

GUHRING

VADZA

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Deep Hole Drills

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

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

Single-fluted gun drill EB 100 solid carbide



Single-fluted gun drill EB 80 with brazed carbide head



Double-fluted gun drill ZB 80 with brazed carbide head



Single-fluted gun drill EB 800 with interchangeable parts



Solid carbide spiral-fluted deep hole drill RT 100 T



Solid carbide micro-precision drills



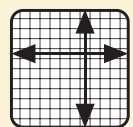
Solid carbide Ratio drills RT 150



Grinding equipment and accessories



Technical section



Inquiry forms



GUHRING NAVIGATOR



suitable for almost every material	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Stock program Ø 8.0 - 12.0 mm • Special solutions Ø 6.0 - 27.0 mm 	
suitable for almost every material	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • procedure on conventional machines • drill procedure • hole accuracy • drivers for conventional gun drills 	
for special solutions for your specific application task	<ul style="list-style-type: none"> • EB 100, EB 800 • EB 80, ZB 80 • RT 100 T, RT 100T Alu • Micro-precision drills, RT150 	
application recommendations for all gun drills and materials	<ul style="list-style-type: none"> • cutting rate recommendations • cooling lubricant data 	

SINGLE-FLUTED GUN DRILL EB 100 SOLID



D CARBIDE







EB 100



GUHRING

Single-fluted gun drills EB 100

EB 100







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



TiAlN nanoA-coated design for almost every material



Solid carbide solid shank with conical MQL shank end*

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



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

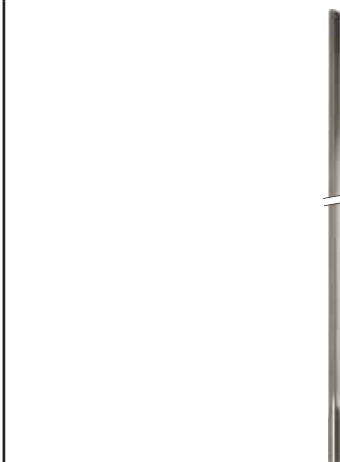
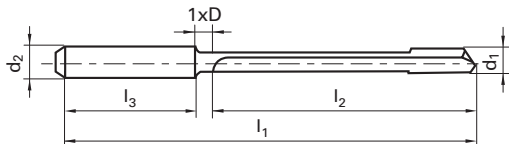


Bright design for all other materials

Order no. = Guhring no. + Code no.

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

5647
Guhring standard
Solid carbide
K30/K40
a
50xD
right-hand
h5
123



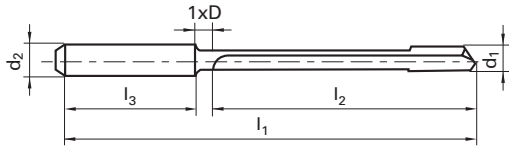
Code no.	d1	d2	l1	l2	l3
	mm	mm	mm	mm	mm
2.500	2.500	4.000	185.00	155.00	28.00
2.780	2.780	4.000	185.00	155.00	28.00
3.000	3.000	6.000	230.00	190.00	36.00
3.170	3.170	6.000	230.00	190.00	36.00
3.500	3.500	6.000	230.00	190.00	36.00
3.970	3.970	6.000	260.00	220.00	36.00
4.000	4.000	6.000	260.00	220.00	36.00
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

Availability	
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Order no. = Guhring no. + Code no.

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

5648
Guhring standard
Solid carbide
K30/K40
a
75xD
right-hand
h5
123



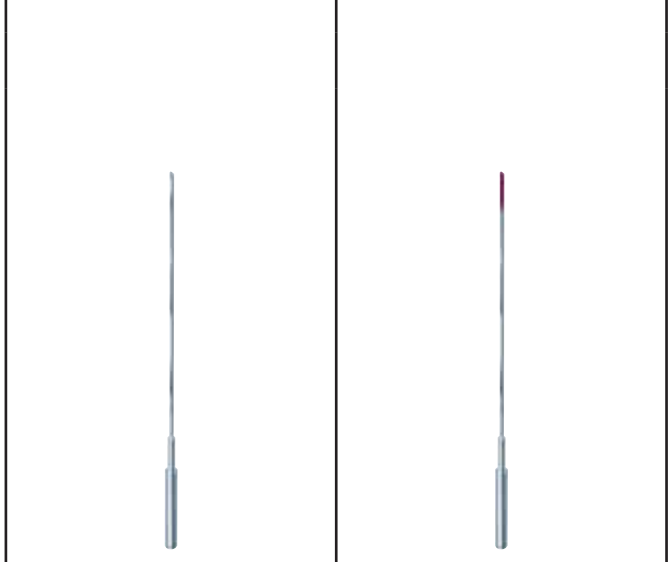
Code no.	d1	d2	l1	l2	l3
	mm	mm	mm	mm	mm
2.500	2.500	4.000	255.00	220.00	28.00
2.780	2.780	4.000	255.00	220.00	28.00
3.000	3.000	6.000	320.00	280.00	36.00
3.170	3.170	6.000	320.00	280.00	36.00
3.500	3.500	6.000	320.00	280.00	36.00
3.970	3.970	6.000	360.00	320.00	36.00
4.000	4.000	6.000	360.00	320.00	36.00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

Availability	
●	
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Order no. = Guhring no. + Code no.

Guhring no.
Standard
Tool material
Carbide grade
Surface
Flute length (mm)
Cutting direction
Tolerance
Discount group

5024	5632
Guhring standard	Guhring standard
Solid carbide	Solid carbide
K30/K40	K30/K40
○	ⓐ
45,00	45,00
right-hand	right-hand
h5	h5
123	123



Code	d1	d2	l1	l2	l3
no.	mm	mm	mm	mm	mm
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

Availability

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●	●
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●	●
●	●
●	●

○ bright ⓐ TiAlN SuperA

Order no. = Guhring no. + Code no.

Guhring no.

Standard

Tool material

Carbide grade

Surface

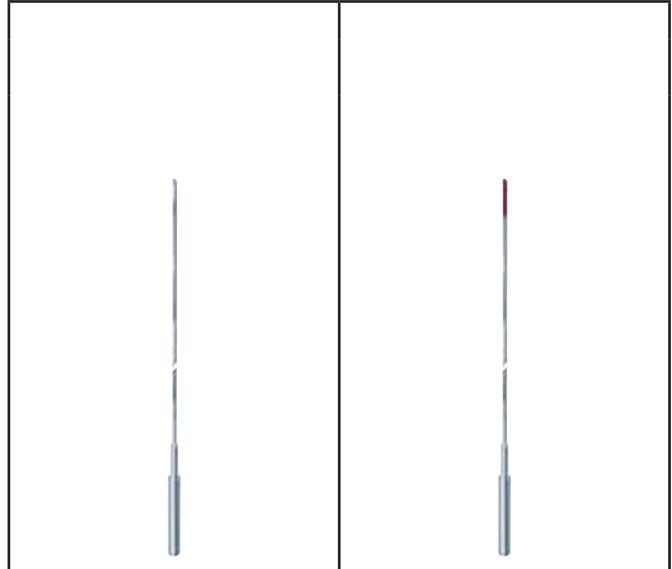
Flute length (mm)

Cutting direction

Tolerance

Discount group

5020	5633
Guhring standard	Guhring standard
Solid carbide	Solid carbide
K30/K40	K30/K40
○	ⓐ
80,00	80,00
right-hand	right-hand
h5	h5
123	123



Code no.	d1	d2	l1	l2	l3
	mm	mm	mm	mm	mm
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

Availability	
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●	●
●	●

○ bright ⓐ TiAlN SuperA

suitable for almost every material,

Stock program from \varnothing 1,2 to 12,0 mm

Special solutions from \varnothing 0,9 to 12,0 mm, flute length max. 500 mm

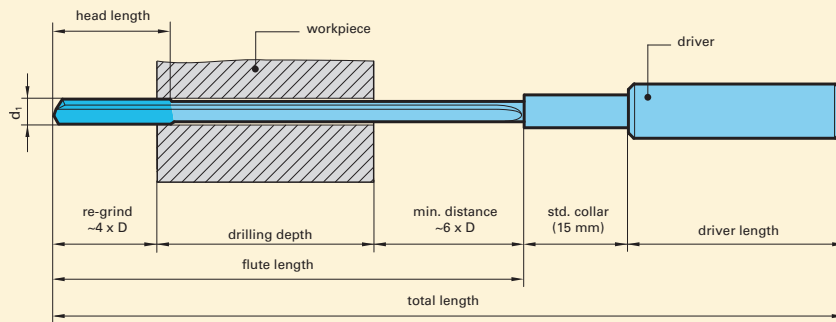
Inquiry form see page 68



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

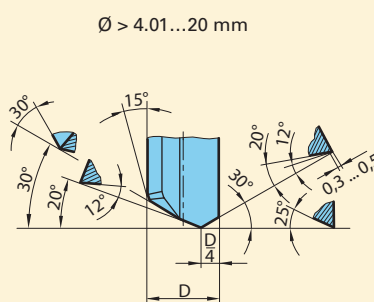
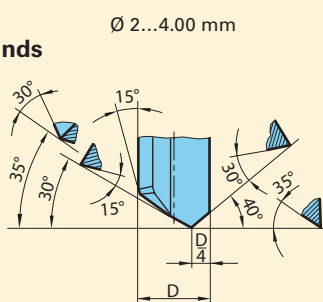


suitable for difficult-to-machine materials, i. e. high-alloyed steel

EB 100

Standard point grinds

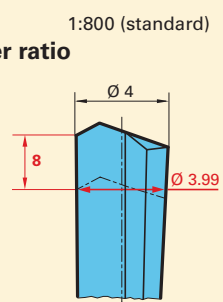
(special point grinds on request)



EB 100

Back taper ratio

(dimensions in mm)



SINGLE-FLUTED GUN DRILL EB 80 WITH B



BRAZED CARBIDE HEAD



EB 80

GUHRING

Single-fluted gun drill EB 80

EB 80

Standard	Type	Tool illustration	Drilling depth	Tool material	Surface	Diameter range	Gühring no.	Discount group	Standard range. page
Single fluted gun drills EB 80									
Gühring std.	EB 80		20 x D	Carbide	S	4.000 - 12.000	5018	123	19
Gühring std.	EB 80		20 x D	Carbide	C	4.000 - 12.000	5639	123	19
Gühring std.	EB 80		30 x D	Carbide	S	4.000 - 12.000	5460	123	20
Gühring std.	EB 80		30 x D	Carbide	C	4.000 - 12.000	5640	123	20
Gühring std.	EB 80		40 x D	Carbide	S	4.000 - 12.000	5022	123	21
Gühring std.	EB 80		40 x D	Carbide	C	4.000 - 12.000	5641	123	21
Gühring std.	EB 80		80 x D	Carbide	S	4.950 - 11.950	5023	123	22
Gühring 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 Gühring 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	Prices on inquiry
2.00...13.90	0.1	G	≤ 7.5 mm Ø 650 max	
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	1200 max	

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

suitable for almost every material,

Stock program from \varnothing 3,97 to 12,7 mm

Special solutions from \varnothing 2,0 to 40,0 mm, total length max. 3000 mm

Inquiry form see page 70 and 71 (Quickservice)



EB 80

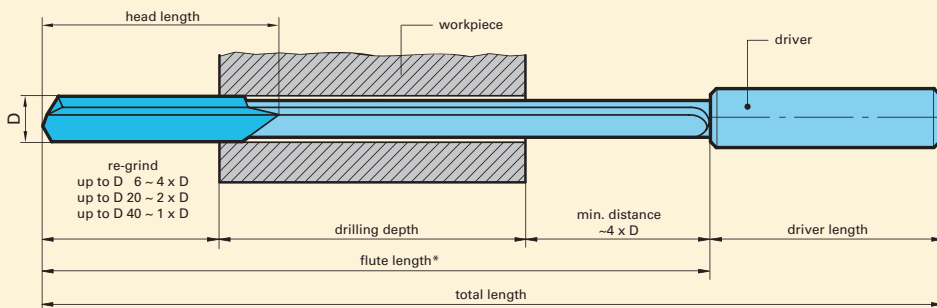
For certain materials a coating is required, as the successful application of gun drills with a bright surface finish cannot be guaranteed. For coating definitions see GuhringNavigator.

On request we can apply PCD or PCB cutting edges from \varnothing 6.0 – 20.00 mm. This improves the tool life in AISi alloys many times over.

S TiN **F** FIRE **M** MolyGlide **C** TiCN

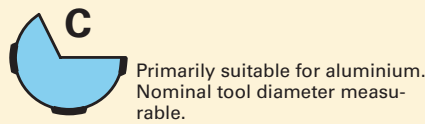
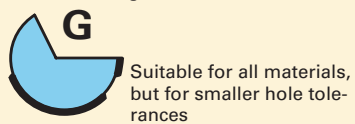
The dimensions required to calculate the length for conventional machine tools

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



EB 80 Head forms (position of supporting strips)

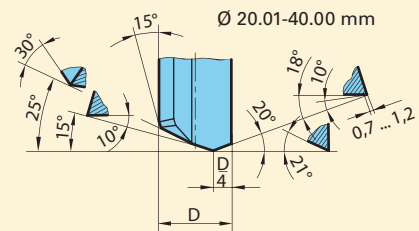
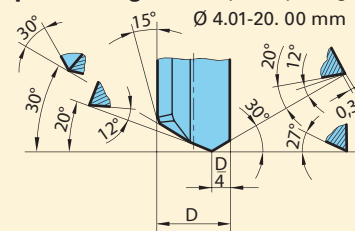
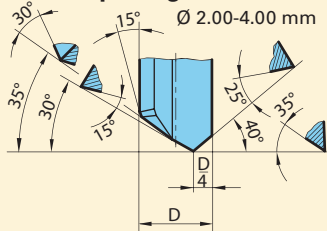
Standard designs



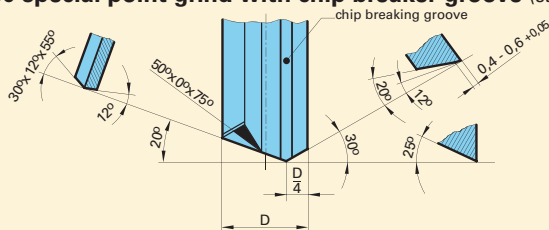
Special designs e.g.



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

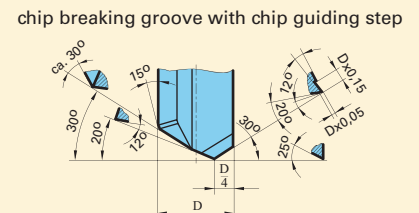
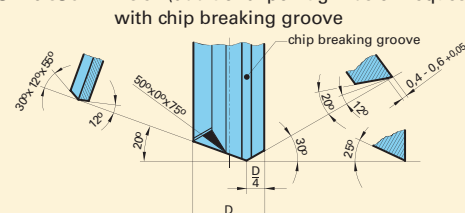
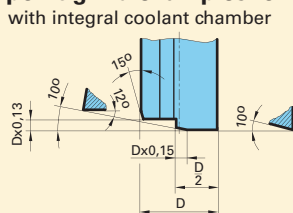


EB 80 special point grind with chip breaker groove (standard Guhring no. 5018, 5460, 5022 and 5023)



Standard head lengths (mm)			
\varnothing -range	length	\varnothing -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)



DOUBLE-FLUTED GUN DRILL ZB 80 WITH







BRAZED CARBIDE HEAD



ZB 80

GUHRING

Double-fluted gun drill ZB 80

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


ZB 80



Point grind for cast materials



Point grind for aluminium

 bright

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



Stock program from \varnothing 8,0 to 12 mm for drilling depth to $30 \times D$

Special solutions from \varnothing 6,0 to 27,0 mm, total length max. 1000 mm

Inquiry form see page 72



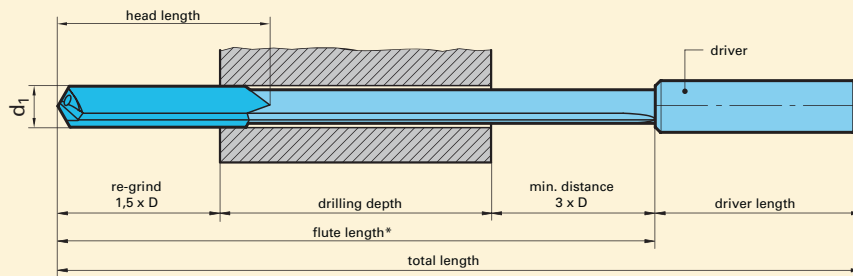
ZB 80

M 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 $40 \times D$, for larger drilling depths apply two tools. (i.e. \varnothing 10 x 450 and \varnothing 9.95 x 850 mm)



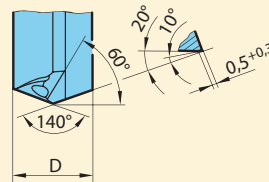
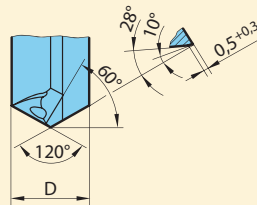
ZB 80

Standard point grinds

(special point grinds available)

Point grind G for machining cast iron

Point grind A for machining aluminium

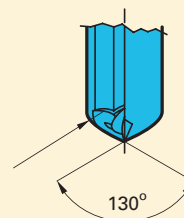
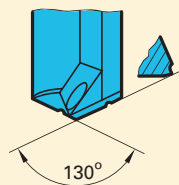


ZB 80

Special point grinds, e.g.:

Aluminium

Cast iron



SINGLE-FLUTED GUN DRILLS WITH INTERCHANGE PARTS EB 800



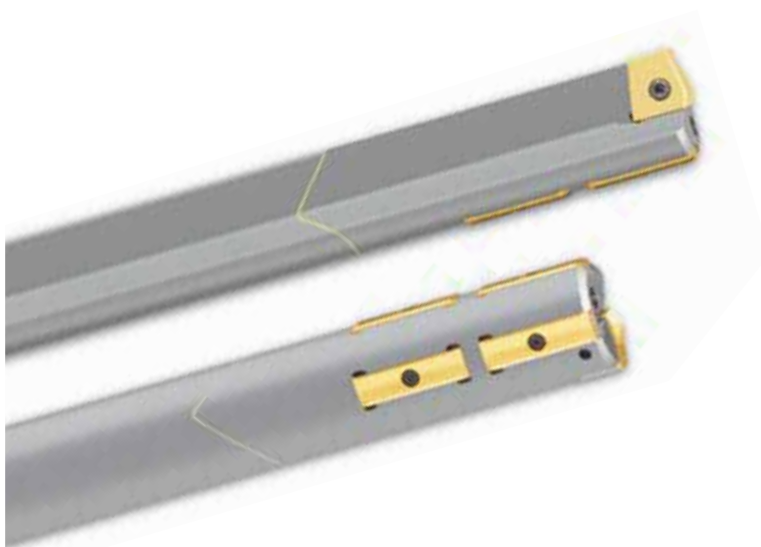
EB 800

GUHRING

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

Size	Diameter holder range	Body/holder	Insert				Screws
			Inserts				
			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
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						Guhring no. 4071 5.002 T20 M5x14.2
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						
6.	Ø38.00 - Ø38.49 Ø38.50 - Ø38.99 Ø39.00 - Ø39.49 Ø39.50 - Ø40.00						

EB 800

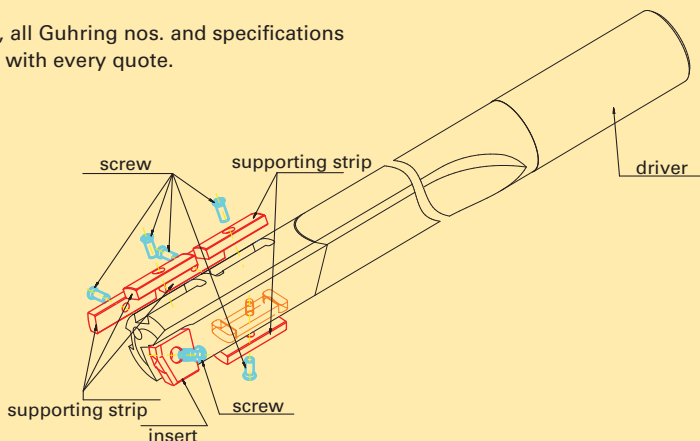


Screw driver	Supporting strip				Screws	Screw driver
	TiN-coated	FIRE-coated	Signum-coated	TiAlN nanoA-coated		
Guhring no. 1612 8.001					Guhring no. 4071 1.601 T5 M1.6x4.4	Guhring no. 1612 5.001
Guhring no. 1612 9.001					Guhring no. 4071 2.203 T7 / M2.2x 4.6	Guhring no. 1612 7.001
					Guhring no. 4071 2.202 T7 / M2.2x5.6	
Guhring no. 1612 15.001	Guhring no. 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 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

ZB 80

**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

Gühring 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:

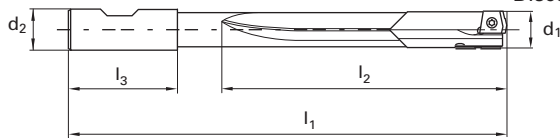
- The interchangeable component technology for inserts and supporting strips makes any combination of carbide grade and coating possible.
- The precision interchangeable inserts and supporting strips eliminate complicated adjustments.
- The precision supporting strips are produced in a special carbide 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 Gühring 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 HE
 - DIN 6535 HB - DIN 1835 E
- Also, all the forms generally required for deep drilling machines are possible to be manufactured.

EB 800

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

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



d1		d2	l1	l2	l3
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

Availability
●
●
●
●
●
●
●
●








RT 100 T SOLID CARBIDE



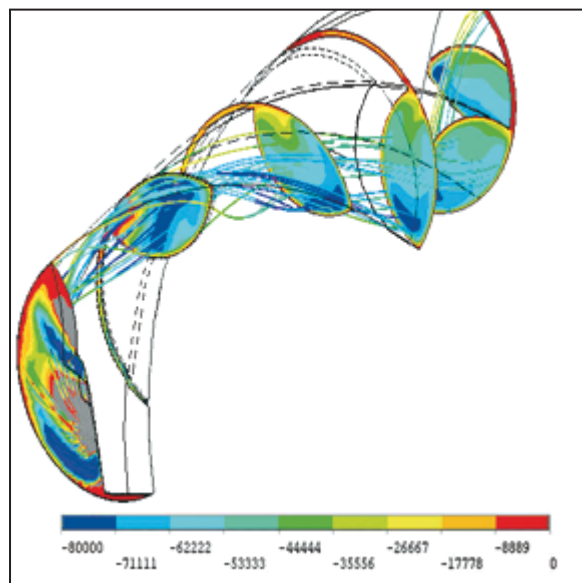
RT 100 T

GUHRING

Spiral-fluted deep hole drill RT 100 T

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

RT 100 T



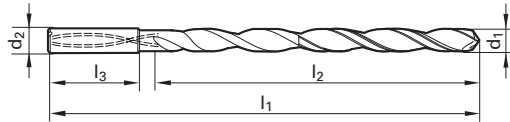
TiAlN head coated for steel and cast material

A TiAlN head coated

Spiral-fluted deep hole drill RT 100 T

Order no. = Guhring no. + Code no.

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



6509
Guhring standard
Solid carbide
K30/K40
A
RT 100 T
HA
15 x D
right-hand
h7
165



RT 100 T

Code	d1	d1	d2 h6	l1	l2	l3
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


Availability

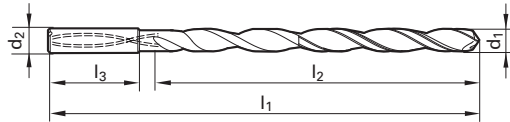


A TiAlN head coated

Spiral-fluted deep hole drill RT 100 T

Order no. = Guhring no. + Code no.

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




RT 100 T

Code no.	d1 inch	d1 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm
3,000		3.000	6.000	110.00	70.00	36.00
3,170	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

Availability

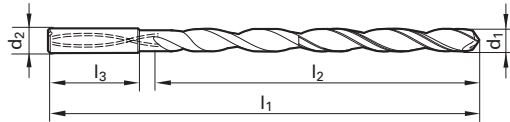


 TiAlN head coated

Spiral-fluted deep hole drill RT 100 T

Order no. = Guhring no. + Code no.

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



RT 100 T

Code no.	d1 inch	d1 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm
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

Availability



A TiAlN head coated

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

Special solutions from \varnothing 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
- \varnothing 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

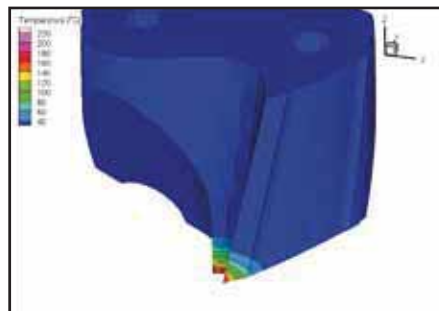


Optimised cutting edge geometry for the machining of aluminium

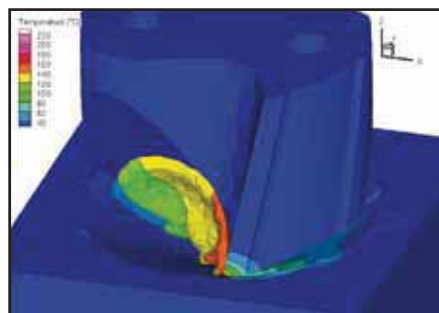
The cutting edge geometry of the spiral-flute deep hole drill RT 100 T ALU is optimised to produce chips that can be evacuated from deep holes as easily as possible.



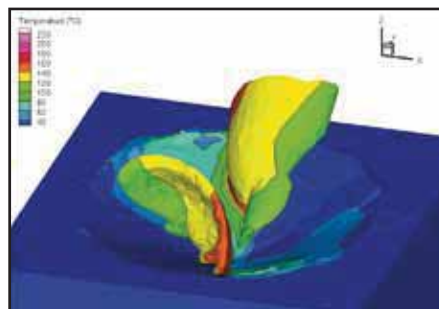
The special design of cutting edge geometry...



... 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 \varnothing -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.



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-
sion drills

GUHRING

Solid carbide micro-precision drills

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		1.400 - 3.000	6412	164	47



**TiAlN SuperA head coated
for steel and cast materials**

RATIO DRILLS RT 150 SOLID CARBIDE











RT 150

GUHRING

Ratio drills RT 150

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

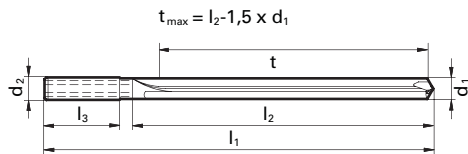


Relieved cone and negative rake angle for aluminium

RT 150

 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

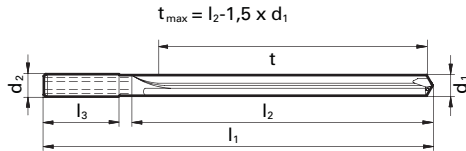
RT 150

Ratio drills RT 150

Order no. = Guhring no. + Code no.

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

770	6070
Guhring standard	Guhring standard
Solid carbide	Solid carbide
K	K
	
RT 150 GG	RT 150 GG
10 x D	10 x D
right-hand	right-hand
m7	m7
121	121



Aluminium















































Cast material



Availability

Code no.	d1		d2	l1	l2	l3
	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

GRINDING EQUIPMENT AND ACCESSORIES



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 truly 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



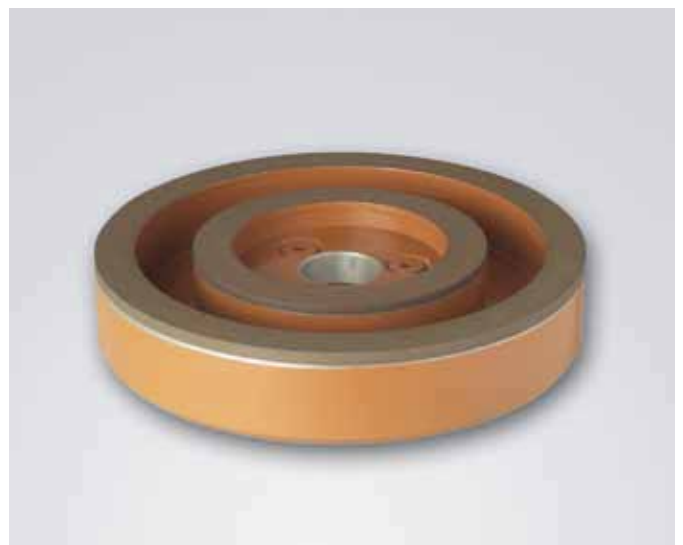
Double grinding wheel DSS 125

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 proportion 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 to 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 \varnothing 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 mechanism, 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



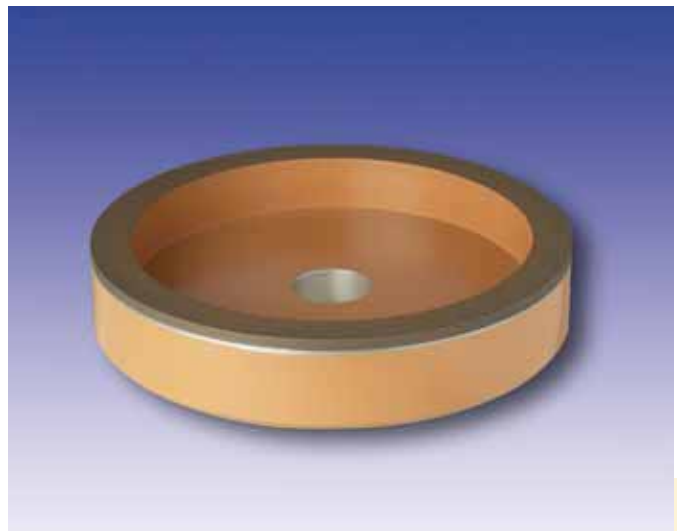
Single grinding wheel ESS 125

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 \varnothing 125 mm, coating width 10 mm, coating thickness 3 mm, hole \varnothing 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	d1	d2	l1	Availability	
no.	mm	mm	mm		
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	●	●

Accessories

Adjustable screw without sealing element

Order no. = Guhring no. + Code no.	Guhring no. Standard Discount group						
	Code no.	Thread	d2	l1	l2	l3	SW
		mm	mm	mm	mm	mm	mm
	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
							5754
							Guhring standard
							123
							Minimum order quantity 5 pieces
							Availability
							●
							●
							●

Adjustable screw with sealing element

Order no. = Guhring no. + Code no.	Guhring no. Standard Discount group							
	Code no.	Thread	d2	l1	l2	l3	SW	O-ring
		mm	mm	mm	mm	mm	mm	DIN 3770
	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
							5755	
							Guhring standard	
							123	
							Minimum order quantity 5 pieces	
							Availability	
							●	
							●	
							●	
							●	


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		Code no.	for gun drill with diameter nominal d1	
	from mm	to mm		from mm	to mm
1,900	2.000	2.099	9,400	9.700	9.999
2,000	2.100	2.199	9,700	10.000	10.299
2,100	2.200	2.299	10,000	10.300	10.799
2,200	2.300	2.399	10,500	10.800	11.299
2,300	2.400	2.499	11,000	11.300	11.799
2,400	2.500	2.599	11,500	11.800	12.399
2,500	2.600	2.699	12,000	12.400	12.899
2,600	2.700	2.799	12,500	12.900	13.399
2,700	2.800	2.899	13,000	13.400	13.899
2,800	2.900	3.099	13,500	13.900	14.399
3,000	3.100	3.359	14,000	14.400	14.899
3,200	3.360	3.459	14,500	14.900	15.399
3,300	3.460	3.559	15,000	15.400	15.899
3,400	3.560	3.799	15,500	15.900	16.399
3,600	3.800	3.959	16,000	16.400	16.899
3,700	3.960	4.259	16,500	16.900	17.399
4,000	4.260	4.499	17,000	17.400	17.899
4,200	4.500	4.749	17,500	17.900	18.399
4,500	4.750	4.999	18,000	18.400	19.509
4,700	5.000	5.249	19,000	19.510	20.509
5,000	5.250	5.499	20,000	20.510	21.509
5,200	5.500	5.749	21,000	21.510	22.609
5,500	5.750	5.999	22,000	22.610	23.609
5,700	6.000	6.249	23,000	23.610	24.609
6,000	6.250	6.449	24,000	24.610	25.609
6,200	6.450	6.749	25,000	25.610	26.609
6,500	6.750	6.999	26,000	26.610	27.609
6,700	7.000	7.299	27,000	27.610	28.609
7,000	7.300	7.599	28,000	28.610	29.609
7,300	7.600	7.799	29,000	29.610	30.609
7,500	7.800	7.999	30,000	30.610	32.609
7,700	8.000	8.299	32,000	32.610	34.699
8,000	8.300	8.699	34,000	34.700	36.699
8,400	8.700	8.999	36,000	36.700	38.699
8,700	9.000	9.299	38,000	38.700	40.000
9,000	9.300	9.699			

Accessories


Sealing disc for single-fluted gun drills

Order no. = Guhring no. + Code no.	Guhring no. Standard Material Discount group			5752
				Guhring standard
				Vulkolan
				123
				Minimum order quantity 5 pieces
				
			Availability	
			<ul style="list-style-type: none"> ● ● ● ● 	
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. Standard Material Discount group			5753
				Guhring standard
				Vulkolan
				123
				Minimum order quantity 5 pieces
				
			Availability	
			<ul style="list-style-type: none"> ● ● 	
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. Standard Material Discount group				5749
					Guhring standard
					Vulkolan
					123
				Minimum order quantity 5 pieces	
					
				Availability	
				● ● ●	
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

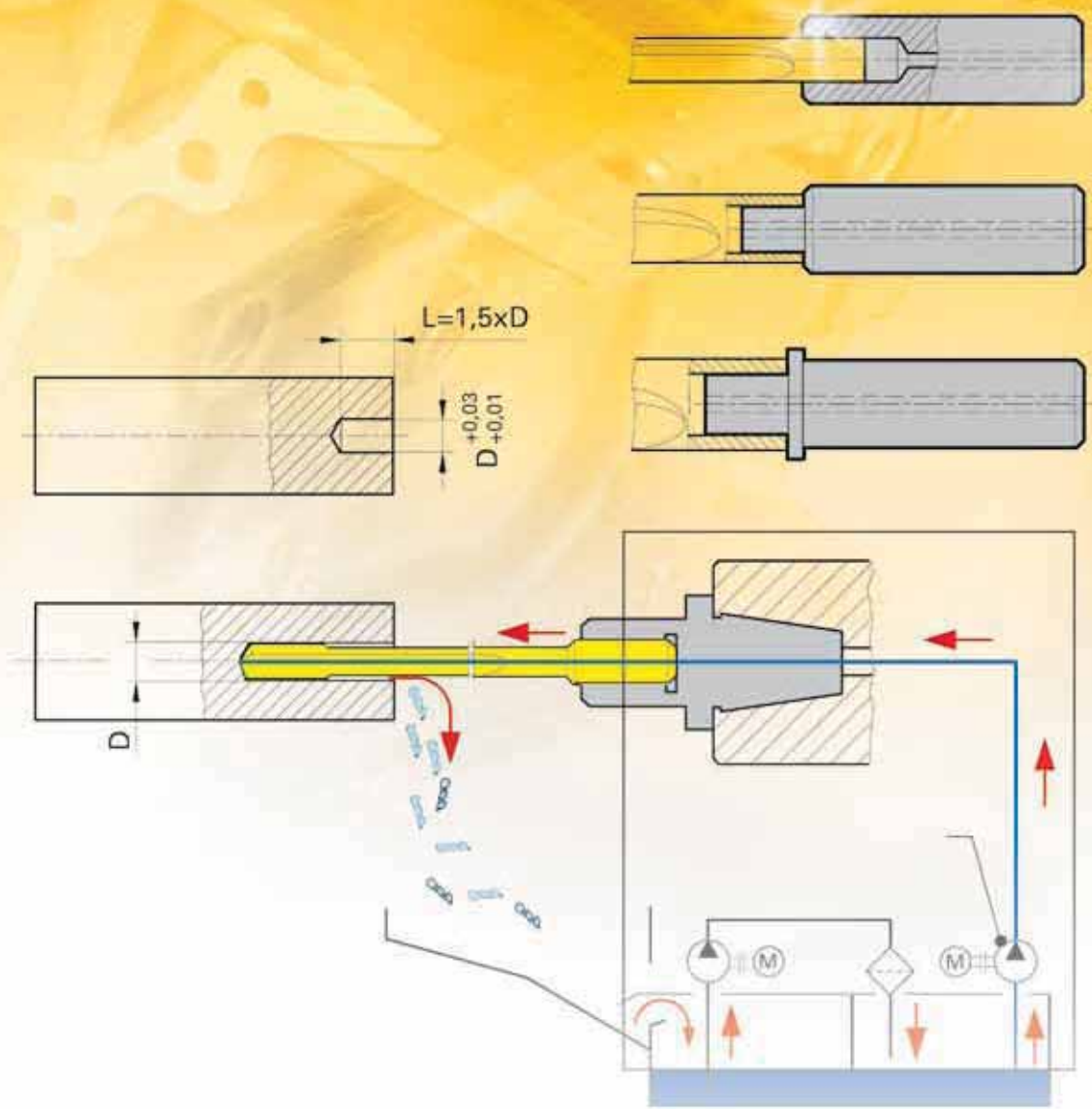
xx,xxx = Code no. pursuant to the table of assignment on page 60 (by code no. with four digits please put in front 0)	Guhring no. Standard Material Discount group				5750
					Guhring standard
					Vulkolan
					123
				Minimum order quantity 5 pieces	
					
				Availability	
				● ● ●	
Order examples: - 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. Standard Material Discount group				5751
					Guhring standard
					Vulkolan
					123
				Minimum order quantity 5 pieces	
					
				Availability	
				● ● ●	
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					

Accessories

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.

Typical procedure with all gun drills on conventional machine tools:

- production of pilot hole ($L = 3 \times D$, 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. $\varnothing 10 \times 400$ mm and $\varnothing 9.95 \times 800$ 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.



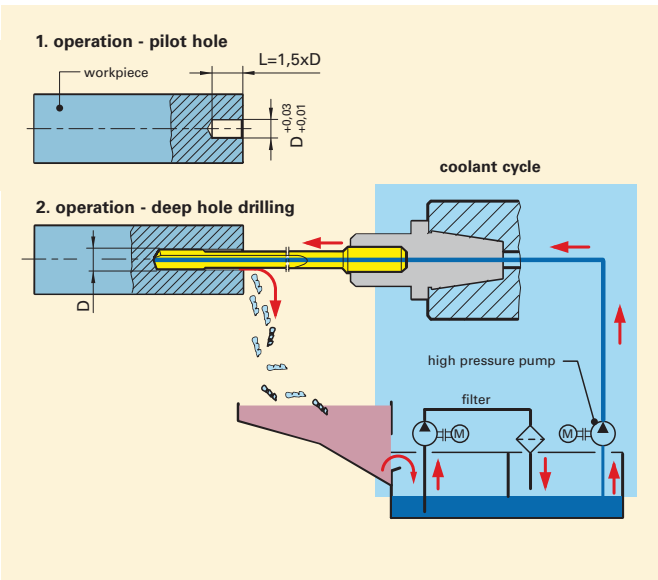
All gun drills must have support for the pilot hole.

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

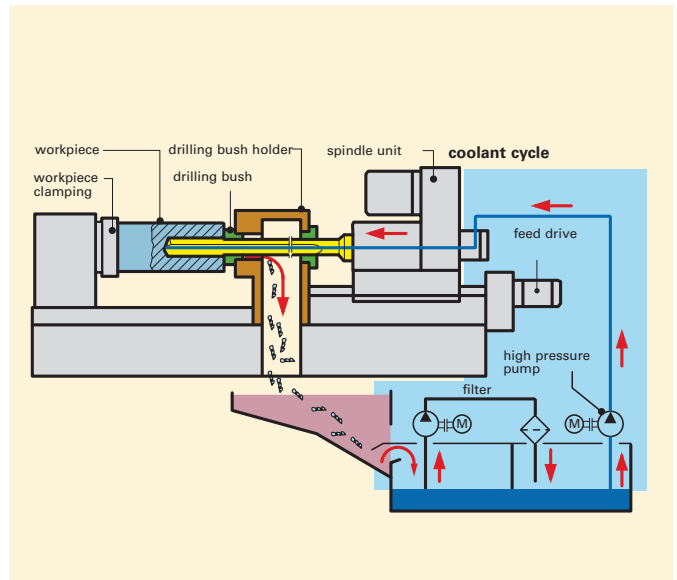
Deep hole drilling is not a closed book, but can be mastered by anybody as long as certain conditions are adhered to.

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

Deep hole drilling on conventional machine tools



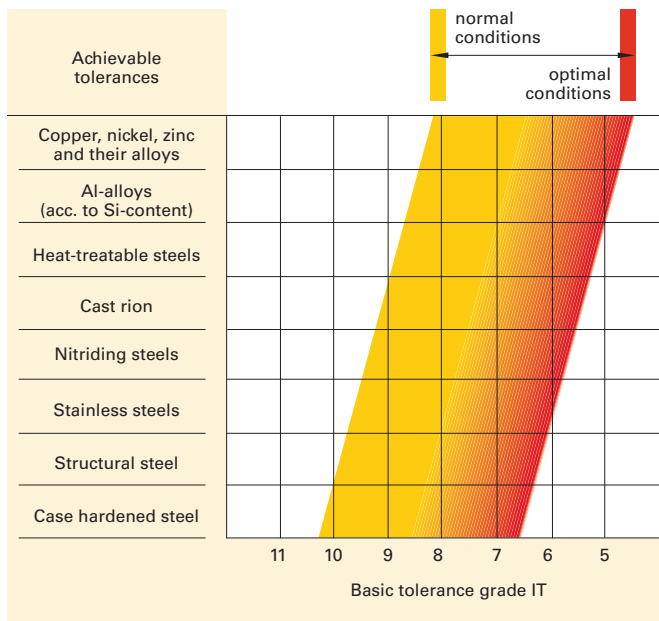
Deep hole drilling machines



Technical section

Basic tolerances*

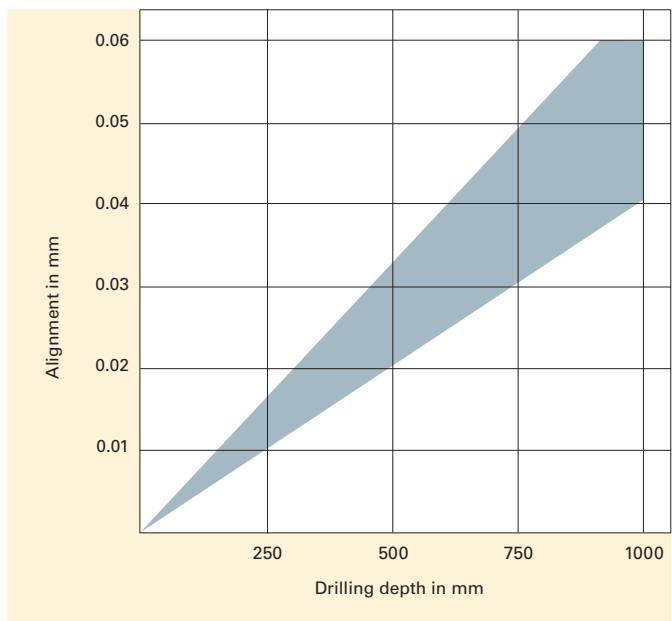
The application of single-fluted gun drills can achieve a lower basic tolerance, as the cutting forces at the cutting edge are absorbed by the supporting strips, unlike twist drills where the slightest deviation of the two cutting edges causes a larger hole.



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.

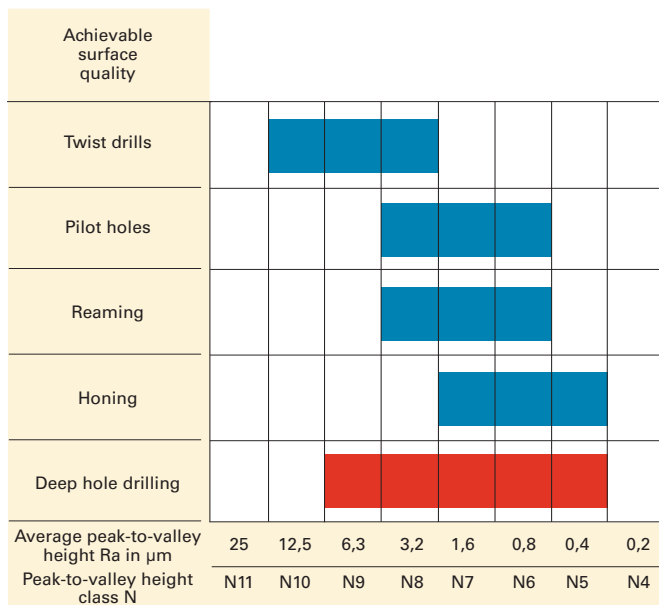


Surface quality*

The forces at the cutting edge are absorbed by the support bushes, which in return burnishes the surface.

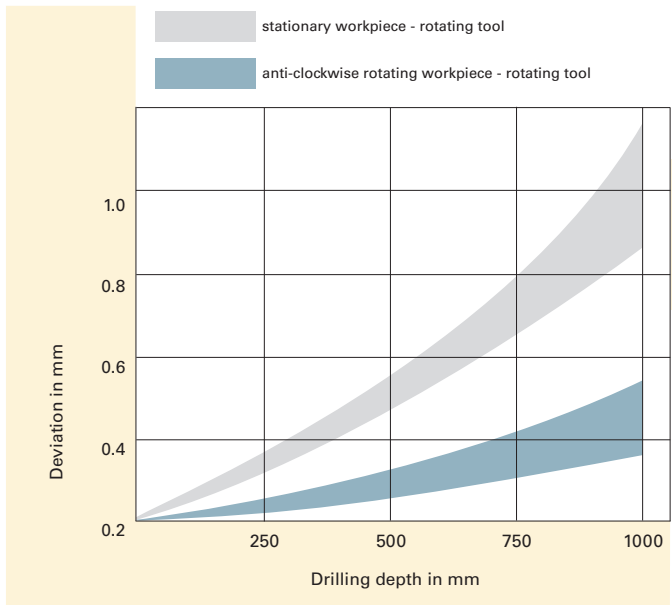
Lubrication between the supporting strips and hole surface is therefore very important.

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.



Technical section

* 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

4

code no.	d ₁	l ₁
4.1	19,05	70

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

5

code no.	d ₁	l ₁	l ₂
5.1	10	60	20
5.2	16	80	28
5.3	25	100	50

3

code no.	d ₁	l ₁	l ₂	l ₃
3.1	25	70	34	100

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

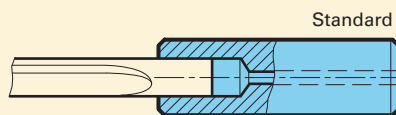
code no.	d ₁	l ₁
11.1	8	36
11.2	10	40
11.3	12	45
11.4	16	48
11.5	20	50
11.6	25	56
11.7	32	60
11.8	40	70

16 sim form HA

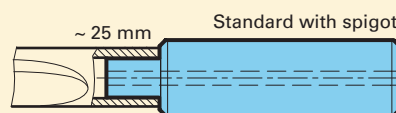
code no.	d ₁	l ₁
16.1	10	50
16.2	16	64
16.3	20	70
16.4	25	81
16.5	32	92

Driver variations to suit gun drill tubes

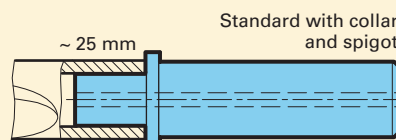
Solution for nom.- \varnothing < driver- \varnothing
(difference must be appr. 6 mm):
tube shank installed in driver



Solution for nom.- \varnothing \neq driver- \varnothing
(close to parallel):
tube shank installed over spigot



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



INQUIRY FORMS



Inquiry forms

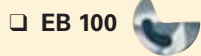
GUHRING

Fax Inquiry / Order

simply photo-copy, complete and fax...

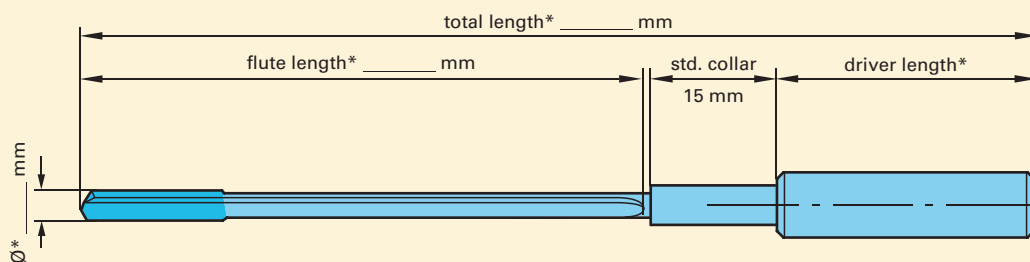
- Inquiry
 Order
 Repeat order, no. of initial order

Deep hole gun drill:

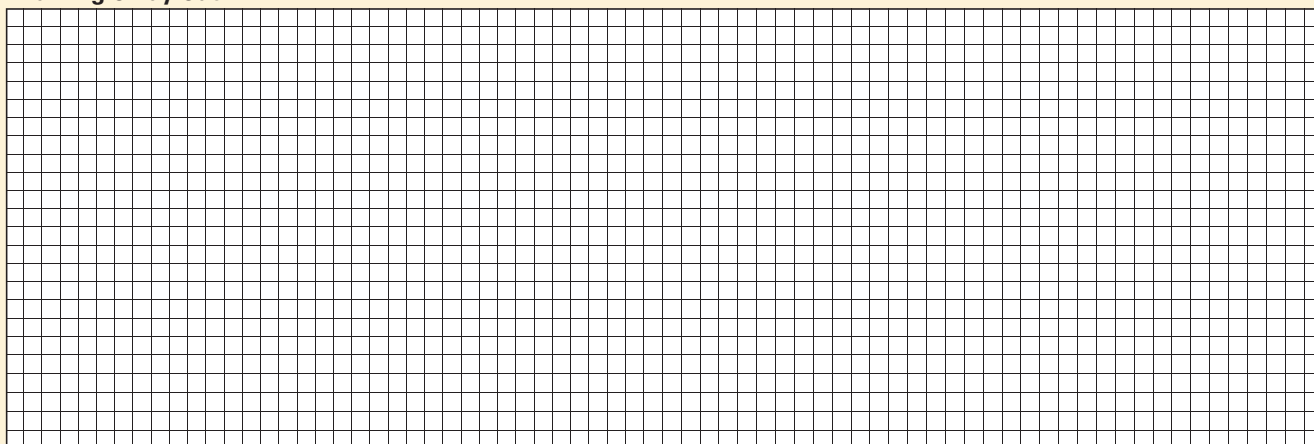


Required no. of pieces: Tool _____ pieces

* 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 Pressure _____ bar Soluble oil Quantity _____ l/min

Company: _____ **Company stamp:** _____

Telephone/fax: _____


Contact: _____ **Signature:** _____

Inquiry forms

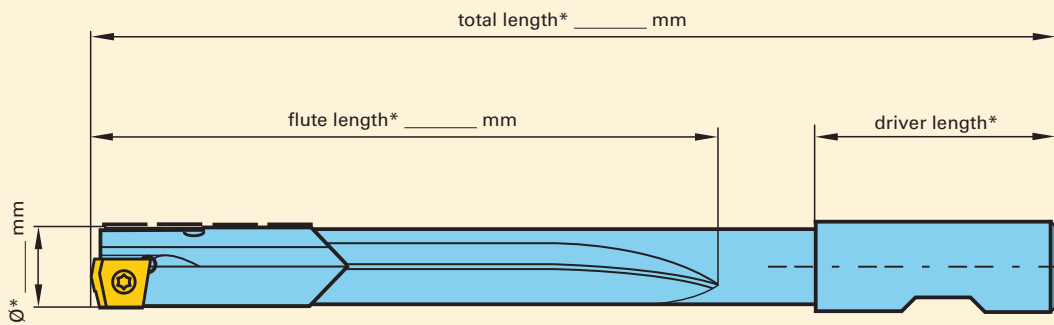
Fax Inquiry / Order

simply photo-copy, complete and fax...

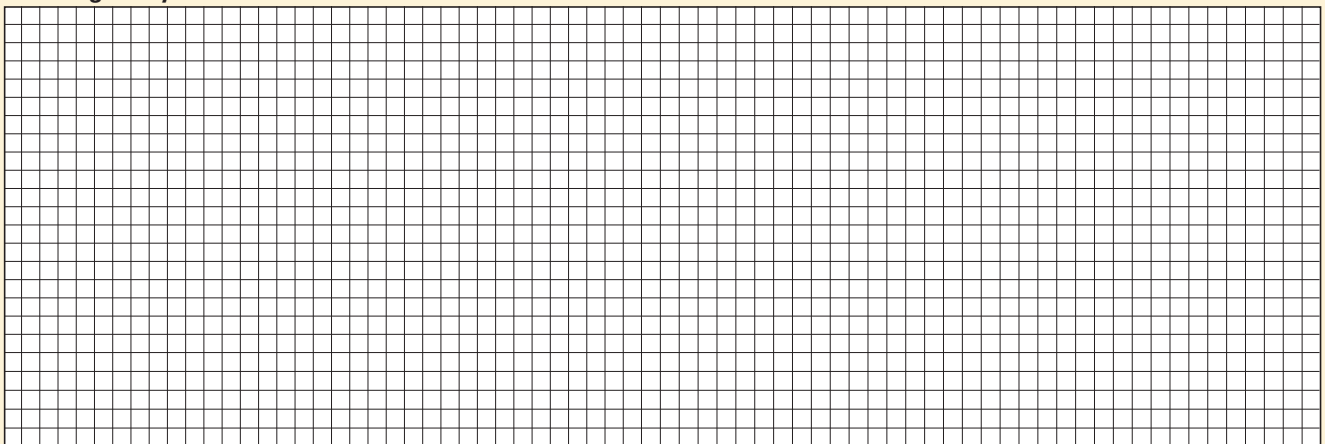
- Inquiry
 Order
 Repeat order, no. of initial order

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: _____

Inquiry forms

Fax Inquiry / Order

simply photo-copy, complete and fax...

- Inquiry
 Order
 Repeat order, no. of initial order

Deep hole gun drill:

EB 80

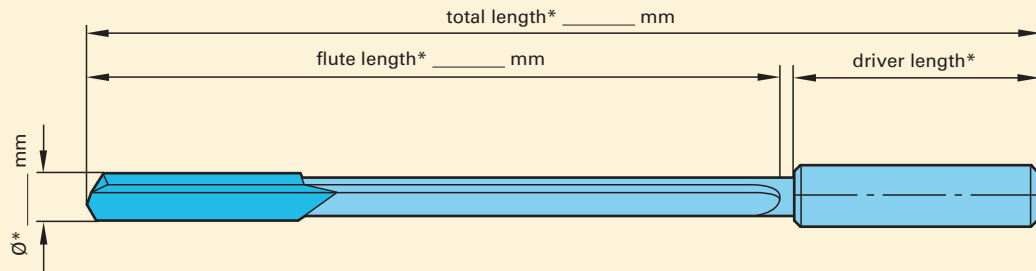


Required no. of pieces: Tool _____ pieces

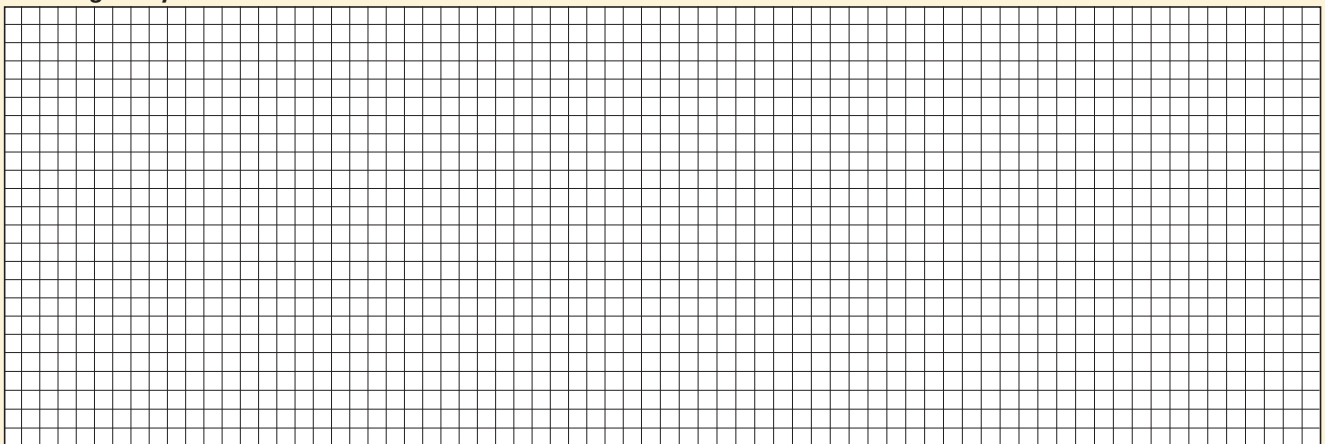
* Ø 2,0 - 40,0 mm

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: _____

Inquiry forms

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

Quick Service

- Inquiry Order Repeat order, no. of initial order

Deep hole gun drill:

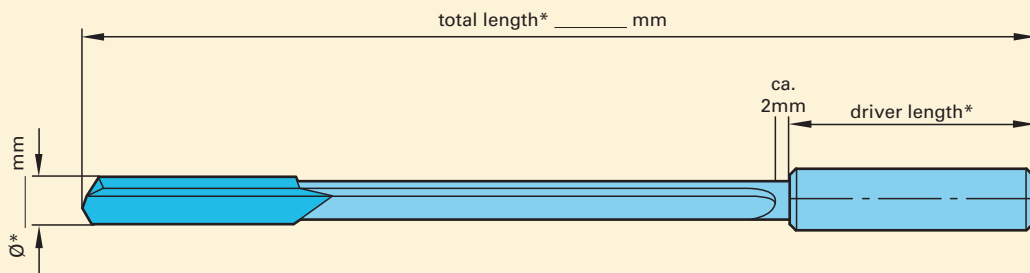
EB 80



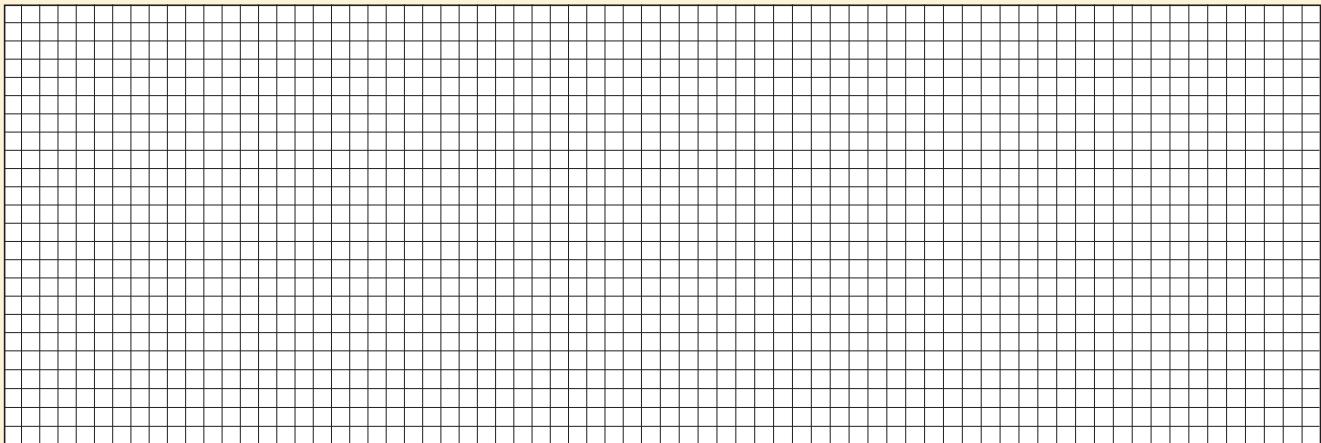
Required no. of pieces: Tool _____ pieces

* 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: _____

Inquiry forms

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

Inquiry Order Repeat order, no. of initial order

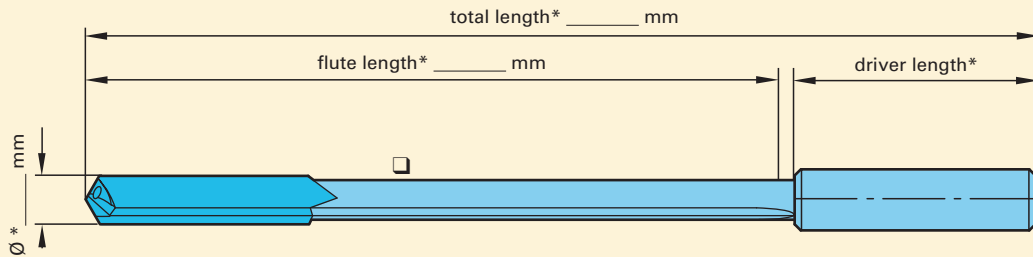
Deep hole gun drill:

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:** _____

Inquiry forms

Fax Inquiry / Order

simply photo-copy, complete and fax...

Inquiry

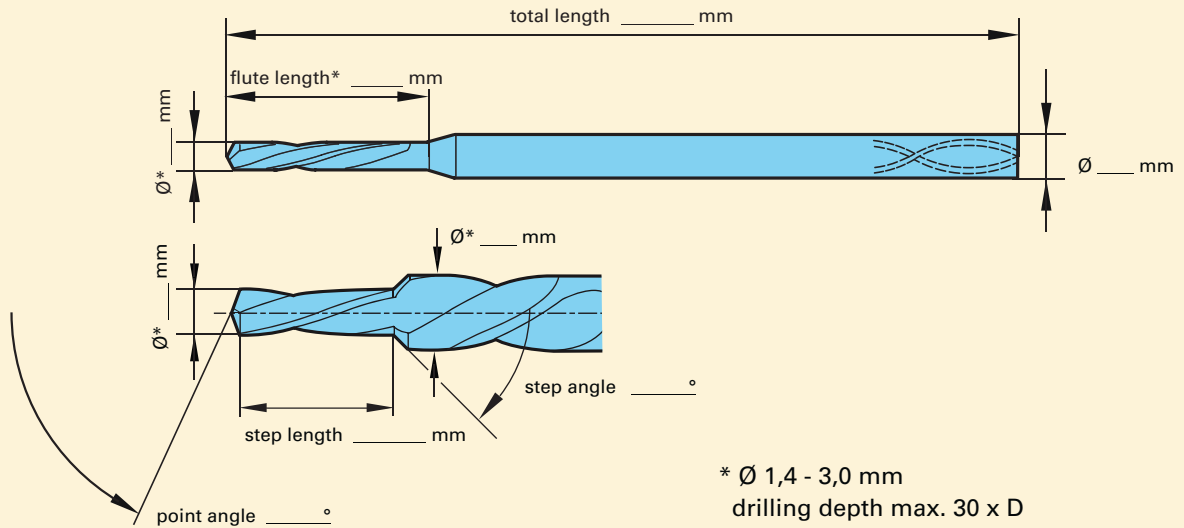
Order

Repeat order, no. of initial order

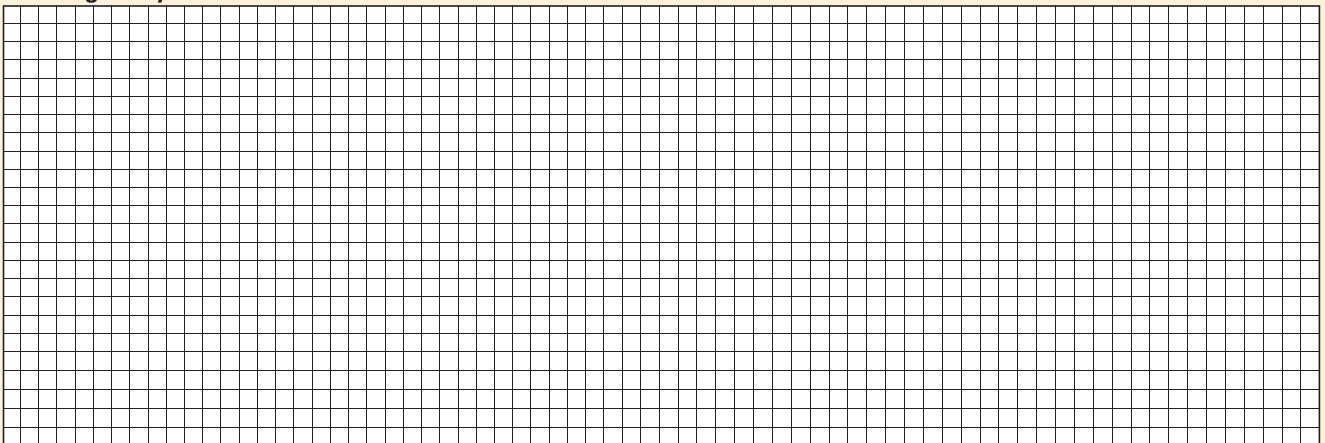
Micro-precision drill



Required no. of pieces: Tool _____ pieces



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
Pressure _____ bar

Soluble oil
Quantity _____ l/min

MQL

Company:

Company stamp:

Telephone/fax:

Contact:

Signature:

Inquiry forms

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

**Steel &
Cast materials**

- Inquiry
 Order
 Repeat order, no. of initial order

Deep hole gun drill:

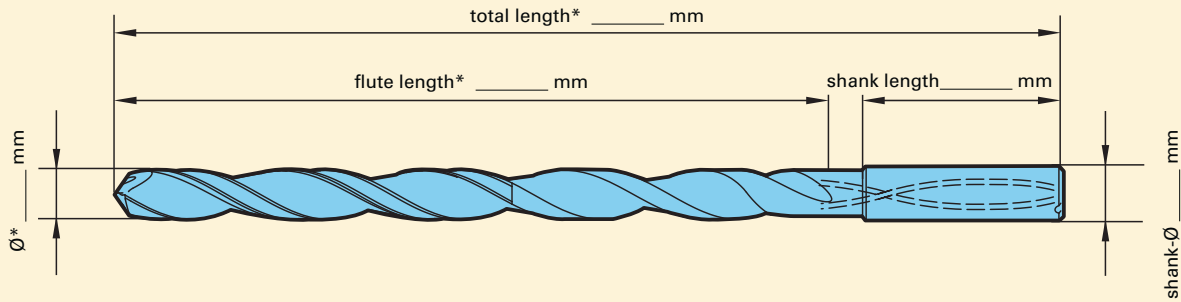
RT 100T



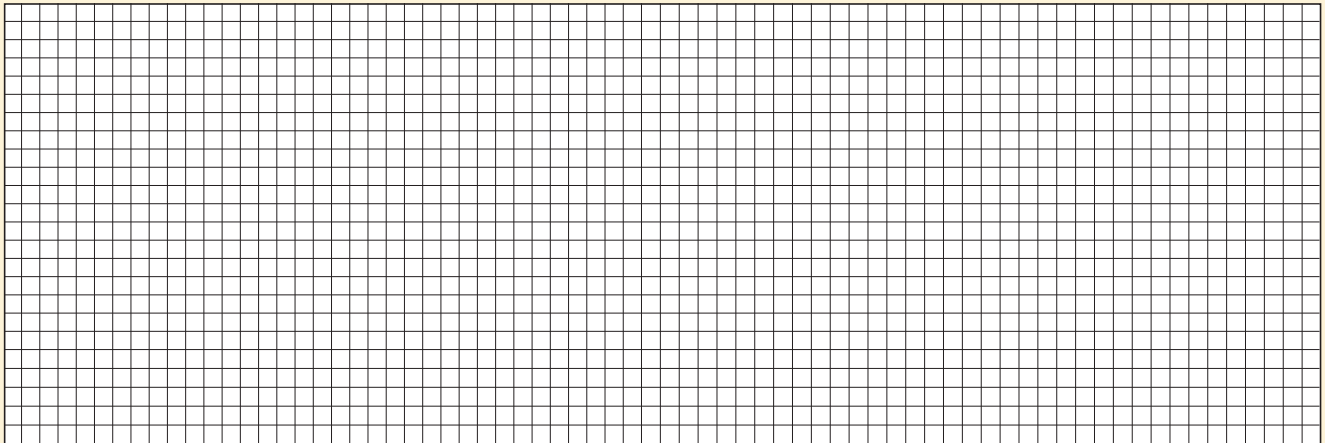
Required no. of pieces: Tool _____ pieces

* \varnothing 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: _____

Inquiry forms

Fax Inquiry / Order

simply photo-copy, complete and fax...

Aluminium

Inquiry

Order

Repeat order, no. of initial order

Deep hole gun drill:

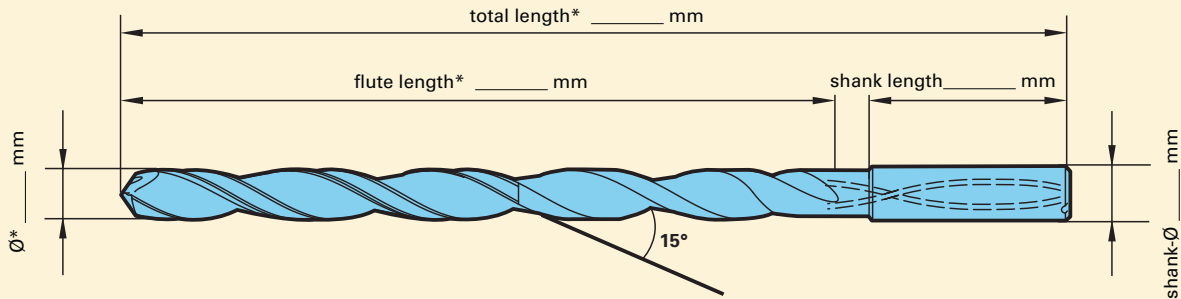
RT 100T ALU



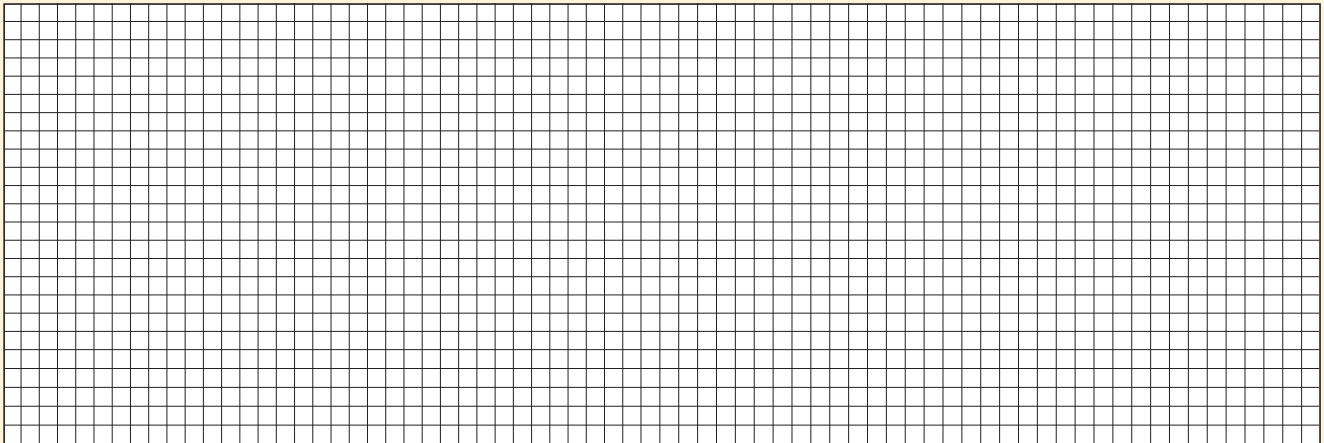
Required no. of pieces: Tool _____ pieces

* 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: _____


Inquiry forms

Fax Inquiry / Order

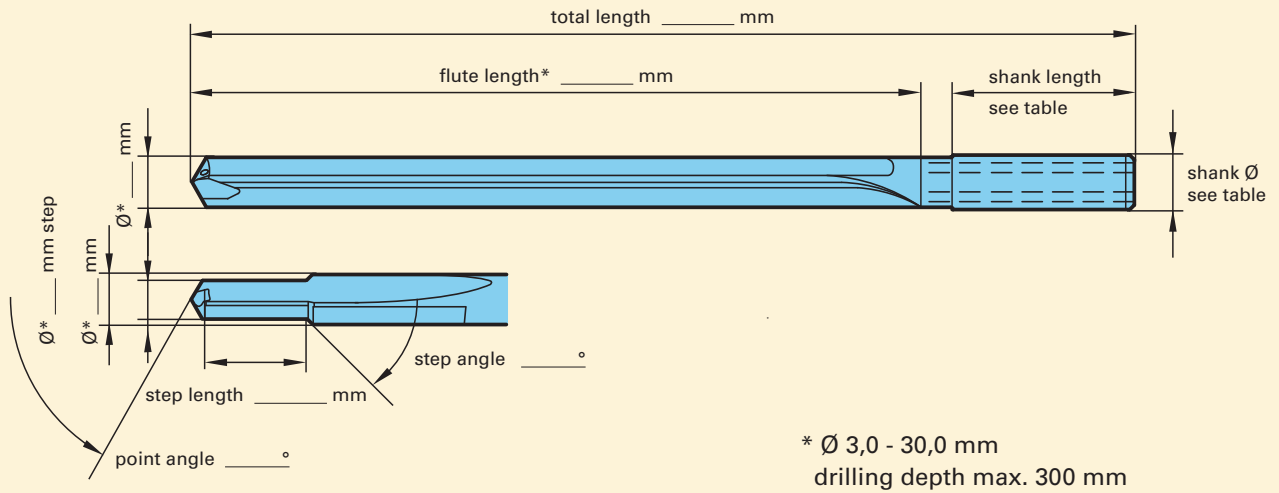
simply photo-copy, complete and fax...

- Inquiry
 Order
 Repeat order, no. of initial order

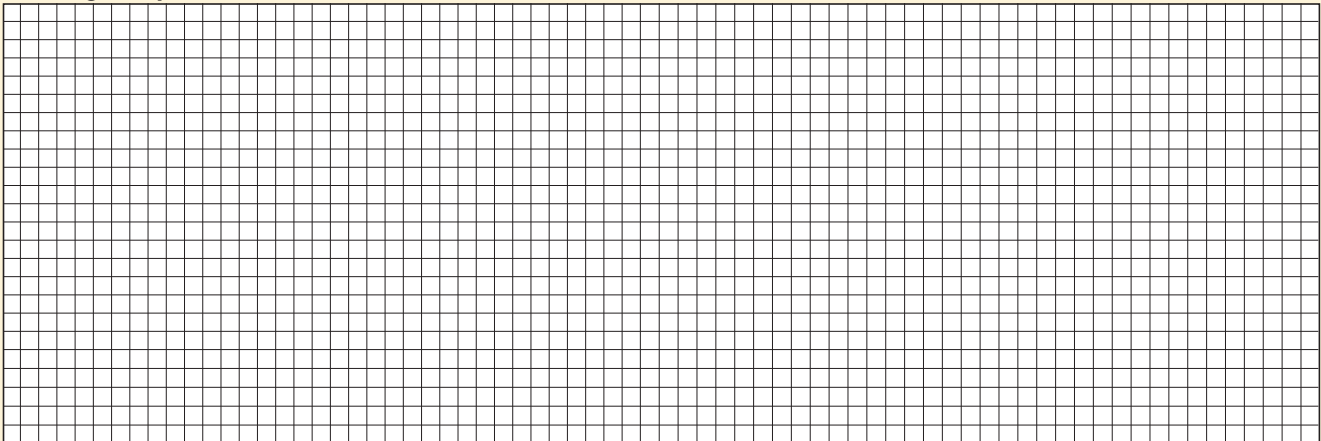
Deep hole gun drill:

- RT 150 GG 
 RT 150 GN

Required no. of pieces: Tool _____ pieces



Drawing of lay-out



required in special cases only

Machining: Stepped hole Drilling and counterboring

Shank: HA HE

Cooling: internal external

Coating: TiN  Fire  nanoFIRE  bright 

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

Company: _____

Company stamp:

Telephone/fax: _____

Contact: _____

Signature: _____

Inquiry forms

GÜHRINGNAVIGATOR



Gun drills

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

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



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



≤35xD >35xD

Material group	Material examples <i>Figures in bold = material no. to DIN EN 10 027</i>	Tens. str. N/mm ²	Hard- ness	Cool- ant	recom- mended coating*	≤35xD		>35xD	
						V _c m/min	Feed col. no.	V _c m/min	Feed col. no.
Common structural steels	1.0035 S185, 1.0486 StE P275N, 1.0345 P235GH, 1.0425 1.0050 E295, 1.0070 E360, 1.8937 P500NH	≤500 >500-850		○		100 85	15 15	95 80	14 14
Free-cutting steels	1.0718 11SMnPb30, 1.0736 115Mn37 1.0727 46 S20, 1.0728 60 S20, 1.0757 46SPb20	≤850 850-1000		○		90 80	15 15	85 75	14 14
Unalloyed heat-treatable steels	1.0402 C22, 1.1178 C30E 1.0503 C45, 1.1191 C45E 1.0601 C60, 1.1221 C60E	≤ 700 700-850 850-1000		○		90 80 75	14 14 14	85 75 70	13 13 13
Alloyed heat-treatable steels	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-1000 1000-1200		○	ⓐ	75 65	14 14	70 60	13 13
Unalloyed case hard. steels	1.0301 C10, 1.1121 C10E	≤750		○	ⓐ	80	15	75	14
Alloyed case hardened steels	1.7043 38Cr4 1.5752 14NiCr14, 1.7131 16MnCr5, 1.7264 20CrMo5	850-1000 1000-1200		●		75 65	14 14	70 60	13 13
Nitriding steels	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850-1000 1000-1200		○	ⓐ	75 65	14 14	70 60	13 13
Tool steels	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767	≤850 850-1000		●	ⓐ	75 65	13 13	70 60	12 12
High speed steels	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 61CrV4	≥850-1000		●	ⓐ	55	12	50	11
Spring steels	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4	≤330 HB		○	ⓐ	65	13	60	12
Stainless steels, sulphured austenitic martensitic	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17 1.4301 X5CrNi18 10, 1.4541 X6CrNiTi18 10, 1.4571 1.4057 X17CrNi16-1, 1.4122 X39CrMo17-1, 1.4521	≤850 ≤850 ≤850		○	ⓐ	55 45 35	14 14 14	50 40 35	13 13 13
Hardened steels	-	≤40-48 HRC >48-60 HRC		●		30 25	13 10	25 20	12 11
Special alloys	Nimonic, Inconel, Monel, Hastelloy	≤1200		○		35	12	30	11
Cast iron	EN-GJL-100 ... EN-GJL-200 EN-GJL-250 ... EN-GJL-350	≤240 HB <300 HB		○		85 80	16 16	80 75	15 15
Spheroidal graphite iron and malleable cast iron	EN-GJMW-350-4, EN-GJMB-550-4, EN-GJS-500-7 EN-GJMB-700-2, EN-GJS-700-2	≤240 HB <300 HB		○		80 70	15 15	75 65	14 14
Chilled cast iron	-	≤350 HB		○		55	14	50	13
Ti and Ti alloys	3.7024 Ti99.5, 3.7114 TiAl5Sn2.5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7164 TiAl6V4, 3.7184 TiAl4Mo4Sn2.5	≤850 850-1200		○	ⓐ	35 30	12 12	30 25	11 11
Al and Al-alloys	3.0255 Al99.5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		○		150	17	140	16
Al-wrought alloys	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365	≤450		○		120	17	115	16
Al-cast alloys ≤ 10 % Si > 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9 3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600 ≤600		○		150 130	18 18	140 120	17 17
Magnesium-alloys	MgMn2, G-MgAl8Zn1, G-MgAl6Zn3	≤450		○		110	17	100	16
Copper, low alloyed	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤400		○	ⓐ	75	15	70	14
Brass, short-chipping long-chipping	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0.5	≤600 ≤600		○		120 90	18 18	115 85	17 17
Bronze, short-chipping	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 >600-850		○		95 75	17 17	90 70	16 16
Bronze, long-chipping	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 850-1000		○		70 60	17 17	65 55	16 16
Duroplastics Thermoplastics	Bakelit, Resopal, Pertinax, Moltopren Plexiglass, Hostalen, Novodur, Makralon	-		○		75 70	15 15	70 65	14 14
Kevlar	Kevlar	-		○		60	14	55	13
Glass/carbon fibre	GFK/CFK	-		○		50	14	45	13

○ bright ○ steam tempered ● nitrided lands ● nitrided ● golden brown ⓐ TiAlN

EB80

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



ZB80

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



EB800

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



recom- mended coating*	$\leq 35 \times D$ $> 35 \times D$				recom- mended coating*	$\leq 35 \times D$ $> 35 \times D$				recom- mended coating*	$\leq 35 \times D$ $> 35 \times D$				
	V _c m/min	Feed col. no.	V _c m/min	Feed col. no.		V _c m/min	Feed col. no.	V _c m/min	Feed col. no.		V _c m/min	Feed col. no.	V _c m/min	Feed col. no.	
S	100	14	95	13						S	90	15	85	15	
S	85	14	80	13						S	80	15	75	15	
S	90	14	85	13						S	85	16	80	16	
S	80	14	75	13						S	75	16	70	16	
S	90	13	85	12						S	85	15	80	15	
S	80	13	75	12						S	80	15	75	15	
S	75	13	70	12						S	75	15	70	15	
S	75	13	70	12						S	75	15	70	15	
S	65	13	60	12						F	75	15	70	15	
S	65	13	60	12						F	65	15	60	15	
S	80	14	75	13						F	80	15	75	15	
S	75	13	70	12						A	75	15	70	15	
S	65	13	60	12						A	70	15	65	15	
C	75	13	70	12						A	60	15	55	15	
C	65	13	60	12						Y	65	14	60	14	
C	75	12	70	11						Y	60	14	55	14	
C	65	12	60	11						Y	65	14	60	14	
C	55	11	50	11						Y	55	14	50	14	
C	65	12	60	12						F	65	15	60	15	
C	55	13	50	12							50	14	45	14	
C	45	13	40	12						A	45	14	40	14	
C	35	13	35	12						A	40	14	35	14	
C	30	12	25	11						Y	30	13	25	13	
C	25	11	20	11						Y	25	12	20	12	
C	35	11	30	11						Y	25	13	20	13	
	85	15	80	14			85	18	80	17	Y	85	16	80	16
	80	15	75	14			80	18	75	17	Y	80	16	75	16
	80	14	75	13			75	17	70	16	Y	75	16	70	16
	70	14	65	13			70	17	65	16	Y	70	16	65	16
	55	13	50	12			65	16	60	15	Y	70	16	65	16
C	35	11	30	11							Y	55	15	50	15
	30	11	25	11							F	35	13	30	13
	150	16	140	15						S	30	12	25	12	
	120	15	115	14			120	18	115	17	S	140	16	135	16
	150	16	140	15			110	18	105	17	S	125	16	120	16
	130	16	120	15			135	18	130	17	S	170	17	165	17
	110	16	100	15			120	17	115	16	S	140	17	135	17
C	75	14	70	13							S	115	16	110	16
	120	17	115	16							Y	75	15	70	15
	90	17	85	16						S	120	17	115	17	
	95	16	90	15						Y	90	17	85	17	
	75	16	70	15						Y	95	17	90	17	
	70	16	65	15						Y	75	17	70	17	
	60	16	55	15						Y	70	17	65	17	
	75	14	70	13						Y	60	17	55	17	
	70	14	65	13						S	75	16	70	16	
	60	13	55	12						Y	70	16	65	16	
	50	13	45	12						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 100 T 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 100 T 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 <i>Figures in bold = material no. to DIN EN</i>	Tensile strength MPa (N/mm ²)	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 1.7043 38Cr4	≤750 850-1000		●
Alloyed case hardened steels	1.5752 14NiCr14, 1.7131 16MnCr5, 1.7264 20CrMo5	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	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 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			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) <i>Figures in bold = material no. to DIN EN</i>	Tensile strength Hardness MPa (N/mm ²)
Common structural steels	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850
Free-cutting steels	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000
Unalloyed heat-treatable steels	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000
Alloyed heat-treatable steels	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850 ≤1000 1000-1200
Unalloyed case hardened steels	1.0301 (C10), 1.1121 C10E (Ck10)	≤750
Alloyed case hardened steels	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850 ≤1000 1000-1200
Nitriding steels	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850 ≤1000 >1000-1200
Tool steels	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000
High speed steels	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000
Spring steels	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)	≤330 HB
Stainless steels, sulphured austenitic martensitic	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiSi18-9 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	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	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	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600
long-chipping	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600
Bronze, short-chipping	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 >600-850
Bronze, long-chipping	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000
Duroplastics	Bakelite, Resopal, Pertinax, Moltopren	-
Thermoplastics	Plexiglass, Hostalen, Novodur, Makralon	-
Kevlar	Kevlar	-
Glass, carbon concentrated plastics	GFK/CFK	-

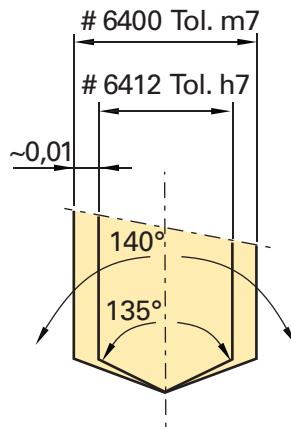
Article no.	6412
Standard	Guhring standard
Tool material	Solid carbide
Carbide grade	K30/K40
Surface	A TiAlN head coated
Type	N
Shank	HA
Drilling depth	15 x D
Cutting direction	right-hand
Coolant	



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

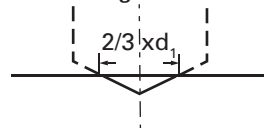
Pilot drilling

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 $\frac{2}{3}xD$.



Filter quality

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



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 <i>Figures in bold = material no. to DIN EN</i>	Tens. strength MPa (N/mm ²)	Hard- ness	Coolant
Common structural steels	1.0035 S185, 1.0486 StE P275N, 1.0345 P235GH, 1.0425 P265GH 1.0050 E295, 1.0070 E360, 1.8937 P500NH	≤ 500 > 500-850		●
Free-cutting steels	1.0718 11SMnPb30, 1.0736 115Mn37 1.0727 46 S20, 1.0728 60 S20, 1.0757 46SPb20	≤850 850-1000		●
Unalloyed heat-treatable steels	1.0402 C22, 1.1178 C30E 1.0503 C45, 1.1191 C45E 1.0601 C60, 1.1221 C60E	≤700 700-850 850-1000		●
Alloyed heat-treatable steels	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-≤1000 1000-1200		●
Unalloyed case hardened steels	1.0301 C10, 1.1121 C10E	≤750		●
Alloyed case hardened steels	1.7043 38Cr4 1.5752 14NiCr14, 1.7131 16MnCr5, 1.7264 20CrMo5	850-≤1000 1000-1200		●
Nitriding steels	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850-≤1000 >1000-1200		●
Tool steels	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000		●
High speed steels	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 61CrV4	≥650-1000		●
Spring steels	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4		≤330 HB	●
Stainless steels, sulphured austenitic martensitic	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4301 X5CrNi18 10, 1.4541 X6CrNiTi18 10, 1.4571 X6CrNiMoTi 17 12 2 1.4057 X17CrNi16-1, 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18 2	≤850 ≤850 ≤850		●
Hardened steels	-		≤40-48 HRC >48-60 HRC	●
Special alloys	Nimonic, Inconel, Monel, Hastelloy	≤1200		●
Cast iron	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20) 0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤240 HB <300 HB	●
New cast materials GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB <300 HB	●
New cast materials ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		●
Spheroidal graphite iron and malleable cast iron	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35) 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤240 HB <300 HB	●
Chilled cast iron	-		≤350 HB	●
Ti and Ti-alloys	3.7024 Ti99.5, 3.7114 TiAl5Sn2.5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7164 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-AISi5Cu1, 3.2153 G-AISi7Cu3, 3.2573 G-AISi9 3.2581 G-AISi12, 3.2583 G-AISi12Cu, - G-AISi12CuNiMg	≤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 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	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0.5	≤600 >600-850		●
Bronze, long-chipping	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0.5	≤850 >850-1000		●

10 x D

15 x D

Article no.	770	6070
Standard	Guhring standard	
Tool material	Solid carbide	
Carbide grade	K	
Surface	bright	bright
Type	RT 150 GG	RT 150 GG
Shank	HA	
Cutting direction	right-hand	right-hand
Coolant		

Article no.	773
Standard	Guhring standard
Tool material	Solid carbide
Carbide grade	K
Surface	bright
Type	RT 150 GN
Shank	HA
Cutting direction	right-hand
Coolant	



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 AISi-alloys, type F for high-alloyed, stainless, acid- and heat-resistant steels, Al and Al-alloys, Mg and Mg-alloys as well as Ti and Ti-alloys.

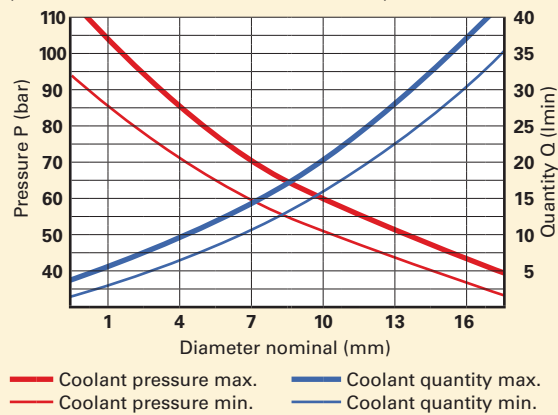
- Procedure**
- In order to achieve optimal machining results when producing deep holes with type RT 100T especially spotting on radii or on an uneven surface structure, we recommend the following machining steps:
1. Initial milling of surface, i.e. with Guhring's centre cutting Ratio end mill RF 100 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 dependent on the pressure of the MQL system.
- If the cooling lubricant data is insufficient the cutting parameters may be reduced. Pressure boosting systems are also possible.

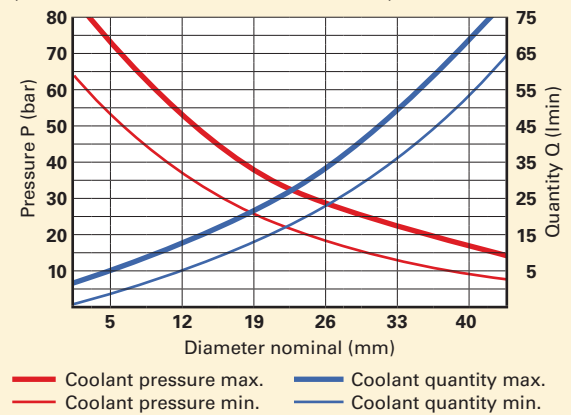
Coolant values EB 100

(Recommended values for soluble oil)



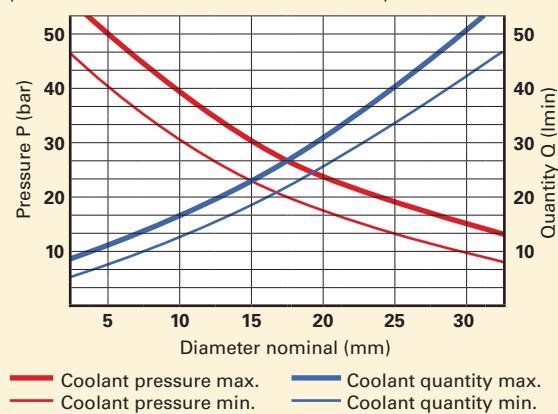
Coolant values EB 80

(Recommended values for soluble oil)



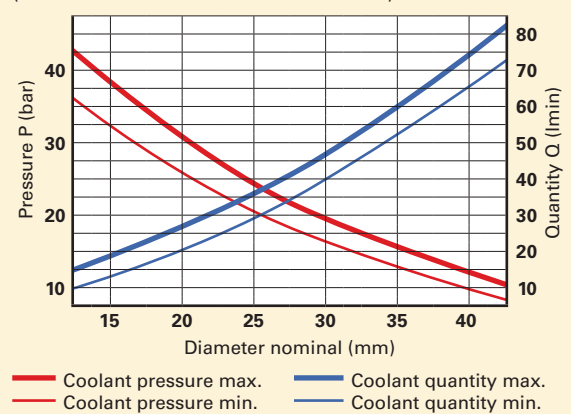
Coolant values ZB 80

(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.



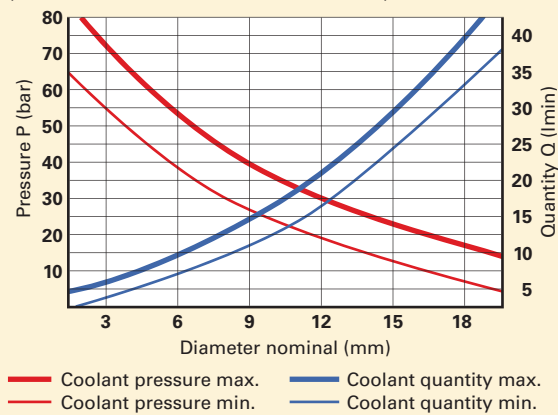
PG 3000, Gühring no. 4068



CC 3000, Gühring no. 4076

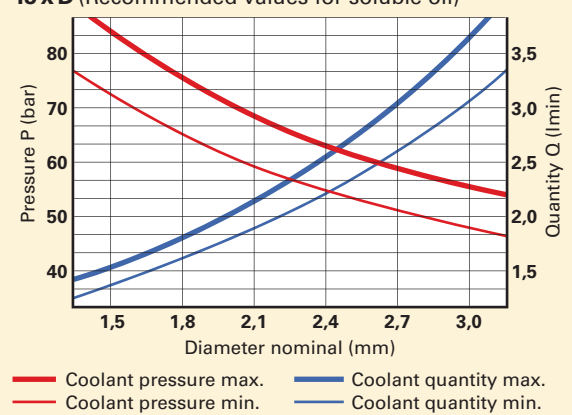
Coolant values RT 100 T

(Recommended values for soluble oil)



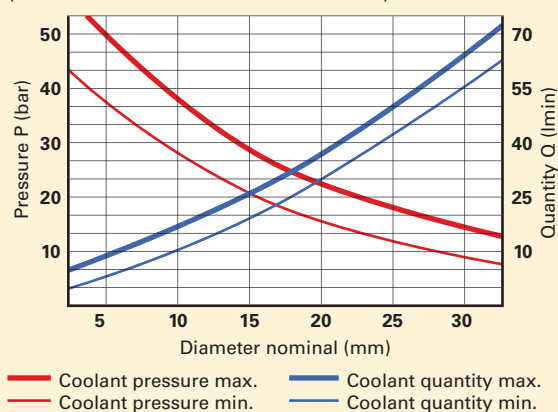
Coolant values Solid carbide micro-precision drills

15 x D (Recommended values for soluble oil)



Coolant values RT 150

(Recommended values for soluble oil)



Drilling



Tapping/thread milling/fluteless tapping



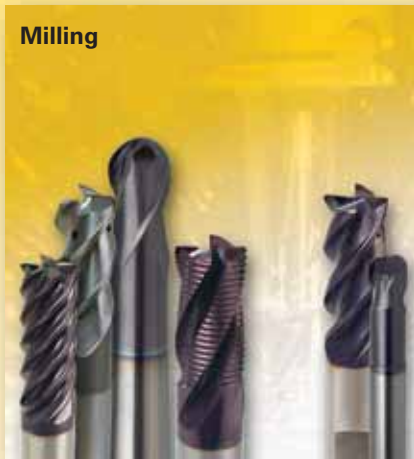
Reaming



Countersinking/de-burring



Milling



PCD/PCB



Modular tooling systems



Special tooling solutions



Tool restoration service



GUHRING

VADZA

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