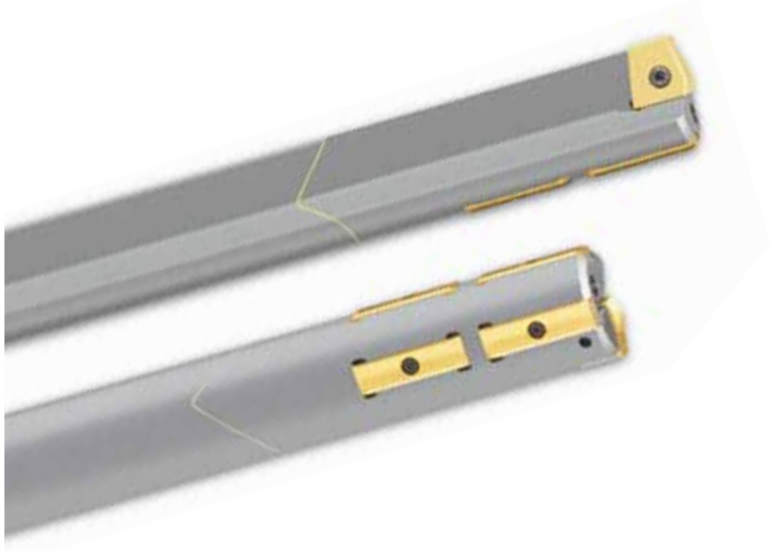
SINGLE-FLUTED GUN DRILLS WITH INTERCHANGE PARTS EB 800

EB 800

GUHRING

Special solutions from Ø 12.0 to 40.0 mm, total length max. 3000 mm

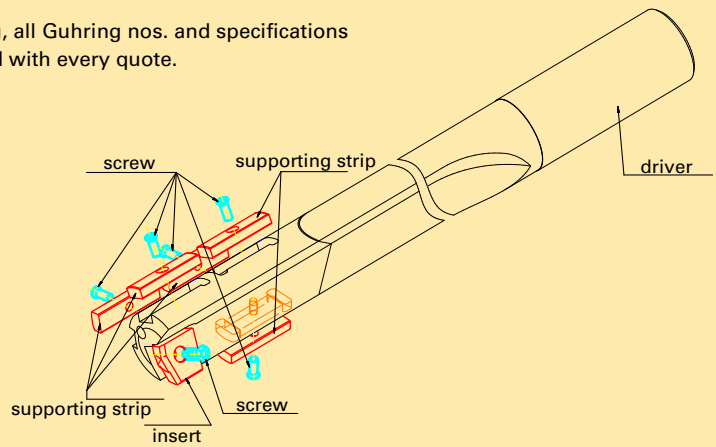
Size	Diameter holder range	Body/ holder	Insert				
			Inserts				Screws
			TiN-coated	FIRE-coated	Signum-coated	TiAlN nanoA-coated	
0.	Ø12.00 - Ø12.49 Ø12.50 - Ø12.99 Ø13.00 - Ø13.49 Ø13.50 - Ø13.99 Ø14.00 - Ø14.49 Ø14.50 - Ø14.99 Ø15.00 - Ø15.49 Ø15.50 - Ø15.99	Body/holder especially to customer requirements. Total length up to 3000mm, flute length from 15xD Alternative: Standard range Guhring no. 5644 from diameter 12.00mm up to 24.00mm in preferred sizes complete with TiN inserts and TiN supporting strips	Guhring no. 5029 + nom. diameter = order no.	Guhring no. 5704 + nom. diameter = order no.	Guhring no. 5702 + nom. diameter = order no.	Guhring no. 5706 + nom. diameter = order no.	Guhring no. 4071 2.502 T8 M2.5x 5.2
1.	Ø16.00 - Ø16.49 Ø16.50 - Ø16.99 Ø17.00 - Ø17.49 Ø17.50 - Ø17.99 Ø18.00 - Ø18.49 Ø18.50 - Ø18.99 Ø19.00 - Ø19.49 Ø19.50 - Ø19.99						Guhring no. 4071 3.002 T9 M3x6.4
2.	Ø20.00 - Ø20.49 Ø20.50 - Ø20.99 Ø21.00 - Ø21.49 Ø21.50 - Ø21.99 Ø22.00 - Ø22.49 Ø22.50 - Ø22.99 Ø23.00 - Ø23.49 Ø23.50 - Ø23.99 Ø24.00 - Ø24.49 Ø24.50 - Ø24.99 Ø25.00 - Ø25.49 Ø25.50 - Ø25.99						Guhring no. 4071 4.001 T15 M4x7.7
3.	Ø26.00 - Ø26.49 Ø26.50 - Ø26.99 Ø27.00 - Ø27.49 Ø27.50 - Ø27.99 Ø28.00 - Ø28.49 Ø28.50 - Ø28.99 Ø29.00 - Ø29.49 Ø29.50 - Ø29.99						Guhring no. 4071 4.002 T15 M4x10.6
4.	Ø30.00 - Ø30.49 Ø30.50 - Ø30.99 Ø31.00 - Ø31.49 Ø31.50 - Ø31.99 Ø32.00 - Ø32.49 Ø32.50 - Ø32.99 Ø33.00 - Ø33.49 Ø33.50 - Ø33.99						
5.	Ø34.00 - Ø34.49 Ø34.50 - Ø34.99 Ø35.00 - Ø35.49 Ø35.50 - Ø35.99 Ø36.00 - Ø36.49 Ø36.50 - Ø36.99 Ø37.00 - Ø37.49 Ø37.50 - Ø37.99						Guhring no. 4071 5.002 T20 M5x14.2
6.	Ø38.00 - Ø38.49 Ø38.50 - Ø38.99 Ø39.00 - Ø39.49 Ø39.50 - Ø40.00						



Screw driver	Supporting strip				Screws	Screw driver
	TiN-coated	FIRE-coated	Signum-coated	TiAlN nanoA-coated		
Guhring no. 1612 8.001	Guhring no. 5030 + nom. diameter = order no.	Guhring no. 5705 + nom. diameter = order no.	Guhring no. 5703 + nom. diameter = order no.	Guhring no. 5707 + nom. diameter = order no.	Guhring no. 4071 1.601 T5 M1.6x4.4	Guhring no. 1612 5.001
Guhring no. 1612 9.001					Guhring no. 4071 2.203 T7 / M2.2x 4.6	Guhring no. 1612 7.001
					Guhring no. 4071 2.202 T7 / M2.2x5.6	
Guhring no. 1612 15.001					Guhring no. 4071 2.502 T8 M2.5x 5.2	Guhring no. 1612 8.001
					Guhring no. 4071 2.501 T8 M2.5x6.4	
Guhring no. 1612 20.001					Guhring no. 4071 3.003 T9 M3x8	Guhring no. 1612 9.001

Attention: shortest flute length 15 x 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 74 31 170
Fax +49 74 43 17-21 279

Gun drills
with interchangeable insert and supporting strip, internal cooling

Diameter range: 12.00 mm - 40.00 mm

NEW:

- Now available: inserts and supporting strips with 4 application orientated coatings
- Inserts and supporting strips in 1/10 diameters as standard, in 1/100 diameters as special tools with fixed additional charges

Guhring single-fluted gun drills with interchangeable inserts and supporting strips are also produced as special tools according to customer requirements. They are suitable for nearly every material and available from diameter 16.0 to 40.0 mm up to a maximum total length of 3000 mm.

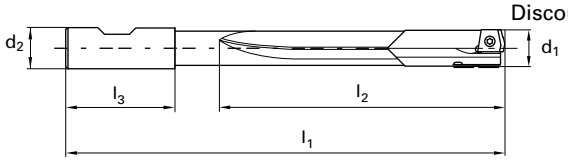
Your special advantages are:

- The interchangeable component technology for inserts and supporting strips makes any combination of carbide grade and coating possible.
- The precision interchangeable inserts and supporting strips eliminate complicated adjustments.
- The precision supporting strips are produced in a special carbide for your individual deep drilling task. They can be reverse-fitted, providing double tool life. In addition, they can be provided with any of the Guhring coatings.
- Thanks to the precision insert seatings and the interchangeable inserts there is only a small number of interchangeable components. The tool is therefore extremely rigid.
- Expensive stoppages are eliminated because the worn components can be replaced without removing the tool from the machine.
- The expensive re-grinding process is eliminated thanks to the interchangeable insert technology.
- The application orientated selection of the most suitable interchangeable insert always ensures optimal chip breaking – even in problematic materials.
- Specifically optimised to your individual deep drilling task, the precision inter-changeable inserts are also produced in a special carbide. In addition, all Gühring coatings are available.
- Within the diameter range it is possible to modify the nominal diameter at any time by simply interchanging the individual components.
- The driver is produced in heat-treatable steel acc. to:
  - DIN 6535 HA
  - DIN 6535 HB
  - DIN 6535 HE
  - DIN 1835 E

  Also, all the forms generally required for deep drilling machines are possible to be manufactured.

Stock program from Ø 12.0 to 24.0 mm suitable for almost every material

Guhring no.	5644
Standard	Guhring std.
Tool material	Carbide
Carbide grade	K20/K40
Surface	(S)
Type	EB 800
Drilling depth	30xD
Cutting direction	right-hand
Tolerance	h8
Discount group	123



d1		d2	l1	l2	l3	Availability
mm	inch	mm	mm	mm	mm	
12.000		20.000	446.00	384.00	50.00	●
12.700	1/2	20.000	468.00	384.00	50.00	●
14.000		20.000	510.00	448.00	50.00	●
15.000		25.000	548.00	480.00	56.00	●
16.000		25.000	580.00	512.00	56.00	●
18.000		25.000	644.00	576.00	56.00	●
20.000		32.000	712.00	640.00	60.00	●
24.000		32.000	840.00	768.00	60.00	●

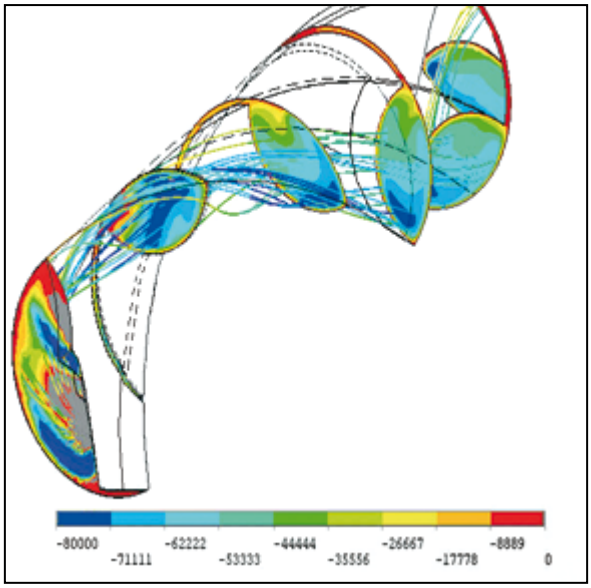
(S) TiN

RT 100 T SOLID CARBIDE

RT 100 T

GUHRING

Standard	Type	Tool illustration	Drilling depth	Tool material	Surface	Diameter range	Guhring no.	Discount group	Standard range. page
Spiral-fluted deep hole drill RT 100 T									
Guhring std.	RT 100 T		15 x D	**Solid carbide**	A	3.000 - 14.000	**6509**	165	35
Guhring std.	RT 100 T		20 x D	**Solid carbide**	A	3.000 - 14.000	**6511**	165	37
Guhring std.	RT 100 T		25 x D	**Solid carbide**	A	3.000 - 12.000	**6512**	165	37
Guhring std.	RT 100 T		30 x D	**Solid carbide**	A	3.000 - 10.000	**6513**	165	41
Guhring std.	RT 100 T		40 x D	**Solid carbide**	A	3.000 - 8.000	**6514**	165	42

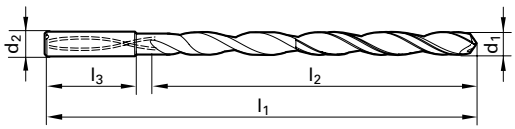


TiAIN head coated for steel and cast material

A TiAIN head coated

Order no. = Guhring no. + Code no.

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



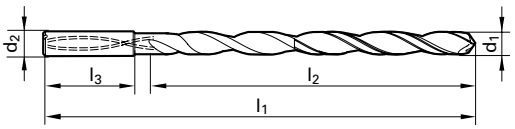
Code	d1	d1	d2 h6	l1	l2	l3	Availability
no.	inch	mm	mm	mm	mm	mm	
3,000	13/64	3.000	6.000	95.00	55.00	36.00	●
3,170	1/8	3.170	6.000	106.00	67.00	36.00	●
3,500		3.500	6.000	116.00	76.00	36.00	●
3,570	9/64	3.570	6.000	116.00	76.00	36.00	●
3,970	5/32	3.970	6.000	116.00	76.00	36.00	●
4,000		4.000	6.000	116.00	76.00	36.00	●
4,370	11/64	4.370	6.000	133.00	93.00	36.00	●
4,500		4.500	6.000	133.00	93.00	36.00	●
4,760	3/16	4.760	6.000	133.00	93.00	36.00	●
5,000		5.000	6.000	133.00	93.00	36.00	●
5,100		5.100	6.000	150.00	110.00	36.00	●
5,160	13/64	5.160	6.000	150.00	110.00	36.00	●
5,410		5.410	6.000	150.00	110.00	36.00	●
5,500		5.500	6.000	150.00	110.00	36.00	●
5,560	7/32	5.560	6.000	150.00	110.00	36.00	●
5,950	15/64	5.950	6.000	150.00	110.00	36.00	●
6,000		6.000	6.000	150.00	110.00	36.00	●
6,350	1/4	6.350	8.000	167.00	127.00	36.00	●
6,500		6.500	8.000	167.00	127.00	36.00	●
6,750	17/64	6.750	8.000	167.00	127.00	36.00	●
7,000		7.000	8.000	167.00	127.00	36.00	●
7,140	9/32	7.140	8.000	183.00	143.00	36.00	●
7,500		7.500	8.000	183.00	143.00	36.00	●
7,540		7.540	8.000	183.00	143.00	36.00	●
7,940	19/64	7.940	8.000	183.00	143.00	36.00	●
8,000		8.000	8.000	183.00	143.00	36.00	●
8,330	21/64	8.330	10.000	204.00	160.00	40.00	●
8,500		8.500	10.000	204.00	160.00	40.00	●
8,730	11/32	8.730	10.000	204.00	160.00	40.00	●
9,000		9.000	10.000	204.00	160.00	40.00	●
9,130	23/64	9.130	10.000	221.00	177.00	40.00	●
9,520	3/8	9.520	10.000	221.00	177.00	40.00	●
9,920	25/64	9.920	10.000	221.00	177.00	40.00	●
10,000		10.000	10.000	221.00	177.00	40.00	●
10,320	13/32	10.320	12.000	247.00	198.00	45.00	●
10,720	27/64	10.720	12.000	247.00	198.00	45.00	●

A TiAlN head coated

Spiral-fluted deep hole drill RT 100T

Order no. = Guhring no. + Code no.

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

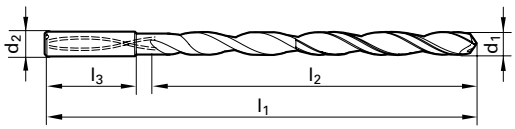


Code no.	d1 inch	d1 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	Availability
11,000		11.000	12.000	247.00	198.00	45.00	●
11,110	7/16	11.110	12.000	263.00	214.00	45.00	●
11,510	29/64	11.510	12.000	263.00	214.00	45.00	●
11,910	15/32	11.910	12.000	263.00	214.00	45.00	●
12,000		12.000	12.000	263.00	214.00	45.00	●
12,300	31/64	12.300	14.000	297.00	248.00	45.00	●
12,700	1/2	12.700	14.000	297.00	248.00	45.00	●
13,100	33/64	13.100	14.000	297.00	248.00	45.00	●
13,490	17/32	13.490	14.000	297.00	248.00	45.00	●
13,890	35/64	13.890	14.000	297.00	248.00	45.00	●
14,000		14.000	14.000	297.00	248.00	45.00	●

A TiAlN head coated

Order no. = Guhring no. + Code no.

Guhring no.	6511
Standard	Guhring standard
Tool material	Solid carbide
Carbide grade	K30/K40
Surface	A
Type	RT 100T
Shank	HA
Drilling depth	20 x D
Cutting direction	right-hand
Tolerance	h7
Discount group	165

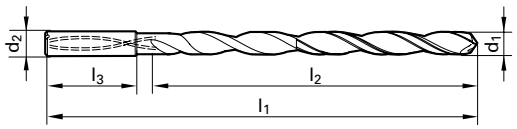


Code no.	d1 inch	d1 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	Availability
3,000		3.000	6.000	110.00	70.00	36.00	●
3,170	1/8	3.170	6.000	123.00	83.00	36.00	●
3,500		3.500	6.000	136.00	96.00	36.00	●
3,570	9/64	3.570	6.000	136.00	96.00	36.00	●
3,970	5/32	3.970	6.000	136.00	96.00	36.00	●
4,000		4.000	6.000	136.00	96.00	36.00	●
4,370	11/64	4.370	6.000	158.00	118.00	36.00	●
4,500		4.500	6.000	158.00	118.00	36.00	●
4,760	3/16	4.760	6.000	158.00	118.00	36.00	●
5,000		5.000	6.000	158.00	118.00	36.00	●
5,100		5.100	6.000	180.00	140.00	36.00	●
5,160	13/64	5.160	6.000	180.00	140.00	36.00	●
5,410		5.410	6.000	180.00	140.00	36.00	●
5,500		5.500	6.000	180.00	140.00	36.00	●
5,560	7/32	5.560	6.000	180.00	140.00	36.00	●
5,950	15/64	5.950	6.000	180.00	140.00	36.00	●
6,000		6.000	6.000	180.00	140.00	36.00	●
6,350	1/4	6.350	8.000	202.00	162.00	36.00	●
6,500		6.500	8.000	202.00	162.00	36.00	●
6,750	17/64	6.750	8.000	202.00	162.00	36.00	●
7,000		7.000	8.000	202.00	162.00	36.00	●
7,140	9/32	7.140	8.000	223.00	183.00	36.00	●
7,500		7.500	8.000	223.00	183.00	36.00	●
7,540		7.540	8.000	223.00	183.00	36.00	●
7,940	19/64	7.940	8.000	223.00	183.00	36.00	●
8,000		8.000	8.000	223.00	183.00	36.00	●
8,330	21/64	8.330	10.000	249.00	205.00	40.00	●
8,500		8.500	10.000	249.00	205.00	40.00	●
8,730	11/32	8.730	10.000	249.00	205.00	40.00	●
9,000		9.000	10.000	249.00	205.00	40.00	●
9,130	23/64	9.130	10.000	271.00	227.00	40.00	●
9,520	3/8	9.520	10.000	271.00	227.00	40.00	●
9,920	25/64	9.920	10.000	271.00	227.00	40.00	●
10,000		10.000	10.000	271.00	227.00	40.00	●
10,320	13/32	10.320	12.000	302.00	253.00	45.00	●
10,720	27/64	10.720	12.000	302.00	253.00	45.00	●

A TiAlN head coated

Order no. = Guhring no. + Code no.

Guhring no.	6511
Standard	Guhring standard
Tool material	Solid carbide
Carbide grade	K30/K40
Surface	A
Type	RT 100T
Shank	HA
Drilling depth	20 x D
Cutting direction	right-hand
Tolerance	h7
Discount group	165

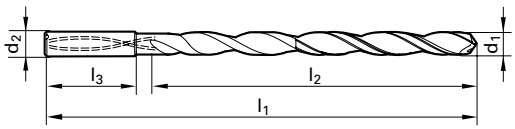


Code no.	d1 inch	d1 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	Availability
11,000		11.000	12.000	302.00	253.00	45.00	●
11,110	7/16	11.110	12.000	323.00	274.00	45.00	●
11,510	29/64	11.510	12.000	323.00	274.00	45.00	●
11,910	15/32	11.910	12.000	323.00	274.00	45.00	●
12,000		12.000	12.000	323.00	274.00	45.00	●
12,300	31/64	12.300	14.000	367.00	318.00	45.00	●
12,700	1/2	12.700	14.000	367.00	318.00	45.00	●
13,100	33/64	13.100	14.000	367.00	318.00	45.00	●
13,490	17/32	13.490	14.000	367.00	318.00	45.00	●
13,890	35/64	13.890	14.000	367.00	318.00	45.00	●
14,000		14.000	14.000	367.00	318.00	45.00	●

A TiAlN head coated

Order no. = Guhring no. + Code no.

Guhring no.	6512
Standard	Guhring standard
Tool material	Solid carbide
Carbide grade	K30/K40
Surface	A
Type	RT 100T
Shank	HA
Drilling depth	25 x D
Cutting direction	right-hand
Tolerance	h7
Discount group	165

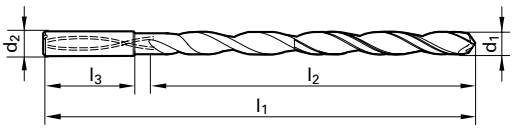


Code no.	d1 inch	d1 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	Availability
3,000		3.000	6.000	125.00	85.00	36.00	●
3,170	1/8	3.170	6.000	141.00	101.00	36.00	●
3,500		3.500	6.000	156.00	116.00	36.00	●
3,570	9/64	3.570	6.000	156.00	116.00	36.00	●
3,970	5/32	3.970	6.000	156.00	116.00	36.00	●
4,000		4.000	6.000	156.00	116.00	36.00	●
4,370	11/64	4.370	6.000	183.00	143.00	36.00	●
4,500		4.500	6.000	183.00	143.00	36.00	●
4,760	3/16	4.760	6.000	183.00	143.00	36.00	●
5,000		5.000	6.000	183.00	143.00	36.00	●
5,100		5.100	6.000	210.00	170.00	36.00	●
5,160	13/64	5.160	6.000	210.00	170.00	36.00	●
5,410		5.410	6.000	210.00	170.00	36.00	●
5,500		5.500	6.000	210.00	170.00	36.00	●
5,560	7/32	5.560	6.000	210.00	170.00	36.00	●
5,950	15/64	5.950	6.000	210.00	170.00	36.00	●
6,000		6.000	6.000	210.00	170.00	36.00	●
6,350	1/4	6.350	8.000	237.00	197.00	36.00	●
6,500		6.500	8.000	237.00	197.00	36.00	●
6,750	17/64	6.750	8.000	237.00	197.00	36.00	●
7,000		7.000	8.000	237.00	197.00	36.00	●
7,140	9/32	7.140	8.000	263.00	223.00	36.00	●
7,500		7.500	8.000	263.00	223.00	36.00	●
7,540		7.540	8.000	263.00	223.00	36.00	●
7,940	19/64	7.940	8.000	263.00	223.00	36.00	●
8,000		8.000	8.000	263.00	223.00	36.00	●
8,330	21/64	8.330	10.000	294.00	250.00	40.00	●
8,500		8.500	10.000	294.00	250.00	40.00	●
8,730	11/32	8.730	10.000	294.00	250.00	40.00	●
9,000		9.000	10.000	294.00	250.00	40.00	●
9,130	23/64	9.130	10.000	321.00	277.00	40.00	●
9,520	3/8	9.520	10.000	321.00	277.00	40.00	●
9,920	25/64	9.920	10.000	321.00	277.00	40.00	●
10,000		10.000	10.000	321.00	277.00	40.00	●
10,320	13/32	10.320	12.000	359.00	310.00	45.00	●
10,720	27/64	10.720	12.000	359.00	310.00	45.00	●

A TiAlN head coated

Order no. = Guhring no. + Code no.

Guhring no.	6512
Standard	Guhring standard
Tool material	Solid carbide
Carbide grade	K30/K40
Surface	A
Type	RT 100T
Shank	HA
Drilling depth	25 x D
Cutting direction	right-hand
Tolerance	h7
Discount group	165

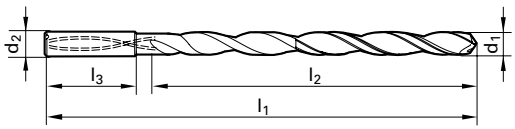


Code	d1	d1	d2 h6	l1	l2	l3	Availability
no.	inch	mm	mm	mm	mm	mm	
11,000		11.000	12.000	359.00	310.00	45.00	●
11,110	7/16	11.110	12.000	386.00	337.00	45.00	●
11,510	29/64	11.510	12.000	386.00	337.00	45.00	●
11,910	15/32	11.910	12.000	386.00	337.00	45.00	●
12,000		12.000	12.000	386.00	337.00	45.00	●

A TiAlN head coated

Order no. = Guhring no. + Code no.

Guhring no.	6513
Standard	Guhring standard
Tool material	Solid carbide
Carbide grade	K30/K40
Surface	A
Type	RT 100T
Shank	HA
Drilling depth	30 x D
Cutting direction	right-hand
Tolerance	h7
Discount group	165



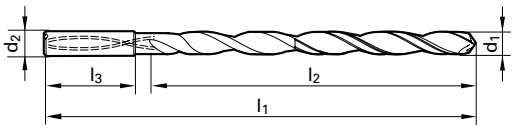
Code no.	d1 inch	d1 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm	Availability
3,000		3.000	6.000	140.00	100.00	36.00	●
3,170	1/8	3.170	6.000	158.00	118.00	36.00	●
3,500		3.500	6.000	176.00	136.00	36.00	●
3,570	9/64	3.570	6.000	176.00	136.00	36.00	●
3,970	5/32	3.970	6.000	176.00	136.00	36.00	●
4,000		4.000	6.000	176.00	136.00	36.00	●
4,370	11/64	4.370	6.000	208.00	168.00	36.00	●
4,500	21/64	4.500	6.000	208.00	168.00	36.00	●
4,760	3/16	4.760	6.000	208.00	168.00	36.00	●
5,000		5.000	6.000	208.00	168.00	36.00	●
5,100		5.100	6.000	240.00	200.00	36.00	●
5,160	13/64	5.160	6.000	240.00	200.00	36.00	●
5,410		5.410	6.000	240.00	200.00	36.00	●
5,500		5.500	6.000	240.00	200.00	36.00	●
5,560	7/32	5.560	6.000	240.00	200.00	36.00	●
5,950	15/64	5.950	6.000	240.00	200.00	36.00	●
6,000		6.000	6.000	240.00	200.00	36.00	●
6,350	1/4	6.350	8.000	272.00	232.00	36.00	●
6,500		6.500	8.000	272.00	232.00	36.00	●
6,750	17/64	6.750	8.000	272.00	232.00	36.00	●
7,000		7.000	8.000	272.00	232.00	36.00	●
7,140	9/32	7.140	8.000	303.00	263.00	36.00	●
7,500		7.500	8.000	303.00	263.00	36.00	●
7,540		7.540	8.000	303.00	263.00	36.00	●
7,940	19/64	7.940	8.000	303.00	263.00	36.00	●
8,000		8.000	8.000	303.00	263.00	36.00	●
8,330	21/64	8.330	10.000	339.00	295.00	40.00	●
8,500		8.500	10.000	339.00	295.00	40.00	●
8,730	11/32	8.730	10.000	339.00	295.00	40.00	●
9,000		9.000	10.000	339.00	295.00	40.00	●
9,130	23/64	9.130	10.000	371.00	327.00	40.00	●
9,520	3/8	9.520	10.000	371.00	327.00	40.00	●
9,920	25/64	9.920	10.000	371.00	327.00	40.00	●
10,000		10.000	10.000	371.00	327.00	40.00	●

A TiAlN head coated

Spiral-fluted deep hole drill RT 100T

Order no. = Guhring no. + Code no.

Guhring no.	6514
Standard	Guhring standard
Tool material	Solid carbide
Carbide grade	K30/K40
Surface	A
Type	RT 100T
Shank	HA
Drilling depth	40 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	Availability
3,000		3.000	6.000	170.00	130.00	36.00	●
3,170	1/8	3.170	6.000	193.00	153.00	36.00	●
3,500		3.500	6.000	193.00	153.00	36.00	●
3,570	9/64	3.570	6.000	216.00	176.00	36.00	●
3,970	5/32	3.970	6.000	216.00	176.00	36.00	●
4,000		4.000	6.000	216.00	176.00	36.00	●
4,370	11/64	4.370	6.000	238.00	198.00	36.00	●
4,500		4.500	6.000	238.00	198.00	36.00	●
4,760	3/16	4.760	6.000	258.00	218.00	36.00	●
5,000		5.000	6.000	258.00	218.00	36.00	●
5,100		5.100	6.000	280.00	240.00	36.00	●
5,160	13/64	5.160	6.000	280.00	240.00	36.00	●
5,410		5.410	6.000	280.00	240.00	36.00	●
5,500		5.500	6.000	280.00	240.00	36.00	●
5,560	7/32	5.560	6.000	300.00	260.00	36.00	●
5,950	15/64	5.950	6.000	300.00	260.00	36.00	●
6,000		6.000	6.000	300.00	260.00	36.00	●
6,350	1/4	6.350	8.000	322.00	282.00	36.00	●
6,500		6.500	8.000	322.00	282.00	36.00	●
6,750	17/64	6.750	8.000	342.00	302.00	36.00	●
7,000		7.000	8.000	342.00	302.00	36.00	●
7,140	9/32	7.140	8.000	363.00	323.00	36.00	●
7,500		7.500	8.000	363.00	323.00	36.00	●
7,540		7.540	8.000	383.00	343.00	36.00	●
7,940	19/64	7.940	8.000	383.00	343.00	36.00	●
8,000		8.000	8.000	383.00	343.00	36.00	●

A TiAlN head coated

suitable for the wet machining of aluminium with an Si-content > 1%.

Special solutions from Ø 3,0 to 14,0 mm, max. drilling depth 30 x D respectively flute length max. 320 mm

Inquiry form see page 75

Guhring has developed the spiral-flute deep hole drill RT 100 T ALU especially for the production of deep holes in aluminium materials. The drill is available as a special tool with immediate effect.
In addition to the correct choice of carbide suitable for the machining of aluminium, Guhring has paid special attention to the cutting edge geometry and the flute form when developing the RT 100 T ALU. They offer the following special features:

Spiral flutes with 15° rake angle and improved surface quality

The flute design with a rake angle of 15° ensures a considerably shorter chip travel. In addition, the high surface quality of the flute offers the chips low friction resistance. The RT 100 T ALU evacuates the optimally formed chips efficiently from deep holes without problem.

Application example cylinderhead

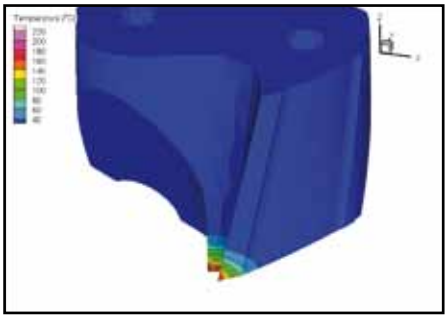
A typical field of application for aluminium materials is the automotive industry and especially engine manufacture. When machining a cylinderhead the spiral-flute deep hole drill RT 100 T ALU's level of performance is impressive:

- drilling the main oil gallery
- Ø 6.95 mm, drilling depth 2 x 210 mm
- drilling from both sides
- v_c = 110 m/min.
- V_f = 1500 mm/min.
- p = 50 bar (soluble oil)
- tool life: 500 m

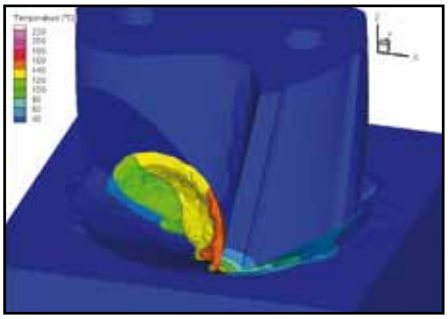
Optimised cutting edge geometry for the machining of aluminium

The cutting edge geometry of the spiral-flute deep hole drill RT 100 T ALU is optimised to produce chips that can be evacuated from deep holes as easily as possible.

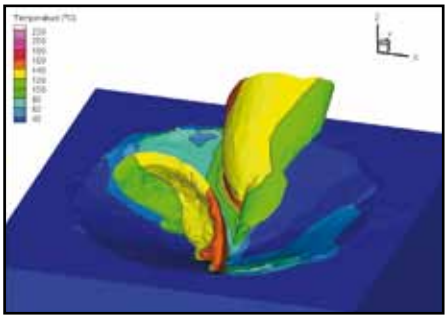
The special design of cutting edge geometry...



... provides optimally formed chips...



... and quick chip evacuation.



The procedure for machining aluminium

To achieve optimal machining results in the production of deep holes with the RT 100 T ALU particularly when piloting on radii and/or uneven surface, we recommend the following machining steps:

1. Milling of flat, i. e. with Guhring Ratio end mill RF 100 U incl. centre cutting. The flat must be at right angles to the entry of the drilling operation.
2. Producing a cylindrical pilot hole (tolerance F9) with a minimum drilling depth of 1xD (up to 3xD). We recommend our Ratio drill RT 100 U. Thanks to its point angle of 140° and its Ø-tolerance m7 it is ideally suited for this machining step.
3. Entering the spiral-flute deep hole drill RT 100 T ALU in the pilot hole with a speed of appr. 300 rev./min and a feed rate of appr. 500 mm/min.
4. Setting the cooling lubricant pressure and speed.
5. Due to the relatively high cutting speeds we recommend, especially for the machining of aluminium, to increase the cutting speed in several steps to the end value, i.e. with the program specification f_{Lin}, until reaching a drilling depth of 5xD.
6. Continuous drilling to full drilling depth without pecking cycle.
7. For through holes with oblique exit reduce the feed rate v_f appr. 1 mm prior to break-through by 40% .
8. Upon reaching the drilling depth switch off speed and cooling lubricant, withdraw with rapid feed rate.

.

STOP All deep hole drills must be guided during pilot drilling. Deep hole drills must never operate at full speed unsupported.

TM VENDING MACHINE

Guhring's modular TM Vending Machine relieves the customer of all tasks regarding tool storage and administration. Drawer and spiral modules enable the individual adaptation to specific customer storage requirements. The intelligent software ensures tool availability around the clock and detailed evaluation of all consumption and movement data.

SOLID CARBIDE MICRO-PRECISION DRILLS

Micro-Pre-
sision drills

GUHRING

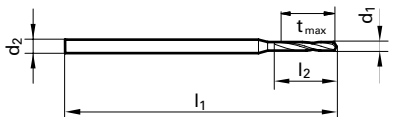
Standard	Type	Tool illustration	Drilling depth	Tool material	Surface	Diameter range	Guhring no.	Discount group	Standard range. page
Micro-precision drills with internal cooling									
Guhring std.	N		15 x D	**Solid carbide**	(A)	1.400 - 3.000	**6412**	164	47

TiAIN SuperA head coated for steel and cast materials

(A) TiAIN SuperA head coated

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	●

A TiAlN SuperA head coated

RATIO DRILLS RT 150 SOLID CARBIDE

RT 150

GUHRING

Standard	Type	Tool illustration	Drilling depth	Tool material	Surface	Diameter range	Guhring no.	Discount group	Standard range. page
Ratio drills RT 150									
Guhring std.	RT 150 GG		10 x D	**Solid carbide**	◯	3.000 - 20.000	**770**	121	51
Guhring std.	RT 150 GG		10 x D	**Solid carbide**	◯	3.000 - 20.000	**6070**	121	51
Guhring std.	RT 150 GN		15 x D	**Solid carbide**	◯	5.000 - 14.000	**773**	121	53

Relieved cone for aluminium

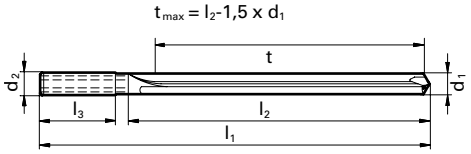
4-facet point grind for cast iron

Relieved cone and negative rake angle for aluminium

◯bright

Order no. = Guhring no. + Code no.

Guhring no.	770	6070
Standard	Guhring standard	Guhring standard
Tool material	Solid carbide	Solid carbide
Carbide grade	K	K
Surface	◯	◯
Type	RT 150 GG	RT 150 GG
Drilling depth	10 x D	10 x D
Cutting direction	right-hand	right-hand
Tolerance	m7	m7
Discount group	121	121
	Aluminium	Cast material



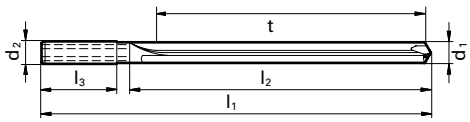
Code	d1		d2	l1	l2	l3	Availability	
no.	inch	mm	mm	mm	mm	mm		
3,000		3,000	6,000	91,00	42,00	36,00	●	●
3,100		3,100	6,000	91,00	42,00	36,00	●	❍
3,300		3,300	6,000	91,00	42,00	36,00	●	●
3,500		3,500	6,000	91,00	48,00	36,00	●	●
3,600		3,600	6,000	91,00	48,00	36,00		●
3,700		3,700	6,000	91,00	48,00	36,00	●	
3,800		3,800	6,000	121,00	77,00	36,00	●	❍
3,900		3,900	6,000	121,00	77,00	36,00	●	
4,000		4,000	6,000	121,00	77,00	36,00	●	●
4,100		4,100	6,000	121,00	77,00	36,00	●	
4,200		4,200	6,000	121,00	77,00	36,00	●	
4,300		4,300	6,000	121,00	77,00	36,00	●	
4,400		4,400	6,000	121,00	77,00	36,00	●	●
4,500		4,500	6,000	121,00	77,00	36,00	●	
4,600		4,600	6,000	121,00	77,00	36,00	●	
4,700		4,700	6,000	121,00	77,00	36,00	❍	●
4,800		4,800	6,000	121,00	82,00	36,00	●	●
4,900		4,900	6,000	121,00	82,00	36,00	●	❍
5,000		5,000	6,000	121,00	82,00	36,00	●	●
5,160	13/64	5,160	6,000	121,00	82,00	36,00	●	
5,500		5,500	6,000	121,00	82,00	36,00	●	●
5,560	7/32	5,560	6,000	121,00	82,00	36,00	●	
6,000		6,000	6,000	121,00	82,00	36,00	●	●
6,350	1/4	6,350	8,000	146,00	106,00	36,00	●	●
6,500		6,500	8,000	146,00	106,00	36,00	●	❍
6,750	17/64	6,750	8,000	146,00	106,00	36,00	❍	
6,800		6,800	8,000	146,00	106,00	36,00	●	●
7,000		7,000	8,000	146,00	106,00	36,00	●	❍
7,140	9/32	7,140	8,000	146,00	106,00	36,00	●	●
7,500		7,500	8,000	146,00	106,00	36,00	●	●
7,800		7,800	8,000	146,00	106,00	36,00	●	●
7,940	5/16	7,940	8,000	146,00	106,00	36,00	●	●
8,000		8,000	8,000	146,00	106,00	36,00	●	●
8,330	21/64	8,330	10,000	175,00	130,00	40,00	●	●
8,500		8,500	10,000	175,00	130,00	40,00	●	●
8,730	11/32	8,730	10,000	175,00	130,00	40,00	●	●
9,000		9,000	10,000	175,00	130,00	40,00	●	●
9,130	23/64	9,130	10,000	175,00	130,00	40,00	❍	
9,500		9,500	10,000	175,00	130,00	40,00	●	●

◯ bright

Order no. = Guhring no. + Code no.

Guhring no.	770	6070
Standard	Guhring standard	Guhring standard
Tool material	Solid carbide	Solid carbide
Carbide grade	K	K
Surface	◯	◯
Type	RT 150 GG	RT 150 GG
Drilling depth	10 x D	10 x D
Cutting direction	right-hand	right-hand
Tolerance	m7	m7
Discount group	121	121
	Aluminium	Cast material

$t_{max} = l_2\text{-}1{,}5 \times d_1$



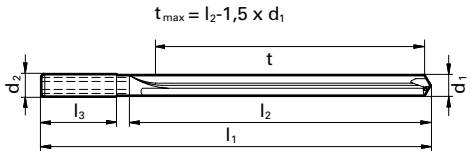
Code	d1		d2	l1	l2	l3	Availability	
no.	inch	mm	mm	mm	mm	mm		
9,520	3/8	9,520	10,000	175,00	130,00	40,00		◯
10,000		10,000	10,000	175,00	130,00	40,00	●	●
10,200		10,200	12,000	209,00	159,00	45,00	●	◯
10,320	13/32	10,320	12,000	209,00	159,00	45,00	◯	
10,500		10,500	12,000	209,00	159,00	45,00	●	●
10,720	27/64	10,720	12,000	209,00	159,00	45,00	●	◯
11,000		11,000	12,000	209,00	159,00	45,00	●	●
11,110	7/16	11,110	12,000	209,00	159,00	45,00	●	
11,500		11,500	12,000	209,00	159,00	45,00	●	◯
11,510	29/64	11,510	12,000	209,00	159,00	45,00	◯	
12,000		12,000	12,000	209,00	159,00	45,00	●	●
12,300		12,300	14,000	233,00	183,00	45,00	●	
12,500		12,500	14,000	233,00	183,00	45,00	●	◯
12,700	1/2	12,700	14,000	233,00	183,00	45,00	●	◯
13,000		13,000	14,000	233,00	183,00	45,00	●	●
13,500		13,500	14,000	233,00	183,00	45,00	●	●
14,000		14,000	14,000	233,00	183,00	45,00	●	●
14,500		14,500	16,000	260,00	207,00	48,00	●	◯
15,000		15,000	16,000	260,00	207,00	48,00	●	●
15,500		15,500	16,000	260,00	207,00	48,00	◯	●
16,000		16,000	16,000	260,00	207,00	48,00	●	●
16,500		16,500	18,000	284,00	231,00	48,00	●	◯
17,000		17,000	18,000	284,00	231,00	48,00	●	●
17,500		17,500	18,000	284,00	231,00	48,00	●	●
18,000		18,000	18,000	284,00	231,00	48,00	●	●
18,500		18,500	20,000	308,00	255,00	50,00	●	◯
19,000		19,000	20,000	308,00	255,00	50,00	●	●
19,500		19,500	20,000	308,00	255,00	50,00		◯
20,000		20,000	20,000	308,00	255,00	50,00	●	●

◯ bright

Order no. = Guhring no. + Code no.

Guhring no.	773
Standard	Guhring standard
Tool material	Solid carbide
Carbide grade	K
Surface	◯
Type	RT 150 GN
Drilling depth	15 x D
Cutting direction	right-hand
Tolerance	m7
Discount group	121

Aluminium and Cast material



Code	d1		d2	l1	l2	l3	Availability
no.	inch	mm	mm	mm	mm	mm	
5,000		5.000	6.000	145.00	105.00	36.00	●
6,000		6.000	6.000	145.00	105.00	36.00	●
8,000		8.000	8.000	180.00	137.00	36.00	●
9,000		9.000	10.000	217.00	170.00	40.00	●
10,000		10.000	10.000	217.00	170.00	40.00	●
11,000		11.000	12.000	258.00	205.00	45.00	●
12,000		12.000	12.000	258.00	205.00	45.00	●
14,000		14.000	14.000	290.00	236.00	45.00	●

◯ bright

GRINDING EQUIPMENT AND ACCESSORI

ES

Accessories

GUHRING

Grinding equipment for single-fluted gun drills

Grinding machine TBM 116 for single-fluted gun drills

TBM 116 is a manually operated, universal grinding machine. Its compact design combined with Guhring's single-fluted gun drill grinding system and Guhring's double grinding wheel makes this a perfect unit to re-grind single-fluted gun drills. It is especially suitable for the re-grinding of a small to medium number of items of varying diameters and lengths. Furthermore, it also allows the fairly simple addition of transverse chip breakers to single-fluted gun drills as well as other modifications.

Supplied items:
Grinding machine with two high-powered light units as well as two 220 V sockets (grinding system and grinding wheel not included).

Machine data:
Input power requirements 380 V/50 Hz, Grinding wheel 2850 rev./min, Max. diameter of grinding wheel 150 mm.
Article no.: 600 127 170

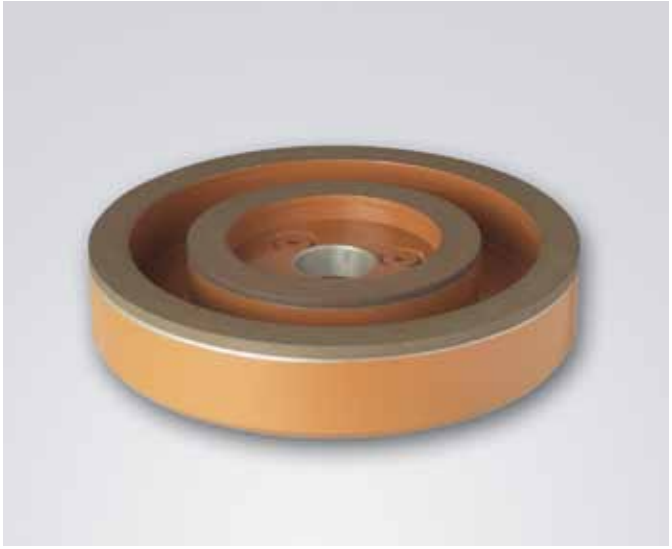
Grinding machine TBV 116 for single-fluted gun drills for Ø 3 till 30 mm

The fixture is designed for the re-grinding of single-fluted gun drills in the diameter range from 3 mm to 30 mm. It is ideally suitable for standard and special point grinds. A minimum flute length is of no importance thanks to a short center sleeve. In addition, the fixture is supplied with a supporting bar for long tools. TBV 116 is therefore truely universal and can be applied on any commercial, manual tool grinding machine.
With TBV 116 we recommend our double grinding wheel DSS 125.

Attention:
Single-fluted gun drills have a flute spacing angle of 120° and can therefore not be clamped in a collet in a separate unit. You could possibly destroy the tool.
Article no.: 600 127 171

Double grinding wheel DSS 125

The DSS double grinding wheel is a firmly clamped and balanced grinding wheel set. It consists of a rough outer diamond disc, with which the main proprtion of wear is removed and a fine diamond disc that then gives a good finish to the cutting edges. It is advisable to use a cleaning stone from time to time remove any grinding dust, otherwise too much heat is created and the carbide cutting edge destroyed.



The DSS 125 consists of:
- an outer disc Ø 125 mm, coating width 10 mm, coating thickness 3 mm, hole Ø 20 mm, grade D 126,
- an inner disc Ø 75 mm, coating width 10 mm, coating thickness 2 mm, hole Ø 20 mm, grade D 46

Article no.: 400 110 098

Grinding equipment for single-fluted gun drills

Grinding machine TBV 216 for single-fluted gun drills for Ø 1 to 6 mm

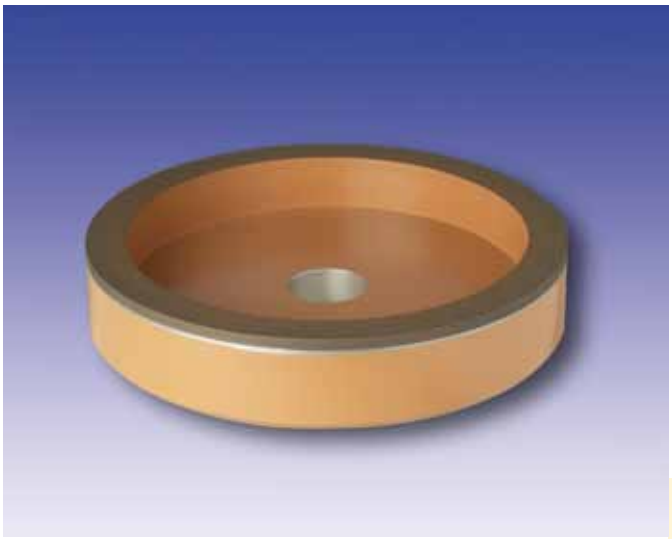
The new TBV 216 universal grinding fixture for small diameter single-fluted gun drills from 1.0 to 6.0 mm and a maximum length of 350 mm is simple to handle and enables the re-grinding or modifying of single-fluted gun drills in only four operations. Grinding is achieved with a 3-axis swivel mechansim, enabling the grinding of various point angles. It is possible to adjust and if necessary correct any angle individually.
We recommend the application of our single grinding wheel ESS 125.

Supplied items:
- A set of guide bushes with the diameters 1.0 / 1.5 / 2.0 / 2.5 / 3.0 / 3.5 mm
- Various adaptors
- Centering microscope
- Spotlight and magnifier

Article no: 600 132 346

Single grinding wheel ESS 125

The ESS 125 grinding wheel is a fine diamond wheel that gives the cutting edges a good finish. It is advisable to remove the grinding dust from the wheel with a cleaning stone from time to time, otherwise too much heat is created destroying the carbide cutting edge.



The ESS 125 consists of:
- a disc Ø 125 mm, coating width 10 mm, coating thickness 3 mm, hole Ø 20 mm, grade D 25

Article no.: 400 119 203

Accessories for gun drilling machines

In contrast to conventional machine tools, certain accessories, i.e. drilling bushes, seal discs, steady rest bushings etc., are part of the standard equipment on deep hole drilling machines. A selection of these products for the current dimensions you will find on the following pages.

Drilling bushes

Order no. = Guhring no. + Code no.	Guhring no.	5747	5748
	Standard	Guhring standard	Guhring standard
	Tool material	HSS	Solid carbide
	Discount group	123	123
		Minimum order quantity 3 pieces	Minimum order quantity 3 pieces
			

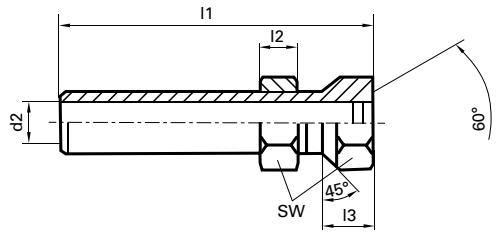
Code no.	d1 mm	d2 mm	l1 mm	Availability	
0,900-0,999	0.900-0.999	3.00	9.00	●	●
1,000-1,899	1.000-1.899	4.00	9.00	●	●
1,900-2,699	1.900-2.699	5.00	9.00	●	●
2,700-3,399	2.700-3.399	6.00	12.00	●	●
3,400-4,099	3.400-4.099	7.00	12.00	●	●
4,100-5,099	4.100-5.099	8.00	12.00	●	●
5,100-6,099	5.100-6.099	10.00	16.00	●	●
6,100-8,099	6.100-8.099	12.00	16.00	●	●
8,100-10,099	8.100-10.099	15.00	20.00	●	●
10,100-12,099	10.100-12.099	18.00	20.00	●	●
12,100-15,099	12.100-15.099	22.00	28.00	●	●
15,100-18,099	15.100-18.099	26.00	28.00	●	●
18,100-22,099	18.100-22.099	30.00	36.00	●	●
22,100-26,099	22.100-26.099	35.00	36.00	●	●
26,100-30,099	26.100-30.099	42.00	45.00	●	●
30,100-35,099	30.100-35.099	48.00	45.00	●	●
35,100-40,000	35.100-40.000	55.00	56.00	●	●

Adjustable screw without sealing element

Order no. = Guhring no. + Code no.

Guhring no.	5754
Standard	Guhring standard
Discount group	123

Minimum order quantity 5 pieces



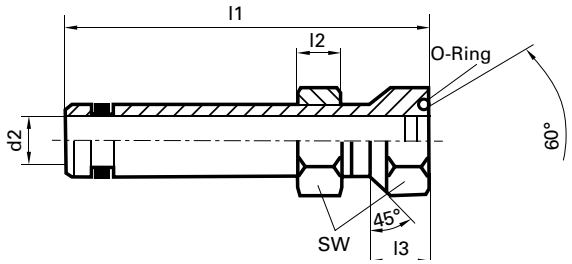
Code no.	Thread mm	d2 mm	l1 mm	l2 mm	l3 mm	SW mm	Availability
6,000	M6x0.5	3.50	26.00	3.20	5.00	9	●
10,000	M10x1.0	6.00	38.00	5.00	7.00	13	●
16,000	M16x1.5	10.00	57.00	8.00	10.00	22	●

Adjustable screw with sealing element

Order no. = Guhring no. + Code no.

Guhring no.	5755
Standard	Guhring standard
Discount group	123

Minimum order quantity 5 pieces



Code no.	Thread mm	d2 mm	l1 mm	l2 mm	l3 mm	SW mm	O-ring DIN 3770	Availability
6,000	M6x0.5	3.50	45.00	3.20	5.00	9	5x1.5	●
10,000	M10x1.0	6.00	50.00	5.00	7.00	13	8x2.0	●
16,000	M16x1.5	10.00	65.00	8.00	10.00	22	14x2.6	●
24,000	M24x1.5	16.00	90.00	12.00	15.00	30	20x3.0	●

Vulkolan accessories

Vulkolan sealing discs and whipguide bushes, Guhring no. 5749, 5750, 5751, 5752 and 5753 always cover one nominal diameter range of the gun drills to be retained. When ordering, please always state the Guhring no. + the code no. from the following table!

Table of assignment Code no. ⇨ diameter for accessories Vulkolan

Code no.	for gun drill with diameter nominal d1	
	from mm	to mm
1,900	2.000	2.099
2,000	2.100	2.199
2,100	2.200	2.299
2,200	2.300	2.399
2,300	2.400	2.499
2,400	2.500	2.599
2,500	2.600	2.699
2,600	2.700	2.799
2,700	2.800	2.899
2,800	2.900	3.099
3,000	3.100	3.359
3,200	3.360	3.459
3,300	3.460	3.559
3,400	3.560	3.799
3,600	3.800	3.959
3,700	3.960	4.259
4,000	4.260	4.499
4,200	4.500	4.749
4,500	4.750	4.999
4,700	5.000	5.249
5,000	5.250	5.499
5,200	5.500	5.749
5,500	5.750	5.999
5,700	6.000	6.249
6,000	6.250	6.449
6,200	6.450	6.749
6,500	6.750	6.999
6,700	7.000	7.299
7,000	7.300	7.599
7,300	7.600	7.799
7,500	7.800	7.999
7,700	8.000	8.299
8,000	8.300	8.699
8,400	8.700	8.999
8,700	9.000	9.299
9,000	9.300	9.699

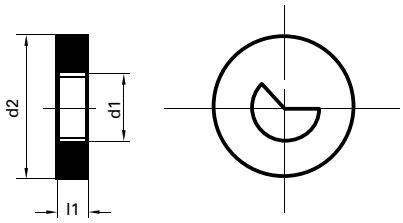
Code no.	for gun drill with diameter nominal d1	
	from mm	to mm
9,400	9.700	9.999
9,700	10.000	10.299
10,000	10.300	10.799
10,500	10.800	11.299
11,000	11.300	11.799
11,500	11.800	12.399
12,000	12.400	12.899
12,500	12.900	13.399
13,000	13.400	13.899
13,500	13.900	14.399
14,000	14.400	14.899
14,500	14.900	15.399
15,000	15.400	15.899
15,500	15.900	16.399
16,000	16.400	16.899
16,500	16.900	17.399
17,000	17.400	17.899
17,500	17.900	18.399
18,000	18.400	19.509
19,000	19.510	20.509
20,000	20.510	21.509
21,000	21.510	22.609
22,000	22.610	23.609
23,000	23.610	24.609
24,000	24.610	25.609
25,000	25.610	26.609
26,000	26.610	27.609
27,000	27.610	28.609
28,000	28.610	29.609
29,000	29.610	30.609
30,000	30.610	32.609
32,000	32.610	34.699
34,000	34.700	36.699
36,000	36.700	38.699
38,000	38.700	40.000

Sealing disc for single-fluted gun drills

Order no. = Guhring no. + Code no.

Guhring no.	5752
Standard	Guhring standard
Material	Vulkolan
Discount group	123

Minimum order quantity 5 pieces



Code no.	d1 from… to…	d2	l1	Availability
	mm	mm	mm	
Code no. see table of assignment on page 60	2.000-4.999	20.000	4.00	●
	5.000-15.399	32.000	4.00	●
	15.400-25.609	40.000	4.00	●
	26.610-40.000	90.000	4.00	●

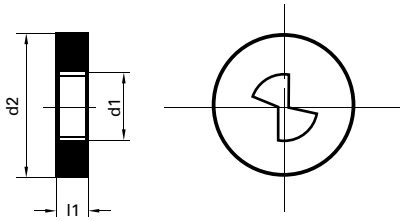
Order example:
- Sealing disc for diameter d1 = 26,500 is due Art. no. 5752 + Code no. 25,000 = **Order no. 5752 25,000**

Sealing disc for double-fluted gun drills

Order no. = Guhring no. + Code no.

Guhring no.	5753
Standard	Guhring standard
Material	Vulkolan
Discount group	123

Minimum order quantity 5 pieces



Code no.	d1 from… to…	d2	l1	Availability
	mm	mm	mm	
Code no. see table of assignment on page 60	5.400-15.399	32.000	4.00	●
	15.400-27.000	40.000	4.00	●

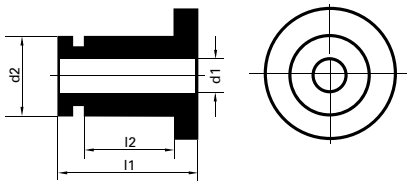
Order example:
- Sealing disc for diameter d1 = 16,000 is due Art. no. 5753 + Code no. 15,500 = **Order no. 5753 15,500**

Steady rest bushing for single- and double-fluted gun drills

xx,xxx = Code no. pursuant to the table of assignment on page 60 (by code no. with four digits please put in front 0)

Guhring no. 5749
Standard Guhring standard
Material Vulkolan
Discount group 123

Minimum order quantity 5 pieces



Code no.	d1 from… to… mm	d2 mm	l1 mm	l2 mm	Availability
2xx,xxx	2.000-11.799	20.000	22.00	12.00	●
3xx,xxx	4.000-25.609	30.000	26.00	13.00	●
4xx,xxx	20.510-36.699	45.000	26.00	16.00	●

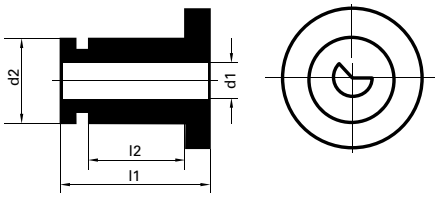
Order examples:
- Steady rest bushing with diam. d2 = 20,000 mm for diam. d1 = 8,000 is due Art. no. 5749 + „2“+“0“Code no. 7,700 = **Order no. 5749 207,700**
- Steady rest bushing with diam d2 = 30,000 mm for diam. d1 = 17,000 is due Art. no. 5749 + „3“+ Code no. 16,500 = **Order no. 5749 316,500**
- Steady rest bushing with diam d2 = 45,000 mm for diam. d1 = 3,000 is due Art. no. 5749 + „4“+“0“Code no. 2,800 = **Order no. 5749 402,800**

Moulded steady rest bushing for single-fluted gun drills

xx,xxx = Code no. pursuant to the table of assignment on page 60 (by code no. with four digits please put in front 0)

Guhring no. 5750
Standard Guhring standard
Material Vulkolan
Discount group 123

Minimum order quantity 5 pieces



Code no.	d1 from… to… mm	d2 mm	l1 mm	l2 mm	Availability
2xx,xxx	2.000-12.399	20.000	20.00	12.00	●
3xx,xxx	4.000-20.509	30.000	26.00	14.00	●
4xx,xxx	20.510-38.699	45.000	26.00	16.00	●

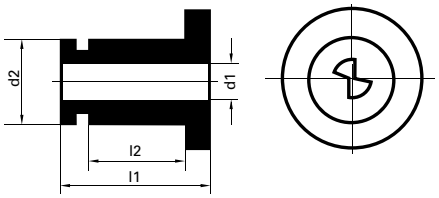
Order examples:
- Moulded steady rest bushes with diam d2 = 20,000 mm for diam. d1 = 8,000 is due Art. no. 5750 + „2“+“0“Code no. 7,700 = **Order no. 5750 207,700**
- Moulded steady rest bushes with diam d2 = 30,000 mm for diam. d1 = 17,000 is due Art. no. 5750 + „3“+ Code no. 16,500 = **Order no. 5750 316,500**
- Moulded steady rest bushes with diam d2 = 45,000 mm for diam. d1 = 23,000 is due Art. no. 5750 + „4“+ Code no. 22,000 = **Order no. 5750 422,000**

Moulded steady rest bushing for double-fluted gun drills

xx,xxx = Code no. pursuant to the table of assignment on page 60 (by code no. with four digits please put in front 0)

Guhring no. 5751
Standard Guhring standard
Material Vulkolan
Discount group 123

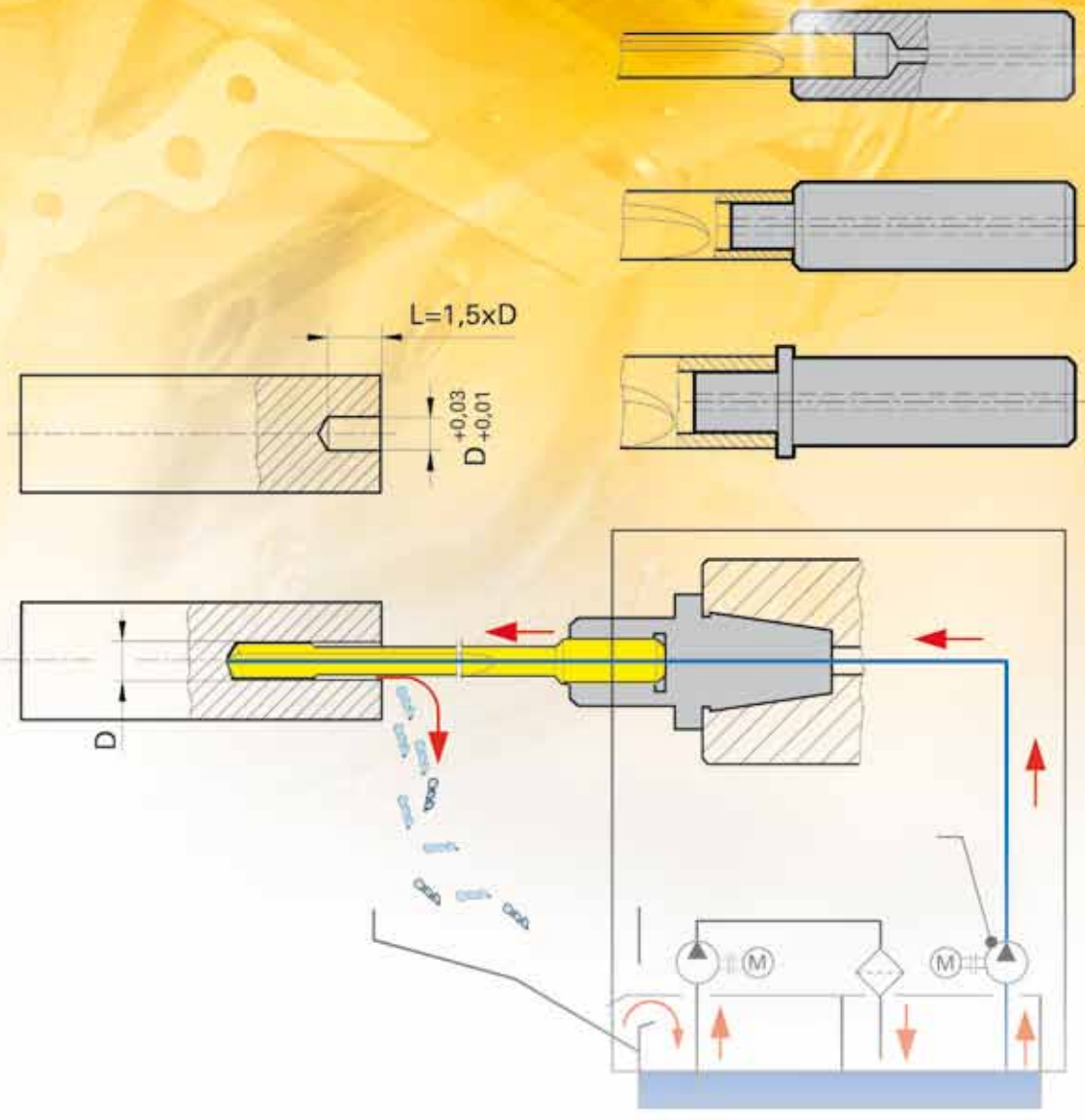
Minimum order quantity 5 pieces



Code no.	d1 from… to… mm	d2 mm	l1 mm	l2 mm	Availability
2xx,xxx	5.400-12.399	20.000	22.00	12.00	●
3xx,xxx	5.400-22.609	30.000	26.00	13.00	●
4xx,xxx	5.400-27.000	45.000	26.00	16.00	●

Order examples:
- Moulded steady rest bushes with diam. d2 = 20,000 mm for diam. d1 = 8,000 is due Art. no. 5751 + „2“+“0“Code no. 7,700 = **Order no. 5751 207,700**
- Moulded steady rest bushes with diam. d2 = 30,000 mm for diam. d1 = 17,000 is due Art. no. 5751 + „3“+ Code no. 16,500 = **Order no. 5751 316,500**
- Moulded steady rest bushes with diam. d2 = 45,000 mm for diam. d1 = 9,000 is due Art. no. 5751 + „4“+“0“Code no. 8,700 = **Order no. 5751 408,700**

TECHNICAL SECTION



GUHRING

A brief introduction to the subject of deep hole gun drilling

In the machining world, drilling depths of 10 x D and deeper are regarded as deep hole drilling operations, whereby smaller drilling depths can naturally also be produced with gun drills. Advantage is taken of the positive side effects, as for example good surface quality, low deviation from concentricity and optimised alignment accuracy.

High pressure cooling -
has become a matter of course.

In recent years, internal cooling has established itself for all drilling tools. Coolants are now living up to their name and being supplied via coolant ducts to where they are urgently required. Considerable improvements in tool life and less breakages have been achieved by this measure for twist drills, taps etc.

Every conventional machine tool currently on the market can be supplied with high pressure internal cooling and is therefore also suitable for deep hole drilling.

The share of gun drills on machining centres, lathes etc. is forever gaining more importance. The process is therefore increasing in popularity in the machining world.

STOP

All gun drills must have support for the pilot hole.

Gun drills must never operate at full speed without support in the machine shop.

Deep hole drilling is not a closed book, but can be mastered by anybody as long as certain conditions are adhered to.

Recommended cutting rates for the application of Guhring gun drills can be found on the pages for the individual types!

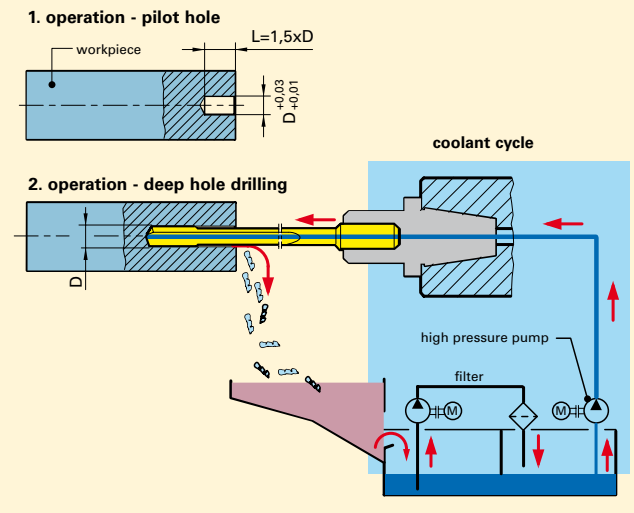
Typical procedure with all gun drills on conventional machine tools:

- production of pilot hole (L = 3 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.
- At cutting speeds higher than 120 m/min we recommend to advance to final speed in several steps.
- 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

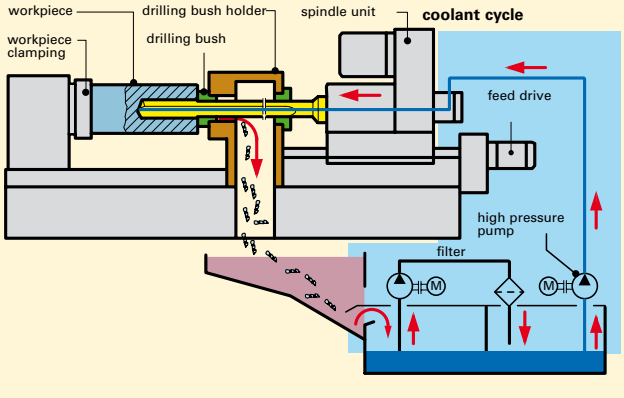
Application advice

- 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.

Deep hole drilling
on conventional machine tools

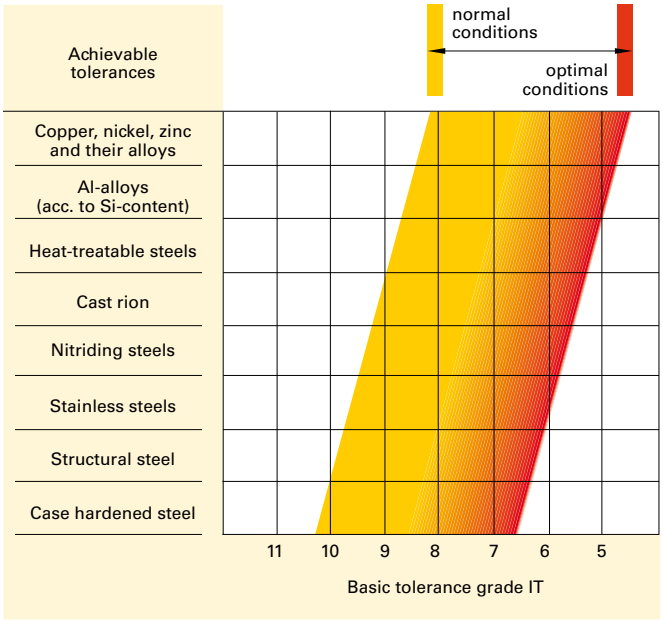


Deep hole drilling machines



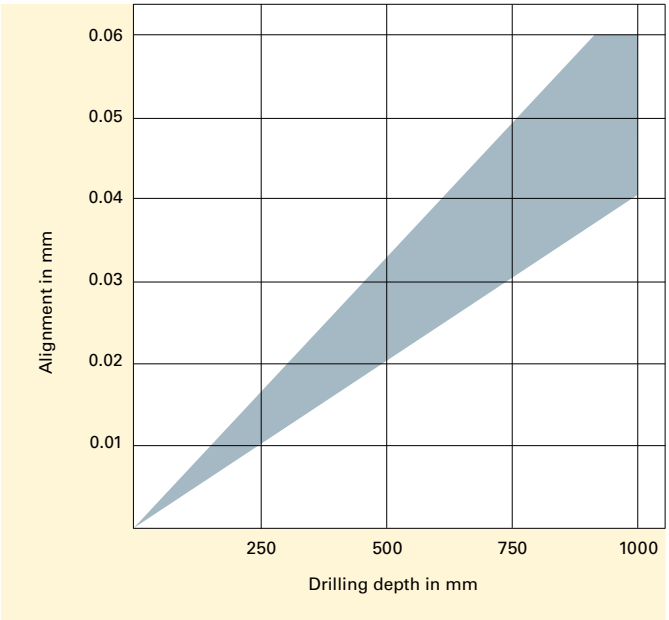
Basic tolerances*

The application of single-fluted gun drills can achieve a lower basic tolerance, as the cutting forces at the cutting edge are absorbed by the supporting strips, unlike twist drills where the slightest deviation of the two cutting edges causes a larger hole.



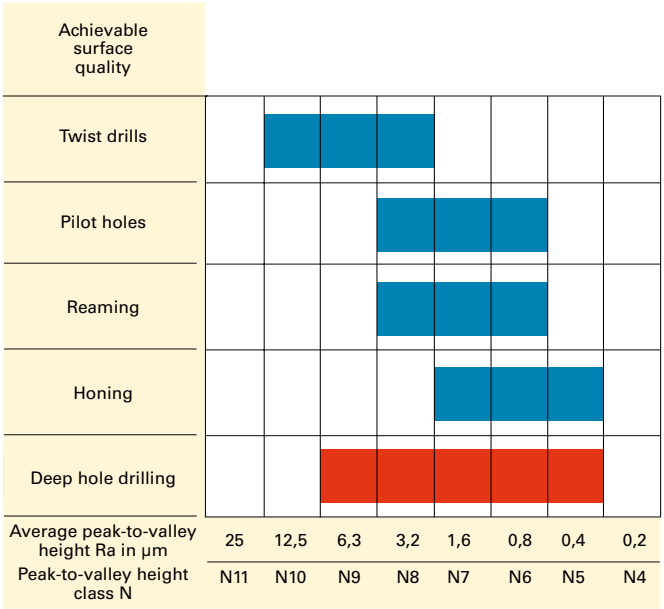
Alignment accuracy*

Because brazed single-fluted gun drills always have the precision carbide head brazed on to a flexible tube, the tool achieves very accurate aligned holes remaining unaffected by possible concentricity errors.
However, extreme material fluctuations and other influencing factors can impair the alignment accuracy.



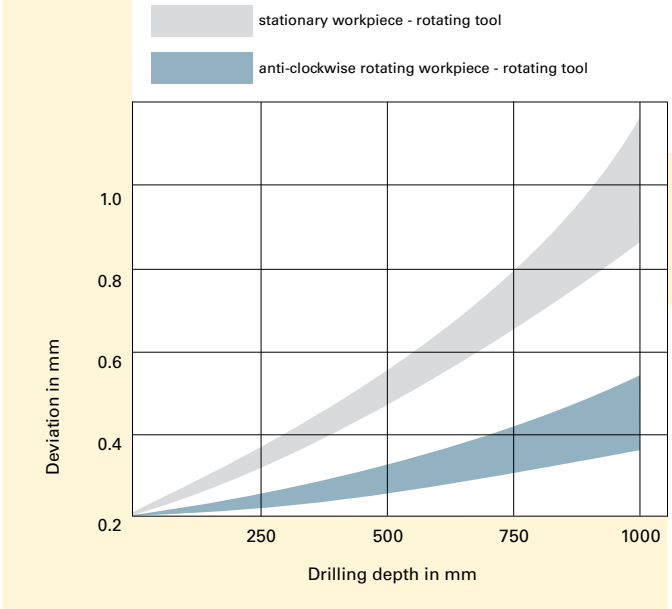
Surface quality*

The forces at the cutting edge are absorbed by the support bushes, which in return burnishes the surface.
Lubrication between the supporting strips and hole surface is therefore very important.
The better the lubricant, the better the surface quality.



Deviation from concentricity*

When a hole is produced with, for example, a commercial twist drill, the quality of the point grind affects the concentricity of the hole. An imbalance of forces is created at the cutting edges. With gun drills, these cutting forces are absorbed by the supporting strips, resulting in excellent concentricity.



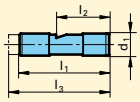
* gun drills with two cutting edges – straight-fluted as well as spiral-fluted – achieve approx. 50% of the values stated

Additional technical parameters

The range of drivers introduced below is available ex stock. However, it only represents a small selection of drivers from our complete range. We naturally also produce individual drivers of the highest precision to customer drawings. Attention! EB 100 requires drivers with positioning lugs. Further information on request.

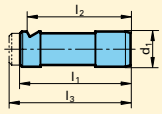
Drivers for deep drilling machines

1



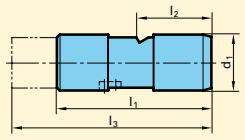
code no.	d_1	l_1	l_2	l_3
1.1	10	40	24	-
1.2	10	40	24	45
1.3	10	40	24	55
1.4	16	45	31,2	-
1.5	25	70	34	-
1.6	25	70	34	78

2



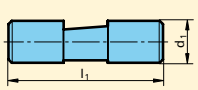
code no.	d_1	l_1	l_2	l_3
2.1	16	50	47	-
2.2	16	50	47	55
2.3	16	50	47	70

3



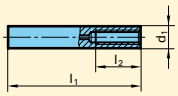
code no.	d_1	l_1	l_2	l_3
3.1	25	70	34	100

4



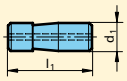
code no.	d_1	l_1
4.1	19,05	70

5



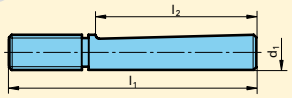
code no.	d_1	l_1	l_2
5.1	10	60	20
5.2	16	80	28
5.3	25	100	50

6



code no.	d_1 (inch)	l_1
6.1	1/2	38
6.2	3/4	70

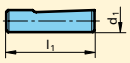
7



code no.	d_1	l_1	l_2
7.1	16	112	73
7.2	20	126	82

Drivers to DIN 1835

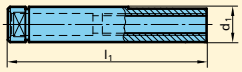
9 form E



code no.	d_1	l_1
9.1	8	36
9.2	10	40
9.3	12	45
9.4	16	48
9.5	20	50
9.6	25	56
9.7	32	60
9.8	40	70

Drivers to VDI draft

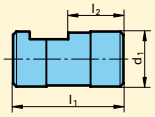
12



code no.	d_1	l_1
12.1	10	68
12.2	16	90
12.3	25	112

Drivers to Speed-Bit-System

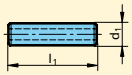
13



code no.	d_1	l_1	l_2
13.1	16	40	16
13.2	25	50	25

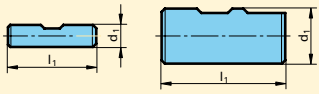
Drivers to DIN 6535

10 form HA



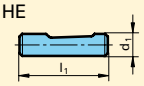
code no.	d_1	l_1
10.1	8	36
10.2	10	40
10.3	12	45
10.4	16	48
10.5	20	50
10.6	25	56
10.7	32	60
10.8	40	70

8 form HB with code no. 8.6, 8.7, 8.8



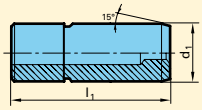
code no.	d_1	l_1
8.1	8	36
8.2	10	40
8.3	12	45
8.4	16	48
8.5	20	50
8.6	25	56
8.7	32	60
8.8	40	70

11 form HE



code no.	d_1	l_1
11.1	8	36
11.2	10	40
11.3	12	45
11.4	16	48
11.5	20	50
11.6	25	56
11.7	32	60
11.8	40	70

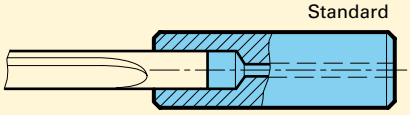
16 sim form HA



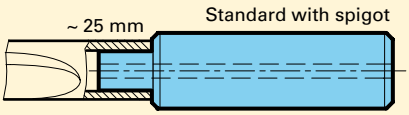
code no.	d_1	l_1
16.1	10	50
16.2	16	64
16.3	20	70
16.4	25	81
16.5	32	92

Driver variations to suit gun drill tubes

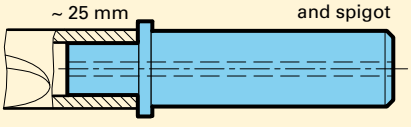
Solution for nom.-Ø < driver-Ø
(difference must be appr. 6 mm):
tube shank installed in driver



Solution for nom.-Ø ≠ driver-Ø
(close to parallel):
tube shank installed over spigot



Solution for nom.-Ø > driver-Ø:
tube shank installed over spigot,
inside-Ø of tube shank >driver-Ø,
tube shank fits against collar shoulder.



Technical section

INQUIRY FORMS

Inquiry forms

GUHRING

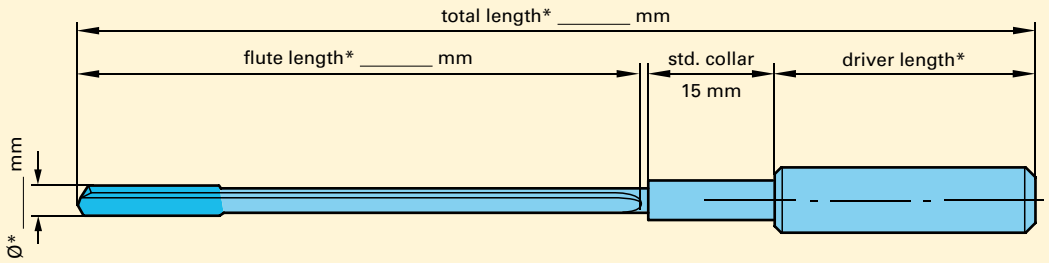
Fax Inquiry / Order
simply photo-copy, complete and fax…

❑ **Inquiry** ❑ **Order** ❑ **Repeat order, no. of initial order**

Deep hole gun drill: ❑ **EB 100** 

Required no. of pieces: **Tool _____ pieces**

* Ø 0,9 - 12,0 mm
Flute length max. 500 mm
Total length and driver length are dependent on the driver selected, see page 66.



Drawing of lay-out

required in special cases only

Driver: ❑ **no** ❑ **Code no.** _____ ❑ **to enclosed drawing**

Coating: ❑ **TiN** Ⓢ ❑ **Fire** Ⓕ ❑ **MolyGlide** Ⓜ ❑ **TiAlN nanoA** Ⓐ ❑ **TiAlN SuperA** Ⓐ ❑ _____

Workpiece: **Drilling depth:** ____ **Hole tolerance:** _____ **Material/designation:** _____

Machine type: ❑ **Deep hole drilling machine** ❑ **Conventional machine tool**
❑ **Pilot hole** ❑ **Drilling bush**

Coolant: ❑ **Deep hole drilling oil** ❑ **Soluble oil**
Pressure _____ **bar** **Quantity** _____ **l/min**

Company: _____ **Company stamp:**

Telephone/fax: _____

Contact: _____ **Signature:** _____

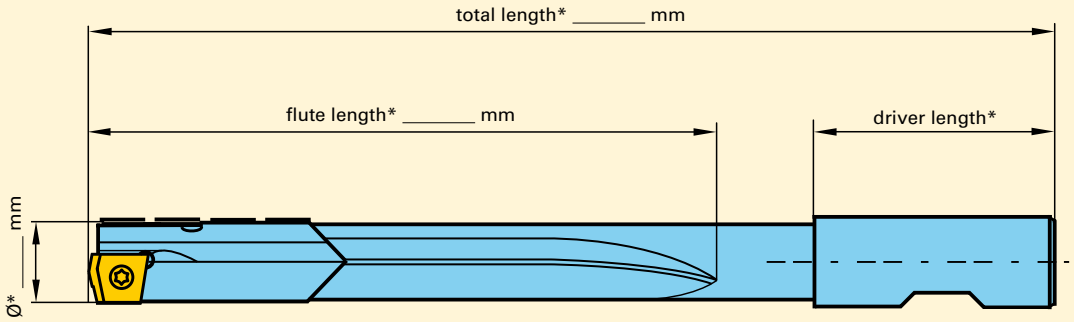
Fax Inquiry / Order
simply photo-copy, complete and fax…

❑ **Inquiry** ❑ **Order** ❑ **Repeat order, no. of initial order**

Deep hole gun drill: ❑ **EB 800** 

Required no. of pieces: **Tool** _____ **pieces**
Interchangeable inserts _____ **pieces**
Guiding bar _____ **pieces**

* Ø 12,0 - 40,0 mm
Flute length min. 15 x D
Total length max. 3000 mm
Total length and driver length are dependent on the driver selected, see page 66.



Drawing of lay-out

required in special cases only

Driver: ❑ **no** ❑ **Code no.** _____ ❑ **to enclosed drawing**

Coating: ❑ **TiN** Ⓢ ❑ **Fire** Ⓕ ❑ **MolyGlide** Ⓜ ❑ **TiCN** Ⓒ ❑ **TiAlN** Ⓐ ❑ **TiAlN SuperA** Ⓐ ❑ **TiAlN nanoA** ⓐ

Workpiece: **Drilling depth:** _____ **Hole tolerance:** _____ **Material/designation:** _____

Surface finish: _____ **Projecting edges :** ❑ **no** ❑ **yes** _____

Machine type: ❑ **Deep hole drilling machine** ❑ **Conventional machine tool**
❑ **Pilot hole** ❑ **Drilling bush**

Coolant: ❑ **Deep hole drilling oil** ❑ **Soluble oil**
Pressure _____ **bar** **Quantity** _____ **l/min**

Company: _____ **Company stamp:**

Telephone/fax: _____

Contact: _____ **Signature:** _____

Ø 12,00 - 15,99 mm: Availability: first quarter 2011

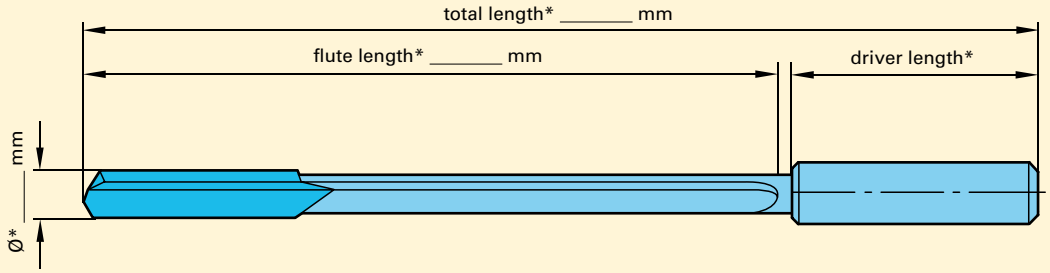
Fax Inquiry / Order
simply photo-copy, complete and fax…

❑ **Inquiry** ❑ **Order** ❑ **Repeat order, no. of initial order**

Deep hole gun drill: ❑ **EB 80** 

Required no. of pieces: Tool_____ pieces

* Ø 2,0 - 40,0 mm
Total length max. 3000 mm
Total length, flute length and driver length are dependent on the driver selected, see page 66.



Drawing of lay-out

required in special cases only

Driver: ❑ **no** ❑ **Code no.** _____ ❑ **to enclosed drawing**

Coating: ❑ **TiN** Ⓢ ❑ **Fire** Ⓕ ❑ **TiCN** Ⓒ ❑ **MolyGlide** Ⓜ ❑ _____

Workpiece: **Drilling depth:**___ **Hole tolerance:** _____ **Material/designation:** _____

Machine type: ❑ **Deep hole drilling machine** ❑ **Conventional machine tool**
❑ **Pilot hole** ❑ **Drilling bush**

Coolant: ❑ **Deep hole drilling oil** ❑ **Soluble oil**
Pressure _____ **bar** **Quantity** _____ **l/min**

Company: _____ **Company stamp:**

Telephone/fax: _____

Contact: _____ **Signature:** _____

Fax Inquiry / Order
simply photo-copy, complete and fax…

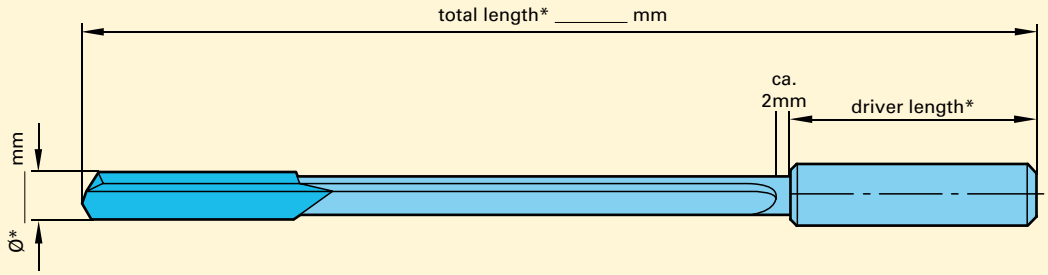
Quick Service

❑ **Inquiry** ❑ **Order** ❑ **Repeat order, no. of initial order**

Deep hole gun drill: ❑ **EB 80** 

Required no. of pieces: Tool _____ pieces

* **Ø 2.0 – 13.9 mm in increments of 0.1 mm, head form G,**
Ø 4.0 – 13.9 mm in increments of 0.1 mm, head form C,
Ø 14.0 – 22.0 mm in increments of 0.5 mm, head form G and C,
Total length max. ≤ Ø 7,5 mm 650 mm, > Ø 7,5 mm 1200 mm, flute length min. 20 x D.
Total length, flute length and driver length are dependent on the driver selected,
see page 66.
INCH sizes are also available within our quick service. Please do not hesitate to contact us!



Drawing of lay-out

required in special cases only

Driver: ❑ **no** ❑ **Code no.** _____

Coating:
❑ **bright** ◯ **for cast materials and aluminium**
❑ **TiN** (S) **with longitudinal chip breaker for long-chipping steels**
❑ **TiCN** (C) **for alloyed and high-alloyed steels (delivery in 15 working days)**

Machine type:
❑ **Deep hole drilling machine** ❑ **Conventional machine tool**
❑ **Pilot hole** ❑ **Drilling bush**

Coolant:
❑ **Deep hole drilling oil** ❑ **Soluble oil**
Pressure _____ **bar** **Quantity** _____ **l/min**

Company: _____ **Company stamp:**

Telephone/fax: _____

Contact: _____ **Signature:** _____

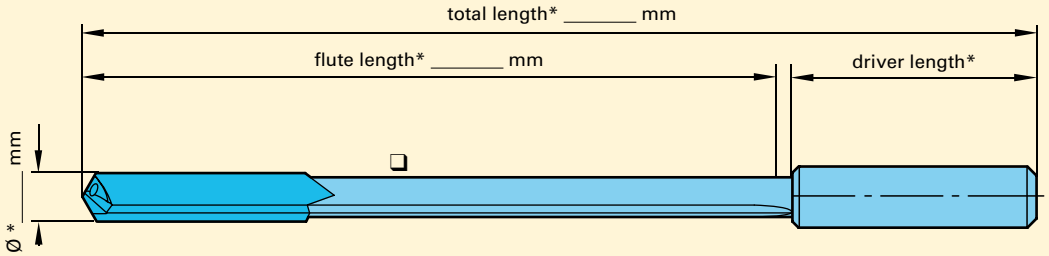
Fax Inquiry / Order
simply photo-copy, complete and fax…

❑ **Inquiry** ❑ **Order** ❑ **Repeat order, no. of initial order**

Deep hole gun drill: ❑ **ZB 80** 

Required no. of pieces: Tool _____ pieces

* Ø 6,0 - 27,0 mm
Total length max. 1000 mm
Total length, flute length and driver length
are dependent on the driver selected,
see page 66.



Drawing of lay-out

required in special cases only

Driver: ❑ **no** ❑ **Code no.**_____ ❑ **to enclosed drawing**

Coating: ❑ **MolyGlide** Ⓜ ❑ **TiN** Ⓢ ❑ **TiCN** Ⓒ ❑ **bright** ◯ ❑ _____

Workpiece: **Drilling depth:** _____ **Hole tolerance:** _____ **Material/designation:** _____

Machine type: ❑ **Deep hole drilling machine** ❑ **Conventional machine tool**
❑ **Pilot hole** ❑ **Drilling bush**

Coolant: ❑ **Deep hole drilling oil** ❑ **Soluble oil**
Pressure _____ **bar** **Quantity** _____ **l/min**

Company: _____ **Company stamp:**

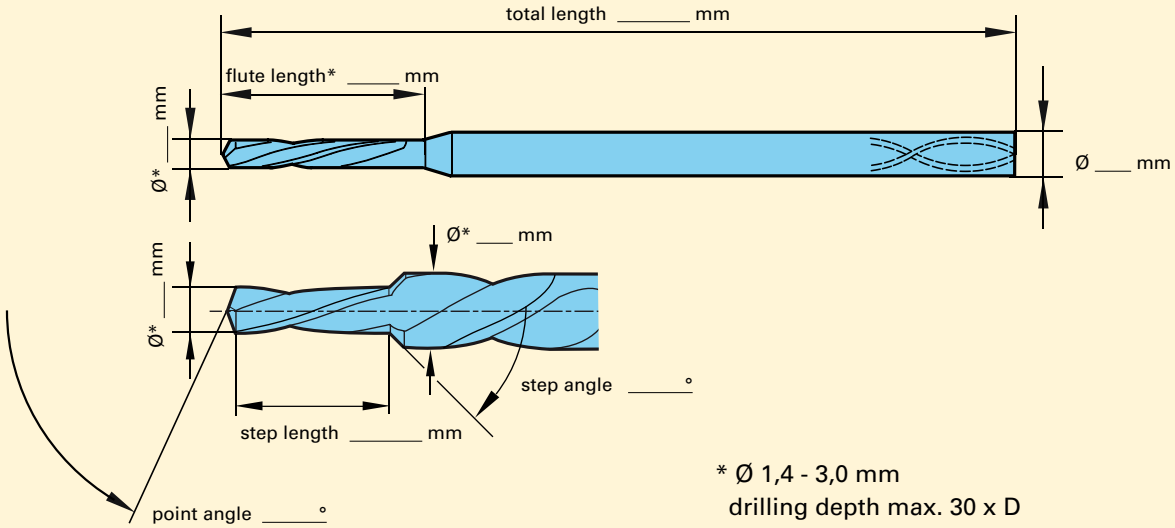
Telephone/fax: _____

Contact: _____ **Signature:** _____

Fax Inquiry / Order
simply photo-copy, complete and fax…

❑ **Inquiry** ❑ **Order** ❑ **Repeat order, no. of initial order**

❑ **Micro-precision drill** **Required no. of pieces: Tool _____ pieces**



* Ø 1,4 - 3,0 mm
drilling depth max. 30 x D

Drawing of lay-out

required in special cases only

Machining:	❑ **Stepped hole**	❑ **Drilling and counterboring**
Shank:	❑ **HA**	❑ **HE**
Cooling:	❑ **internal**	❑ **external**
Coating:	❑ **bright** ◯	❑ **TiAlN SuperA** Ⓐ

Coolant: ❑ **Oil** ❑ **Soluble oil** ❑ **MQL**
Pressure _____ **bar** **Quantity** _____ **l/min**

Company: _____ **Company stamp:**

Telephone/fax: _____

Contact: _____ **Signature:** _____

Fax Inquiry / Order
simply photo-copy, complete and fax…

Steel & Cast materials

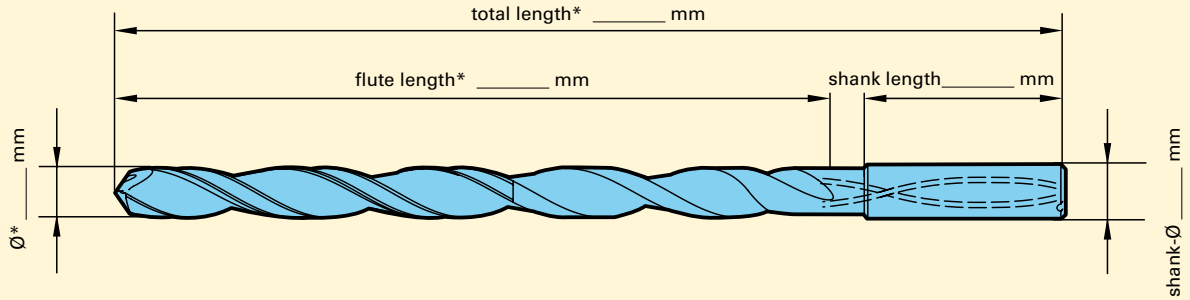
❑ Inquiry **❑ Order** **❑ Repeat order, no. of initial order**

Deep hole gun drill: **❑ RT 100T** 

Required no. of pieces: **Tool _____ pieces**

* Ø 3,0 - 20,0 mm
Drilling depth max. 40 x D
Total length max. 400 mm

Attention: not applicable without starting bushing!



Drawing of lay-out

required in special cases only

Shank: **❑ HA** (recommended) **❑ _____**

Workpiece: **Drilling depth: _____ Hole tolerance: _____ Material/designation: _____**
Surface finish: _____

Machine type: **❑ Machining centre** **❑ Turning centre**
❑ Pilot hole

Machining: **❑ vertical** **❑ horizontal**

Coolant: **❑ Oil** **❑ Soluble oil** **❑ MQL**
Pressure _____ bar **Quantity _____ l/min**

Company: _____ **Company stamp:**

Telephone/fax: _____

Contact: _____ **Signature:** _____

Fax Inquiry / Order
simply photo-copy, complete and fax…

Aluminium

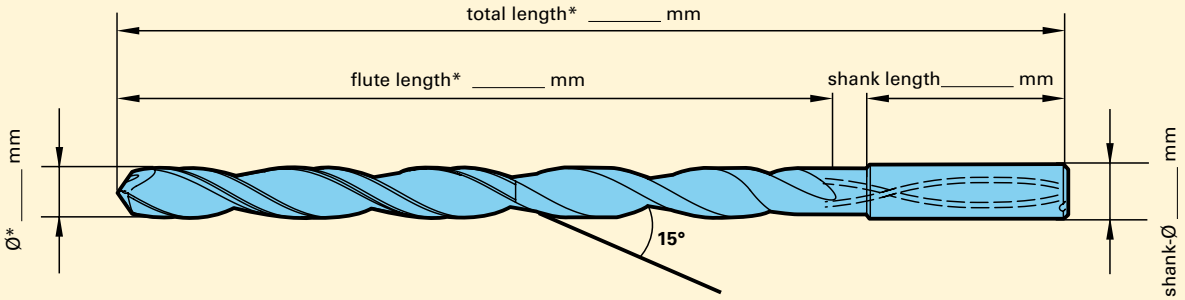
❑ Inquiry **❑ Order** **❑ Repeat order, no. of initial order**

Deep hole gun drill: **❑ RT 100T ALU** 

Required no. of pieces: **Tool _____ pieces**

* Ø 3,0 - 14,0 mm
Drilling depth max. 30 x D
Total length max. 320 mm

Attention: not applicable without starting bushing!!



Drawing of lay-out

required in special cases only

Shank: **❑ HA** (recommended) **❑ _____**

Workpiece: **Drilling depth: _____ Hole tolerance: _____ Material/designation: _____**
Surface finish: _____ (Aluminium with content Si > 1%)

Machine type: **❑ Machining centre** **❑ Turning centre**
❑ Pilot hole

Machining: **❑ vertical** **❑ horizontal**

Coolant: **❑ Oil** **❑ Soluble oil** **❑ MQL**
Pressure _____ bar **Quantity _____ l/min**

Company: _____ **Company stamp:**

Telephone/fax: _____

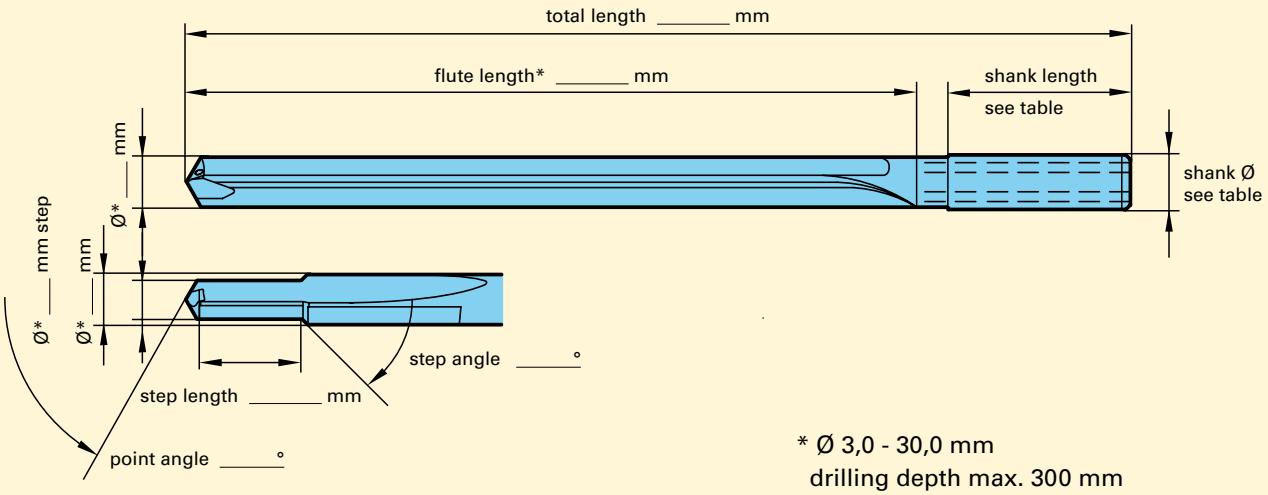
Contact: _____ **Signature:** _____

Fax Inquiry / Order
simply photo-copy, complete and fax…

❑ **Inquiry** ❑ **Order** ❑ **Repeat order, no. of initial order**

Deep hole gun drill: ❑ **RT 150 GG** ❑ **RT 150 GN**

Required no. of pieces: Tool _____ pieces



* Ø 3,0 - 30,0 mm
drilling depth max. 300 mm

Drawing of lay-out

required in special cases only

Machining: ❑ **Stepped hole** ❑ **Drilling and counterboring**

Shank: ❑ **HA** ❑ **HE**

Cooling: ❑ **internal** ❑ **external**

Coating: ❑ **TiN** (S) ❑ **Fire** (F) ❑ **nanoFIRE** (F) ❑ **bright** ○

Coolant: ❑ **Oil** ❑ **Emulsion** ❑ **MQL**
Pressure _____ **bar** **Quantity** _____ **l/min**

Company: _____ **Company stamp:**

Telephone/fax: _____

Contact: _____ **Signature:** _____

GÜHRINGNAVIGATOR

Gühring Navigator

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.

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.

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.**

The sequence of operations for deep hole drilling
- production of pilot hole (L ≈ 3 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.
- At cutting speeds higher than 120 m/min we recommend to advance to final speed in several steps.
- 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 Sie the coolant values on page 86/87!

EB100

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

Material group	Material examples *Figures in bold = material no. to DIN EN 10 027*	Tens. str. N/mm²	Hard-ness	Cool-ant	recom-mended coating*	≤35×D v_c m/min	≤35×D Feed col. no.	>35×D v_c m/min	>35×D Feed col. no.
Common structural steels	**1.0035** S185, **1.0486** StE P275N, **1.0345** P235GH, **1.0425**	≤500		◍		*100*	15	*95*	14
	1.0050 E295, **1.0070** E360, **1.8937** P500NH	>500-850		◍		*85*	15	*80*	14
Free-cutting steels	**1.0718** 11SMnPb30, **1.0736** 11SMn37	≤850		◍		*90*	15	*85*	14
	1.0727 46 S20, **1.0728** 60 S20, **1.0757** 46SPb20	850-1000		◍		*80*	15	*75*	14
Unalloyed heat-treatable steels	**1.0402** C22, **1.1178** C30E	≤ 700		◍		*90*	14	*85*	13
	1.0503 C45, **1.1191** C45E	700-850		◍		*80*	14	*75*	13
	1.0601 C60, **1.1221** C60E	850-1000		◍		*75*	14	*70*	13
Alloyed heat-treatable steels	**1.5131** 50MnSi4, **1.7003** 38Cr2, **1.7030** 28Cr4	850-1000		◍		*75*	14	*70*	13
	1.5710 36NiCr6, **1.7035** 41Cr4, **1.7225** 42CrMo4	1000-1200		◍	A	*65*	14	*60*	13
Unalloyed case hard. steels	**1.0301** C10, **1.1121** C10E	≤750		◍	A	*80*	15	*75*	14
Alloyed case hardened steels	**1.7043** 38Cr4	850-1000		●		*75*	14	*70*	13
	1.5752 14NiCr14, **1.7131** 16MnCr5, **1.7264** 20CrMo5	1000-1200		●		*65*	14	*60*	13
Nitriding steels	**1.8504** 34CrAl6	≥850-1000		◍		*75*	14	*70*	13
	1.8519 31CrMoV9, **1.8550** 34CrAlNi7	1000-1200		●	A	*65*	14	*60*	13
Tool steels	**1.1750** C75W, **1.2067** 102Cr6, **1.2307** 29CrMoV9	≤850		◍		*75*	13	*70*	12
	1.2080 X210Cr12, **1.2083** X42Cr13, **1.2419** 105WCr6, **1.2767**	850-1000		●	A	*65*	13	*60*	12
High speed steels	**1.3243** S 6-5-2-5, **1.3343** S 6-5-2, **1.3344** 61CrV4	≥650-1000		●	A	*55*	12	*50*	11
Spring steels	**1.5026** 55Si7, **1.7176** 55Cr3, **1.8159** 51CrV4	≤330 HB		●	A	*65*	13	*60*	12
Stainless steels, sulphured	**1.4005** X12CrS13, **1.4104** X14CrMoS17, **1.4105** X6CrMoS17	≤850		●		*55*	14	*50*	13
austenitic	**1.4301** X5CrNi18 10, **1.4541** X6CrNiTi18 10, **1.4571**	≤850		●	A	*45*	14	*40*	13
martensitic	**1.4057** X17CrNi16-1, **1.4122** X39CrMo17-1, **1.4521**	≤850		●		*35*	14	*35*	13
Hardened steels	–	≤40-48 HRC		●		*30*	13	*25*	12
		>48-60 HRC		●		*25*	10	*20*	11
Special alloys	Nimonic, Inconel, Monel, Hastelloy	≤1200		●		*35*	12	*30*	11
Cast iron	EN-GJL-100 ... EN-GJL-200	≤240 HB		◍ ○		*85*	16	*80*	15
	EN-GJL-250 ... EN-GJL-350	<300 HB		◍ ○		*80*	16	*75*	15
Spheroidal graphite iron and	EN-GJMW-350-4, EN-GJMB-550-4, EN-GJS-500-7	≤240 HB		◍		*80*	15	*75*	14
malleable cast iron	EN-GJMB-700-2, EN-GJS-700-2	<300 HB		◍		*70*	15	*65*	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	≤850		●		*35*	12	*30*	11
	3.7154 TiAl6Zr5, **3.7164** TiAl6V4, **3.7184** TiAl4Mo4Sn2,5	850-1200		●	A	*30*	12	*25*	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	**3.2131** G-AlSi5Cu1, **3.2153** G-AlSi7Cu3, **3.2573** G-AlSi9	≤600		◍		*150*	18	*140*	17
> 10 % Si	**3.2581** G-AlSi12, **3.2583** G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		◍		*130*	18	*120*	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		◍	A	*75*	15	*70*	14
Brass, short-chipping	**2.0380** CuZn39Pb2, **2.0401** CuZn39Pb3, **2.0410** CuZn43Pb2	≤600		◍		*120*	18	*115*	17
long-chipping	**2.0250** CuZn20, **2.0280** CuZn33, **2.0332** CuZn37Pb0,5	≤600		◍		*90*	18	*85*	17
Bronze, short-chipping	**2.1090** CuSn7ZnPb, **2.1170** CuPb5Sn5, **2.1176** CuPb10Sn	≤600		◍ ●		*95*	17	*90*	16
	2.0790 CuNi18Zn19Pb	>600-850		●		*75*	17	*70*	16
Bronze, long-chipping	**2.0916** CuAl5, **2.0960** CuAl9Mn, **2.1050** CuSn10	≤850		●		*70*	17	*65*	16
	2.0980 CuAl11Ni, **2.1247** CuBe2	850-1000		●		*60*	17	*55*	16
Duroplastics	Bakelit, Resopal, Pertinax, Moltopren	–		○		*75*	15	*70*	14
Thermoplastics	Plexiglass, Hostalen, Novodur, Makralon	–		◍ ○		*70*	15	*65*	14
Kevlar	Kevlar	–		○		*60*	14	*55*	13
Glass/carbon fibre	GFK/CFK	–		○		*50*	14	*45*	13

○ bright ◍ steam tempered ◓ nitrided lands ● nitrided ● golden brown A TiAlN

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

recommended coating*	≤35×D v_c m/min	≤35×D Feed col. no.	>35×D v_c m/min	>35×D Feed col. no.
S	100	14	95	13
	85	14	80	13
S	90	14	85	13
	80	14	75	13
S	90	13	85	12
	80	13	75	12
	75	13	70	12
S	75	13	70	12
	65	13	60	12
S	80	14	75	13
S	75	13	70	12
	65	13	60	12
C	75	13	70	12
	65	13	60	12
C	75	12	70	11
	65	12	60	11
C	55	11	50	11
C	65	12	60	12
	55	13	50	12
C	45	13	40	12
	35	13	35	12
C	30	12	25	11
	25	11	20	11
C	35	11	30	11
	85	15	80	14
	80	15	75	14
	80	14	75	13
	70	14	65	13
	55	13	50	12
C	35	11	30	11
	30	11	25	11
	150	16	140	15
	120	15	115	14
	150	16	140	15
	130	16	120	15
	110	16	100	15
C	75	14	70	13
	120	17	115	16
	90	17	85	16
	95	16	90	15
	75	16	70	15
	70	16	65	15
	60	16	55	15
	75	14	70	13
	70	14	65	13
	60	13	55	12
	50	13	45	12

recommended coating*	≤35×D v_c m/min	≤35×D Feed col. no.	>35×D v_c m/min	>35×D Feed col. no.
	85	18	80	17
	80	18	75	17
	75	17	70	16
	70	17	65	16
	65	16	60	15
	120	18	115	17
	110	18	105	17
	135	18	130	17
	120	17	115	16
	130	18	125	17
	120	18	115	17
	110	17	105	16
	110	17	105	16
	95	17	90	16
	95	17	90	16

recommended coating*	≤35×D v_c m/min	≤35×D Feed col. no.	>35×D v_c m/min	>35×D Feed col. no.
S	90	15	85	15
	80	15	75	15
S	85	16	80	16
	75	16	70	16
S	85	15	80	15
	80	15	75	15
	75	15	70	15
F	75	15	70	15
	65	15	60	15
F	80	15	75	15
a	75	15	70	15
	70	15	65	15
a	70	15	65	15
	60	15	55	15
Y	65	14	60	14
	60	14	55	14
Y	55	14	50	14
F	65	15	60	15
a	50	14	45	14
	45	14	40	14
	40	14	35	14
Y	30	13	25	13
	25	12	20	12
Y	25	13	20	13
Y	85	16	80	16
	80	16	75	16
Y	75	16	70	16
	70	16	65	16
Y	55	15	50	15
F	35	13	30	13
	30	12	25	12
S	140	16	135	16
S	125	16	120	16
S	170	17	165	17
	140	17	135	17
S	115	16	110	16
Y	75	15	70	15
S	120	17	115	17
	90	17	85	17
Y	95	17	90	17
	75	17	70	17
Y	70	17	65	17
	60	17	55	17
S	75	16	70	16
	70	16	65	16
Y	60	15	55	15
a	50	15	45	15

A TiAlN SuperA C TiCN F FIRE P AlCrN S TiN M MolyGlide

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, withdrawal 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 86/87!

Tool material	Material examples *Figures in bold = material no. to DIN EN*	Tensile strength MPa (N/mm²)	Hardness	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	–	≤40-60 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 GGV	**EN-GJV250** (GGV25), **EN-GJV350** (GGV35) **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	**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, **3.7164** 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	≤450		●
Al cast iron ≤ 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	MgMn2, G-MgAl8Zn1, G-MgAl6Zn3	≤450		○
Copper, low-alloyed	**2.0070** SE-Cu, **2.1020** CuSn6, **2.1096** G-CuSn5ZnPb	≤400		●
Brass, short-chipping langspanend	**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		● ●

	15 x D				20 x D				25 x D				30 x D				40 x D	
Article 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 coolant min. 40 bar		MQL by GÜHRING Lic. HORKOS CORP		conventional coolant min. 40 bar		MQL by GÜHRING Lic. HORKOS CORP		conventional coolant min. 40 bar		MQL by GÜHRING Lic. HORKOS CORP		conventional coolant min. 40 bar		MQL by GÜHRING Lic. HORKOS CORP		conventional coolant min. 40 bar	
	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.	v_c m/min	Feed col.no.	v_c m/min	Feed col.no.	v_c 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 86/87!

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

Please note the coolant values on page 86/87!

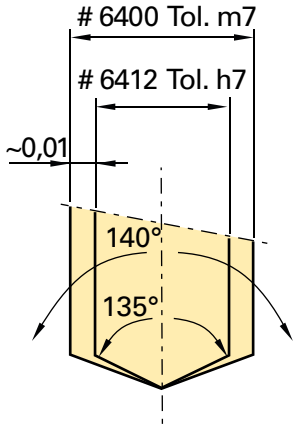
Material group	Material examples, **new description** (old description in brackets) *Figures in bold = material no. to DIN EN*	Tensile strength Hardness MPa (N/mm²)
Common structural steels	**1.0035** S185(St33),**1.0486** P275N(StE285),**1.0345** P235GH(H1),**1.0425** P265GH(H2) **1.0050** E295 (St50-2), **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	Bakelite, Resopal, Pertinax, Moltopren Plexiglass, Hostalen, Novodur, Makralon	– –
Kevlar Glass, carbon concentrated plastics	Kevlar GFK/CFK	– –

Article 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**
Coolant	■

v_c 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

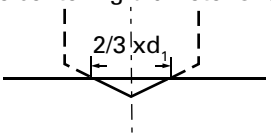
Pilot drilling

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 $^2/_3$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.

Tools with bold feed column no. are preferred choice.

At www.guehring.de an electronic version of the GuhringNavigator is available for selecting the optimal tool and recommended cutting rates.

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

drill Ø mm	Feed column no. 1	2	3	4	5	6	7	8	9
	f (mm/rev)								
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

Tool cooling:
with internal cooling

Material dependent coolants:
air
neat oil
soluble oil

Al Preferred for machining aluminium

G Preferred for machining cast materials

Please note the coolant values on page 86/87!

Tool material	Material examples *Figures in bold = material no. to DIN EN*	Tens. strength MPa (N/mm²)	Hardness	Coolant
Common structural steels	**1.0035** S185, **1.0486** StE P275N, **1.0345** P235GH, **1.0425** P265GH	≤ 500		○
	1.0050 E295, **1.0070** E360, **1.8937** P500NH	> 500-850		○
Free-cutting steels	**1.0718** 11SMnPb30, **1.0736** 115Mn37	≤850		○
	1.0727 46 S20, **1.0728** 60 S20, **1.0757** 46SPb20	850-1000		○
Unalloyed heat-treatable steels	**1.0402** C22, **1.1178** C30E	≤700		○
	1.0503 C45, **1.1191** C45E	700-850		○
	1.0601 C60, **1.1221** C60E	850-1000		○
Alloyed heat-treatable steels	**1.5131** 50MnSi4, **1.7003** 38Cr2, **1.7030** 28Cr4	850-≤1000		○
	1.5710 36NiCr6, **1.7035** 41Cr4, **1.7225** 42CrMo4	1000-1200		○
Unalloyed case hardened steels	**1.0301** C10, **1.1121** C10E	≤750		○
Alloyed case hardened steels	**1.7043** 38Cr4	850-≤1000		●
	1.5752 14NiCr14, **1.7131** 16MnCr5, **1.7264** 20CrMo5	1000-1200		●
Nitriding steels	**1.8504** 34CrAl6	≥850-≤1000		○
	1.8519 31CrMoV9, **1.8550** 34CrAlNi7	>1000-1200		●
Tool steels	**1.1750** C75W, **1.2067** 102Cr6, **1.2307** 29CrMoV9	≤850		○
	1.2080 X210Cr12, **1.2083** X42Cr13, **1.2419** 105WCr6, **1.2767** X45NiCrMo4	>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	**1.4005** X12CrS13, **1.4104** X14CrMoS17, **1.4105** X6CrMoS17,	≤850		●
austenitic	**1.4301** X5CrNi18 10, **1.4541** X6CrNiTi18 10, **1.4571** X6CrNiMoTi 17 12 2	≤850		●
martensitic	**1.4057** X17CrNi16-1, **1.4122** X39CrMo17-1, **1.4521** X2CrMoTi18 2	≤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)		≤240 HB	○ ○
	0.6025 EN-GJL-250 (GG25), **0.6035** EN-GJL-350 (GG35)		<300 HB	○ ○
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)	800-1000		○ ○
	EN-GJS-1200-2 (ADI1200), **EN-GJS-1400-1** (ADI1400)	1200-1400		○ ○
Spheroidal graphite iron and	**0.7050** EN-GJS-500-7 (GGG50), **0.8035** EN-GJMW-350-4 (GTW35)		≤240 HB	○
malleable cast iron	**0.7070** EN-GJS-700-2 (GGG70), **0.8170** EN-GJMB-700-2 (GTS70)		<300 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, **3.7164** TiAl6V4, **3.7184** TiAl4Mo4Sn2,5, - TiAl8Mo1V1	>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	≤450		○
Al cast iron ≤ 10 % Si	**3.2131** G-AlSi5Cu1, **3.2153** G-AlSi7Cu3, **3.2573** G-AlSi9	≤600		○
> 10% Si	**3.2581** G-AlSi12, **3.2583** G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		○
Magnesium alloys	MgMn2, G-MgAl8Zn1, G-MgAl6Zn3	≤450		○
Copper, low-alloyed	**2.0070** SE-Cu, **2.1020** CuSn6, **2.1096** G-CuSn5ZnPb	≤400		○
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	**2.0380** CuZn39Pb2, **2.0401** CuZn39Pb3, **2.0410** CuZn43Pb2	≤600		○ ●
	2.0250 CuZn20, **2.0280** CuZn33, **2.0332** CuZn37Pb0,5	>600-850		●
Bronze, long-chipping	**2.0380** CuZn39Pb2, **2.0401** CuZn39Pb3, **2.0410** CuZn43Pb2	≤850		●
	2.0250 CuZn20, **2.0280** CuZn33, **2.0332** CuZn37Pb0,5	>850-1000		●

	10 x D		15 x D
Article no.	770	6070	773
Standard	Guhring standard		Guhring standard
Tool material	Solid carbide		Solid carbide
Carbide grade	K		K
Surface	◯ bright	◯ bright	◯ bright
Type	RT 150 GG	RT 150 GG	RT 150 GN
Shank	HA	HA	HA
Cutting direction	right-hand	right-hand	right-hand
Coolant	■	■	■
	Al	G	Al
			

Vc m/min	Feed col. no.		Vc m/min	Feed col. no.
120	6	**6**	120	5
100	6	**6**	100	5
90	6	**6**	90	5
80	6	**6**	80	5
40	2	**1**	40	1
410	8	6	410	6
410	8	6	410	6
380	**8**	6	380	**7**
330	**8**	6	330	**7**
280	7	7	280	6
110	6	6	110	5
80	5	5	80	4

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.

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:

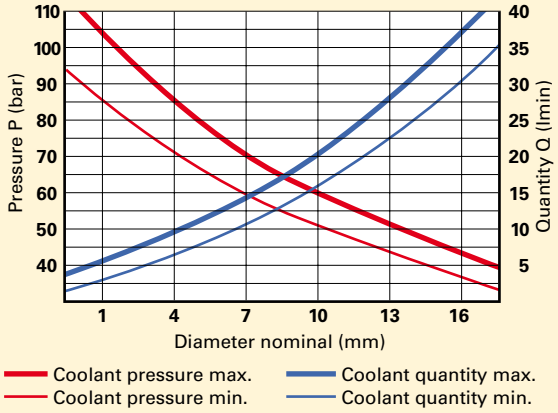
1. Initial milling of surface, i.e. with Guhring's centre cutting Ratio end mill RF 100 U. The surface must be machined at right angles to the entry angle of the drilling operation.
2. Production of a cylindrical pilot hole (tolerance F9) with a minimum drilling depth of 1 x D. For this operation we 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, withdrawal in top gear.

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 de pendent 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.

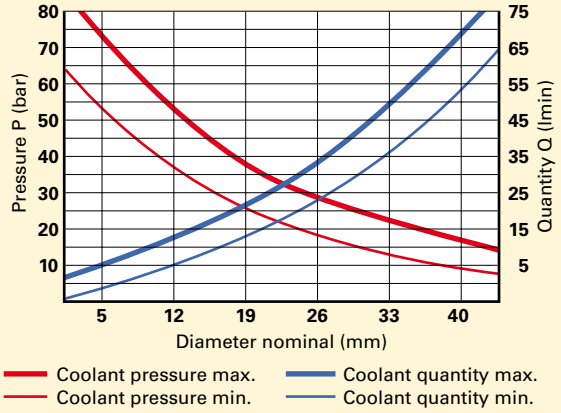
Coolant values EB 100

(Recommended values for soluble oil)



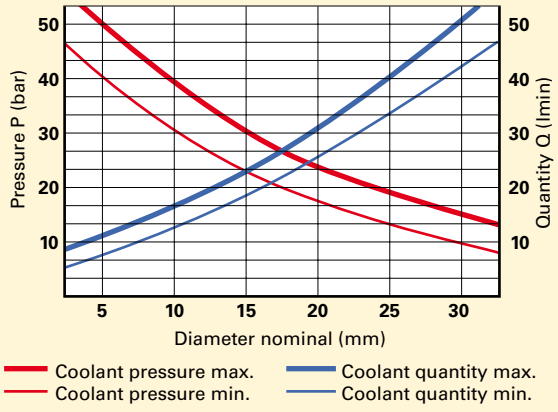
Coolant values EB 80

(Recommended values for soluble oil)



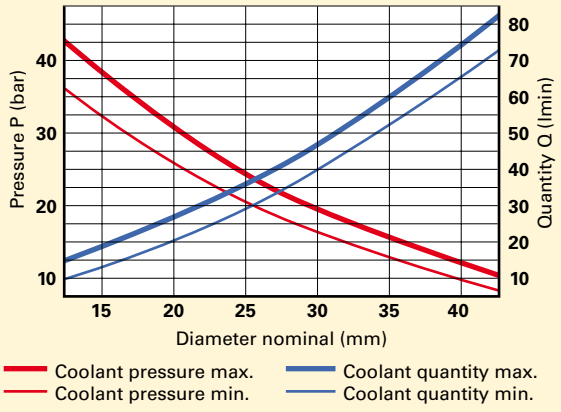
Coolant values ZB 80

(Recommended values for soluble oil)



Coolant values EB 800

(Recommended values for soluble oil)



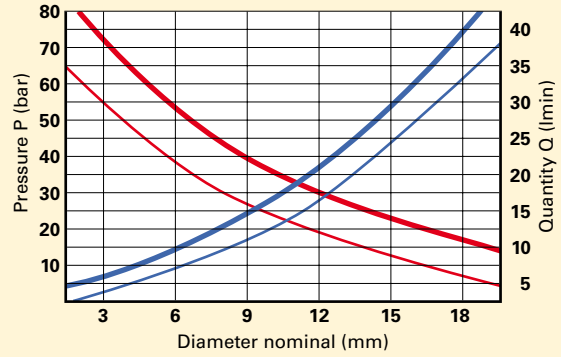
To monitor an optimal cooling lubrication we recommend our PQ 3000 inspection and measuring system to accurately check the pressure and the volume of the cooling lubricant flow as well as CC 3000 to accurately check the filter quality of the cooling lubricant system.

PG 3000, Guhring no. 4068

CC 3000, Guhring no. 4076

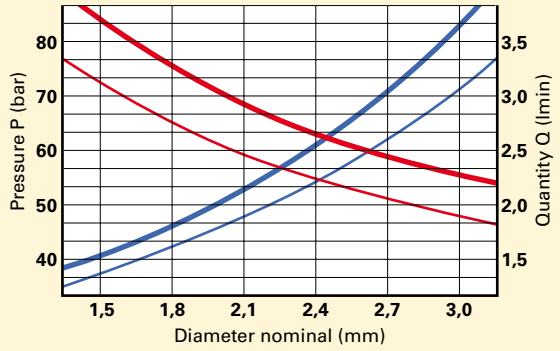
Coolant values RT 100T

(Recommended values for soluble oil)



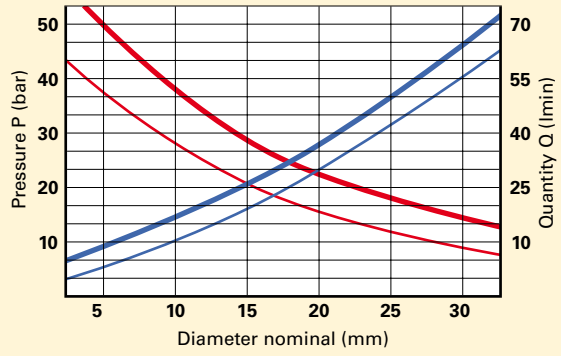
Coolant values Solid carbide micro-precision drills

15 x D (Recommended values for soluble oil)



Coolant values RT 150

(Recommended values for soluble oil)



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