

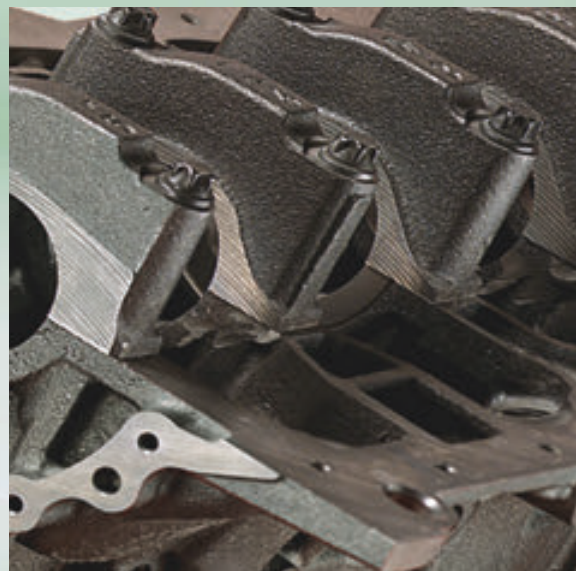
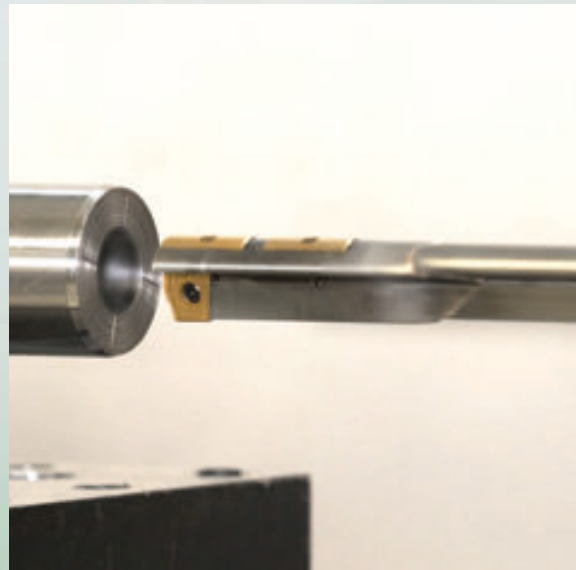
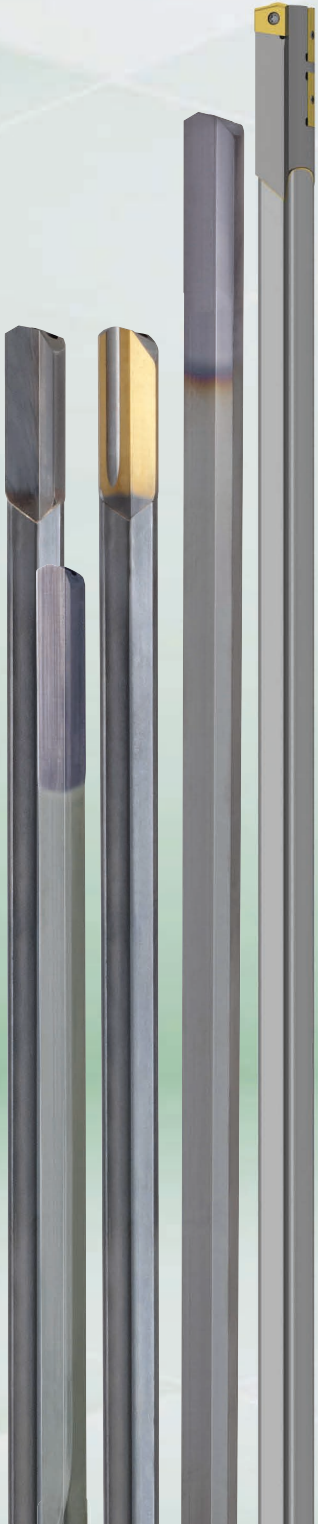


HARTNER

Precision Cutting Tools

GUN DRILLS

THE COMPLETE PROGRAMME




























+ Edition 2017

+ new **XXL-** stock programme for deep hole drilling machines

ISO code

P	Steel, high-alloyed steel
M	Stainless steel
K	Grey cast iron, spheroidal graphite iron/malleable cast iron
N	Aluminium and other non-ferrous metals
S	Special, super and titanium alloys
H	Hardened steel and chilled cast iron

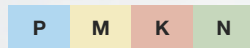
Pictograms

Tool material	VHM	HM					
	Solid carbide	Carbide-tipped					
Surface							
	bright	AlTiN	AlTiN nano	TiCN	TiN		
Type							
Drilling depth							
Standard		to Hartner standard					
Ø-tolerance							
Cutting direction							
	right						
Shank form							
	to DIN 6535		Driver Ø25x70 mm		cylindrical		
Internal coolant							
	with IC						



Solid carbide **single-fluted gun drills E 100**

page 8



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

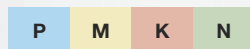


Inch-diameters



Single-fluted gun drills E 80 with brazed carbide head

page 17

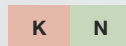


- ▶ ex stock range Ø 3.97 – 25.00 mm
- ▶ special Ø 2.0 – 40.0 mm
- ▶ **Fast service: page 18**



Two-fluted gun drills Z 80 with brazed carbide head

page 28



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



Single-fluted gun drills E 800 with interchangeable inserts

page 31



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



Accessories and grinding equipment

page 39

- ▶ Accessories for deep hole drilling machines
- ▶ Grinding equipment for single-fluted gun drills

Enquiry form

page 50

Technical section

page 52

Application recommendations

page 64



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

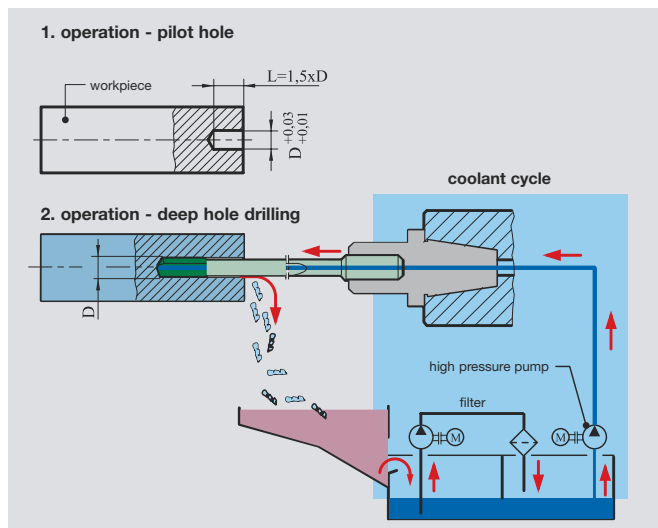
- For drilling depths in excess than $40 \times D$ we recommend the use of two or more gun drills, e. g. $\varnothing 10 \times 400$ mm and $\varnothing 9.95 \times 800$ mm.
- Gun drills for drilling depths of more than $40 \times D$ should enter the pilot hole revolving in the left hand direction.
- 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.



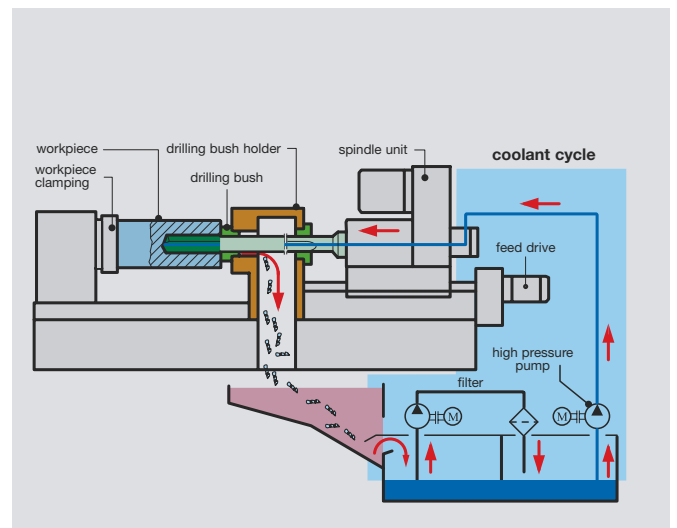
All gun drills must have support for the pilot hole. Gun drills must never operate at full speed without support in the machine shop.

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 64/65 for the individual types!

Deep hole drilling on conventional machine tools



Deep hole drilling machines



P	M	K	N	S	H	Standard	Type	Tool material	Surface	Cutting direction	Shank form	Drilling depth	d1/mm	Article no.	Progr. page
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Single-fluted gun drills E 100

	•	•	○	•	○	○	Company std.	TLB E 100	Solid carbide		right-hand	HA	25xD	2.380 - 12.000	89520	10
	•	•	○	•	○	○	Company std.	TLB E 100	Solid carbide		right-hand	HA	50xD	2.380 - 8.000	89521	11
	•	•	○	•	○	○	Company std.	TLB E 100	Solid carbide		right-hand	HA	75xD	2.380 - 6.000	89522	12
	○	○	○	•	•	○	Company std.	TLB E 100	Solid carbide		right-hand	HA		1.200 - 3.200	89503	13
	•	○	•	○	○	○	Company std.	TLB E 100	Solid carbide		right-hand	HA		1.200 - 3.200	89510	13
	○	○	○	•	•	○	Company std.	TLB E 100	Solid carbide		right-hand	HA		1.200 - 5.000	89501	14
	•	○	•	○	○	○	Company std.	TLB E 100	Solid carbide		right-hand	HA		1.200 - 5.000	89511	14
	○	○	○	•	•	○	Company std.	TLB E 100	Solid carbide		right-hand	HA		1.500 - 5.000	89504	15
	•	○	•	○	○	○	Company std.	TLB E 100	Solid carbide		right-hand	HA		1.500 - 5.000	89512	15
	○	○	○	•	•	○	Company std.	TLB E 100	Solid carbide		right-hand	HA		1.500 - 8.000	89502	16
	•	○	•	○	○	○	Company std.	TLB E 100	Solid carbide		right-hand	HA		1.500 - 8.000	89513	16

Single-fluted gun drills E 80



	•	○	•	○	○	○	Company std.	TLB E 80	Carbide		right-hand	HA	20xD	3.970 - 12.700	89505	20
	○	•	○	○	•	○	Company std.	TLB E 80	Carbide		right-hand	HA	20xD	3.970 - 12.700	89514	20

P	M	K	N	S	H	Standard	Type	Tool material	Surface	Cutting direction	Shank form	Drilling depth	d1/mm	Article no.	Progr. page
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Single-fluted gun drills E 80

		Company std.	TLB E 80	Carbide		right-hand	HA	30xD	3.970 - 12.700	89509	21
		Company std.	TLB E 80	Carbide		right-hand	HA	30xD	3.970 - 12.700	89515	21
		Company std.	TLB E 80	Carbide		right-hand	HA	40xD	3.970 - 12.700	89506	22
		Company std.	TLB E 80	Carbide		right-hand	HA	40xD	3.970 - 12.700	89516	22
		Company std.	TLB E 80	Carbide		right-hand	HA	80xD	4.950 - 12.650	89507	23
		Company std.	TLB E 80	Carbide		right-hand	HA	80xD	4.950 - 12.650	89517	23
		Company std.	TLB E 80	Carbide						XXL	
		Company std.	TLB E 80	Carbide		right-hand	T 3.1		5.000 - 25.000	89540	24
		Company std.	TLB E 80	Carbide						XXL	
		Company std.	TLB E 80	Carbide		right-hand	T 3.1		5.000 - 22.000	89541	25
		Company std.	TLB E 80	Carbide						XXL	
		Company std.	TLB E 80	Carbide		right-hand	T 3.1		4.000 - 22.000	89542	26
		Company std.	TLB E 80	Carbide						XXL	
		Company std.	TLB E 80	Carbide		right-hand	T 3.1		5.000 - 22.000	89543	27

Gun drills with 2 cutting lips Z 80

		Company std.	TLB Z 80	Carbide		right-hand	HA	30xD	8.000 - 12.000	89508	30
		Company std.	TLB Z 80	Carbide		right-hand	HA	30xD	8.000 - 12.000	89518	30

P	M	K	N	S	H	Standard	Type	Tool material	Surface	Cutting direction	Shank form	Drilling depth	d1/mm	Article no.	Progr. page
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Single-fluted gun drills with interchangeable inserts E 800



•	○	○	•	○		Company std.	TLB E 800	Carbide		T	right-hand	HB	30xD	12.000 - 24.000	89530	32
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Inserts for single-fluted gun drills E 800



•	○	○	•	○		Company std.		Solid carbide		T	right-hand			12.000 - 40.000	89535	36
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Supporting strips for single-fluted gun drills E 800



•	○	○	•	○		Company std.		Solid carbide		T				12.000 - 40.000	89536	37
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E 100

A selection of classic applications:

Medical industry

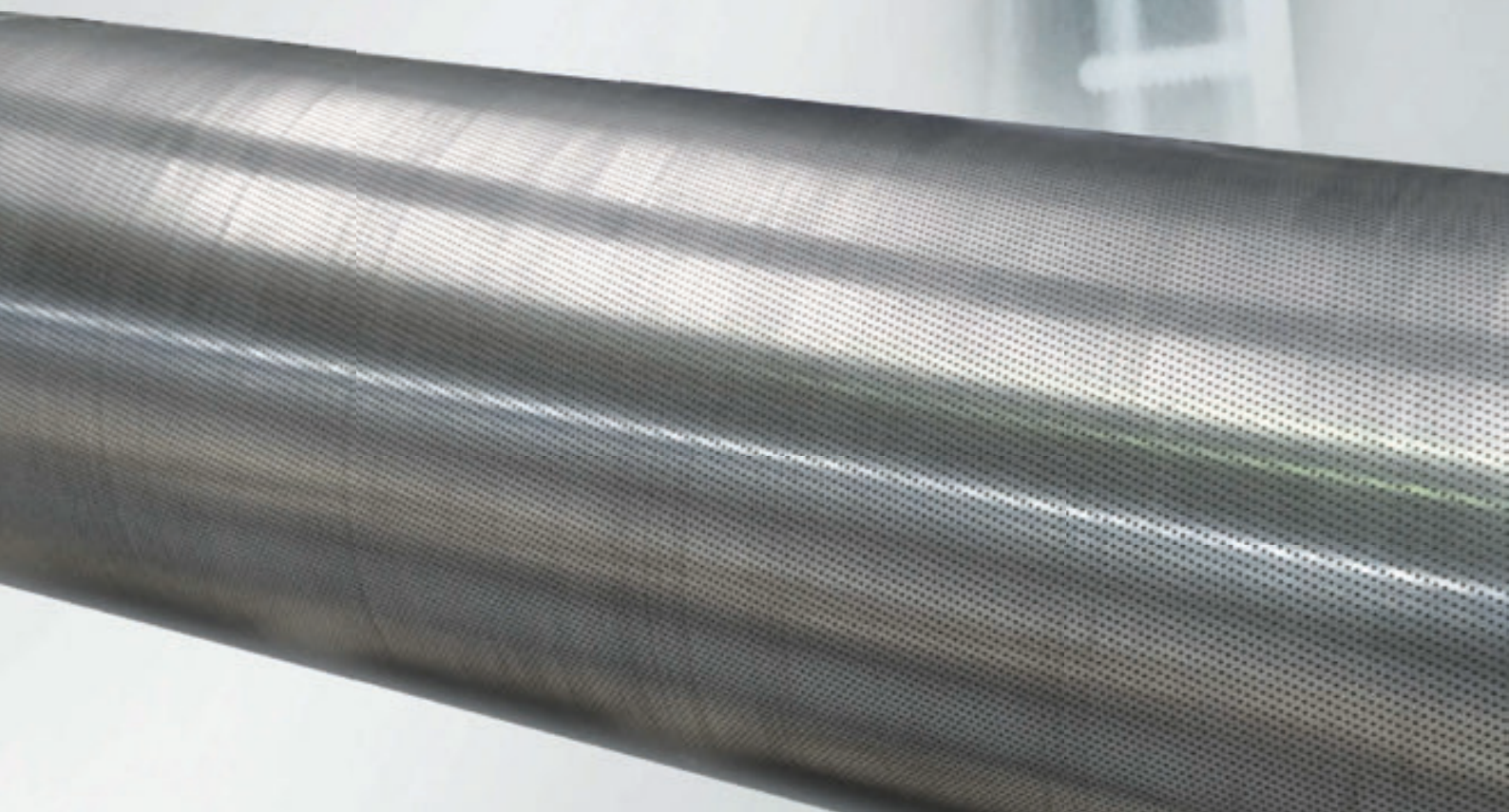
- ▶ bone nails
- ▶ bone screws

Animal feed industry

- ▶ pellet dies

Automobile technology

- ▶ injection systems for diesel engines
- ▶ starting valves
- ▶ small crank shafts





HARTNER

Solid carbide **single-fluted gun drills E 100**

- ▶ suitable for almost every material
- ▶ from Ø 1.0 – 12.0 mm
- ▶ max. flute length 500 mm / max. 100xD

In addition to our comprehensive standard programme, we offer you special tools on request specifically according to your specifications. Please use our inquiry form on page 50/51.

E 100



Solid carbide from the tip to the shank – Article no. 89520 | 89521 | 89522:



- ▶ AlTiN nano-coated design for almost every material



- ▶ Solid carbide solid shank with conical MQL shank end

Single-fluted solid carbide gun drill with soldered steel driver



- ▶ bright finish for universal application



- ▶ AlTiN-coated version for alloyed and high-alloy steels

For certain materials a coating is required, as the successful application of gun drills with a bright finish surface finish cannot be guaranteed. For coating definitions see our application recommendations on page 64/65.

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



Single-fluted gun drills E 100

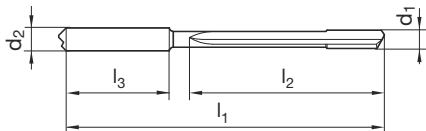
Article no. 89520



P	M	K	N	S	H
•	•	○	•	○	○



drilling depth up to 25xD • head form G • solid carbide shank with tapered MQL shank end from d1 = 3 mm / d2 = 6 mm



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
2.380	3/32	4.000	100.000	70.000	28.000
2.500		4.000	115.000	85.000	28.000
2.780	7/64	4.000	115.000	85.000	28.000
3.000		6.000	145.000	105.000	36.000
3.170	1/8	6.000	145.000	105.000	36.000
3.500		6.000	145.000	105.000	36.000
3.570	9/64	6.000	160.000	120.000	36.000
3.970	5/32	6.000	160.000	120.000	36.000
4.000		6.000	160.000	120.000	36.000
4.370	11/64	6.000	220.000	180.000	36.000
4.760	3/16	6.000	220.000	180.000	36.000
5.000		6.000	220.000	180.000	36.000
5.160	13/64	6.000	220.000	180.000	36.000
5.560	7/32	6.000	220.000	180.000	36.000
5.950	15/64	6.000	220.000	180.000	36.000
6.000		6.000	220.000	180.000	36.000
6.350	1/4	8.000	260.000	210.000	36.000
6.750	17/64	8.000	260.000	210.000	36.000
7.000		8.000	260.000	210.000	36.000
7.140	9/32	8.000	285.000	240.000	36.000
7.540	19/64	8.000	285.000	240.000	36.000
7.940	5/16	8.000	285.000	240.000	36.000
8.000		8.000	285.000	240.000	36.000
9.000		10.000	350.000	300.000	40.000
10.000		10.000	350.000	300.000	40.000
11.000		12.000	420.000	360.000	45.000
12.000		12.000	420.000	360.000	45.000



Single-fluted gun drills E 100

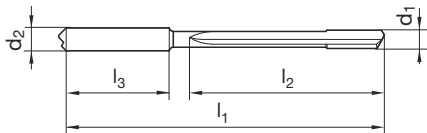
Article no. 89521



P	M	K	N	S	H
•	•	○	•	○	○



drilling depth up to 50xD • head form G • solid carbide shank with tapered MQL shank end from d1 = 3 mm / d2 = 6 mm



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
2.380	3/32	4.000	160.000	130.000	28.000
2.500		4.000	185.000	155.000	28.000
2.780	7/64	4.000	185.000	155.000	28.000
3.000		6.000	230.000	190.000	36.000
3.170	1/8	6.000	230.000	190.000	36.000
3.500		6.000	230.000	190.000	36.000
3.570	9/64	6.000	260.000	220.000	36.000
3.970	5/32	6.000	260.000	220.000	36.000
4.000		6.000	260.000	220.000	36.000
4.370	11/64	6.000	370.000	330.000	36.000
4.760	3/16	6.000	370.000	330.000	36.000
5.000		6.000	370.000	330.000	36.000
5.160	13/64	6.000	370.000	330.000	36.000
5.560	7/32	6.000	370.000	330.000	36.000
5.950	15/64	6.000	370.000	330.000	36.000
6.000		6.000	370.000	330.000	36.000
6.350	1/4	8.000	430.000	385.000	36.000
6.750	17/64	8.000	430.000	385.000	36.000
7.000		8.000	430.000	385.000	36.000
7.140	9/32	8.000	485.000	440.000	36.000
7.540	19/64	8.000	485.000	440.000	36.000
7.940	5/16	8.000	485.000	440.000	36.000
8.000		8.000	485.000	440.000	36.000



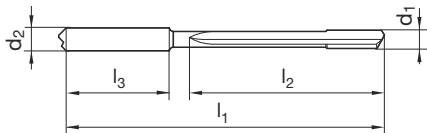
Single-fluted gun drills E 100

Article no. 89522

P	M	K	N	S	H
•	•	○	•	○	○



drilling depth up to 75xD • head form G • solid carbide shank with tapered MQL shank end from d1 = 3 mm / d2 = 6 mm



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
2.380	3/32	4.000	220.000	190.000	28.000
2.500		4.000	255.000	220.000	28.000
2.780	7/64	4.000	255.000	220.000	28.000
3.000		6.000	320.000	280.000	36.000
3.170	1/8	6.000	320.000	280.000	36.000
3.500		6.000	320.000	280.000	36.000
3.570	9/64	6.000	360.000	320.000	36.000
3.970	5/32	6.000	360.000	320.000	36.000
4.000		6.000	360.000	320.000	36.000
4.370	11/64	6.000	525.000	485.000	36.000
4.760	3/16	6.000	525.000	485.000	36.000
5.000		6.000	525.000	485.000	36.000
5.160	13/64	6.000	525.000	485.000	36.000
5.560	7/32	6.000	525.000	485.000	36.000
5.950	15/64	6.000	525.000	485.000	36.000
6.000		6.000	525.000	485.000	36.000



Single-fluted gun drills E 100

Article no. 89503



P	M	K	N	S	H
○	○	○	●	●	○



flute length 45 mm • head form G

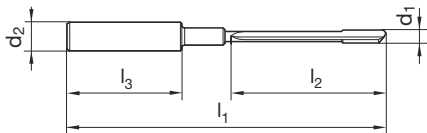
Article no. 89510



P	M	K	N	S	H
●	○	●	○	○	○



flute length 45 mm • head form G



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
1.200		4.000	90.000	45.000	28.000
1.500		4.000	90.000	45.000	28.000
1.590	1/16	4.000	90.000	45.000	28.000
1.600		4.000	90.000	45.000	28.000
1.980	5/64	4.000	90.000	45.000	28.000
2.000		4.000	90.000	45.000	28.000
2.500		10.000	100.000	45.000	40.000
2.700		10.000	100.000	45.000	40.000
3.000		10.000	100.000	45.000	40.000
3.200		10.000	100.000	45.000	40.000



Single-fluted gun drills E 100

Article no. 89501



P	M	K	N	S	H
○	○	○	●	●	○



flute length 80 mm • head form G

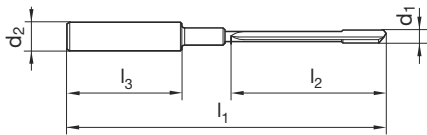
Article no. 89511



P	M	K	N	S	H
●	○	●	○	○	○



flute length 80 mm • head form G



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
1.200		4.000	125.000	80.000	28.000
1.500		4.000	125.000	80.000	28.000
1.590	1/16	4.000	125.000	80.000	28.000
1.600		4.000	125.000	80.000	28.000
1.980	5/64	4.000	125.000	80.000	28.000
2.000		4.000	125.000	80.000	28.000
2.500		10.000	135.000	80.000	40.000
2.700		10.000	135.000	80.000	40.000
3.000		10.000	135.000	80.000	40.000
3.200		10.000	135.000	80.000	40.000
3.500		10.000	135.000	80.000	40.000
4.000		10.000	135.000	80.000	40.000
4.200		10.000	135.000	80.000	40.000
4.500		10.000	135.000	80.000	40.000
5.000		10.000	135.000	80.000	40.000



Single-fluted gun drills E 100

Article no. 89504



P	M	K	N	S	H
○	○	○	●	●	○



flute length 120 mm • head form G

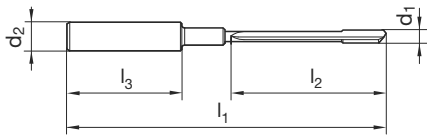
Article no. 89512



P	M	K	N	S	H
●	○	●	○	○	○



flute length 120 mm • head form G



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
1.500		4.000	165.000	120.000	28.000
1.590	1/16	4.000	165.000	120.000	28.000
1.600		4.000	165.000	120.000	28.000
1.980	5/64	4.000	165.000	120.000	28.000
2.000		4.000	165.000	120.000	28.000
2.500		10.000	175.000	120.000	40.000
2.700		10.000	175.000	120.000	40.000
3.000		10.000	175.000	120.000	40.000
3.200		10.000	175.000	120.000	40.000
3.500		10.000	175.000	120.000	40.000
4.000		10.000	175.000	120.000	40.000
4.200		10.000	175.000	120.000	40.000
4.500		10.000	175.000	120.000	40.000
5.000		10.000	175.000	120.000	40.000



Single-fluted gun drills E 100

Article no. 89502



P	M	K	N	S	H
○	○	○	●	●	○



flute length 160 mm • head form G

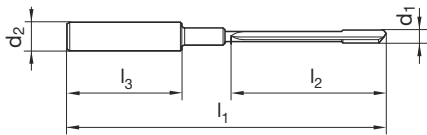
Article no. 89513



P	M	K	N	S	H
●	○	●	○	○	○



flute length 160 mm • head form G



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
1.500		4.000	205.000	160.000	28.000
1.590	1/16	4.000	205.000	160.000	28.000
1.600		4.000	205.000	160.000	28.000
1.980	5/64	4.000	205.000	160.000	28.000
2.000		4.000	205.000	160.000	28.000
2.500		10.000	215.000	160.000	40.000
2.700		10.000	215.000	160.000	40.000
3.000		10.000	215.000	160.000	40.000
3.200		10.000	215.000	160.000	40.000
3.500		10.000	215.000	160.000	40.000
4.000		10.000	215.000	160.000	40.000
4.200		10.000	215.000	160.000	40.000
4.500		10.000	215.000	160.000	40.000
5.000		10.000	215.000	160.000	40.000
6.000		16.000	225.000	160.000	48.000
8.000		16.000	225.000	160.000	48.000



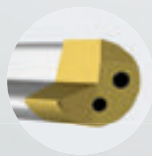
HARTNER

Single-fluted gun drills E 80 with brazed carbide head

- ▶ suitable for almost every material
- ▶ Ø 2.0 – 40.0 mm
- ▶ max. total length 3000 mm

In addition to our comprehensive standard programme, we offer you special tools on request specifically according to your specifications. Please use our inquiry form on page 50/51. From Ø 6.0 to 20.0 mm, we can fit PCD or CBN cutting edges on request. With AISi alloys for example, tool life subsequently increases multi-fold.

E 80



Standard range:



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



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

For certain materials a coating is required, as the successful application of gun drills with a bright finish surface finish cannot be guaranteed. For coating definitions see our application recommendations on page 64/65.

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

E80

Fast service *for brazed single-fluted gun drills*

Delivery time max. **2 weeks!**

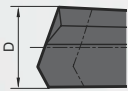
In addition to the ex stock range Hartner offers a fast service for gun drills with standard point grind and standard driver in following dimensions. Delivery time is max. 2 weeks.



In just four steps to your custom-made gun drill:

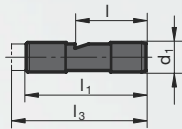
1

nom.-Ø



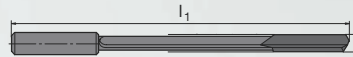
2

driver



3

total length



4

surface



Please choose

Ø 2.0 – 13.9 mm
in increments of 0.1 mm
Ø 14.0 – 22.0 mm
in increments of 0.5 mm

Please choose

a standard driver
from page 62

Please choose

min. 20xD
max. 1200 mm
Please determine overall
length according to
instructions on page 56!

Please choose

TiN-coating/bright finish

Send us your choice. We will quote within 24 hours and you will receive your custom-made tool in just 2 weeks!

This fast service is valid for gun drills that:

- ▶ fit in the above framework. Carbide head length, head form and other technical details are determined according to our company standard.
- ▶ are used for the machining of steel and cast materials.
For all other materials, we recommend special geometries on request.
- ▶ have a flute length of min. 20xD and one of the two abovementioned surface finishes.
Shorter gun drills and tools with other coatings have a delivery time of 4 weeks.



Single-fluted gun drills E 80

Article no. 89505



P	M	K	N	S	H
●	○	●	○	○	○



drilling depth up to 20xD • head form G • with lateral chip breaker

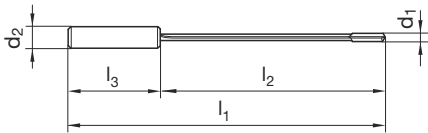
Article no. 89514



P	M	K	N	S	H
○	●	○	○	●	○



drilling depth up to 20xD • head form G • for alloyed and high alloyed steels



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
3.970	5/32	10.000	150.000	100.000	40.000
4.000		12.000	150.000	100.000	45.000
4.200		12.000	160.000	110.000	45.000
4.500		12.000	170.000	120.000	45.000
5.000		16.000	180.000	130.000	48.000
5.156		16.000	180.000	130.000	48.000
5.500		16.000	190.000	140.000	48.000
6.000		16.000	210.000	160.000	48.000
6.350	1/4	16.000	220.000	170.000	48.000
6.500		16.000	220.000	170.000	48.000
7.000		16.000	235.000	185.000	48.000
7.938	5/16	16.000	260.000	210.000	48.000
8.000		16.000	260.000	210.000	48.000
9.000		16.000	280.000	230.000	48.000
9.525	3/8	16.000	290.000	240.000	48.000
10.000		20.000	320.000	260.000	50.000
11.000		20.000	340.000	290.000	50.000
11.113	7/16	20.000	340.000	290.000	50.000
12.000		20.000	370.000	310.000	50.000
12.700	1/2	20.000	385.000	330.000	50.000



Single-fluted gun drills E 80

Article no. 89509



P	M	K	N	S	H
●	○	●	○	○	○



drilling depth up to 30xD • head form G • with lateral chip breaker

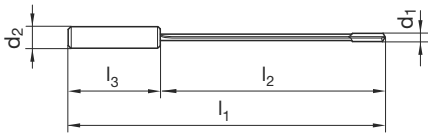
Article no. 89515



P	M	K	N	S	H
○	●	○	○	●	○



drilling depth up to 30xD • head form G • for alloyed and high alloyed steels



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
3.970	5/32	10.000	200.000	155.000	40.000
4.000		12.000	200.000	155.000	45.000
4.200		12.000	210.000	165.000	45.000
4.500		12.000	220.000	175.000	45.000
5.000		16.000	230.000	182.000	48.000
5.156		16.000	230.000	182.000	48.000
5.500		16.000	245.000	197.000	48.000
6.000		16.000	260.000	212.000	48.000
6.350	1/4	16.000	275.000	227.000	48.000
6.500		16.000	275.000	227.000	48.000
7.000		16.000	290.000	242.000	48.000
7.938	5/16	16.000	320.000	272.000	48.000
8.000		16.000	320.000	272.000	48.000
9.000		16.000	350.000	302.000	48.000
9.525	3/8	16.000	380.000	330.000	48.000
10.000		20.000	400.000	350.000	50.000
11.000		20.000	430.000	380.000	50.000
11.113	7/16	20.000	430.000	380.000	50.000
12.000		20.000	450.000	400.000	50.000
12.700	1/2	20.000	500.000	450.000	50.000



Single-fluted gun drills E 80

Article no. 89506



P	M	K	N	S	H
●	○	●	○	○	○



drilling depth up to 40xD • head form G • with lateral chip breaker

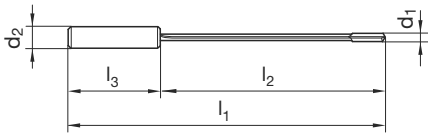
Article no. 89516



P	M	K	N	S	H
○	●	○	○	●	○



drilling depth up to 40xD • head form G • for alloyed and high alloyed steels



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
3.970	5/32	10.000	230.000	185.000	40.000
4.000		12.000	230.000	185.000	45.000
4.200		12.000	240.000	195.000	45.000
4.500		12.000	250.000	205.000	45.000
5.000		16.000	280.000	232.000	48.000
5.156		16.000	280.000	232.000	48.000
5.500		16.000	300.000	252.000	48.000
6.000		16.000	320.000	272.000	48.000
6.350	1/4	16.000	340.000	292.000	48.000
6.500		16.000	340.000	292.000	48.000
7.000		16.000	370.000	322.000	48.000
7.938	5/16	16.000	420.000	372.000	48.000
8.000		16.000	420.000	372.000	48.000
9.000		16.000	450.000	402.000	48.000
9.525	3/8	16.000	480.000	432.000	48.000
10.000		20.000	510.000	460.000	50.000
11.000		20.000	550.000	500.000	50.000
11.113	7/16	20.000	550.000	500.000	50.000
12.000		20.000	600.000	550.000	50.000
12.700	1/2	20.000	635.000	585.000	50.000



Single-fluted gun drills E 80

Article no. 89507



P	M	K	N	S	H
●	○	●	○	○	○



drilling depth up to 80xD • head form G • with lateral chip breaker • for long-chipping materials • maximum drilling depth per tool 40xD, for larger drilling depths first apply drill art. no. 89506

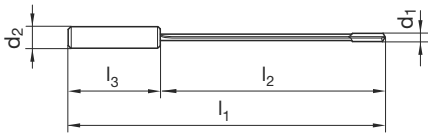
Article no. 89517



P	M	K	N	S	H
○	●	○	○	●	○



drilling depth up to 80xD • head form G • maximum drilling depth per tool 40xD, for larger drilling depths first apply drill art. no. 89516



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
4.950		16.000	480.000	432.000	48.000
5.106		16.000	480.000	432.000	48.000
5.950	15/64	16.000	560.000	512.000	48.000
6.300		16.000	590.000	542.000	48.000
6.950		16.000	650.000	602.000	48.000
7.888		16.000	740.000	692.000	48.000
7.950		16.000	740.000	692.000	48.000
8.950		16.000	820.000	772.000	48.000
9.475		16.000	870.000	822.000	48.000
9.950		20.000	910.000	860.000	50.000
10.950		20.000	995.000	945.000	50.000
11.063		20.000	995.000	945.000	50.000
11.950		20.000	1080.000	1030.000	50.000
12.650		20.000	1140.000	1090.000	50.000



HARTNER

Single-fluted gun drills E 80

Article no. 89540



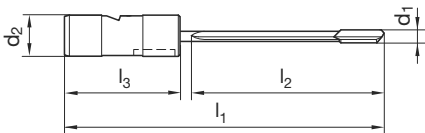
XXL

P	M	K	N	S	H
•	○	•	○	○	○



for the use on gun drill machines • stock item with fixed overall length for deep hole drilling machines • polished flutes • brazed-on carbide head with circuit form G

Single-fluted gun drills E 80



d1 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm
5.000	25.000	800.000	700.000	70.000
6.000	25.000	800.000	700.000	70.000
7.000	25.000	800.000	700.000	70.000
8.000	25.000	800.000	700.000	70.000
9.000	25.000	800.000	700.000	70.000
10.000	25.000	800.000	700.000	70.000
11.500	25.000	800.000	700.000	70.000
12.000	25.000	800.000	700.000	70.000
15.000	25.000	800.000	700.000	70.000
16.000	25.000	800.000	700.000	70.000
18.000	25.000	800.000	700.000	70.000
19.000	25.000	800.000	700.000	70.000
20.000	25.000	800.000	700.000	70.000
21.000	25.000	800.000	700.000	70.000
22.000	25.000	800.000	700.000	70.000
25.000	25.000	800.000	700.000	70.000



Single-fluted gun drills E 80

Article no. 89541

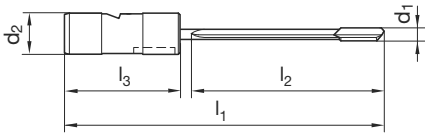


XXL

P	M	K	N	S	H
●	○	●	○	○	○



for the use on gun drill machines • stock item with fixed overall length for deep hole drilling machines • polished flutes • brazed-on carbide head with circuit form G



d1 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm
5.000	25.000	1200.000	1100.000	70.000
6.000	25.000	1200.000	1100.000	70.000
7.000	25.000	1200.000	1100.000	70.000
8.000	25.000	1200.000	1100.000	70.000
9.000	25.000	1200.000	1100.000	70.000
10.000	25.000	1200.000	1100.000	70.000
11.500	25.000	1200.000	1100.000	70.000
12.000	25.000	1200.000	1100.000	70.000
15.000	25.000	1200.000	1100.000	70.000
16.000	25.000	1200.000	1100.000	70.000
18.000	25.000	1200.000	1100.000	70.000
19.000	25.000	1200.000	1100.000	70.000
20.000	25.000	1200.000	1100.000	70.000
22.000	25.000	1200.000	1100.000	70.000



Single-fluted gun drills E 80

Article no. 89542



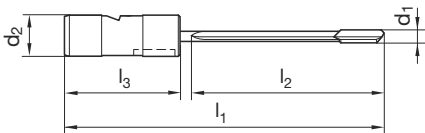
XXL

P	M	K	N	S	H
●	○	●	○	○	○



for the use on gun drill machines • stock item with fixed overall length for deep hole drilling machines • polished flutes • brazed-on carbide head with circuit form G

Single-fluted gun drills E 80



d1 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm
4.000	25.000	1600.000	1500.000	70.000
5.000	25.000	1600.000	1500.000	70.000
5.500	25.000	1600.000	1500.000	70.000
6.000	25.000	1600.000	1500.000	70.000
6.500	25.000	1600.000	1500.000	70.000
7.000	25.000	1600.000	1500.000	70.000
7.500	25.000	1600.000	1500.000	70.000
8.000	25.000	1600.000	1500.000	70.000
9.000	25.000	1600.000	1500.000	70.000
9.500	25.000	1600.000	1500.000	70.000
10.000	25.000	1600.000	1500.000	70.000
11.000	25.000	1600.000	1500.000	70.000
11.500	25.000	1600.000	1500.000	70.000
12.000	25.000	1600.000	1500.000	70.000
13.000	25.000	1600.000	1500.000	70.000
14.000	25.000	1600.000	1500.000	70.000
15.000	25.000	1600.000	1500.000	70.000
16.000	25.000	1600.000	1500.000	70.000
17.000	25.000	1600.000	1500.000	70.000
18.000	25.000	1600.000	1500.000	70.000
19.000	25.000	1600.000	1500.000	70.000
20.000	25.000	1600.000	1500.000	70.000
22.000	25.000	1600.000	1500.000	70.000



Single-fluted gun drills E 80

Article no. 89543

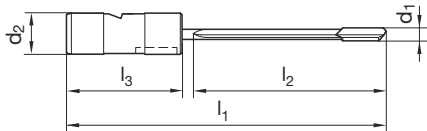


XXL

P	M	K	N	S	H
●	○	●	○	○	○



for the use on gun drill machines • stock item with fixed overall length for deep hole drilling machines • polished flutes • brazed-on carbide head with circuit form G



d1 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm
5.000	25.000	2000.000	1900.000	70.000
6.000	25.000	2000.000	1900.000	70.000
7.000	25.000	2000.000	1900.000	70.000
8.000	25.000	2000.000	1900.000	70.000
9.000	25.000	2000.000	1900.000	70.000
10.000	25.000	2000.000	1900.000	70.000
11.500	25.000	2000.000	1900.000	70.000
12.000	25.000	2000.000	1900.000	70.000
15.000	25.000	2000.000	1900.000	70.000
16.000	25.000	2000.000	1900.000	70.000
18.000	25.000	2000.000	1900.000	70.000
19.000	25.000	2000.000	1900.000	70.000
20.000	25.000	2000.000	1900.000	70.000
22.000	25.000	2000.000	1900.000	70.000

Z80





HARTNER

Two-fluted gun drills Z 80 with brazed carbide head

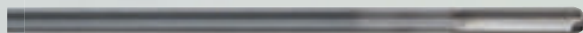
- ▶ suitable for cast iron, aluminium and short-chipping nonferrous metals
- ▶ Ø 6.0 – 30.0 mm
- ▶ max. total length 1000 mm

In addition to our comprehensive standard programme, we offer you special tools on request specifically according to your specifications. Please use our inquiry form on page 50/51.

Z 80



- ▶ Article no. 89508 with point grind for aluminium



- ▶ Article no. 89518 with point grind for cast materials

For certain materials a coating is required, as the successful application of gun drills with a bright finish surface finish cannot be guaranteed. For coating definitions see our application recommendations on page 64/65.

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



Gun drills with 2 cutting lips Z 80

Article no. 89508



P	M	K	N	S	H
			•		



drilling depth up to 30xD • 4-facet gun drills • for aluminium

Article no. 89518

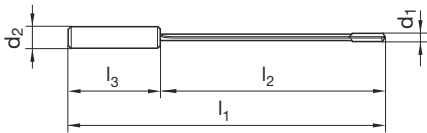


P	M	K	N	S	H
		•			



drilling depth up to 30xD • 4-facet gun drills • for cast materials

Gun drills with 2 cutting lips Z 80



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
8.000		16.000	330.000	280.000	48.000
10.000		20.000	390.000	340.000	50.000
12.000		20.000	450.000	400.000	50.000



HARTNER

Single-fluted gun drills E 800 with interchangeable inserts and supporting strips

- ▶ suitable for almost all materials
- ▶ \varnothing 12.0 – 52.0 mm
- ▶ max. total length 3000 mm

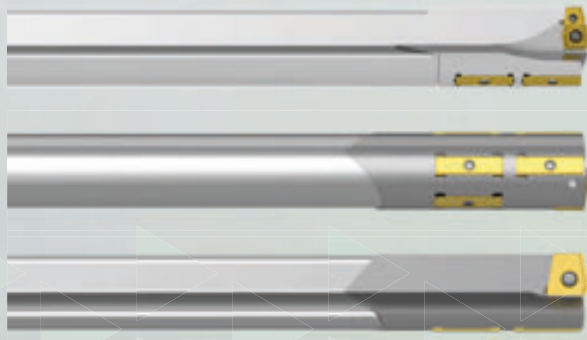
E 800



- ▶ \varnothing 12.0 – 40.00 mm
- ▶ with interchangeable insert



- ▶ \varnothing 40.01 – 52.00 mm
- ▶ with internal and external insert





Single-fluted gun drills with interchangeable inserts E 800

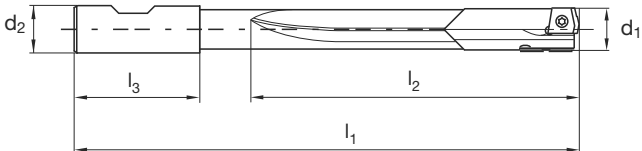
Article no. 89530



P	M	K	N	S	H
•	○	○	•	○	



drilling depth up to 30xD • with interchangeable inserts • with interchangeable supporting strips • with screw driver • with screws
 • universal application



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
12.000		20.000	446.000	384.000	50.000
12.700	1/2	20.000	468.000	406.000	50.000
14.000		20.000	510.000	448.000	50.000
15.000		25.000	548.000	480.000	56.000
16.000		25.000	580.000	512.000	56.000
18.000		25.000	644.000	576.000	56.000
20.000		32.000	712.000	640.000	60.000
24.000		32.000	840.000	768.000	60.000

XXL Programme

page 24

- ▶ for deep hole drilling machines
- ▶ total lengths 800 mm / 1200 mm / 1600 mm / 2000 mm
- ▶ suitable not just for the mould- and toolmaking industry
- ▶ polished flute for perfect chip evacuation
- ▶ TiN-coated for universal application
- ▶ driver T 3.1

NEW





Single-fluted gun drills E 800 with interchangeable inserts

Size	Diameter / holder range	Body/ holder	Exterior inserts					
			Inserts				Screws	Screw driver
TiN-coated	FIRE-coated	TiAlSiN-coated	AlTiN nano-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 article no. 89530 from diameter 12.00 mm up to 24.00 mm in preferred sizes complete with TiN inserts and TiN supporting strips					Item no. 4071 2.502 T8 M2.5x5.2	Item no. 86842 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					
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	Article no. 89535 + nom.-Ø = Item no.	on request	on request	on request	Item 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		Item no. 4071 4.002 T15 M4x10.6	Item no. 86842 20.001		
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	Item no. 4071 5.002 T20 M5x14.2			Item no. 86842 20.001	
	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		Item no. 4071 3.002 TX9 M3x6.4	Item no. 86842 9.001		
6.			Ø38.00 - Ø38.49 Ø38.50 - Ø38.99 Ø39.00 - Ø39.49 Ø39.50 - Ø40.00	on request			on request	on request
	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		Item no. 4071 4.002 TX15 M4x10.6	Item no. 86842 15.001		
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	Item no. 4071 4.002 TX15 M4x10.6			Item no. 86842 15.001	
	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		Item no. 4071 4.002 TX15 M4x10.6	Item no. 86842 15.001		

- Accessory table for Ø 12.0 – 52.0 mm
- Further coatings on request



Single-fluted gun drills E 800 with interchangeable inserts

Inserts	Screws	Screw driver	Supporting strips				Screws	Screw driver																																																
			TiN-coated	FIRE-coated	TiAlSiN-coated	AlTiN nano-coated																																																		
			<table border="1"> <tr><td>P</td><td>•</td></tr> <tr><td>M</td><td>○</td></tr> <tr><td>K</td><td>○</td></tr> <tr><td>N</td><td>•</td></tr> <tr><td>S</td><td>○</td></tr> <tr><td>H</td><td></td></tr> </table>	P	•	M	○	K	○	N	•	S	○	H		<table border="1"> <tr><td>P</td><td>•</td></tr> <tr><td>M</td><td>○</td></tr> <tr><td>K</td><td>•</td></tr> <tr><td>N</td><td>○</td></tr> <tr><td>S</td><td>○</td></tr> <tr><td>H</td><td></td></tr> </table>	P	•	M	○	K	•	N	○	S	○	H		<table border="1"> <tr><td>P</td><td>•</td></tr> <tr><td>M</td><td>•</td></tr> <tr><td>K</td><td>•</td></tr> <tr><td>N</td><td></td></tr> <tr><td>S</td><td>•</td></tr> <tr><td>H</td><td>○</td></tr> </table>	P	•	M	•	K	•	N		S	•	H	○	<table border="1"> <tr><td>P</td><td>○</td></tr> <tr><td>M</td><td>•</td></tr> <tr><td>K</td><td>○</td></tr> <tr><td>N</td><td>○</td></tr> <tr><td>S</td><td>•</td></tr> <tr><td>H</td><td>○</td></tr> </table>	P	○	M	•	K	○	N	○	S	•	H	○	Item no. 4071 1.601 T5 M1.6x4.4	Item no. 86842 5.001
P	•																																																							
M	○																																																							
K	○																																																							
N	•																																																							
S	○																																																							
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H	○																																																							
			Article no. 89536 + nom.-Ø = Item no.	on request	on request	on request	Item no. 4071 2.203 T7 / M2.2x4.6	Item no. 86842 7.001																																																
							Item no. 4071 2.202 T7 / M2.2x5.6																																																	
							Item no. 4071 2.502 T8 M2.5x5.2	Item no. 86842 8.001																																																
			Item no. 4071 2.501 T8 M2.5x6.4																																																					
bright on request TiN on request FIRE on request	Item no. 4071 4.501 T15 M4.5x11.8	Item no. 1612 15.001	on request	on request	on request	on request	Item no. 4071 3.003 T9 M3x8	Item no. 86842 9.001																																																



Inserts for single-fluted gun drills E 800

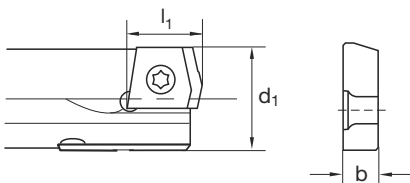
Article no. 89535



P	M	K	N	S	H
●	○	○	●	○	



universal application



d1 mm	l1 mm	b mm	Code no.	d1 mm	l1 mm	b mm	Code no.
12.000	10.000	2.800	12.000	25.500	15.000	4.000	25.500
12.500	10.000	2.800	12.500	25.800	15.000	4.000	25.800
12.700	10.000	2.800	12.700	26.000	16.000	5.000	26.000
13.000	10.000	2.800	13.000	26.500	16.000	5.000	26.500
13.500	10.000	2.800	13.500	27.000	16.000	5.000	27.000
14.000	10.000	2.800	14.000	27.500	16.000	5.000	27.500
14.500	10.000	2.800	14.500	28.000	16.000	5.000	28.000
15.000	10.000	2.800	15.000	28.100	16.000	5.000	28.100
16.000	12.000	3.000	16.000	28.500	16.000	5.000	28.500
16.100	12.000	3.000	16.100	29.000	16.000	5.000	29.000
16.300	12.000	3.000	16.300	29.500	16.000	5.000	29.500
16.500	12.000	3.000	16.500	29.700	16.000	5.000	29.700
17.000	12.000	3.000	17.000	30.000	18.000	6.000	30.000
17.500	12.000	3.000	17.500	30.100	18.000	6.000	30.100
18.000	12.000	3.000	18.000	30.500	18.000	6.000	30.500
18.400	12.000	3.000	18.400	31.000	18.000	6.000	31.000
18.500	12.000	3.000	18.500	31.500	18.000	6.000	31.500
19.000	12.000	3.000	19.000	32.000	18.000	6.000	32.000
19.300	12.000	3.000	19.300	32.500	18.000	6.000	32.500
19.500	12.000	3.000	19.500	33.000	18.000	6.000	33.000
19.800	12.000	3.000	19.800	33.500	18.000	6.000	33.500
20.000	15.000	4.000	20.000	34.000	19.000	6.500	34.000
20.200	15.000	4.000	20.200	34.500	19.000	6.500	34.500
20.500	15.000	4.000	20.500	35.000	19.000	6.500	35.000
21.000	15.000	4.000	21.000	35.500	19.000	6.500	35.500
21.500	15.000	4.000	21.500	36.000	19.000	6.500	36.000
22.000	15.000	4.000	22.000	36.500	19.000	6.500	36.500
22.200	15.000	4.000	22.200	37.000	19.000	6.500	37.000
22.500	15.000	4.000	22.500	37.500	19.000	6.500	37.500
23.000	15.000	4.000	23.000	37.700	19.000	6.500	37.700
23.500	15.000	4.000	23.500	38.000	20.000	7.000	38.000
24.000	15.000	4.000	24.000	38.100	20.000	7.000	38.100
24.500	15.000	4.000	24.500	38.500	20.000	7.000	38.500
25.000	15.000	4.000	25.000	39.000	20.000	7.000	39.000
25.100	15.000	4.000	25.100	39.500	20.000	7.000	39.500
25.400	15.000	4.000	25.400	40.000	20.000	7.000	40.000



Supporting strips for single-fluted gun drills E 800

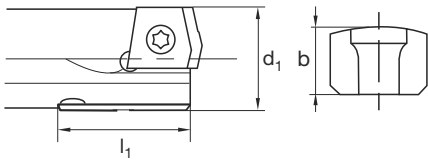
Article no. 89536



P	M	K	N	S	H
●	○	○	●	○	○



universal application



d1 mm	l1 mm	b mm	Code no.	d1 mm	l1 mm	b mm	Code no.
12.000	19.950	2.150	12.000	25.500	25.000	3.350	25.500
12.500	19.950	2.150	12.500	25.800	25.000	3.500	25.800
12.700	19.950	2.250	12.700	26.000	25.000	3.850	26.000
13.000	19.950	2.150	13.000	26.500	25.000	3.850	26.500
13.500	19.950	2.150	13.500	27.000	25.000	3.850	27.000
14.000	19.950	2.150	14.000	27.500	25.000	3.850	27.500
14.500	19.950	2.150	14.500	28.000	25.000	3.850	28.000
15.000	19.950	2.150	15.000	28.100	25.000	3.900	28.100
16.000	20.000	2.850	16.000	28.500	25.000	3.850	28.500
16.100	20.000	2.900	16.100	29.000	25.000	3.850	29.000
16.300	20.000	3.000	16.300	29.500	25.000	3.850	29.500
16.500	20.000	2.850	16.500	29.700	25.000	3.950	29.700
17.000	20.000	2.850	17.000	30.000	30.000	4.350	30.000
17.500	20.000	2.850	17.500	30.100	30.000	4.400	30.100
18.000	20.000	2.850	18.000	30.500	30.000	4.350	30.500
18.400	20.000	3.050	18.400	31.000	30.000	4.350	31.000
18.500	20.000	2.850	18.500	31.500	30.000	4.350	31.500
19.000	20.000	2.850	19.000	32.000	30.000	4.350	32.000
19.300	20.000	3.000	19.300	32.500	30.000	4.350	32.500
19.500	20.000	2.850	19.500	33.000	30.000	4.350	33.000
19.800	20.000	3.000	19.800	33.500	30.000	4.350	33.500
20.000	25.000	3.350	20.000	34.000	30.000	4.850	34.000
20.200	25.000	3.450	20.200	34.500	30.000	4.850	34.500
20.500	25.000	3.350	20.500	35.000	30.000	4.850	35.000
21.000	25.000	3.350	21.000	35.500	30.000	4.850	35.500
21.500	25.000	3.350	21.500	36.000	30.000	4.850	36.000
22.000	25.000	3.350	22.000	36.500	30.000	4.850	36.500
22.200	25.000	3.450	22.200	37.000	30.000	4.850	37.000
22.500	25.000	3.350	22.500	37.500	30.000	4.850	37.500
23.000	25.000	3.350	23.000	37.700	30.000	4.950	37.700
23.500	25.000	3.350	23.500	38.000	30.000	5.350	38.000
24.000	25.000	3.350	24.000	38.100	30.000	5.400	38.100
24.500	25.000	3.350	24.500	38.500	30.000	5.350	38.500
25.000	25.000	3.350	25.000	39.000	30.000	5.350	39.000
25.100	25.000	3.400	25.100	39.500	30.000	5.350	39.500
25.400	25.000	3.550	25.400	40.000	30.000	5.600	40.000

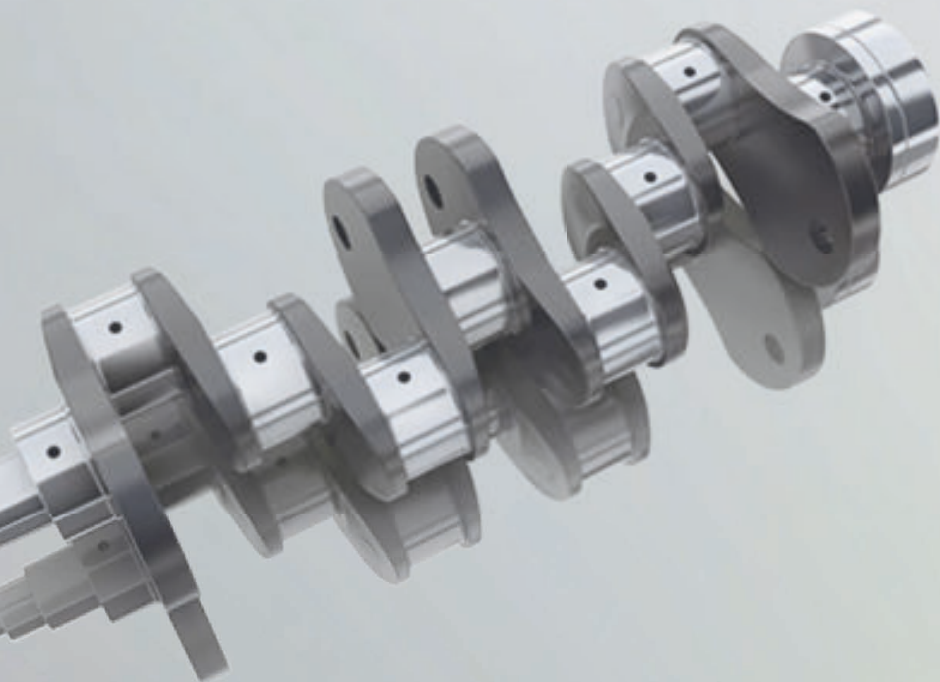
15xD
20xD
25xD
30xD
40xD

TS 100 T

**Spiral-fluted deep hole drill for drilling depths
up to 40xD**



- ▶ Optimised flute geometry
- ▶ Short chips, excellent chip evacuation
- ▶ Maximised coolant duct profile
- ▶ Polished flutes



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.



ACCESSORIES



Accessories for deep hole drilling machines

Drilling bushes Article no. 89600

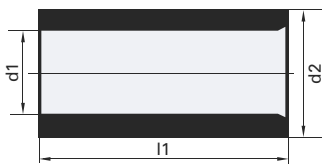


Discount group 123 • min. order quantity 3 pieces

Drilling bushes Article no. 89601



Discount group 123 • min. order quantity 3 pieces



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

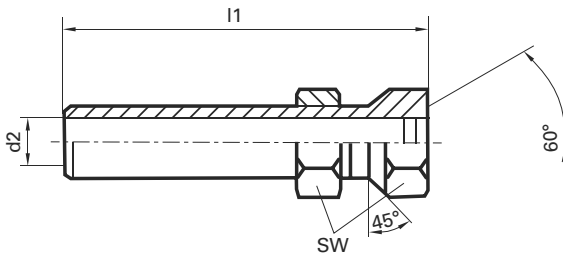


Accessories for deep hole drilling machines

Adjustable screw without sealing element Article no. 89602



Discount group 123 • min. order quantity 5 pieces



Code no.	thread mm	d2 mm	l1 mm	l2 mm	l3 mm	SW 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

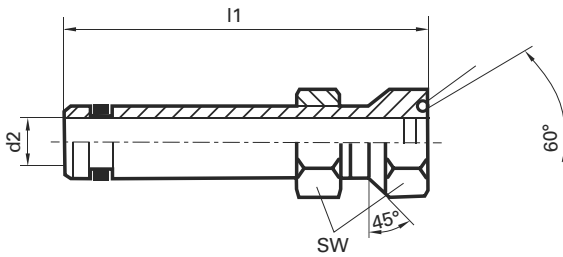


Accessories for deep hole drilling machines

Adjustable screw with sealing element Article no. 89603



Discount group 123 • min. order quantity 5 pieces



Code no.	thread mm	d2 mm	l1 mm	l2 mm	l3 mm	SW mm	O-Ring 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



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	
	from mm	to mm
1.900	2.000	2.099
2.000	2.100	2.199
2.100	2.200	2.299
2.200	2.300	2.399
2.300	2.400	2.499
2.400	2.500	2.599
2.500	2.600	2.699
2.600	2.700	2.799
2.700	2.800	2.899
2.800	2.900	3.099
3.000	3.100	3.359
3.200	3.360	3.459
3.300	3.460	3.559
3.400	3.560	3.799
3.600	3.800	3.959
3.700	3.960	4.259
4.000	4.260	4.499
4.200	4.500	4.749
4.500	4.750	4.999
4.700	5.000	5.249
5.000	5.250	5.499
5.200	5.500	5.749
5.500	5.750	5.999
5.700	6.000	6.249
6.000	6.250	6.449
6.200	6.450	6.749
6.500	6.750	6.999
6.700	7.000	7.299
7.000	7.300	7.599
7.300	7.600	7.799
7.500	7.800	7.999
7.700	8.000	8.299
8.000	8.300	8.699
8.400	8.700	8.999
8.700	9.000	9.299
9.000	9.300	9.699

Code no.	For gun drills with nominal diameter d1	
	from mm	to mm
9.400	9.700	9.999
9.700	10.000	10.299
10.000	10.300	10.799
10.500	10.800	11.299
11.000	11.300	11.799
11.500	11.800	12.399
12.000	12.400	12.899
12.500	12.900	13.399
13.000	13.400	13.899
13.500	13.900	14.399
14.000	14.400	14.899
14.500	14.900	15.399
15.000	15.400	15.899
15.500	15.900	16.399
16.000	16.400	16.899
16.500	16.900	17.399
17.000	17.400	17.899
17.500	17.900	18.399
18.000	18.400	19.509
19.000	19.510	20.509
20.000	20.510	21.509
21.000	21.510	22.609
22.000	22.610	23.609
23.000	23.610	24.609
24.000	24.610	25.609
25.000	25.610	26.609
26.000	26.610	27.609
27.000	27.610	28.609
28.000	28.610	29.609
29.000	29.610	30.609
30.000	30.610	32.609
32.000	32.610	34.699
34.000	34.700	36.699
36.000	36.700	38.699
38.000	38.700	40.000

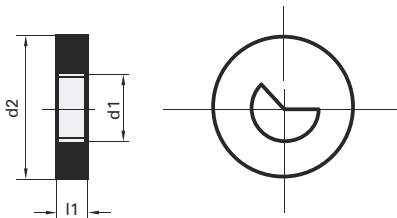


Accessories for deep hole drilling machines

Sealing disc for single-fluted gun drills Article no. 89604



Discount group 123 • min. order quantity 5 pieces



Code no.	d1 from... to... mm	d2 mm	l1 mm
see assignment table page 34	2.000-4.999	20.000	4.00
	5.000-15.399	32.000	4.00
	15.400-25.609	40.000	4.00
	26.610-40.000	90.000	4.00

Order example:

- Sealing disc for diameter d1 = 26.500
is article no. 89604 + code no. 25.000 = **order no. 89604 25.000**

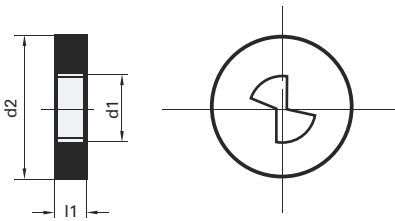


Accessories for deep hole drilling machines

Sealing disc for double-fluted gun drills Article no. 89605



Discount group 123 • min. order quantity 5 pieces



Code no.	d1 from... to... mm	d2 mm	l1 mm
see assignment table page 34	5.400-15.399 15.400-27.000	32.000 40.000	4.00 4.00

Order example:

- Sealing disc for diameter d1 = 16.000
is article no. 89605 + code no. 15.500 = **order no. 89605 15.500**

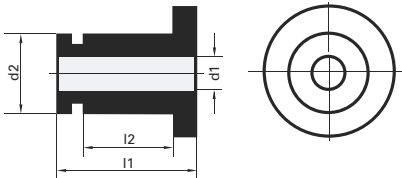


Accessories for deep hole drilling machines

Whipguide bushes for single-/two-fluted gun drills Article no. 89606



Discount group 123 • min. order quantity 5 pieces



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**

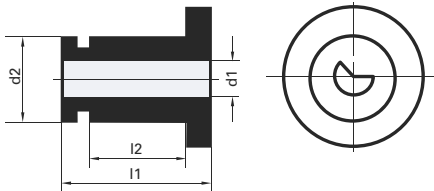


Accessories for deep hole drilling machines

Whipguide bushes for single-fluted gun drills Article no. 89607



Discount group 123 • min. order quantity 5 pieces



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**

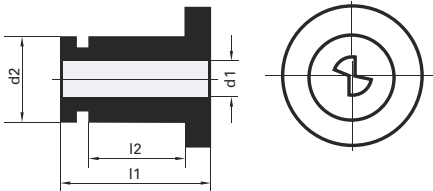


Accessories for deep hole drilling machines

Whipguide bushes for two-fluted gun drills Article no. 89608



Discount group 123 • min. order quantity 5 pieces



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

Order examples:

- 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





Fax inquiry / Order

Inquiry Order by Fax to: +49 74 31 125 - 21547

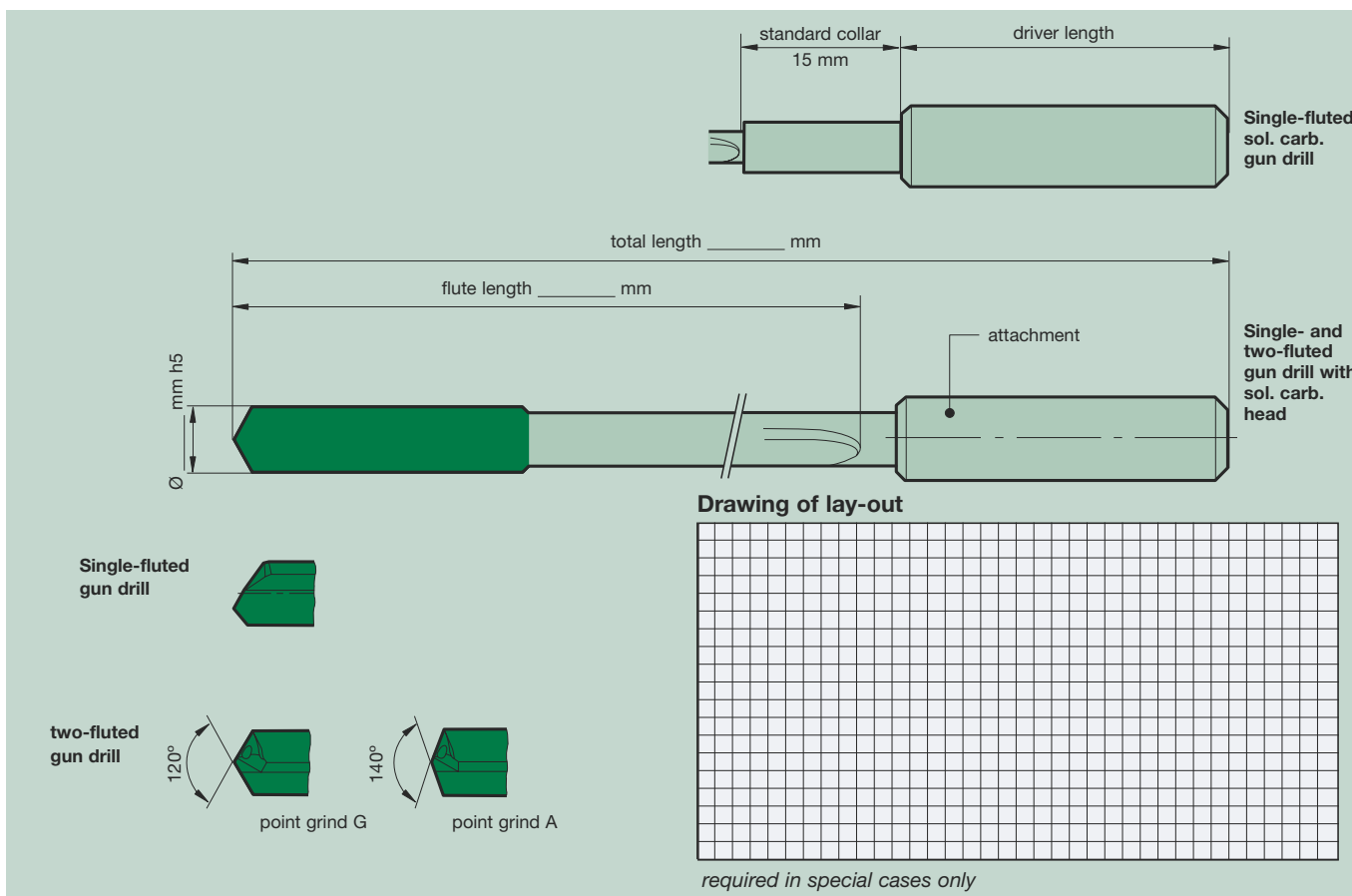
Contact partner

Hartner GmbH
P. O. Box 10 04 27
D-72425 Albstadt
Tel.: + 49 74 31 125-0
Fax: +49 74 31 125-21547
www.hartner.de

Customer no. _____	New customer <input type="checkbox"/>	Order no. _____
Company _____		Contact _____
Street no. _____		Town/post code _____
Telephone _____		Fax _____
Date _____		Signature _____

Deep hole gun drill: **E 100 Single-fluted solid carbide gun drill** **E 80 Single-fluted gun drill with solid carbide head** **Z 80 Two-fluted gun drill with sol. carb. head**

Head form: _____ Number required: _____ items



Driver: no code no.: _____ to enclosed drawing

Coating: TiN FIRE TiAlN AlTiN nano TiCN _____

Workpiece: drilling depth: _____ hole tolerance: _____ material: _____

bling hole Durchgangsloch through hole

Machine type: deep hole drilling machine conventional machine tool

Coolant: deep drilling oil soluble oil

pressure _____ bar pressure _____ bar



Fax inquiry / Order interchangeable inserts gun drill

Inquiry Order by Fax to: +49 74 31 125 - 21547

Contact partner

Hartner GmbH
P. O. Box 10 04 27
D-72425 Albstadt
Tel.: +49 74 31 125-0
Fax: +49 74 31 125-21547
www.hartner.de

Customer no. New customer

Company

Street no.

Telephone

Date

Order no.

Ansprechpartner

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

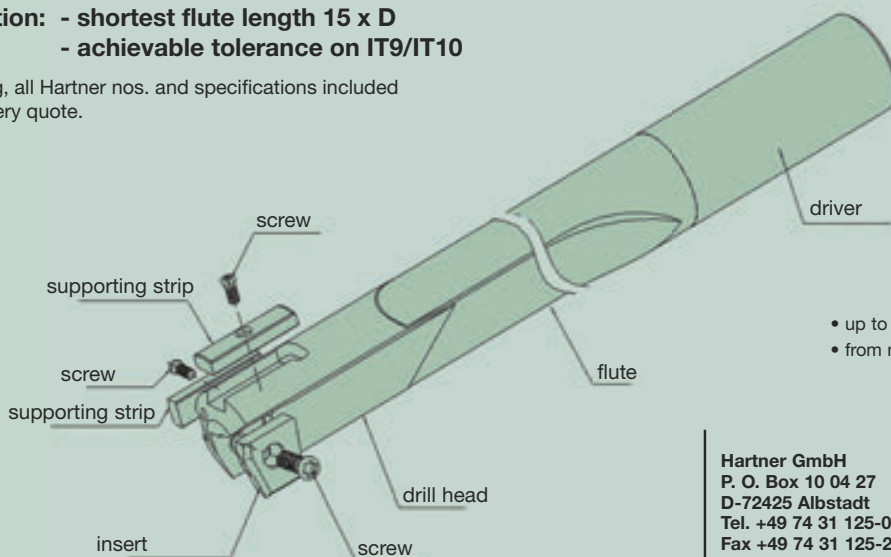
Pressure: bar

Volume: l/min

The Hartner E 800 for you 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
P. O. Box 10 04 27
D-72425 Albstadt
Tel. +49 74 31 125-0
Fax +49 74 31 125-21547

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

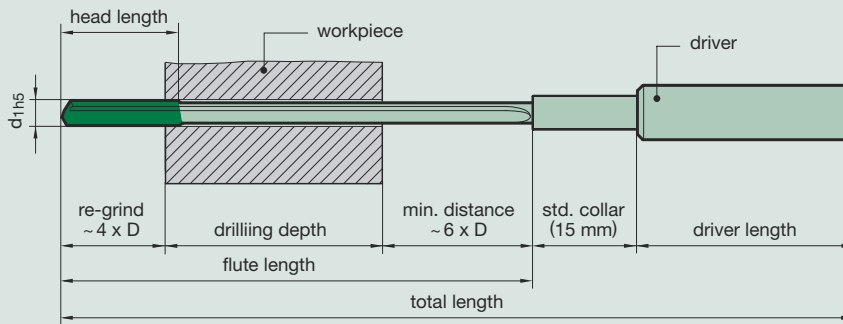


TECHNICAL SECTION



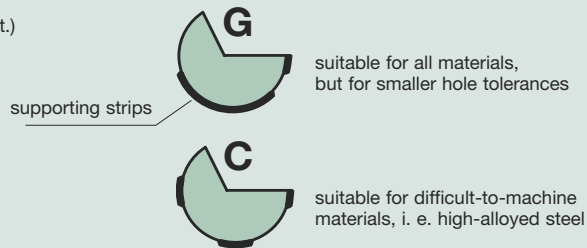
Solid carbide single-fluted gun drills E 100

The dimensions required to calculate the length for conventional machine tools



Head forms

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

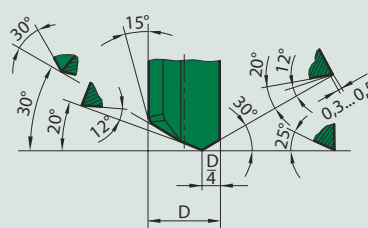
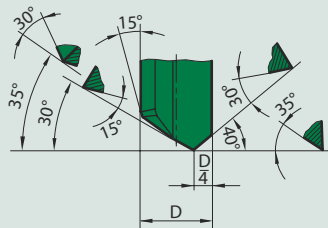


Standard point grinds

(special point grinds on request)

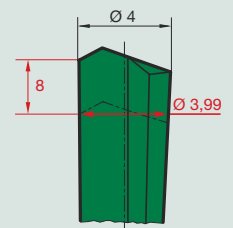
$\varnothing 2...4.00$ mm

$\varnothing > 4.01...20$ mm



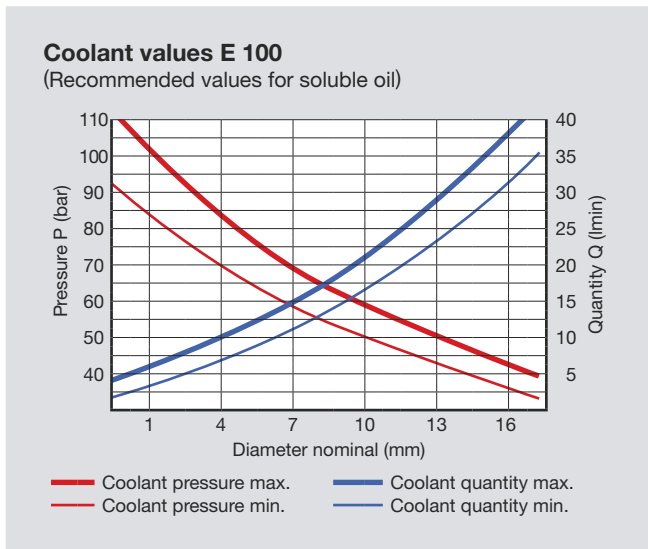
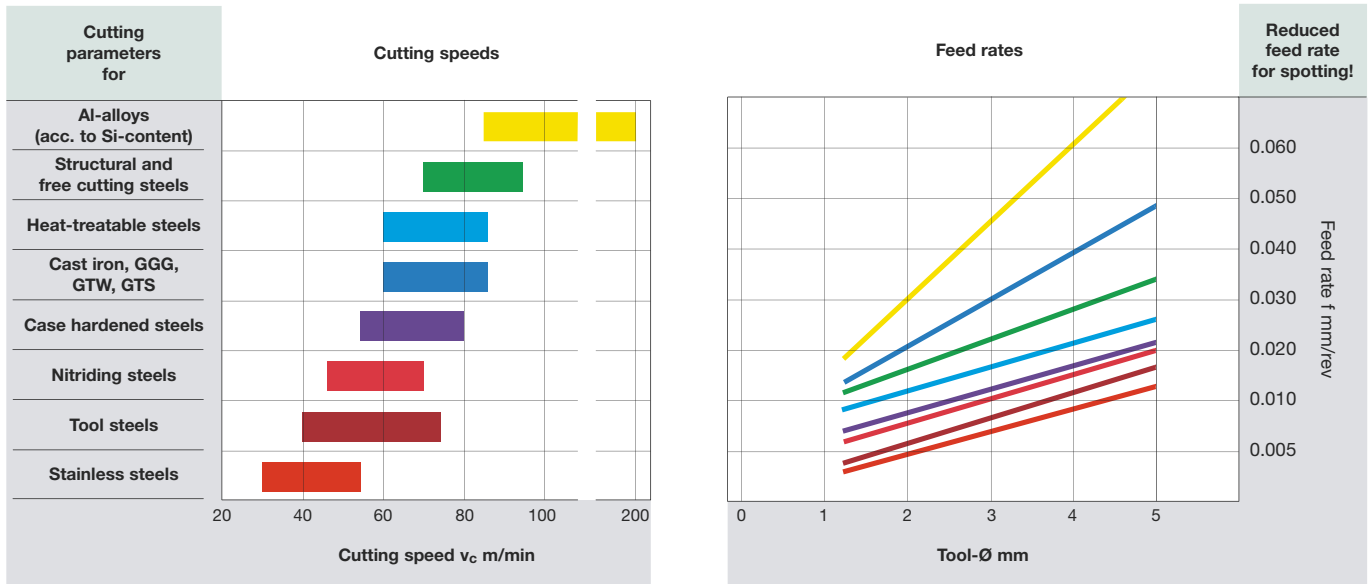
Back taper ratio 1:800 (standard)

(dimensions in mm)





Solid carbide single-fluted gun drills E 100

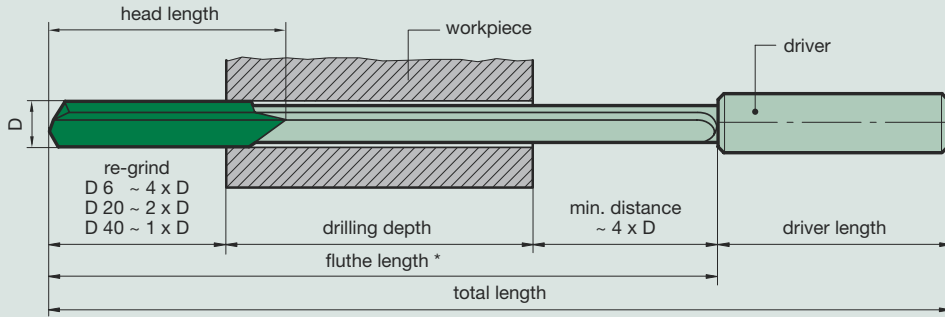




Single-fluted gun drills E 80 with brazed carbide head

The dimensions required to calculate the length for conventional machine tools

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



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



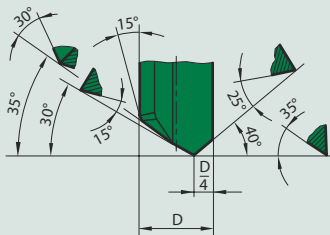
Suitable for all materials, but only when spotting conditions are unfavourable



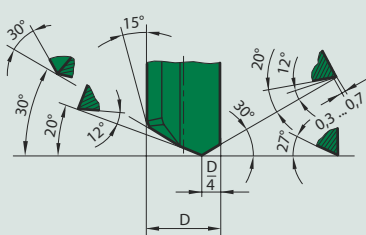
This design is predominantly suitable for grey cast iron

Standard point grinds (special point grinds available)

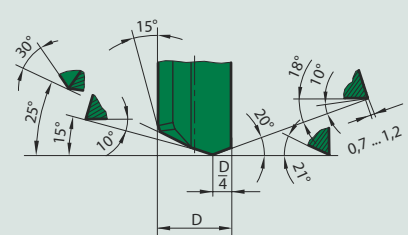
Ø 2...4.00 mm



Ø 4.01...20.00 mm



Ø 20.01...40 mm

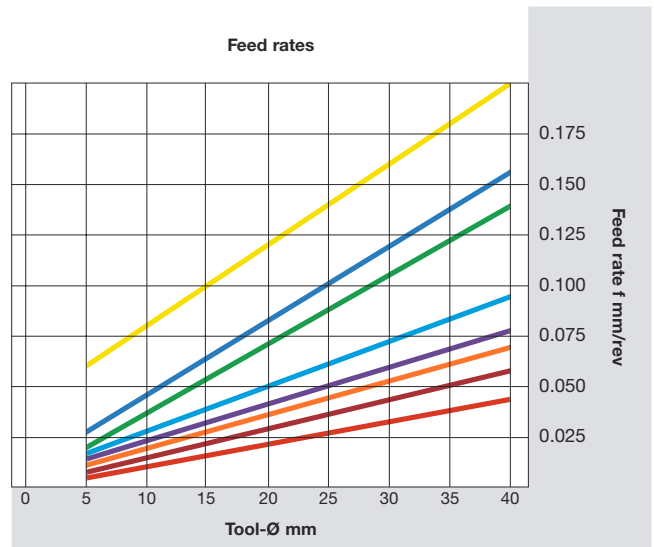
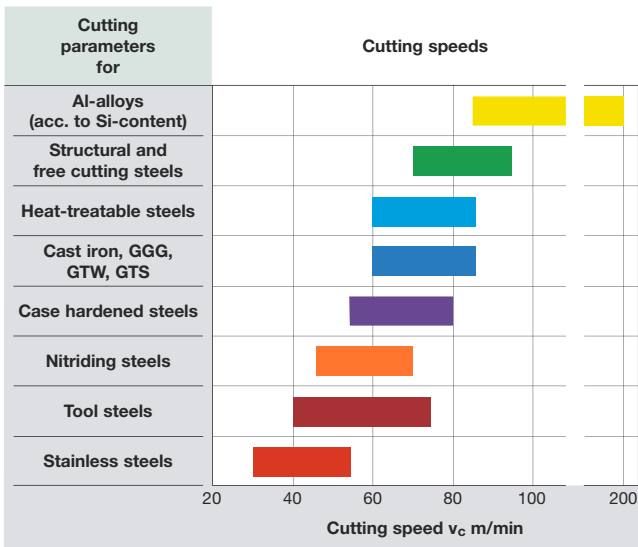
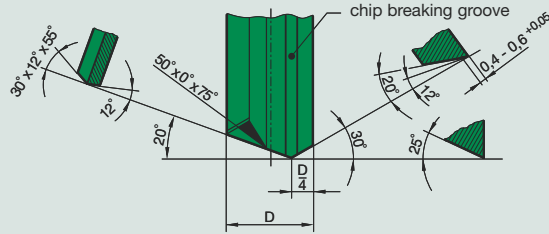




Single-fluted gun drills E 80 with brazed carbide head

Standard point grind with chip breaker groove

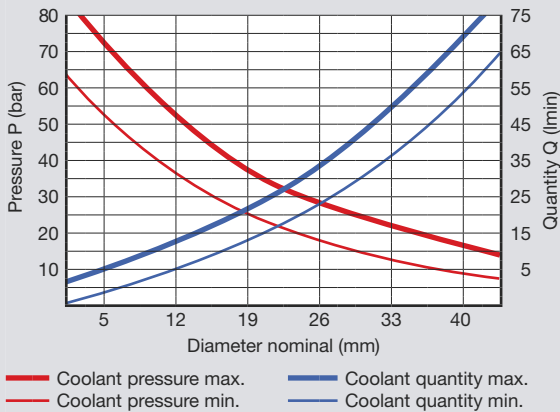
for article no. 89505, 89509, 89506 und 89507



(Detailed cutting parameters see page 64/65)

Coolant values E 80

(Recommended values for soluble oil)



Standard-head lengths (mm)

solid carbide / K15

Tool material

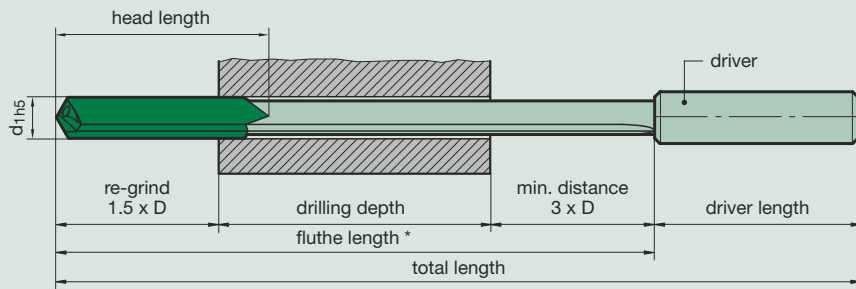
Ø-range	length	Ø-range	length
2.00...2.40	15	11.03...17.50	40
2.41...2.90	18	17.51...20.50	45
2.91...4.02	20	20.51...22.00	50
4.03...5.10	25	22.01...25.90	55
5.11...7.02	30	25.91...40.00	65
7.03...11.02	35		



Two-fluted gun drills Z 80 with brazed carbide head

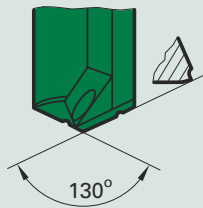
The dimensions required to calculate the length for conventional machine tools

* 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)

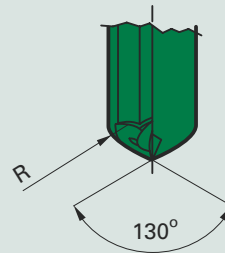


Point grinds

Aluminium

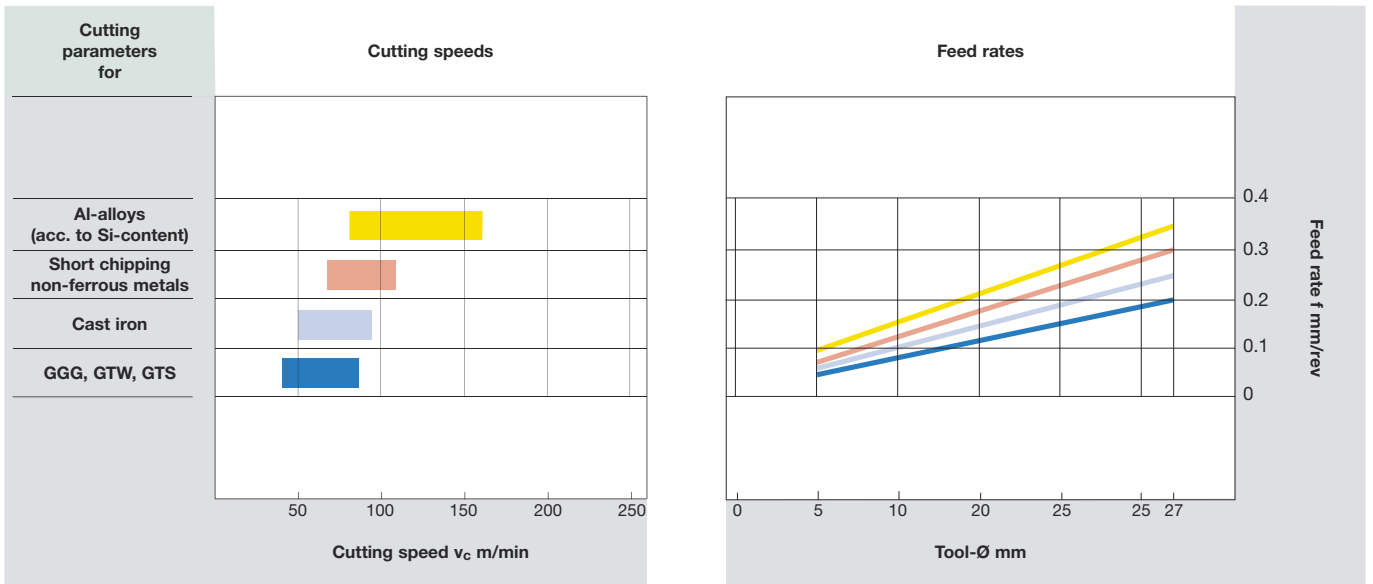


cast materials





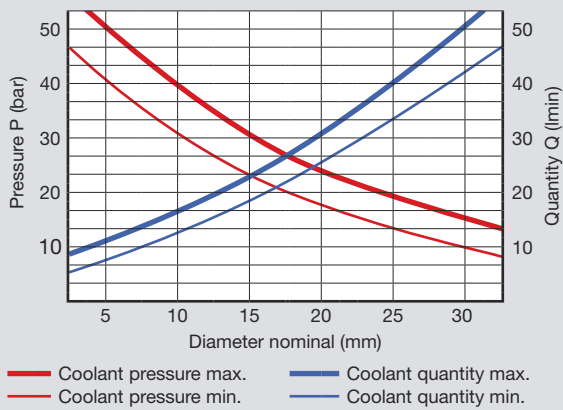
Two-fluted gun drills Z 80 with brazed carbide head



(Detailed cutting parameters see page 64/65)

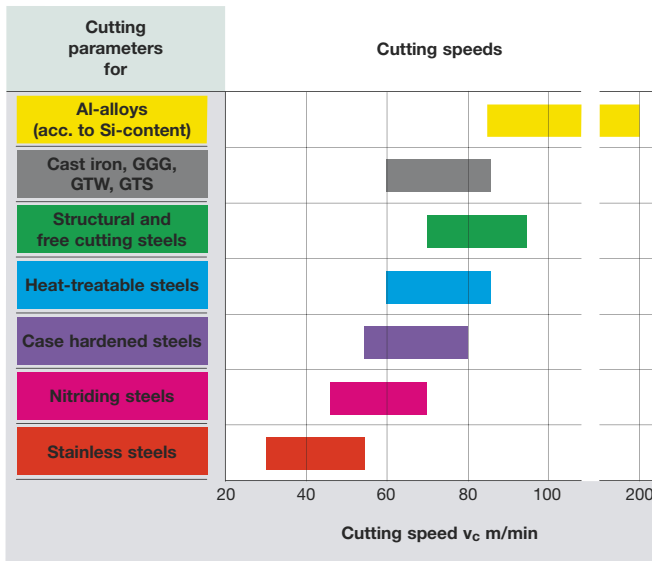
Coolant values Z 80

(Recommended values for soluble oil)

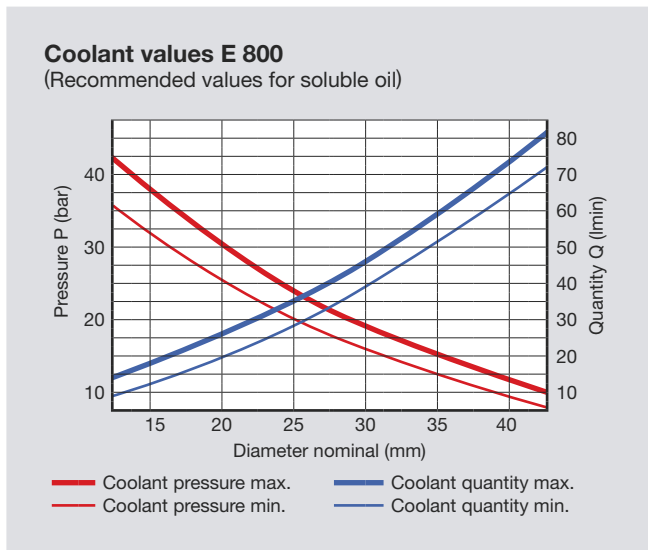
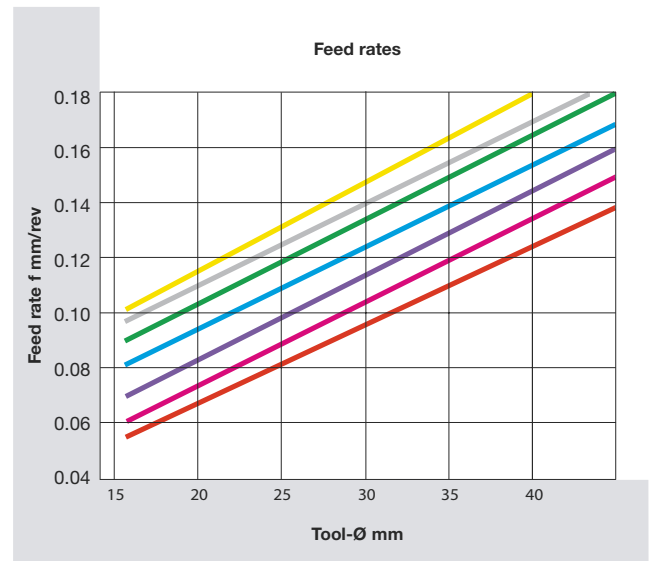




Single-fluted gun drills E 800 with interchangeable inserts



(Detailed cutting parameters see page 64/65)

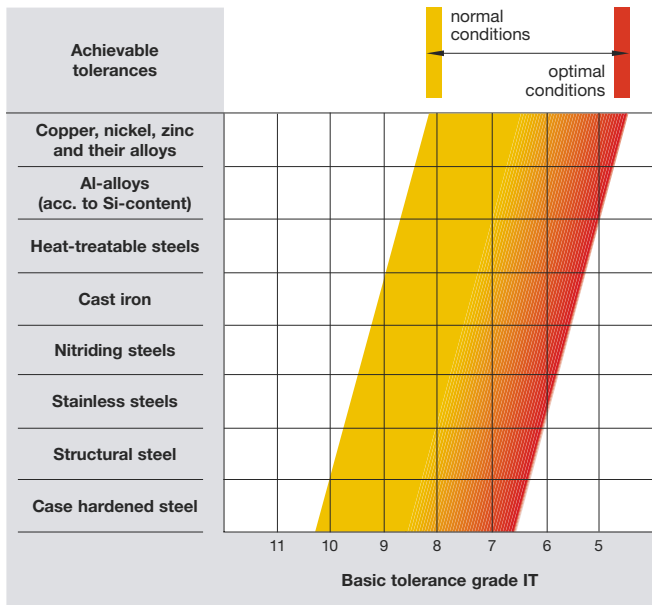




Technical section

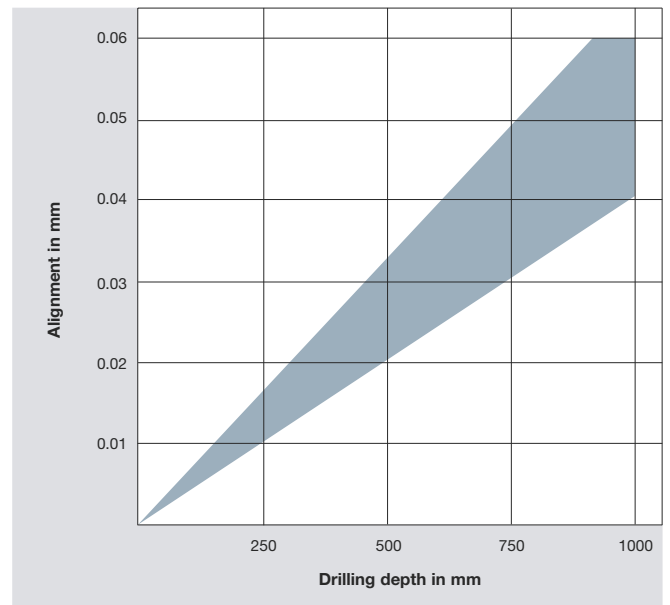
Basic tolerances*

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 guide pads, unlike twist drills where the slightest deviation of the two cutting edges causes a larger hole.



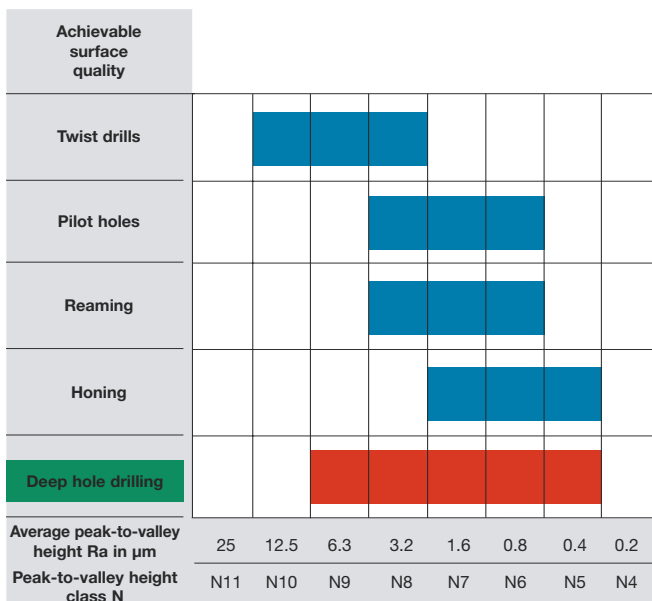
Alignment accuracy*

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



Technical section

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

5

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	-

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

6

code no.	d ₁	l ₁
6.1	12.7	38
6.2	19.05	70
6.3	38.1	70

3

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

7

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

4

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

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	31.75	70
9.9	38.1	70
9.10	40	70

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	25	70
10.9	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

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

Drivers to Speed-Bit-System

13

code no.	d ₁	l ₁	l ₂
13.1	16	40	16
13.2	25	50	25
13.3	35.6	60	-

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	25.4	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

17 similar form HE

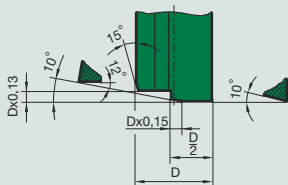
code no.	d ₁	l ₁
17.1	19.05	70
17.2	25.40	70
17.3	31.75	70
17.4	38.1	70

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.

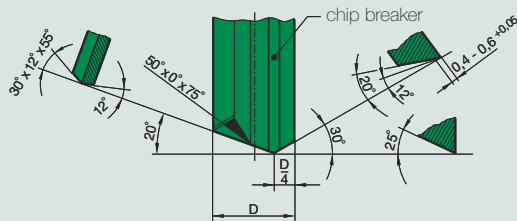


Special point grinds for single-fluted gun drills (further point grinds on request)

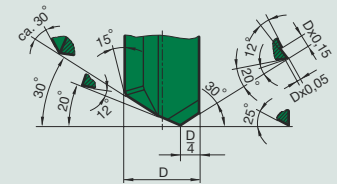
with recessed coolant chamber



with chip breaker



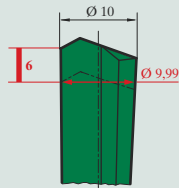
with chip guiding step



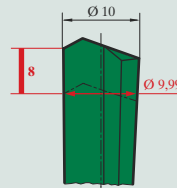
Backtaper ratio for gun drills

(dimensions in mm)

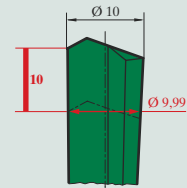
1:600



1:800 (standard)

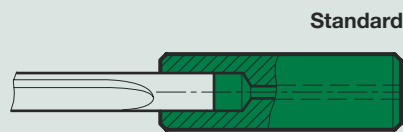


1:1000

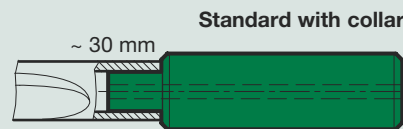


Variations for drivers at gun drills with tube shank

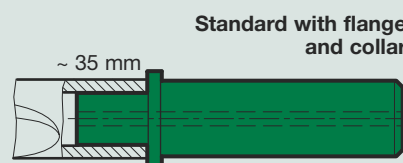
Solution for nom.-Ø < driver-Ø
(difference must be appr. 6 mm):
tube shank installed in driver



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



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





Application recommendations for gun drills

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 40xD 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 E 100 gun drills > 50xD please note: up to drilling depth 50xD the feed has to be reduced to 60%

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.

Material dependent coolants:

- air
- neat oil
- soluble oil

single-fluted gun drill E 100

solid carbide

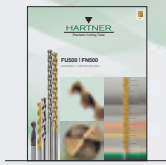
1.0 ... 12.0



- A** AITiN
- C** TiCN
- F** FIRE
- T** TiN

Material group	Material examples Figures in bold = material no. to DIN EN	Tens.str. Hardness N/mm ²	Coolant	rec. coating*	<35xD		>35xD	
					V _c m/min	Feed col. no.	V _c m/min	Feed col. no.
Common structural steels	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937	≤500 ≤1000	○ ○		100 85	15 15	100 85	15 15
Free-cutting steels	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb2	≤850 ≤1000	○ ○		90 80	15 15	90 80	15 15
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 ≤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 (C10), 1.1121 C10E (Ck10)	≤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	○ ○		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 105WCr6	≤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 (51CrV4)	≤350 HB	○	A	65	13	65	13
Hardened steels	-	≤48 HRC ≤66 HRC	○ ○		30 25	13 10	30 25	13 14
Stainless steels, sulphured austenitic martensitic	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10 1.4057 X20CrNi172 (X17CrNi16-2), 1.4122	≤900 ≤1100 ≤1500	○ ○ ○	A	40 35 35	14 14 14	40 35 35	14 14 14
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 ≤350 HB	○ ○		80 80	16 16	85 85	16 16
Spheroidal graphite iron and malleable cast iron	0.7050 EN-GJS-500-7 (GGG50), 0.8035 0.7070 EN-GJS-700-2 (GGG70), 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
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	○ ○					
Special alloys	Nimonic, Inconel, Monel, Hastelloy	≤2000	○	A	20	12	20	12
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	≤850	○		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 AlMg3Si	≤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 long-chipping	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0.5	≤600 ≤600	○ ○		120 90	18 18	120 90	18 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	Plexiglass, Hostalen, Novodur, Makralon	≤100	○		70	15	70	15
Kevlar	Kevlar	≤1000	○		60	14	60	14
Glass, carbon concentr.plastics	GFK/CFK	≤1000	○		50	14	50	14

Our programme:



FU 500/FN 500



Gun Drills



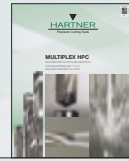
INOX Drills



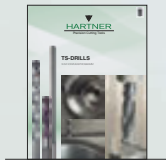
Multiplex



Micro Precision Drills



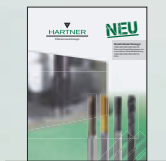
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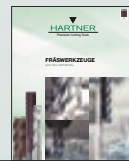
TS-Drills



TM Vending Machines



Threading Tools



Solid Carbide
High Performance Milling Cutters



TF 100 Multi-Mill



Chamfering Milling Cutters

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