



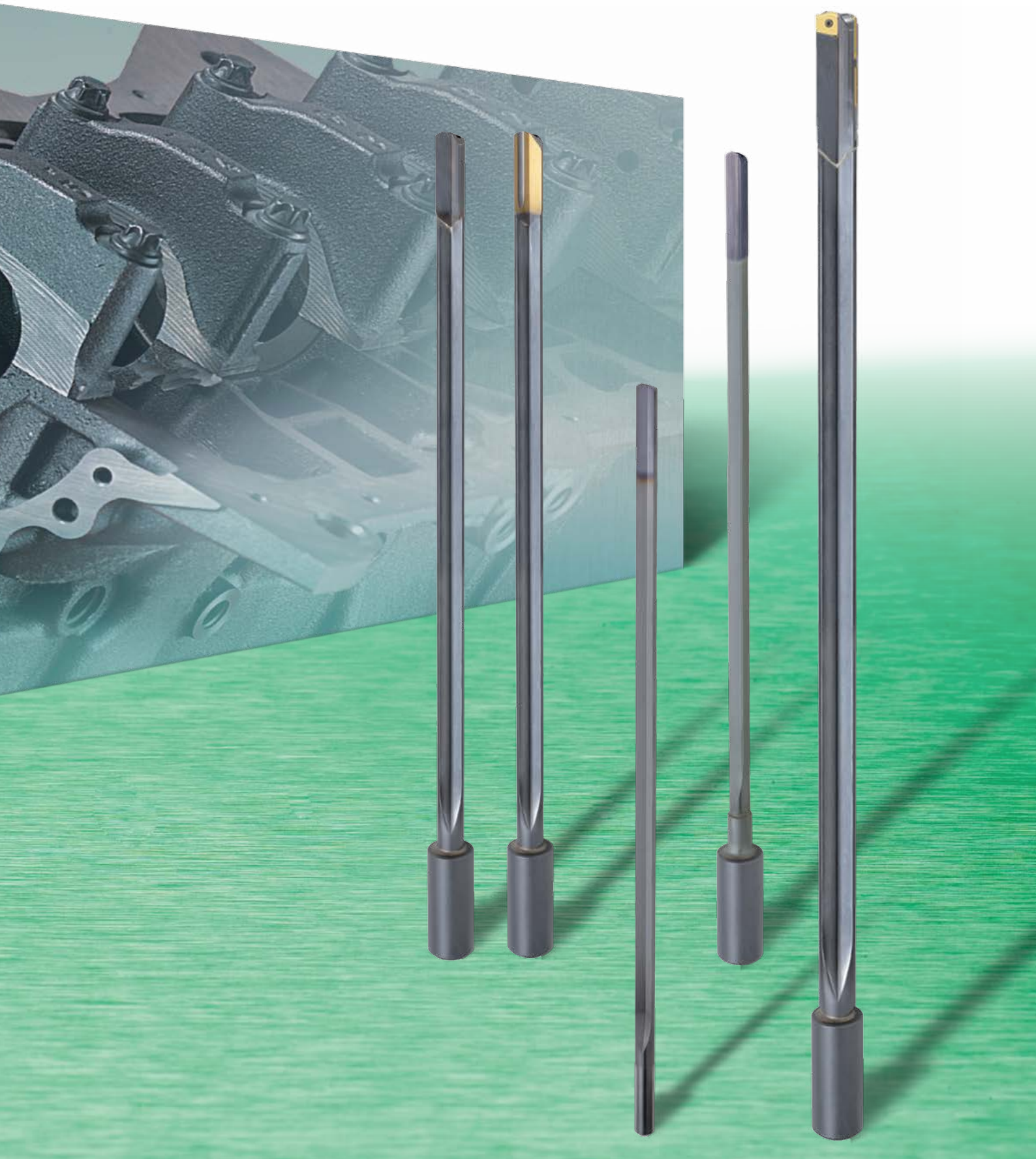
HARTNER

Precision Cutting Tools

Gun Drills

The complete programme

2014





HARTNER

Overview

Solid carbide single-fluted gun drills E 100



**Single-fluted gun drills E 80
with brazed carbide head**



**Two-fluted gun drills Z 80
with brazed carbide head**



**Single-fluted gun drills E 800
with interchangeable inserts**



Accessories and grinding equipment



Enquiry form

Technical section

Application recommendations



HARTNER

Overview

for universal application

- ex-stock range Ø 1.2 - 12.0 mm
- special Ø 0.9 - 16.0 mm

page 6

for universal application

- ex-stock range Ø 3.97 - 12.7 mm
- special Ø 2.0 - 40.0 mm

page 12

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

- ex-stock range Ø 8.0 - 12.0 mm
- special Ø 6.0 - 30.0 mm

page 18

for universal application

- ex-stock range Ø 12.0 - 24.0 mm
- special Ø 12.0 - 52.0 mm

NEW
up to Ø 52 mm

page 20

for re-grinding single-fluted drills and for application on deep hole drilling machines

- wide range of accessories for the application on deep hole drilling machines
- grinding equipment

page 24

for special solutions for your specific application task

- E 100
- E 80
- Z 80
- E 800

page 32

deep hole drilling from A to Z

- application on conventional machines
- drilling application
- hole accuracy
- drivers

page 34

application recommendations for all gun drills and materials







- cooling lubricant data
- cutting rate recommendations
- sequence of operations for deep hole drilling

page 38















Gun drills

Standard	Type	Tool material	Surface finish	Cutting direction	Flute length (mm)	Drilling depth	Diameter range	Order no.	Discount group	page
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Single-fluted gun drills E 100, flute length depending on drilling depth

	Hartner std.	TLB E 100	Solid carbide		right-hand	25xD	2.380 - 12.000	89520	123	8
	Hartner std.	TLB E 100	Solid carbide		right-hand	50xD	2.380 - 8.000	89521	123	9
	Hartner std.	TLB E 100	Solid carbide		right-hand	75xD	2.380 - 6.000	89522	123	9

Single-fluted gun drills E 100, with fixed flute length in mm

	Hartner std.	TLB E 100	Solid carbide		right-hand	45.00	1.200 - 3.200	89503	123	10
	Hartner std.	TLB E 100	Solid carbide		right-hand	45.00	2.000 - 3.200	89510	123	10
	Hartner std.	TLB E 100	Solid carbide		right-hand	80.00	1.200 - 5.000	89501	123	10
	Hartner std.	TLB E 100	Solid carbide		right-hand	80.00	2.000 - 5.000	89511	123	10
	Hartner std.	TLB E 100	Solid carbide		right-hand	120.00	1.500 - 5.000	89504	123	11
	Hartner std.	TLB E 100	Solid carbide		right-hand	120.00	2.000 - 5.000	89512	123	11
	Hartner std.	TLB E 100	Solid carbide		right-hand	160.00	1.500 - 6.000	89502	123	11
	Hartner std.	TLB E 100	Solid carbide		right-hand	160.00	2.000 - 8.000	89513	123	11

 bright
  TiCN
  AITiN
  a AITiN nano
  T TiN



Gun drills

Standard	Type	Tool material	Surface finish	Cutting direction	Flute length (mm)	Drilling depth	Diameter range	Order no.	Discount group	page
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Single-fluted gun drills E 80 with brazed carbide head

	Hartner std.	TLB E 80	Carbide	T	right-hand	20 x D	4.000 - 12.000	89505	123	14
	Hartner std.	TLB E 80	Carbide	C	right-hand	20 x D	3.970 - 12.700	89514	123	14
	Hartner std.	TLB E 80	Carbide	T	right-hand	30 x D	4.000 - 12.000	89509	123	15
	Hartner std.	TLB E 80	Carbide	C	right-hand	30 x D	3.970 - 12.700	89515	123	15
	Hartner std.	TLB E 80	Carbide	T	right-hand	40 x D	4.000 - 12.000	89506	123	16
	Hartner std.	TLB E 80	Carbide	C	right-hand	40 x D	3.970 - 12.700	89516	123	16
	Hartner std.	TLB E 80	Carbide	T	right-hand	80 x D	4.950 - 11.950	89507	123	17
	Hartner std.	TLB E 80	Carbide	C	right-hand	80 x D	3.970 - 12.650	89517	123	17

Two-fluted gun drills Z 80 with brazed carbide head

	Hartner std.	TLB Z 80	Carbide	○	right-hand	30 x D	8.000 - 12.000	89508	123	19
	Hartner std.	TLB Z 80	Carbide	○	right-hand	30 x D	8.000 - 12.000	89518	123	19

Single-fluted gun drills E 800 with interchangeable inserts

	Hartner std.	TLB E 800	Carbide		right-hand	30 x D	12.000 - 24.000	89530	123	21
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○ bright ● TICN ● A AITiN ● a AITiN nano ● T TiN



Solid carbide single-fluted gun drills E 100

suitable for almost every material, from $\varnothing 0.9 - 12.0$ mm,
max. flute length 500 mm



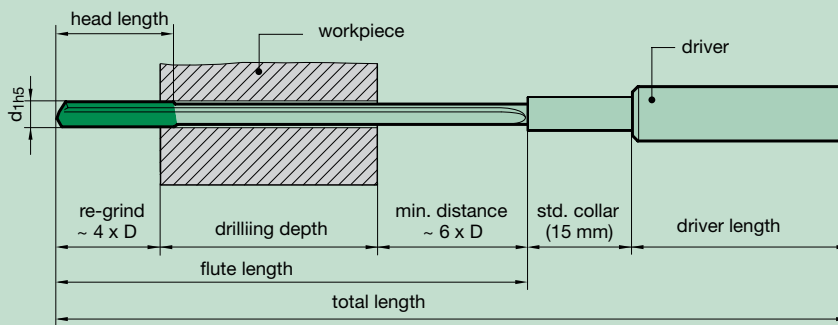
To ask for or to order Hartner solid carbide single-fluted gun drills E 100 especially suited to your application, please complete the fax inquiry on page 32.

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 Hartnerguide page 38/39.

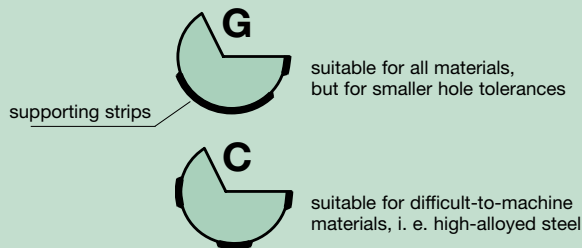
T TiN **C** TiCN **A** AlTiN **a** AlTiN nano

The dimensions required to calculate the length for conventional machine tools



Head forms

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

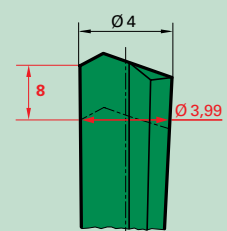
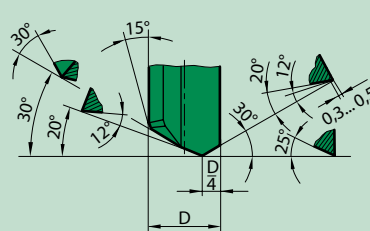
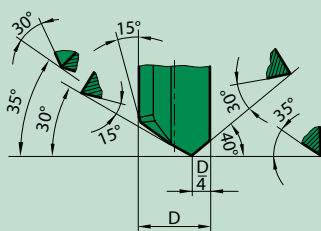


Standard point grinds (special point grinds on request)

$\varnothing 2...4,00$ mm

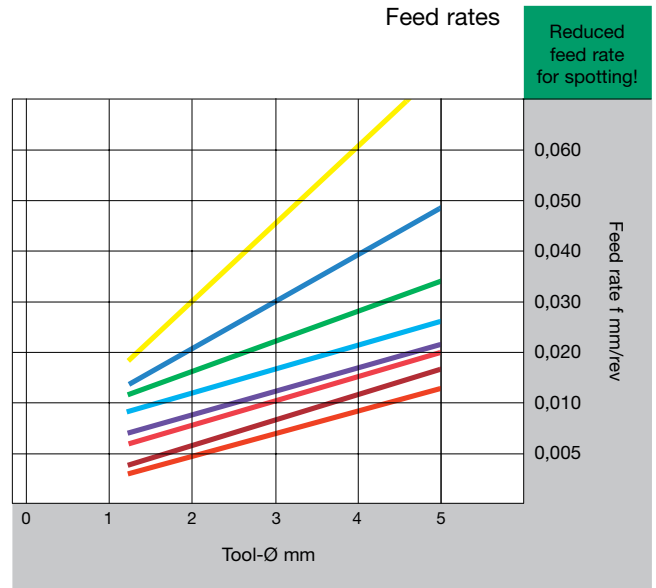
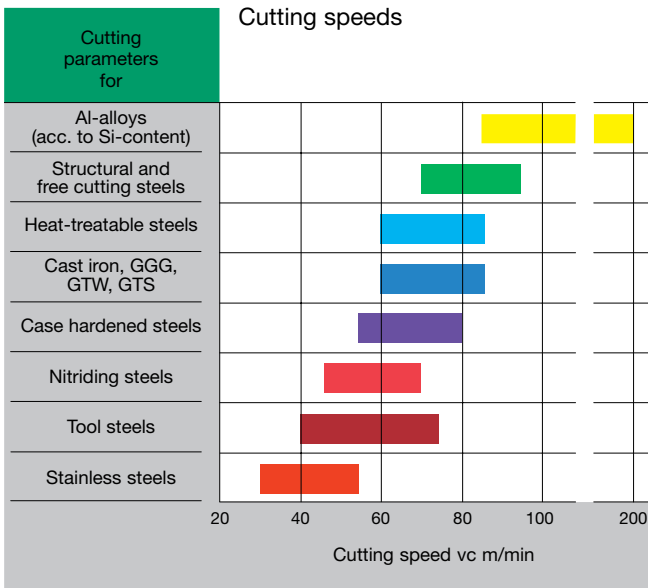
$\varnothing > 4,01...20$ mm

Back taper ratio 1:800 (standard)
(dimensions in mm)

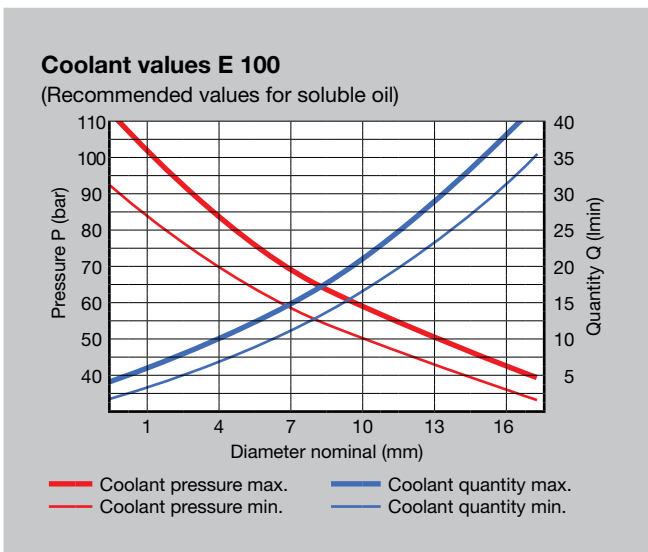




Solid carbide single-fluted gun drills E 100



(Detailed cutting parameters see page 38/39)



E 100 solid carbide from tip to shank



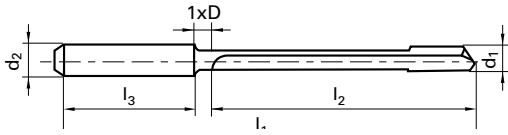
AlTiN nano-coated design for almost every material



Solid carbide solid shank with conical MQL shank end



Solid carbide single-fluted gun drills E 100



89520

Solid carbide

123

right-hand

25xD

a

Availability

d1h5	d2	l1	l2	l3	Availability
mm	mm	mm	mm	mm	
2.380	4.000	100.00	70.00	28.00	●
2.500	4.000	115.00	85.00	28.00	●
2.780	4.000	115.00	85.00	28.00	●
3.000	6.000	145.00	105.00	36.00	●
3.170	6.000	145.00	105.00	36.00	●
3.500	6.000	145.00	105.00	36.00	●
3.970	6.000	160.00	120.00	36.00	●
4.000	6.000	160.00	120.00	36.00	●
5.000	6.000	220.00	180.00	36.00	●
5.560	6.000	220.00	180.00	36.00	●
6.000	6.000	220.00	180.00	36.00	●
6.350	8.000	260.00	210.00	36.00	●
7.000	8.000	260.00	210.00	36.00	●
7.140	8.000	285.00	240.00	36.00	●
8.000	8.000	285.00	240.00	36.00	●
9.000	10.000	350.00	300.00	40.00	●
10.000	10.000	350.00	300.00	40.00	●
11.000	12.000	420.00	360.00	45.00	●
12.000	12.000	420.00	360.00	45.00	●

○ bright

● TICN

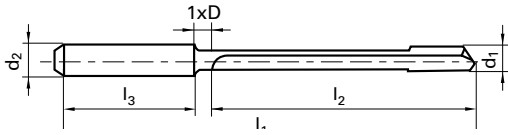
● A TiN

● a AITiN nano

● T TiN



Solid carbide single-fluted gun drills E 100



d1h5	d2	l1	l2	l3
mm	mm	mm	mm	mm
2.380	4.000	160.00	130.00	28.00
2.500	4.000	185.00	155.00	28.00
2.780	4.000	185.00	155.00	28.00
3.000	6.000	230.00	190.00	36.00
3.170	6.000	230.00	190.00	36.00
3.500	6.000	230.00	190.00	36.00
3.970	6.000	260.00	220.00	36.00
4.000	6.000	260.00	220.00	36.00
5.000	6.000	370.00	330.00	36.00
5.560	6.000	370.00	330.00	36.00
6.000	6.000	370.00	330.00	36.00
6.350	8.000	430.00	385.00	36.00
7.000	8.000	430.00	385.00	36.00
7.140	8.000	485.00	440.00	36.00
8.000	8.000	485.00	440.00	36.00

89521

Solid carbide

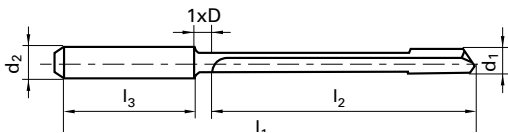
123

right-hand

50xD

a

Availability



d1h5	d2	l1	l2	l3
mm	mm	mm	mm	mm
2.380	4.000	220.00	190.00	28.00
2.500	4.000	255.00	220.00	28.00
2.780	4.000	255.00	220.00	28.00
3.000	6.000	320.00	280.00	36.00
3.170	6.000	320.00	280.00	36.00
3.500	6.000	320.00	280.00	36.00
3.970	6.000	360.00	320.00	36.00
4.000	6.000	360.00	320.00	36.00
5.000	6.000	525.00	485.00	36.00
5.560	6.000	525.00	485.00	36.00
6.000	6.000	525.00	485.00	36.00

89522

Solid carbide

123

right-hand

75xD

a

Availability



○ bright

● TICN

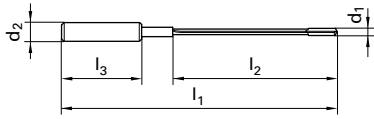
● A TiTiN

● a TiTiN nano

● T TiN

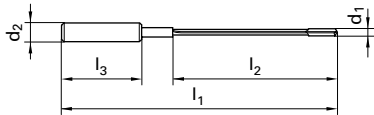


Solid carbide single-fluted gun drills E 100



d1h5	d2	l1	l2	l3
mm	mm	mm	mm	mm
1.200	4.000	90.00	45.00	28.00
1.500	4.000	90.00	45.00	28.00
1.600	4.000	90.00	45.00	28.00
2.000	4.000	90.00	45.00	28.00
2.500	10.000	100.00	45.00	40.00
2.700	10.000	100.00	45.00	40.00
3.000	10.000	100.00	45.00	40.00
3.200	10.000	100.00	45.00	40.00

89503	89510
Solid carbide	
123 right-hand 45 mm ○	123 right-hand 45 mm Ⓐ
Availability	
●	
●	
●	
●	●
●	●
●	●
●	●
●	●



d1h5	d2	l1	l2	l3
mm	mm	mm	mm	mm
1.200	4.000	125.00	80.00	28.00
1.500	4.000	125.00	80.00	28.00
1.600	4.000	125.00	80.00	28.00
2.000	4.000	125.00	80.00	28.00
2.500	10.000	135.00	80.00	40.00
2.700	10.000	135.00	80.00	40.00
3.000	10.000	135.00	80.00	40.00
3.200	10.000	135.00	80.00	40.00
3.500	10.000	135.00	80.00	40.00
4.000	10.000	135.00	80.00	40.00
4.200	10.000	135.00	80.00	40.00
4.500	10.000	135.00	80.00	40.00
5.000	10.000	135.00	80.00	40.00

89501	89511
Solid carbide	
123 right-hand 80 mm ○	123 right-hand 80 mm Ⓐ
Availability	
●	
●	
●	
●	●
●	●
●	●
●	●
●	●
●	●
●	●
●	●
●	●

○ bright Ⓒ TiCN Ⓐ AlTiN ⓐ AlTiN nano Ⓣ TiN



Single-fluted gun drills E 80 with brazed carbide head

suitable for almost every material, from $\varnothing 2 - 40.0$ mm,
max. total length 3000 mm



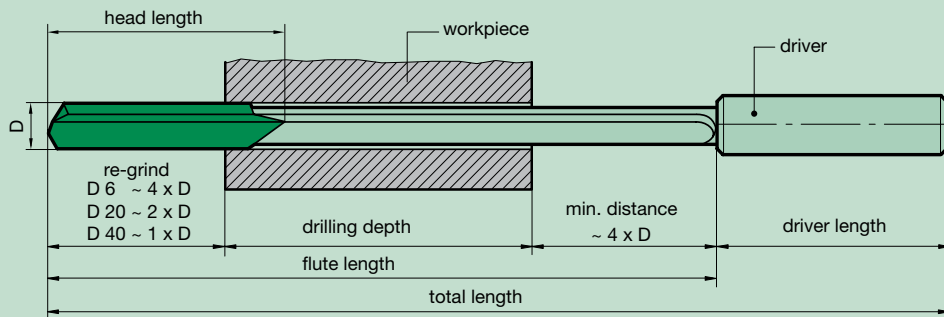
To ask for or to order Hartner single-fluted gun drills E 80 with solid carbide head especially suited to your application, please complete the fax inquiry on page 32.
From $\varnothing 6.0 \dots 20.0$ mm we can fit PCD or CBN cutting edges on request.
With AISI-alloys for example, tool life subsequently increases multi-fold.

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 Hartnerguide page 38/39.

T TiN **C** TiCN **A** AlTiN **a** AlTiN nano

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. $\varnothing 10 \times 450$ and $\varnothing 9,95 \times 850$ mm)



Head forms

(Position of supporting strips.)



Standard designs

Suitable for all materials, but for smaller hole tolerances



Suitable for difficult-to-machine materials, i.e. high-alloyed steels

Supporting strip



Special designs

Suitable for all materials, but for larger hole tolerances

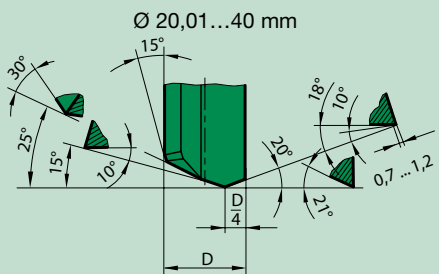
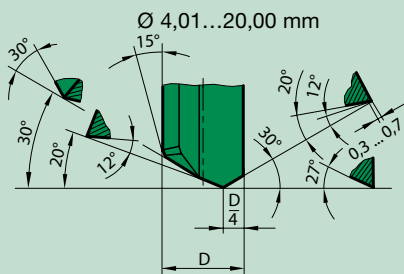
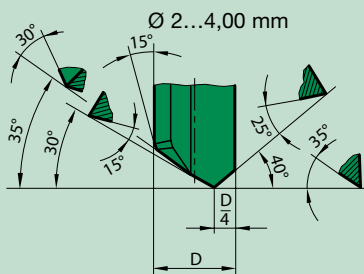


Suitable for all materials, but only when spotting conditions are unfavourable



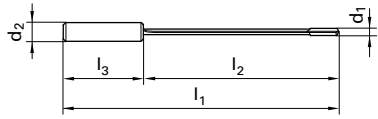
This design is predominantly suitable for grey cast iron

Standard point grinds (special point grinds available, see page 20)





Single-fluted gun drills E 80 with brazed carbide head

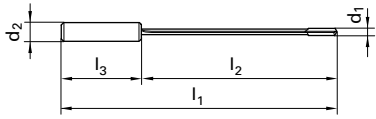


						89505	89514
						Carbide	
						123 right-hand 20xD T	123 right-hand 20xD C
						Availability	
d1h5	d1h5	d2	l1	l2	l3		
inch	mm	mm	mm	mm	mm		
5/32	3.970	10.000	150.00	100.00	40.00		●
	4.000	12.000	150.00	100.00	40.00	●	●
	4.200	12.000	160.00	110.00	40.00	●	
	4.500	12.000	170.00	120.00	40.00	●	
13/64	5.000	16.000	180.00	130.00	48.00	●	●
	5.156	16.000	180.00	130.00	48.00		●
1/4	5.500	16.000	190.00	140.00	48.00	●	
	6.000	16.000	210.00	160.00	48.00	●	●
	6.350	16.000	220.00	170.00	48.00		●
15/16	6.500	16.000	220.00	170.00	48.00	●	
	7.000	16.000	235.00	185.00	48.00	●	●
	7.938	16.000	260.00	210.00	48.00		●
	8.000	16.000	260.00	210.00	48.00	●	●
3/8	9.000	16.000	280.00	230.00	48.00	●	●
	9.525	16.000	290.00	240.00	48.00		●
	10.000	20.000	320.00	260.00	50.00	●	●
7/16	11.000	20.000	340.00	290.00	50.00		●
	11.113	20.000	340.00	290.00	50.00		●
1/2	12.000	20.000	370.00	310.00	50.00	●	●
	12.700	20.000	385.00	330.00	50.00		●

○ bright ● C TiCN ● A AlTiN ● a AlTiN nano ● T TiN



Single-fluted gun drills E 80 with brazed carbide head

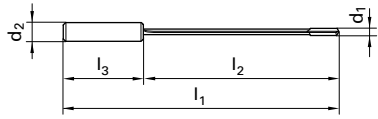


						89509	89515
						Carbide	
						123 right-hand 30xD T	123 right-hand 30xD C
						Availability	
d1h5	d1h5	d2	l1	l2	l3		
inch	mm	mm	mm	mm	mm		
5/32	3.970	10.000	200.00	155.00	40.00		●
	4.000	12.000	200.00	155.00	40.00	●	●
	4.200	12.000	210.00	165.00	40.00	●	
	4.500	12.000	220.00	175.00	40.00	●	
13/64	5.000	16.000	230.00	182.00	48.00	●	●
	5.156	16.000	230.00	182.00	48.00		●
1/4	5.500	16.000	245.00	197.00	48.00	●	
	6.000	16.000	260.00	212.00	48.00	●	●
	6.350	16.000	275.00	227.00	48.00		●
15/16	6.500	16.000	275.00	227.00	48.00	●	
	7.000	16.000	290.00	242.00	48.00	●	●
	7.938	16.000	320.00	272.00	48.00		●
	8.000	16.000	320.00	272.00	48.00	●	●
3/8	9.000	16.000	350.00	302.00	48.00	●	●
	9.525	16.000	380.00	330.00	48.00		●
	10.000	20.000	400.00	350.00	50.00	●	●
7/16	11.000	20.000	430.00	380.00	50.00		●
	11.113	20.000	430.00	380.00	50.00		●
1/2	12.000	20.000	450.00	400.00	50.00	●	●
	12.700	20.000	500.00	450.00	50.00		●

○ bright ● C TiCN ● A AlTiN ● a AlTiN nano ● T TiN



Single-fluted gun drills E 80 with brazed carbide head



						89506	89516
						Carbide	
						123 right-hand 40xD T	123 right-hand 40xD C
						Availability	
d1h5	d1h5	d2	l1	l2	l3		
inch	mm	mm	mm	mm	mm		
5/32	3.970	10.000	230.00	185.00	40.00		●
	4.000	12.000	230.00	185.00	40.00	●	●
	4.200	12.000	240.00	195.00	40.00	●	
	4.500	12.000	250.00	205.00	40.00	●	
13/64	5.000	16.000	280.00	232.00	48.00	●	●
	5.156	16.000	280.00	232.00	48.00		●
1/4	5.500	16.000	300.00	252.00	48.00	●	
	6.000	16.000	320.00	272.00	48.00	●	●
	6.350	16.000	340.00	292.00	48.00		●
15/16	6.500	16.000	340.00	292.00	48.00	●	
	7.000	16.000	370.00	322.00	48.00	●	●
	7.938	16.000	430.00	372.00	48.00		●
	8.000	16.000	430.00	372.00	48.00	●	●
3/8	9.000	16.000	450.00	402.00	48.00	●	●
	9.525	16.000	480.00	432.00	48.00		●
7/16	10.000	20.000	510.00	460.00	50.00	●	●
	11.000	20.000	550.00	500.00	50.00		●
	11.113	20.000	550.00	500.00	50.00		●
1/2	12.000	20.000	600.00	550.00	50.00	●	●
	12.700	20.000	635.00	585.00	50.00		●

○ bright ● C TiCN ● A AlTiN ● a AlTiN nano ● T TiN



Two-fluted gun drills Z 80 with brazed carbide head

suitable for cast iron, aluminium and short-chipping nonferrous metals, from Ø 6.0 - 30.0 mm, max. total length 1000 mm



To ask for or to order Hartner two-fluted gun drills Z 80 with solid carbide head especially suited to your application, please complete the fax inquiry on page 32.

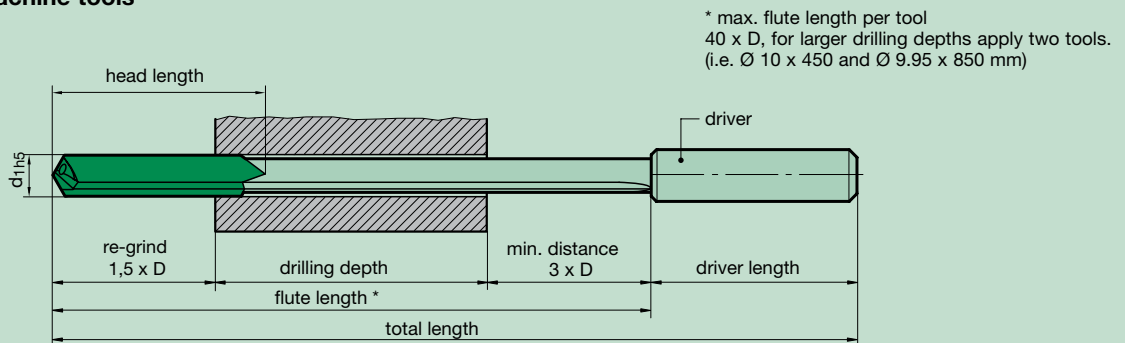
For certain materials a coating is required, as the successful application of gun drills with a bright surface finish cannot be guaranteed. For coating definitions see Hartnerguide page 38/39.

T TiN **C** TiCN **A** AlTiN **a** AlTiN nano

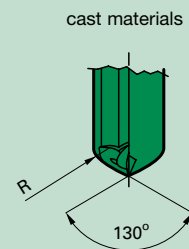
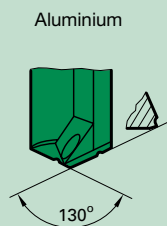
The main advantage of two-fluted gun drills compared to single-fluted gun drills is the substantially higher feed rate that can be applied during the production of the hole. This is due to the design of the two-fluted gun drill, it has two cutting edges and two flutes. Holes can therefore be produced considerably faster. However, this increase in machining speed is combined with a reduction in hole accuracy. This is also a direct consequence

of a drill design with two cutting edges. As the cutting edges are positioned opposite each other, there is less of a smoothing effect and less support in comparison to a single-fluted gun drill. For drilling depths $\leq 10 \times D$ we recommend our TS Drill TS 150 GG, available ex stock and more cost-effective for these drilling depths than brazed gun drills. In addition, TS 150 GG does not require a pilot hole in most applications.

The dimensions required to calculate the length for conventional machine tools

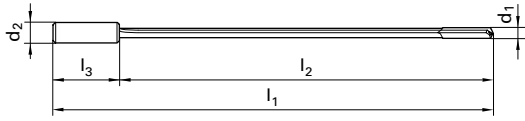


Point grinds



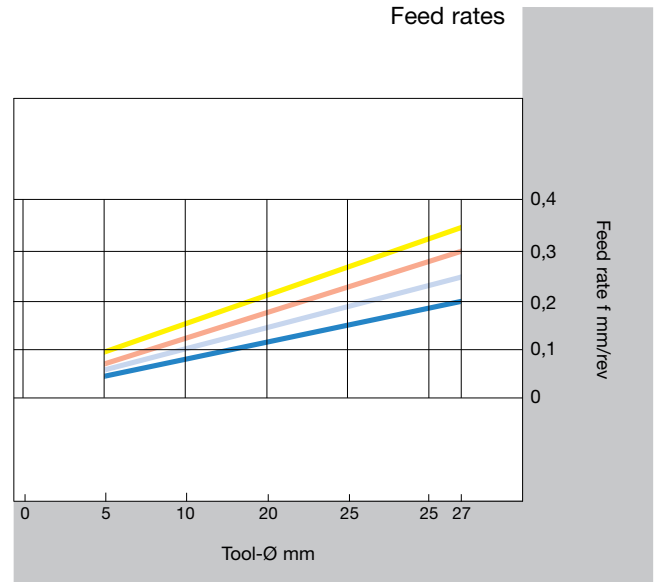
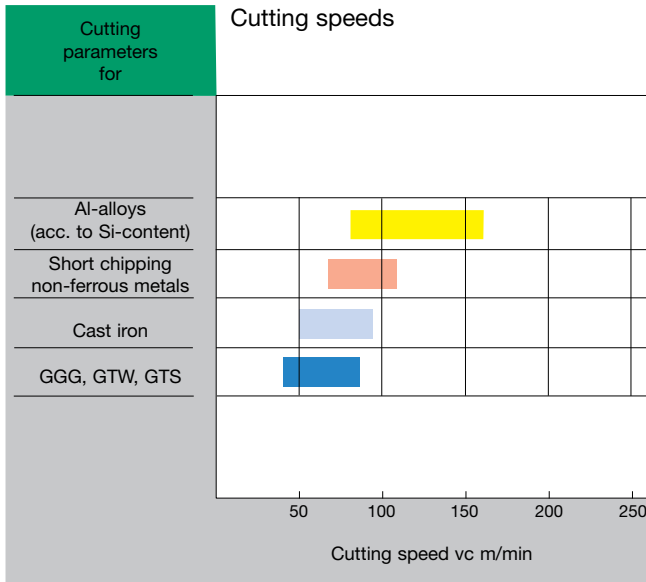


Two-fluted gun drills Z 80 with brazed carbide head

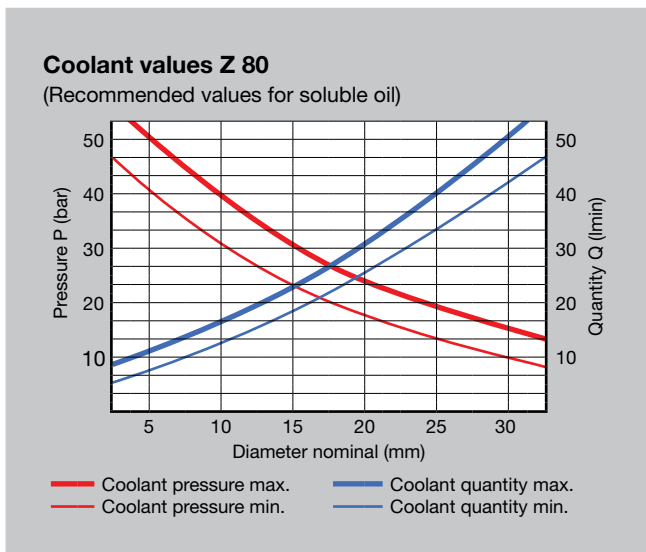


d1	d2	l1	l2	l3
mm	mm	mm	mm	mm
8.000	16.000	330.00	280.00	48.00
10.000	20.000	390.00	340.00	50.00
12.000	20.000	450.00	400.00	50.00

89508	89518
Carbide	
123 right-hand TLB Z 80 ○ aluminium	123 right-hand TLB Z 80 ○ cast materials
Availability	
●	●
●	●
●	●



(Detailed cutting parameters see pages 38/39)



art. no. 89508 with point grind for aluminium

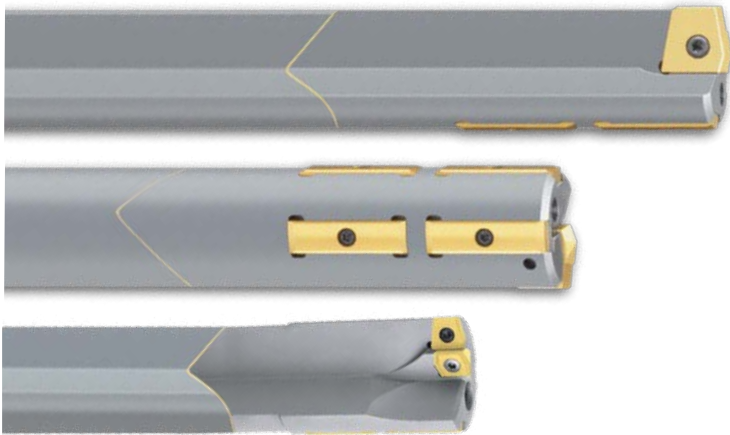


art. no. 89518 with point grind for cast materials

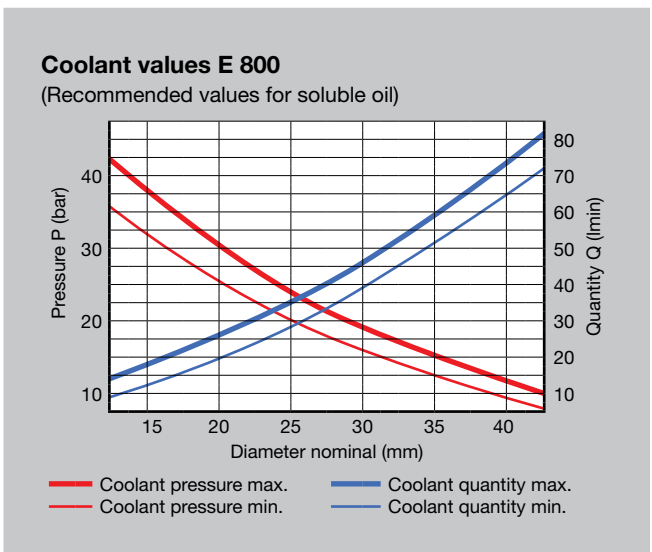
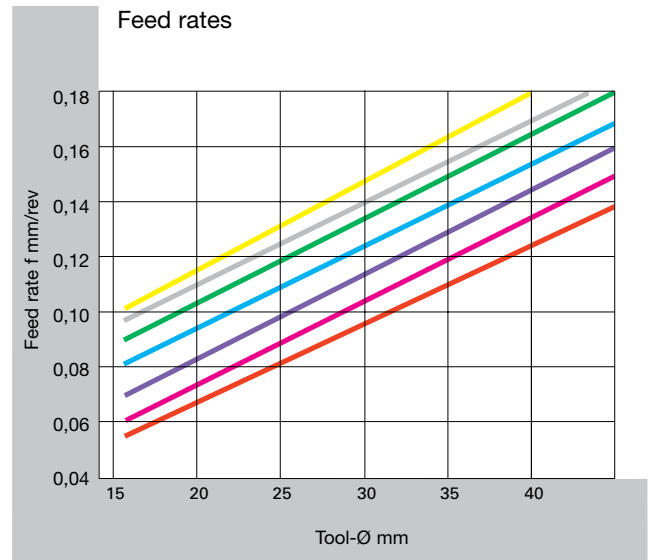
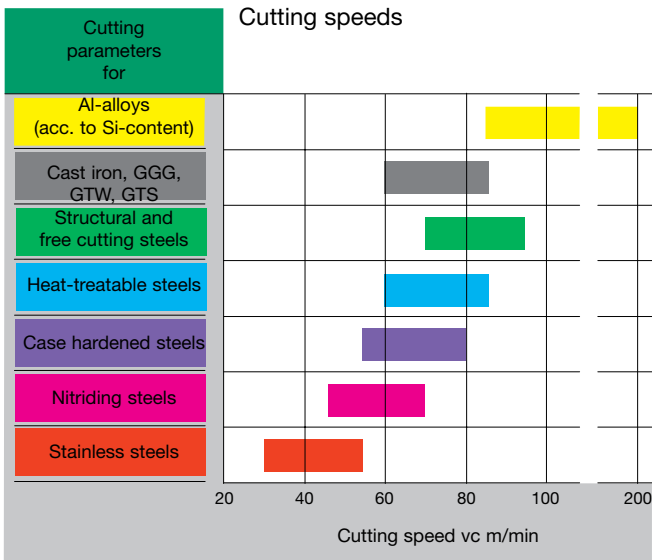


Single-fluted gun drills E 800 with interchangeable inserts

with interchangeable inserts and supporting strips, suitable for almost all materials, from Ø 12.0 - 52.0 mm, max. total length 3000 mm

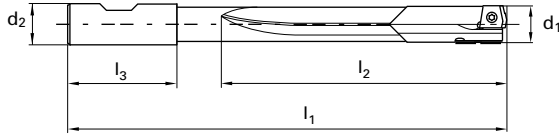


Ø 40.01 - 52.00 mm with internal and external insert





Single-fluted gun drills E 800 with interchangeable inserts



d1h8	d2	l1	l2	l3
mm	mm	mm	mm	mm
12.000	20.000	446.00	384.00	50.00
12.700	20.000	468.00	406.00	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

89530
Carbide
123
right-hand
30xD
T
Availability
●
●
●
●
●
●
●
●

Accessories

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

Ø	Interchangeable insert	Screw for insert	Screwdriver for insert	Supporting strips	Screw for supporting strips	Screwdriver for supporting strips
12	No. 89535 Ø 12.0 + TiN	89537 2,502	89538 8,001	No. 89536 Ø 12.0 + TiN	89537 1,601	89538 5,001
12.7	No. 89535 Ø 12.7 + TiN	89537 2,502	89538 8,001	No. 89536 Ø 12.7 + TiN	89537 1,601	89538 5,001
14	No. 89535 Ø 14.0 + TiN	89537 2,502	89538 8,001	No. 89536 Ø 14.0 + TiN	89537 1,601	89538 5,001
15	No. 89535 Ø 15.0 + TiN	89537 2,502	89538 8,001	No. 89536 Ø 15.0 + TiN	89537 1,601	89538 5,001
16	No. 89535 Ø 16.0 + TiN	89537 3,002	89538 9,001	No. 89536 Ø 16.0 + TiN	89537 2,203	89538 7,001
18	No. 89535 Ø 18.0 + TiN	89537 3,002	89538 9,001	No. 89536 Ø 18.0 + TiN	89537 2,203	89538 7,001
20	No. 89535 Ø 20.0 + TiN	89537 4,001	89538 15,001	No. 89536 Ø 20.0 + TiN	89537 2,502	89538 8,001
24	No. 89535 Ø 24.0 + TiN	89537 4,001	89538 15,001	No. 89536 Ø 24.0 + TiN	89537 2,502	89538 8,001

Every single-fluted gun drill E 800 with interchangeable parts – out of the ex stock range as well as special tools – can be modified in the diameter range of 0.5 mm:

Size	Diameter range (mm)	Size	Diameter range (mm)
0.00	12.00 - 12.49	3.02	27.00 - 27.49
0.01	12.50 - 12.99	3.03	27.50 - 27.99
0.02	13.00 - 13.49	3.04	28.00 - 28.49
0.03	13.50 - 13.99	3.05	28.50 - 28.99
0.04	14.00 - 14.49	3.06	29.00 - 29.49
0.05	14.50 - 14.99	3.07	29.50 - 29.99
0.06	15.00 - 15.49	4.00	30.00 - 30.49
0.07	15.50 - 15.99	4.01	30.50 - 30.99
1.00	16.00 - 16.49	4.02	31.00 - 31.49
1.01	16.50 - 16.99	4.03	31.50 - 31.99
1.02	17.00 - 17.49	4.04	32.00 - 32.49
1.03	17.50 - 17.99	4.05	32.50 - 32.99
1.04	18.00 - 18.49	4.06	33.00 - 33.49
1.05	18.50 - 18.99	4.07	33.50 - 33.99
1.06	19.00 - 19.49	5.00	34.00 - 34.49
1.07	19.50 - 19.99	5.01	34.50 - 34.99
2.00	20.00 - 20.49	5.02	35.00 - 35.49
2.01	20.50 - 20.99	5.03	35.50 - 35.99
2.02	21.00 - 21.49	5.04	36.00 - 36.49
2.03	21.50 - 21.99	5.05	36.50 - 36.99
2.04	22.00 - 22.49	5.06	37.00 - 37.49
2.05	22.50 - 22.99	5.07	37.50 - 37.99
2.06	23.00 - 23.49	6.00	38.00 - 38.49
2.07	23.50 - 23.99	6.01	38.50 - 38.99
2.08	24.00 - 24.49	6.02	39.00 - 39.49
2.09	24.50 - 24.99	6.03	39.50 - 40.00
2.10	25.00 - 25.49		
2.11	25.50 - 25.99		
3.00	26.00 - 26.49		
3.01	26.50 - 26.99		



Single-fluted gun drills E 800 with interchangeable inserts

Accessory table for Ø 12.0 - 52.0 mm

Size	Diameter holder range	Body/holder	Exterior inserts									
			Inserts	Screws	Screw driver							
			TiN-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 3000 mm. flute length from 15xD Alternatively: Standard range art. no. 89530 from diameter 12.00 mm up to 24.00 mm in preferred sizes complete with TiN inserts and TiN supporting strips	art. no. 89535 + Nom.-Ø = Order no.	Order no. 4071 2,502 T8 M2.5x 5.2	Order no. 1612 8,001							
	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	Order no. 4071 3,002 T9 M3x6.4	Order no. 1612 9,001						
				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	Order no. 4071 4,001 T15 M4x7.7	Order no. 1612 15,001					
					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		Order no. 4071 4,002 T15 M4x10.6				
						4.			Ø30.00 - Ø30.49 Ø30.50 - Ø30.99 Ø31.00 - Ø31.49 Ø31.50 - Ø31.99 Ø32.00 - Ø32.49 Ø32.50 - Ø32.99 Ø33.00 - Ø33.49 Ø33.50 - Ø33.99			
									5.	Ø34.00 - Ø34.49 Ø34.50 - Ø34.99 Ø35.00 - Ø35.49 Ø35.50 - Ø35.99 Ø36.00 - Ø36.49 Ø36.50 - Ø36.99 Ø37.00 - Ø37.49 Ø37.50 - Ø37.99		
										6.	Ø38.00 - Ø38.49 Ø38.50 - Ø38.99 Ø39.00 - Ø39.49 Ø39.50 - Ø40.00	
7.	Ø40.01 - Ø40.49 Ø40.50 - Ø40.99 Ø41.00 - Ø41.49 Ø41.50 - Ø41.99 Ø42.00 - Ø42.49 Ø42.50 - Ø42.99 Ø43.00 - Ø43.49 Ø43.50 - Ø43.99										Order no. 4071 3,002 TX9 M3x6.4	Order no. 1612 9,001
	8.										Ø44.00 - Ø44.49 Ø44.50 - Ø44.99 Ø45.00 - Ø45.49 Ø45.50 - Ø45.99 Ø46.00 - Ø46.49 Ø46.50 - Ø46.99 Ø47.00 - Ø47.49 Ø47.50 - Ø47.99	on request
					9.			Ø48.00 - Ø48.49 Ø48.50 - Ø48.99 Ø49.00 - Ø49.49 Ø49.50 - Ø49.99 Ø50.00 - Ø50.49 Ø50.50 - Ø50.99 Ø51.00 - Ø51.49 Ø51.50 - Ø52.00			Order no. 4071 4,002 TX15 M4x10.6	

Further coatings on request



Single-fluted gun drills E 800 with interchangeable inserts

Interior inserts			Supporting strips		
Inserts	Screws	Screw driver	Supporting strips TiN-coated	Screws	Screw driver
			art. no. 89536 + Nom.-Ø = Order no.	Order no. 4071 1,601 T5 M1.6x4.4	Order no. 1612 5,001
				Order no. 4071 2,203 T7 / M2.2x 4.6	Order no. 1612 7,001
				Order no. 4071 2,202 T7 / M2.2x5.6	
				Order no. 4071 2,502 T8 M2.5x 5.2	Order no. 1612 8,001
				Order no. 4071 2,501 T8 M2.5x6.4	
on request	Order no. 4071 4,501 T15 M4.5x11.8	Order no. 1612 15,001	on request	Order no. 4071 3,003 T9 M3x8	Order no. 1612 9,001

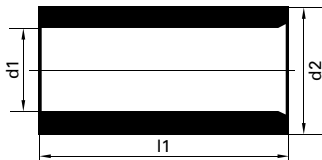


Accessories for deep hole drilling machines



In contrast to conventional machine tools, certain accessories, i.e. drilling bushes, seal discs, whipguide bushes 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



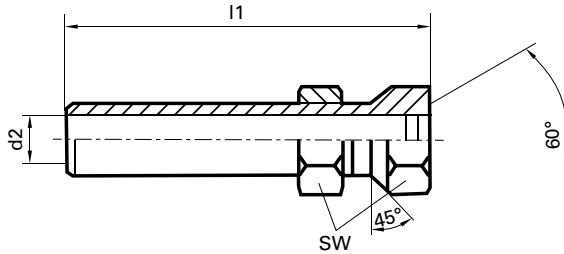
Code no.	d1 mm	d2 mm	l1 mm
0,900-0,999	0.900-0.999	3.00	9.00
1,000-1,899	1.000-1.899	4.00	9.00
1,900-2,699	1.900-2.699	5.00	9.00
2,700-3,399	2.700-3.399	6.00	12.00
3,400-4,099	3.400-4.099	7.00	12.00
4,100-5,099	4.100-5.099	8.00	12.00
5,100-6,099	5.100-6.099	10.00	16.00
6,100-8,099	6.100-8.099	12.00	16.00
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

89600	89601
Hartner Std.	Hartner Std.
HSS	Solid carbide
123	123
Min. order quantity 3 pieces	Min. order quantity 3 pieces
	
Availability	
●	●
●	●
●	●
●	●
●	●
●	●
●	●
●	●
●	●
●	●
●	●
●	●
●	●
●	●
●	●
●	●
●	●
●	●
●	●
●	●
●	●



Accessories for deep hole drilling machines

Adjustable screw without sealing element



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

89602

Hartner Std.

123

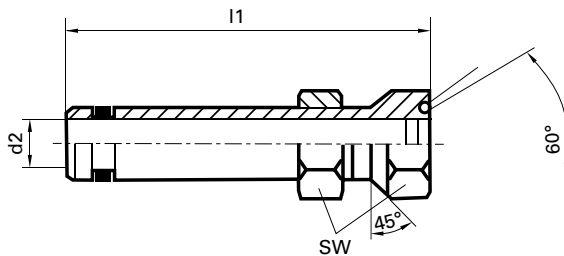
Min. order quantity 5 pieces



Availability



Adjustable screw with sealing element



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

89603

Hartner Std.

123

Min. order quantity 5 pieces



Availability





Accessories for deep hole drilling machines

Vulkolan sealing discs and whipguide bushes, art. no. 89604, 89605, 89606, 89607 and 89608 always cover one nominal diameter range of the gun drills to be retained. When ordering, please always state the art. no. + the code no. from the following table!

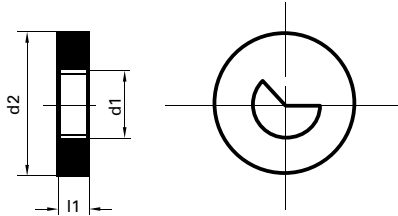
Assignment table for Vulkolan accessories

Code no.	For gun drills with nominal diameter d1		Code no.	For gun drills with nominal diameter 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 for deep hole drilling machines

Sealing disc for single-fluted gun drills



Code no.	d1 from... to... mm	d2 mm	l1 mm
see assignment table page 26	2.000-4.999	20.000	4.00
	5.000-15.399	32.000	4.00
	15.400-25.609	40.000	4.00
	26.610-40.000	90.000	4.00

89604
Hartner Std.
Vulkolan
123
Minimum order quantity 5 pieces

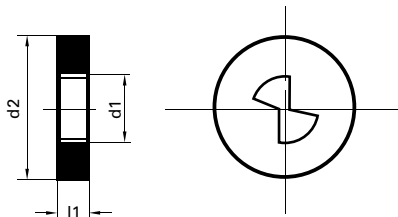


Availability

-
-
-
-

Order example:
- Sealing disc for diameter d1 = 26.500
is art. no. 89604 + code no. 25.000 = **order no. 89604 25.000**

Sealing disc for double-fluted gun drills



Code no.	d1 from... to... mm	d2 mm	l1 mm
see assignment table page 26	5.400-15.399	32.000	4.00
	15.400-27.000	40.000	4.00

89605
Hartner Std.
Vulkolan
123
Minimum order quantity 5 pieces



Availability

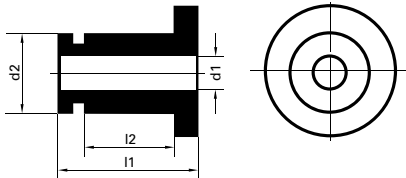
-
-

Order example:
- Sealing disc for diameter d1 = 16.000
is art. no. 89605 + code no. 15.500 = **order no. 89605 15.500**



Accessories for deep hole drilling machines

Whipguide bushes for single-/two-fluted gun drills



89606
Hartner Std.
Vulkolan
123
Minimum order quantity 5 pieces

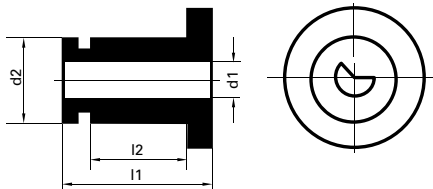
Availability
●
●
●

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

Order examples:

- Whipguide bush with dia. d2 = 20,000 mm for gun drill dia. d1 = 8,000 is art. no. 89606 + „2“+“0“+Code no. 7,700 = **Order no. 89606 207,700**
- Whipguide bush with dia. d2 = 30,000 mm for gun drill dia. d1 = 17,000 is art. no. 89606 + „3“+ Code no. 16,500 = **Order no. 89606 316,500**
- Whipguide bush with dia. d2 = 45,000 mm for gun drill dia. d1 = 3,000 is art. no. 89606 + „4“+“0“+Code no. 2,800 = **Order no. 89606 402,800**

Whipguide bushes for single-fluted gun drills



89607
Hartner Std.
Vulkolan
123
Minimum order quantity 5 pieces

Availability
●
●
●

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

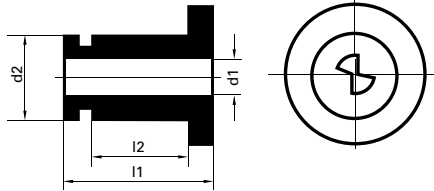
Order examples:

- Whipguide bush with dia. d2 = 20,000 mm for gun drill dia. d1 = 8,000 is art. no. 89607 + „2“+“0“+Code no. 7,700 = **Order no. 89607 207,700**
- Whipguide bush with dia. d2 = 30,000 mm for gun drill dia. d1 = 17,000 is art. no. 89607 + „3“+ Code no. 16,500 = **Order no. 89607 316,500**
- Whipguide bush with dia. d2 = 45,000 mm for gun drill dia. d1 = 23,000 is art. no. 89607 + „4“+“0“+Code no. 22,000 = **Order no. 89607 422,000**



Accessories for deep hole drilling machines

Whipguide bushes for two-fluted gun drills



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

89608
Hartner Std.
Vulkolan
123
Minimum order quantity 5 pieces



Availability

Order examples:

- Whipguide bush with dia. d2 = 20,000 mm for gun drill dia. d1 = 8,000 is art. no. 89608 + „2“+“0“+Code no. 7,700 = **Order no. 89608 207,700**
- Whipguide bush with dia. d2 = 30,000 mm for gun drill dia. d1 = 17,000 is art. no. 89608 + „3“+ Code no. 16,500 = **Order no. 89608 316,500**
- Whipguide bush with dia. d2 = 45,000 mm for gun drill dia. d1 = 9,000 is art. no. 89608 + „4“+“0“+Code no. 8,700 = **Order no. 89608 408,700**



Grinding equipment for single-fluted gun drills

TBM 116

TBM 116 is a manually operated, universal grinding machine. Its compact design combined with Hartner's single-fluted gun drill grinding system and Hartner'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



TBV 116

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.

For the use 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.



TBV 216

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.

Scope of delivery:

- 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



15/20/25/30/40xD



HARTNER

Precision Cutting Tools

TS 100 T SPIRAL-FLUTE DEEP HOLE DRILLS FOR DRILLING DEPTHS 15/20/25/30/40XD

- Optimised flute geometry
- Problem-free swarf
- Maximised coolant duct profile





Fax Inquiry / Order Gun Drill

Inquiry Order by Fax to: +497431 125 - 21547

Ansprechpartner

Hartner GmbH
P. O. Box 10 04 27
D-72425 Albstadt
Tel.: +497431 125-0
Fax: +497431 125-21547
www.hartner.de

Customer no. New customer

Company

Street no.

Telephone

Date

Order no.

Contact

Town/post code

Fax

Signature

Workpiece

Material:

Description:

Quantity/Year:

Hole diameter:

Tolerance on diameter:

Drilling depth:

Surface quality required:

Protruding edge:
No Yes mm

Additional information:

Machine

Machining centre:

Tool holder:

No. of spindles:

Deep drilling machine:

Tool holder:

No. of spindles:

Overall length of tool:

Coolant/lubrication:
soluble oil neat oil

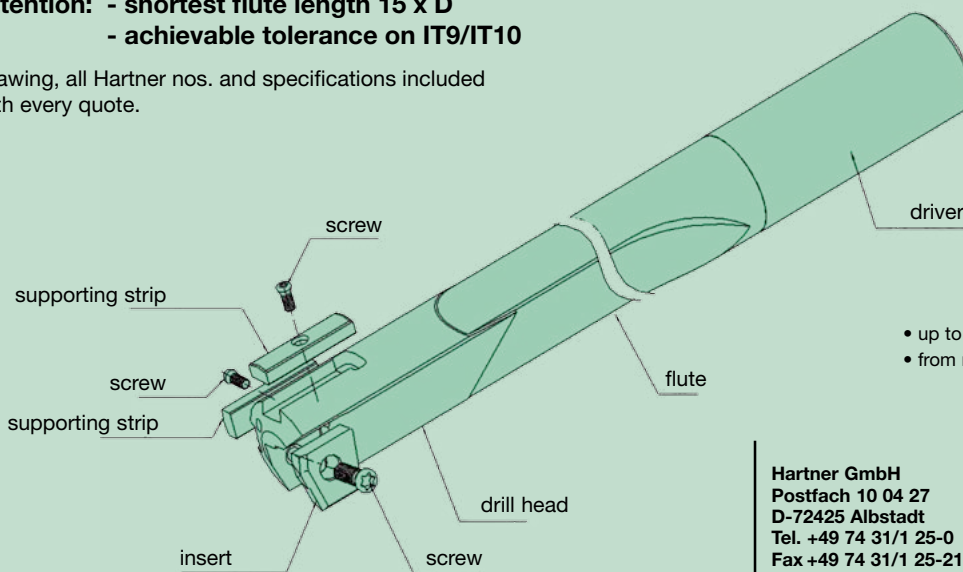
Pressure: bar

Volume: l/min

The Hartner E 800 for your application

Attention: - shortest flute length 15 x D
- achievable tolerance on IT9/IT10

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



- up to nom-Ø 23,99 mm with 4 supporting strips
- from nom-Ø 24,00 mm with 5 supporting strips

Hartner GmbH
Postfach 10 04 27
D-72425 Albstadt
Tel. +49 74 31/1 25-0
Fax +49 74 31/1 25-21547

Gun Drill with interchangeable insert and supporting strip, internal cooling
Diameter range: 16.00 - 40.00mm



An introduction to the subject of deep hole drilling

In the machining world, drilling depths of $10 \times D$ 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 $40 \times D$ 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 required hole depth
- withdrawal in top gear with stationary spindle

Application advice

- For drilling depths in excess than $40 \times D$ 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 $40 \times D$ should enter the pilot hole revolving in the left hand direction.
- When changing tools for drilling depths of more than $40 \times D$, 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.



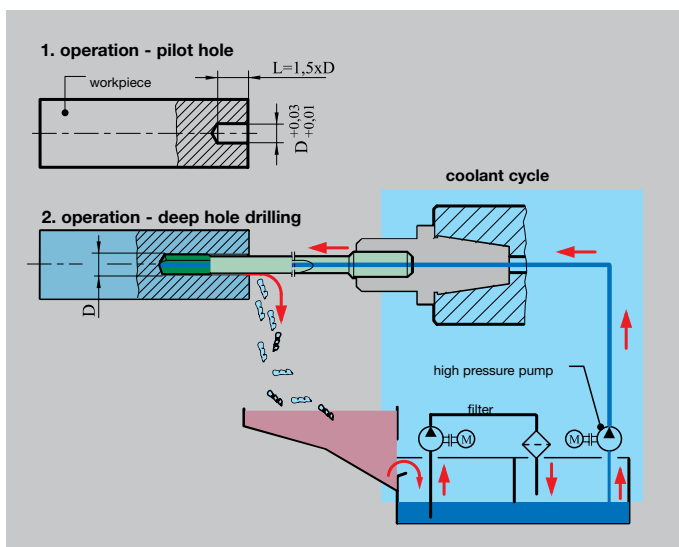
All gun drills must have support for the pilot hole.

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

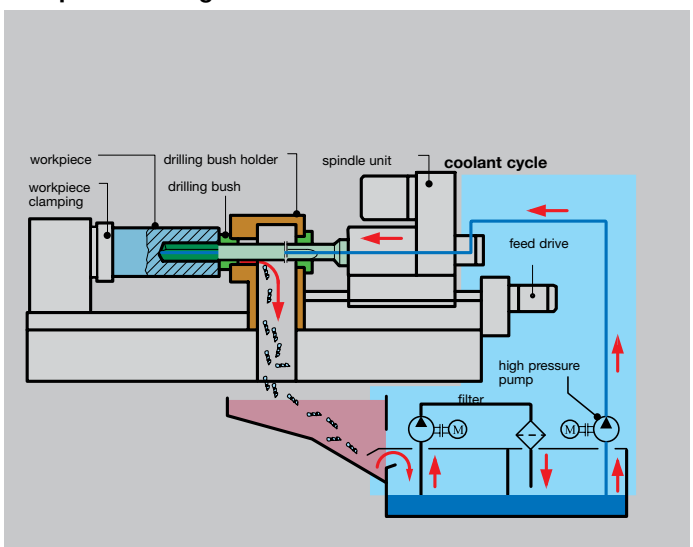
Deep hole drilling is not a closed book, but can be mastered by anybody as long as certain conditions are adhered to.

Recommended cutting rates for the application of Hartner gun drills can be found on the pages 38/39 for the individual types!

Deep hole drilling on conventional machine tools



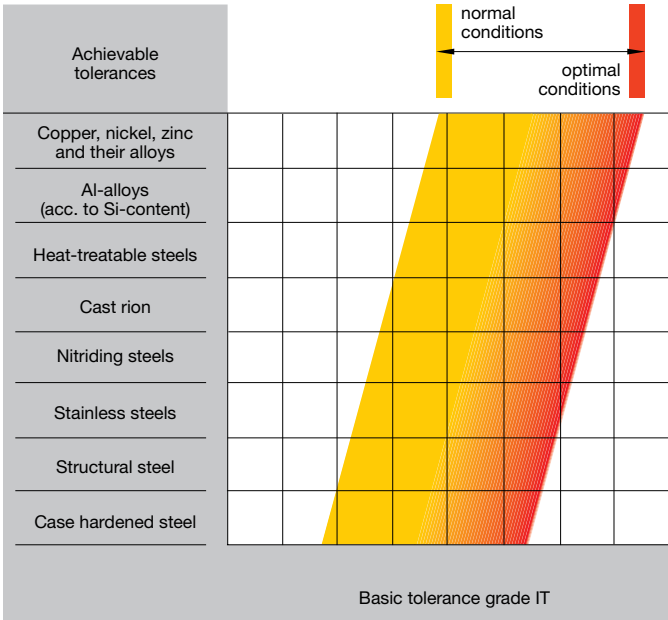
Deep hole drilling machines





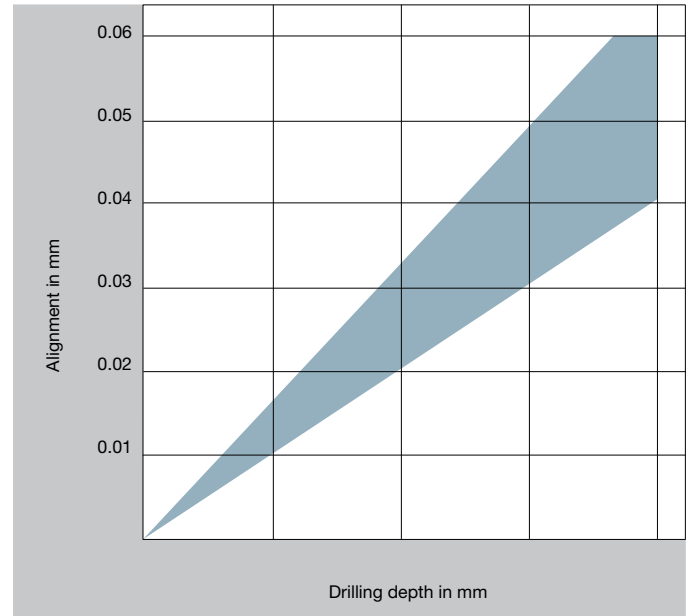
Basic tolerances*

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



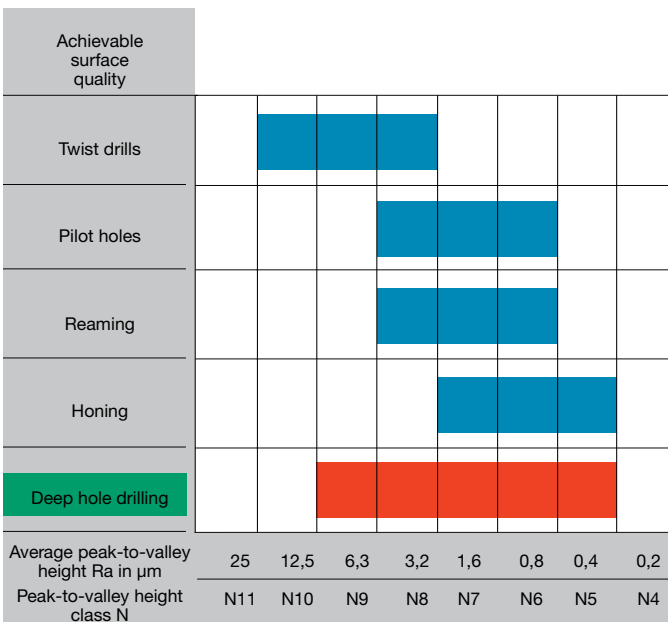
Alignment accuracy*

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.



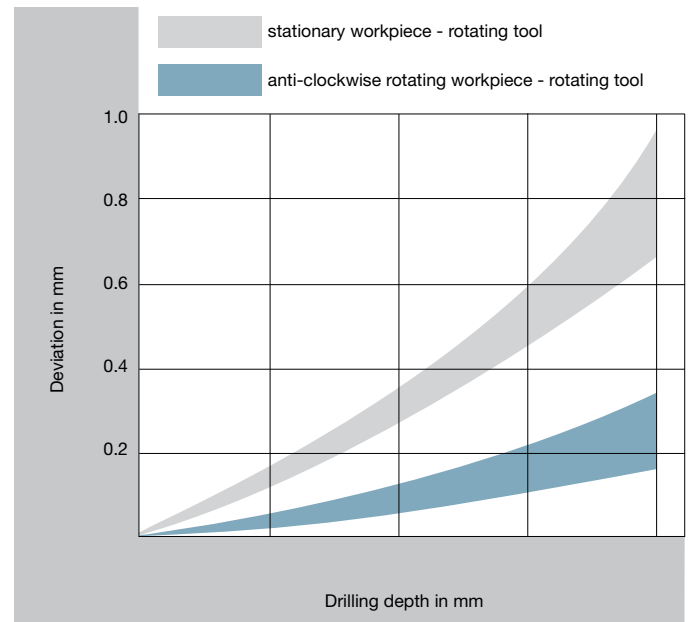
Surface quality*

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



Deviation from concentricity*

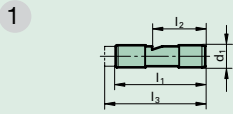
When a hole is produced with, for example, a commercial twist drill, the quality of the point grind affects the concentricity of the hole. An imbalance of forces is created at the cutting edges. With gun drills, these cutting forces are absorbed by the guide pads, resulting in excellent concentricity.



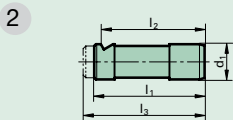
* gun drills with two cutting edges – straight-fluted as well as spiral-fluted – achieve approx. 50% of the values stated



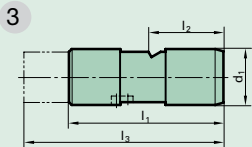
Drivers for deep drilling machines



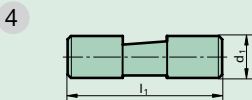
code no.	d ₁	l ₁	l ₂	l ₃
1.1	10	40	24	-
1.2	10	40	24	45
1.3	10	40	24	55
1.4	16	45	31,2	-
1.5	25	70	34	-
1.6	25	70	34	78



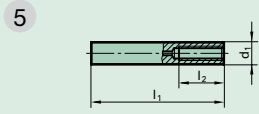
code no.	d ₁	l ₁	l ₂	l ₃
2.1	16	50	47	-
2.2	16	50	47	55
2.3	16	50	47	70



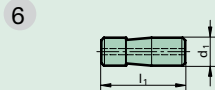
code no.	d ₁	l ₁	l ₂	l ₃
3.1	25	70	34	100



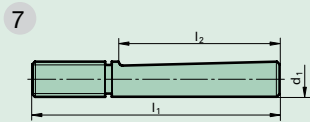
code no.	d ₁	l ₁
4.1	19,05	70
4.2	12,70	70
4.3	25,40	70
4.4	31,75	70
4.5	38,10	70



code no.	d ₁	l ₁	l ₂
5.1	10	60	20
5.2	16	80	28
5.3	25	100	50
5.4	10	100	-
5.5	10	110	-

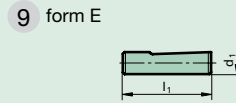


code no.	d ₁	l ₁
6.1	12,7	38
6.2	19,05	70
6.3	38,1	70



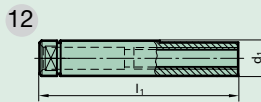
code no.	d ₁	l ₁	l ₂
7.1	16	112	73
7.2	20	126	82

Drivers to DIN 1835



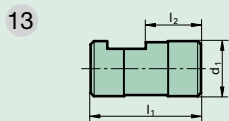
code no.	d ₁	l ₁
9.1	8	36
9.2	10	40
9.3	12	45
9.4	16	48
9.5	20	50
9.6	25	56
9.7	32	60
9.8	31,75	70
9.9	38,1	70
9.10	40	70

Drivers to VDI draft



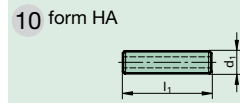
code no.	d ₁	l ₁
12.1	10	68
12.2	16	90
12.3	25	112

Drivers to Speed-Bit-System



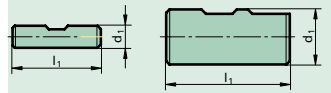
code no.	d ₁	l ₁	l ₂
13.1	16	40	16
13.2	25	50	25
13.3	35,6	60	-

Drivers to DIN 6535

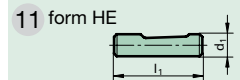


code no.	d ₁	l ₁
10.1	8	36
10.2	10	40
10.3	12	45
10.4	16	48
10.5	20	50
10.6	25	56
10.7	32	60
10.8	25	70
10.9	40	70

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

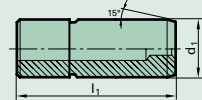


code no.	d ₁	l ₁
8.1	8	36
8.2	10	40
8.3	12	45
8.4	16	48
8.5	20	50
8.6	25	56
8.7	32	60
8.8	40	70

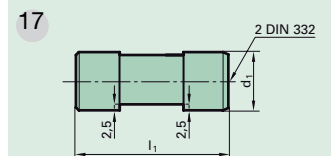


code no.	d ₁	l ₁
11.1	8	36
11.2	10	40
11.3	12	45
11.4	16	48
11.5	20	50
11.6	25,4	70
11.7	25	56
11.8	32	60
11.9	40	70

16 similar 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



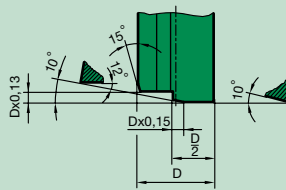
code no.	d ₁	l ₁
17.1	19,05	70
17.2	25,40	70
17.3	31,75	70
17.4	38,1	70

The range of drivers introduced here we keep on 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! Single-fluted solid carbide gun drills** require drivers with positioning lugs. Further information on request.

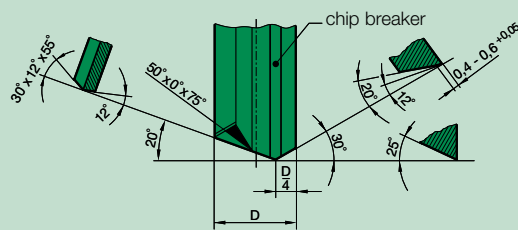


Special point grinds for single-fluted gun drills (further point grinds on request)

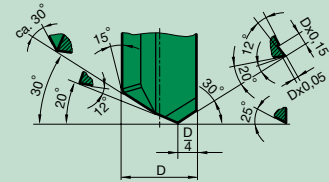
with recessed coolant chamber



with chip breaker



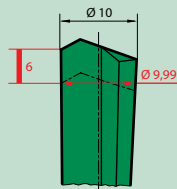
with chip guiding step



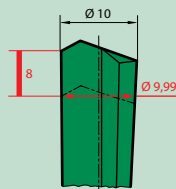
Backtaper ratio for gun drills

(dimensions in mm)

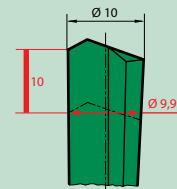
1:600



1:800 (Standard)

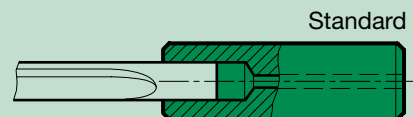


1:1000

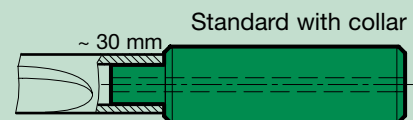


Variations for drivers at gun drills with tube shank

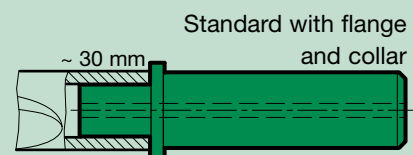
Solution for $\text{nom.-}\varnothing < \text{driver-}\varnothing$
(difference must be appr. 6 mm):
tube shank installed in driver



Solution for $\text{nom.-}\varnothing - \text{driver-}\varnothing$
(close to parallel):
tube shank installed over collar



Solution for $\text{nom.-}\varnothing > \text{driver-}\varnothing$:
tube shank installed over collar,
inside- \varnothing of tube shank $>$ driver- \varnothing ,
tube shank fits against flange shoulder.





Application recommendations for gun drills

Drill Ø mm from	Feed column no.									
	11	12	13	14	15	16	17	18	19	20
	f (mm/rev.)									
1,50	0,002	0,004	0,006	0,008	0,012	0,020	0,032	0,045	0,045	0,075
2,00	0,003	0,005	0,007	0,010	0,016	0,028	0,046	0,055	0,050	0,100
2,50	0,004	0,006	0,008	0,012	0,018	0,030	0,054	0,070	0,075	0,125
4,00	0,005	0,007	0,010	0,016	0,025	0,043	0,065	0,085	0,120	0,240
6,00	0,007	0,009	0,013	0,024	0,035	0,061	0,085	0,120	0,180	0,360
8,00	0,010	0,014	0,022	0,032	0,045	0,068	0,100	0,150	0,240	0,480
10,00	0,012	0,016	0,028	0,040	0,055	0,075	0,120	0,160	0,300	0,600
14,00	0,020	0,025	0,035	0,050	0,065	0,085	0,130	0,180	0,420	0,700
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		
52,00	0,040	0,050	0,060	0,080	0,150	0,200	0,300	0,500		

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

The sequence of operations for deep hole drilling

- production of pilot hole (L ≈ 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
- for E100 gun drills > 50xD please note: up to drilling depth 50xD the feed has to be reduced to 60%

single-fluted gun drill E 100

solid carbide

0.9 ... 16.0



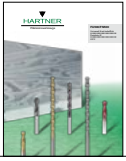
Material dependent coolants

- A TiAlN SuperA
 C TiCN
 F FIRE
 S TiN

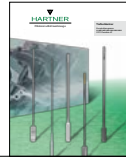
- air ○
 neat oil ●
 soluble oil ◐

Material group	Material examples Figures in bold = material no. to DIN EN	Tens.str. Hardness N/mm ²	Cool- ant	rec. coating*	≤50xD		>50xD	
					V _c m/min	Feed col. no.	V _c m/min	Feed col. no.
Common structural steels	1.0035 S185, 1.0486 P275N, 1.0345 P235GH, 1.0425 1.0050 E295), 1.0070 E360, 1.8937 P500NH	≤500 ≤1000	○ ○		100 85	15 15	100 85	15 15
Free-cutting steels	1.0718 11SMnPb30, 1.0736 11SMn37 1.0727 46S20, 1.0728 60S20, 1.0757 46SPb20	≤850 ≤1000	○ ○		90 80	15 15	90 80	15 15
Unalloyed heat-treatable steels	1.0402 C22, 1.1178 C30E 1.0503 C45, 1.1191 C45E 1.0601 C60, 1.1221 C60E	≤700 ≤850 ≤1000	○ ○ ○		80 75 75	14 14 14	80 75 75	14 14 14
Alloyed heat-treatable steels	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400	○ ○	A	75 65	14 14	75 65	14 14
Unalloyed case hard. steels	1.0301 , 1.1121 C10E	≤850	○	A	80	15	80	15
Alloyed case hardened steels	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400	● ○	A	75 65	14 14	75 65	14 14
Nitriding steels	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400	○ ●	A	75 65	14 14	75 65	14 14
Tool steels	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 , 1.2767	≤850 ≤1400	○ ○	A	75 65	13 13	75 65	13 13
High speed steels	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400	●	A	55	12	55	12
Spring steels	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4	≤350 HB	●	A	65	13	65	13
Stainless steels, sulphured	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105	≤900	●	A	40	14	40	14
austenitic	1.4301 X5CrNi18-10, 1.4541 X6CrNiTi18-10, 1.4571	≤1100	●	A	35	14	35	14
martensitic	1.4057 X20CrNi172, 1.4122 X39CrMo17-1, 1.4521	≤1500	●	A	35	14	35	14
Hardened steels	-	≤48 HRC ≤66 HRC	● ●		30 25	13 10	30 25	13 10
Special alloys	Nimonic, Inconel, Monel, Hastelloy	≤2000	●		20	12	20	12
Cast iron	0.6010 EN-GJL-100, 0.6020 EN-GJL-200 0.6025 EN-GJL-250, 0.6035 EN-GJL-350	≤240 HB ≤350 HB	○ ○		85 80	16 16	85 80	16 16
Spheroidal graphite iron and malleable cast iron	0.7050 EN-GJS-500-7, 0.8035 EN-GJMW-350-4 0.7070 EN-GJS-700-2, 0.8170 EN-GJMB-700-2	≤240 HB ≤350 HB	○ ○		80 70	15 15	80 70	15 15
Chilled cast iron	-	≤350 HB	○		55	14	55	14
Ti and Ti-alloys	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184	≤850 ≤1400	● ○	A	35 30	12 12	35 30	12 12
Aluminium and Al-alloys	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400	○		150	17	150	17
Al wrought alloys	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 , 3.4365	≤650	○		120	19	120	19
Al cast alloys ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600	○		120	20	120	20
≤ 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600	○		130	18	130	18
Magnesium alloys	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05	≤400	○		110	17	110	17
Copper, low-alloyed	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500	○	A	75	15	75	15
Brass, short-chipping	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410	≤600	○		120	18	120	18
long-chipping	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600	○		90	18	90	18
Bronze, short-chipping	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 2.0790 CuNi18Zn19Pb	≤600 ≤850	○ ○		95 75	17 17	95 75	17 17
Bronze, long-chipping	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 ≤1000	○ ○		70 60	17 17	70 60	17 17
Duroplastics	Bakelit, Resopal, Pertinax, Moltopren	≤150	○		75	15	75	15
Thermoplastics	Plexiglas, Hostalen, Novodur, Makralon	≤100	○		70	15	70	15
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)	≤1000 ≤1400	○ ○					
Kevlar	Kevlar	≤1000	○		60	14	60	14
Glass, carbon concentr. plastics	GFK/CFK	≤1000	○		50	14	50	14

Our programme:



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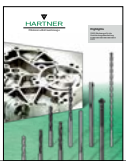
Multiplex HPC



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