KONRAD
TOOLS

DEEP HOLE DRILLING

SINGLE FLUTE DRILLING PROCEDURE

Single flute deep hole drilling is used today in the diameter range from 0,8 mm to 50 mm in three versions. In the diameter range below 1,9 mm drills are mainly solid carbide drills in which the cutting head and the shank used consist of one piece. For larger diameters we produce a two-piece design consisting of a carbide cutting head or a steel head with interchangeable inserts, and a steel shank.

Single flute deep hole drilling is characterized by a cooling channel in the tool though which the cooling lubricant is fed and the chips and coolant evacuated via a V-shaped flute.

ADVANTAGES:

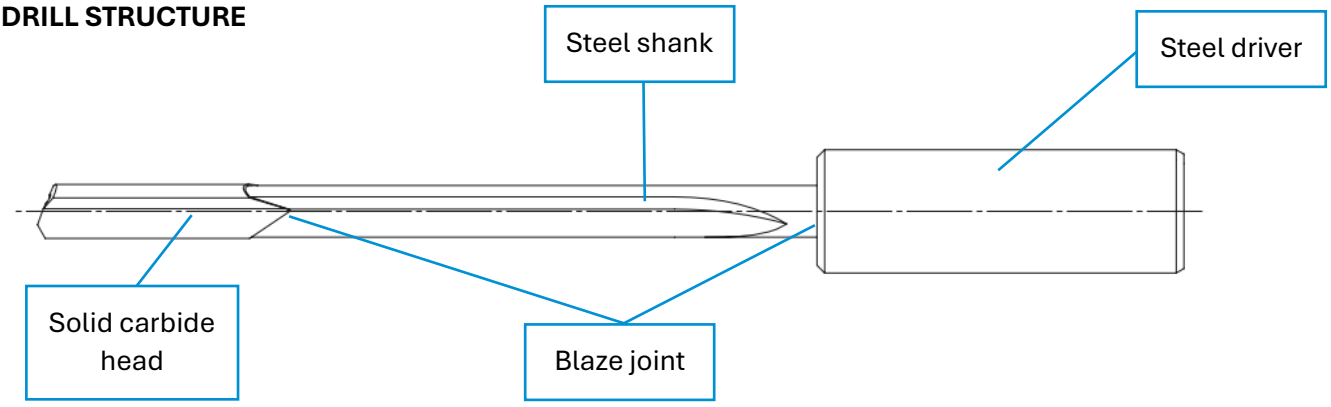
- Easy to regrind;
- Lower hole straightness deviation;
- Good surface finish;
- Diameter tolerances up to H7 are achievable;
- Low manufacturing costs;
- Can be used on universal machines;
- Cross bores possible with longer drill;
- Possible use of minimal lubrication;
- Very good roundness (Circular shape accuracy).

KGD1000 - SINGLE FLUTE GUNDRILLS WITH BLAZED CARBIDE HEAD

Type	Description	Drill - d (mm)
KGD1000	Drill	Ab 1,900
KGD1001	Step drill	Ab 3,000
KGD1002	Conterboring drill	Ab 3,000

- *Tool length depending on the diameter up to 5000 mm!*

DRILL STRUCTURE



Single flute drill with a brazed carbide head Type 100 are connected by a braze joint and consist of the following three components:

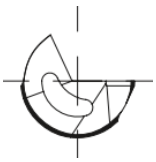
- Solid carbide head;
- Shank of tempered steel;
- Driver of steel.

DRILL HEAD

The peripheral shape is optimally adjusted depending on material and hole requirements for your drilling task

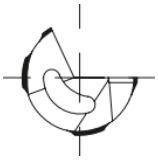
Upon request we can generate special contours for you.

Form G



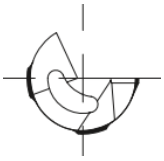
- Universal contour;
- For all materials;
- Low hole straightness deviation;
- Low tendency to jam.

Form A



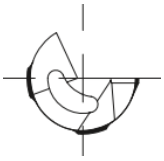
- Tight hole tolerance;
- Angular entrance and exit bores.

Form C



- Steel;
- Difficult to machine materials;
- Tight hole tolerance.

Form EA



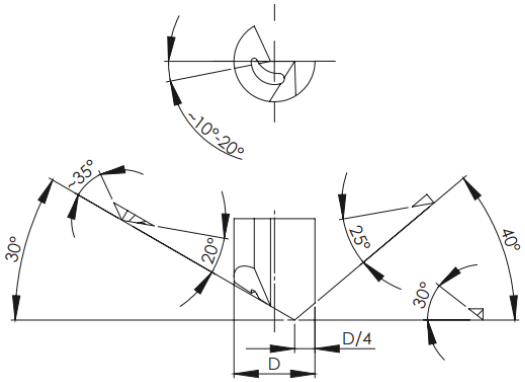
- Cross drilling;
- Angular entrance and exit bores;
- Tight hole tolerance.

- *The tool diameter is not micable for forms G and EA after finishing!*

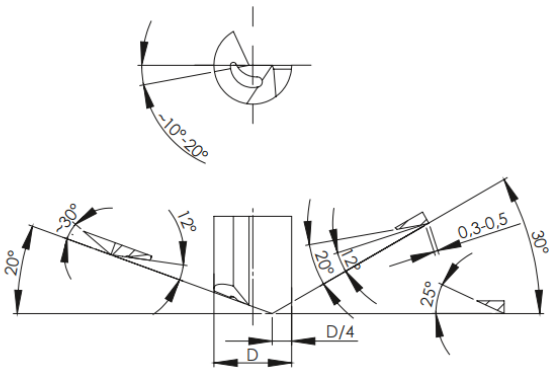
NOSE GRINDS

With the change of the cutting geometry, solid carbide gundrills can be optimally adapted to your requirements. For long chipping and hard to machine materials an open special point should be used.

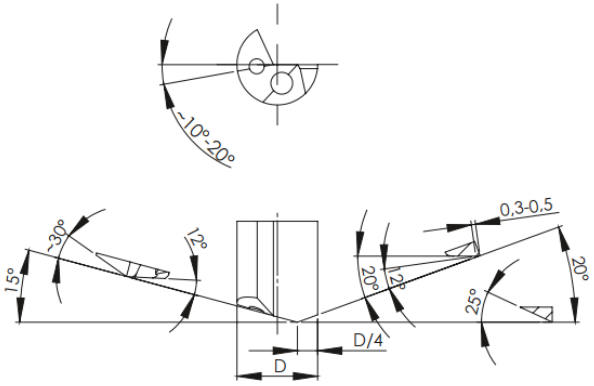
STANDARD NOSE GRINDS



Standard nose grind 1
or drill range: 1,900 - 4,000 mm



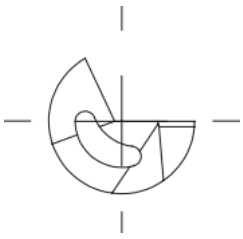
Standard nose grind 2
for drill range: 4,001 - 20,000 mm



Standard nose grind 3
for drill range: 20,001 - max. mm

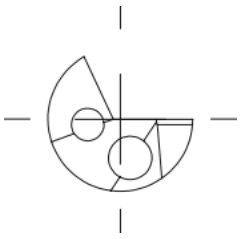
COOLING HOLE DESIGN

Kidney shape



Up to D7,059

2-hole shape

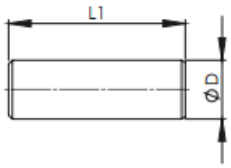
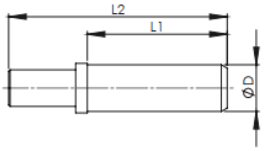
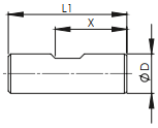
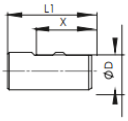
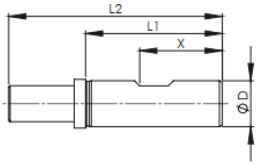


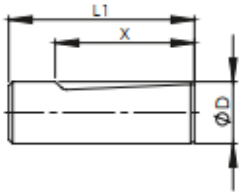
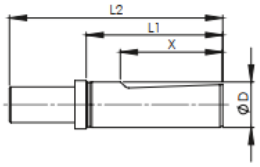
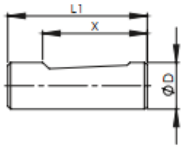
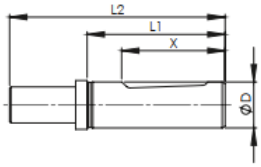
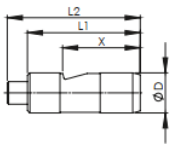
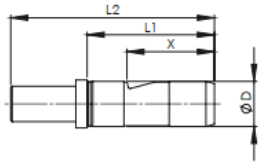
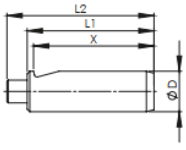
From D7,060

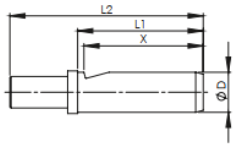
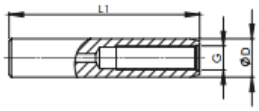
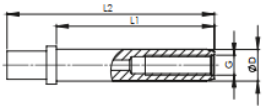
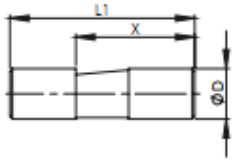
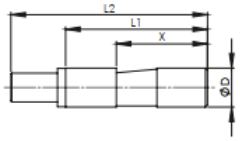
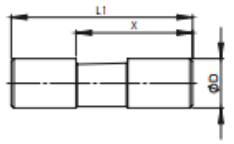
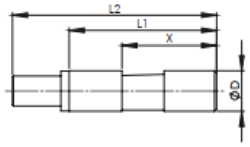
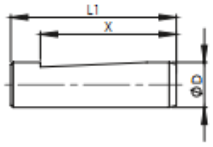
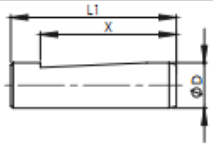
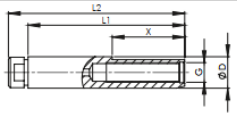
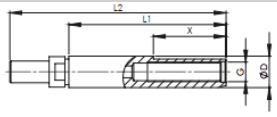
STANDARD COATINGS

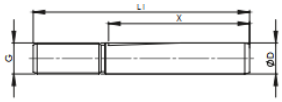
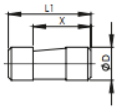
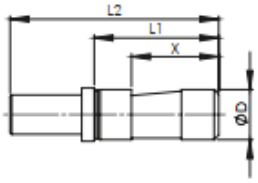
- TiN: Titanium Nitride
- TiCN: Titanium Carbo Nitride
- AlTiN: Aluminum-Titanium Nitride
- TiAlN: Titanium Aluminum Nitride

OVERVIEW OF STANDARD DRIVERS

Description	Standard	Sketch	Drilling range	L1	L2	X	G	Number for request
Ø 10 x 40	DIN 6535-HA		1,850 - 7,299	40	-	-	-	**HA10X40**
Ø 12 x 45			1,850 - 8,999	45	-	-	-	**HA12X45**
Ø 16 x 48			1,850 - 12,399	48	-	-	-	**HA16X48**
Ø 20 x 50			1,850 - 15,899	50	-	-	-	**HA20X50**
Ø 25 x 56			6,000 - 19,509	56	-	-	-	**HA25X56**
Ø 32 x 60			9,700 - 25,609	60	-	-	-	**HA32X60**
Ø 40 x 70			9,700 - 32,609	70	-	-	-	**HA40X70**
Ø 10 x 40	DIN 6535-HA with pin		7,300 - 10,799	40	57	-	-	**HA10X40/57P**
			10,800 - 12,399					
Ø 12 x 45			9,000 - 12,399	45	62	-	-	**HA12X45/62P**
			12,400 - 15,899					
Ø 16 x 48			12,400 - 16,399	48	75	-	-	**HA16X48/75P**
			16,400 - 20,509					
Ø 20 x 50			15,900 - 20,509	50	77	-	-	**HA20X50/77P**
			20,510 - 29,600					
Ø 25 x 56			19,510 - 25,609	56	86	-	-	**HA25X56/86P**
			25,610 - 34,699					
Ø 32 x 60			25,610 - 32,609	60	100	-	-	**HA32X60/100P**
			32,610 - max					
Ø 40 x 70			32,610 - max	70	110	-	-	**HA40X70/110P**
Ø 10 x 40	DIN 1835-B		1,850 - 7,299	40	-	23,5	-	**B10X40**
Ø 12 x 45			1,850 - 8,999	45	-	26,5	-	**B12X45**
Ø 16 x 48			1,850 - 12,399	48	-	29	-	**B16X48**
Ø 20 x 50			1,850 - 15,899	50	-	30,5	-	**B20X50**
Ø 25 x 56			6,000 - 19,509	56	-	38	-	**B25X56**
Ø 32 x 60			9,700 - 25,609	60	-	43	-	**B32X60**
Ø 40 x 70			9,700 - 32,609	70	-	47	-	**B40X70**
Ø 10 x 40	DIN 1835-B with pin		7,300 - 10,799	40	57	23,5	-	**B10X40/57P**
			10,800 - 12,399					
Ø 12 x 45			9,000 - 12,399	45	62	26,5	-	**B12X45/62P**
			12,400 - 15,899					
Ø 16 x 48			12,400 - 16,399	48	75	29	-	**B16X48/75P**
			16,400 - 20,509					
Ø 20 x 50			15,900 - 20,509	50	77	30,5	-	**B20X50/77P**
			20,510 - 29,600					
Ø 25 x 56			19,510 - 25,609	56	86	38	-	**B25X56/86P**
			25,610 - 34,699					
Ø 32 x 60			25,610 - 32,609	60	100	43	-	**B32X60/100P**
			32,610 - max					
Ø 40 x 70			32,610 - max	70	110	47	-	**B40X70/110P**

Ø 10 x 40	DIN 1835-E		1,850 - 7,299	40	-	28	-	**E10X40**
Ø 12 x 45			1,850 - 8,999	45	-	33	-	**E12X45**
Ø 16 x 48			1,850 - 12,399	48	-	36	-	**E16X48**
Ø 20 x 50			1,850 - 15,899	50	-	38	-	**E20X50**
Ø 25 x 56			6,000 - 19,509	56	-	44	-	**E25X56**
Ø 32 x 60			9,700 - 25,609	60	-	48	-	**E32X60**
Ø 40 x 70			9,700 - 32,609	70	-	66	-	**E40X70**
Ø 10 x 40	DIN 1835-E with pin		7,300 - 10,799	40	57	28	-	**E10X40/57P**
			10,800 - 12,399					
Ø 12 x 45			9,000 - 12,399	45	62	33	-	**E12X45/62P**
			12,400 - 15,899					
Ø 16 x 48			12,400 - 16,399	48	75	36	-	**E16X48/75P**
			16,400 - 20,509					
Ø 20 x 50			15,900 - 20,509	50	77	38	-	**E20X50/77P**
			20,510 - 29,600					
Ø 25 x 56			19,510 - 25,609	56	86	44	-	**E25X56/86P**
			25,610 - 34,699					
Ø 32 x 60			25,610 - 32,609	60	100	48	-	**E32X60/100P**
			32,610 - max					
Ø 40 x 70			32,610 - max	70	110	66	-	**E40X70/110P**
Ø 10 x 40	DIN 6535-HE		1,850 - 7,299	40	-	28	-	**HE10X40**
Ø 12 x 45			1,850 - 8,999	45	-	33	-	**HE12X45**
Ø 16 x 48			1,850 - 12,399	48	-	36	-	**HE16X48**
Ø 20 x 50			1,850 - 15,899	50	-	38	-	**HE20X50**
Ø 10 x 40	DIN 6535-HE with pin		7,300 - 10,799	40	57	28	-	**HE10X40/57P**
			10,800 - 12,399					
Ø 12 x 45			9,000 - 12,399	45	62	33	-	**HE12X45/62P**
			12,400 - 15,899					
Ø 16 x 48			12,400 - 16,399	48	75	36	-	**HE16X48/75P**
			16,400 - 20,509					
Ø 20 x 50			15,900 - 20,509	50	77	38	-	**HE20X50/77P**
			20,510 - 29,600					
Ø 10 x 40			1,850 - 7,299	40	46	24	-	**10X40/46**
Ø 12 x 45			1,850 - 12,399	45	53	31	-	**12X45/53**
Ø 25 x 70			1,850 - 10,000	70	78	34	-	**20X70/78**
			10,001 - 19,509					
Ø 10 x 40	with pin		7,300 - 10,799	40	57	24	-	**10X40/57P**
			10,800 - 12,399					
Ø 12 x 45			12,400 - 16,399	45	72	31	-	**12X45/72P**
			16,400 - 20,500					
Ø 25 x 70			19,510 - 25,609	70	105	34	-	**25X70/105P**
			25,610 - max					
Ø 16 x 50			1,850 – 12,399	50	58	47,5	-	**16X50**

Ø 16 x 50	with pin		12,400 – 16,399 16,400 – 20,500	50	77	47,5	-	**16X50/77P**
Ø 10 x 60	GKT		1,850 - 7,299	60	-	-	M6x0,5	**GKT10X60**
Ø 16 x 80			1,850 - 12,399	80	-	-	M10x1	**GKT16X80**
Ø 25 x 100			1,850 - 20,509	100	-	-	M16x1,5	**GKT25X100**
Ø 10 x 40	GKT with pin		7,300 - 10,799 10,800 - 12,399	60	77	-	M6x0,5	**GKT10X60/77P**
Ø 12 x 45			12,400 - 16,399 16,400 - 20,500	80	105	-	M10x1	**GKT16X80/105P**
Ø 16 x 48			20,510 - 25,609 25,610 - max	100	140	-	M16x1,5	**GKT25X100/140P**
Ø 12,7 x 38,1	Zoll		1,850 - 9,699	38,1	-	25,3	-	**Z12X38**
Ø 19,05 x 70			3,960 - 14,899	70	-	45	-	**Z19X70**
Ø 25,4 x 70			6,000 - 19,509	70	-	57,5	-	**Z25X70**
Ø 31,7 x 70			9,700 - 25,609	70	-	57,5	-	**Z31X70**
Ø 38,1 x 70			9,700 - 32,609	70	-	57,5	-	**Z38X70**
Ø 19,05 x 70	Zoll with pin		14,900 - 24,609	70	97	45	-	**Z12X38/97P**
Ø 25,4 x 70			19,510 - max	70	100	57,5	-	**Z19X70/100P**
Ø 31,7 x 70			25,610 - max	70	100	57,5	-	**Z25X70/100P**
Ø 38,1 x 70			32,610 - max	70	100	57,5	-	**Z31X70/100P**
Ø 19,05 x 70	Muraki		3,960 - 14,899	70	-	45	-	**M19X70**
Ø 19,05 x 70	Muraki with pin		14,900 - 24,609	70	97	45	-	**M19X70/97P**
Ø 19,05 x 70	with inclined clamping surface		3,960 - 14,899	70	-	57,5	-	**19X70**
Ø 19,05 x 70	with inclined clamping surface with pin		14,900 - 24,609	70	97	57,5	-	**19X70/97P**
Ø 10 x 60	VDI 3208		1,850 - 7,299	60	68	35	M6x0,5	**VDI10X60**
Ø 16 x 80			1,850 - 10,899	80	90	37	M10x1	**VDI16X80**
Ø 25 x 100			1,850 - 19,799	100	112	45	M16x1,5	**VDI25X100**
Ø 16 x 80	VDI 3208 with pin		10,900 - 16,399	80	110	37	M10x1	**VDI16X80/110P**
Ø 25 x 100			19,800 – 25,999 26,000 - max	100	142	45	M16x1,5	**VDI25X100/142P**

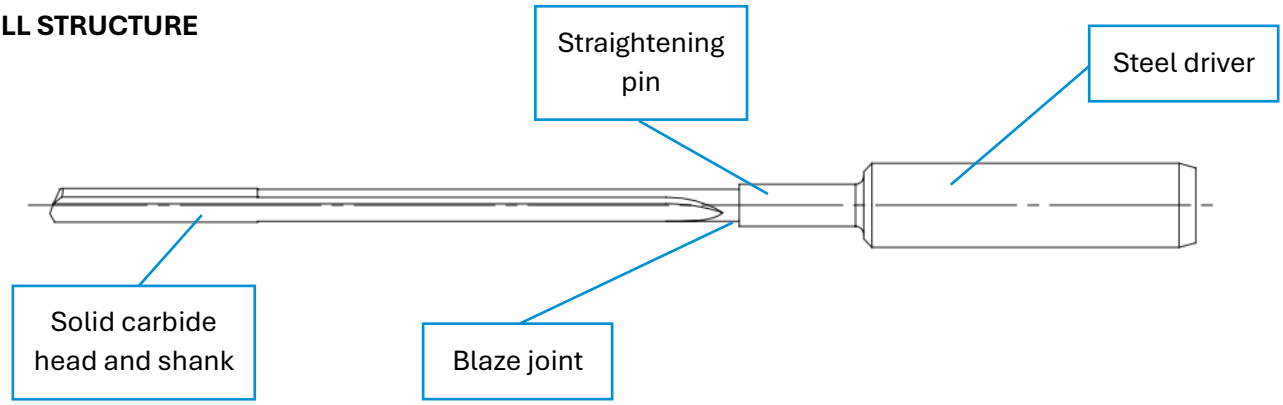
Ø 16 x 112	adjustment driver		1,850 - 12,899	60	-	73	TR16x1,5	**A16X112**
Ø 20 x 126			1,850 - 14,899	80	-	82	TR20x2	**A20X126**
Ø 28 x 126			6,000 - 21,509	100	-	82	TR28x2	**A28X126**
Ø 36 x 162			8,700 - 28,609	100	-	109	TR36x2	**A36X162**
Ø 16 x 40	Speedbit		1,850 - 12,399	40	-	28	-	**SB16X40**
Ø 25 x 50			4,000 - 19,509	50	-	35	-	**SB25X50**
Ø 35 x 60			9,700 - 28,609	60	-	40	-	**SB35X60**
Ø 16 x 40	Speedbit with pin		12,400 - 16,399	40	67	28	-	**SB16X40/67P**
			16,400 - 20,509					
Ø 25 x 50			19,510 - 25,609	50	77	35	-	**SB25X50/77P**
			25,610 - 30,609					
Ø 35 x 60			28,610 - max	60	100	40	-	**SB35X60/100P**

KGD1100 - SOLID CARBIDE SINGLE FLUTE GUNDRILLS

Type	Description	Drill - D (mm)
KGD1100	Solid carbide boring drill	From 0,500
KGD1101	Solid carbide step boring drill	From 1,500
KGD1102	Solid carbide counterboring drill	From 0,800
KGD1103	Full solid carbide boring drill	Upon request

- *Tool length depending on the diameter up to 700 mm!*

DRILL STRUCTURE



The solid carbide single flute drill Type 110, which are connected by a braze joint, consist of the following two components:

- Drill head and drill shank made of solid carbide with a kidney-cooling channel;
- Driver with straightening pin of steel.

This type of tool is especially process and strong due to its construction. In addition, with low torsional longer service life can be achieved.

- Available on inquiry into completely solid carbide drill (Type KGD1103).

DRILL HEAD + SHANK

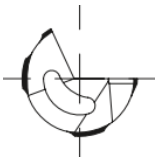
The peripheral shape is optimally adjusted depending on material and hole requirements for your drilling task

Upon request we can generate special contours for you.

Form G

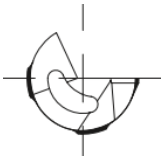
- Universal contour;
- For all materials;
- Low hole straightness deviation;
- Low tendency to jam.

Form A



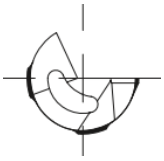
- Tight hole tolerance;
- Angular entrance and exit bores.

Form C



- Steel;
- Difficult to machine materials;
- Tight hole tolerance.

Form EA

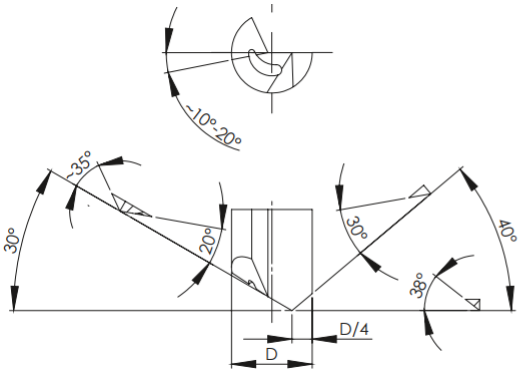


- Cross drilling;
- Angular entrance and exit bores;
- Tight hole tolerance.

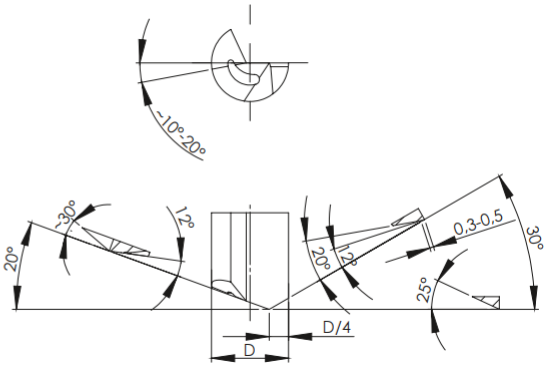
NOSE GRINDS

With the change of the cutting geometry, solid carbide gundrills can be optimally adapted to your requirements. For long chipping and hard to machine materials an open special point should be used.

STANDARD NOSE GRINDS



Standard nose grind 1
or drill range: 0,050 - 4,000 mm

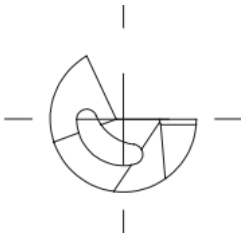


Standard nose grind 2
for drill range: 4,001 - 12,000 mm

- *More nose grinds are shown in the Technology chapter!*

COOLING HOLE DESIGN

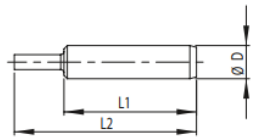
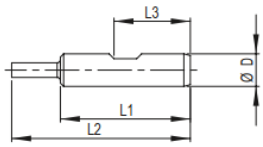
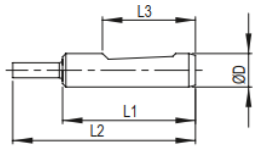
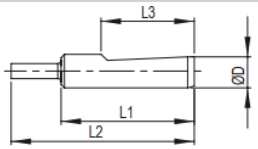
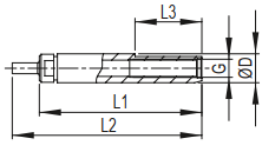
Kidney shape



STANDARD COATINGS

- TiN: Titanium Nitride
- TiCN: Titanium Carbo Nitride
- AlTiN: Aluminum-Titanium Nitride
- TiAlN: Titanium Aluminum Nitride

OVERVIEW OF STANDARD DRIVERS

Description	Standard	Sketch	Drilling range	L1	L2	X	G	Number for request
Ø 4 x 34/46	DIN 6535-HA		0,800 - 2,905	34	46	-	-	**HA4X34/46**
Ø 6 x 36/51			2,906 - 5,145	36	50	-	-	**HA6X36/51**
Ø 10 x 40/55			0,900 - 4,645	40	55	-	-	**HA10X40/55**
Ø 12 x 45/60			0,900 - 7,000	45	60	-	-	**HA12X45/60**
Ø 16 x 48/63			0,900 - 7,000	48	63	-	-	**HA16X48/63**
Ø 6 x 36/50	DIN 1835-B		0,900 - 4,645	36	50	20	-	**B6X36/50**
Ø 10 x 40/55			0,900 -6,349	40	55	23,5	-	**B10X40/55**
Ø 12 x 45/60			0,900 -7,000	45	60	26,5	-	**B12X45/60**
Ø 16 x 48/63			0,900 -7,000	48	63	29	-	**B16X48/63**
Ø 6 x 36/50	DIN 6535-HE		0,900 - 4,645	36	50	25	-	**HE6X36/50**
Ø 10 x 40/55			0,900 -6,349	40	55	28	-	**HE10X40/55**
Ø 12 x 45/60			0,900 -7,000	45	60	33	-	**HE12X45/60**
Ø 16 x 48/63			0,900 -7,000	48	63	36	-	**HE16X48/63**
Ø 6 x 36/50	DIN 1835-E		0,900 - 4,645	36	50	25	-	**E6X36/50**
Ø 10 x 40/55			0,900 -6,349	40	55	28	-	**E10X40/55**
Ø 12 x 45/60			0,900 -7,000	45	60	33	-	**E12X45/60**
Ø 16 x 48/63			0,900 -7,000	48	63	36	-	**E16X48/63**
Ø 16 x 80/105			0,900 - 7,000	80	105	37	M10x1	**16X80/105**

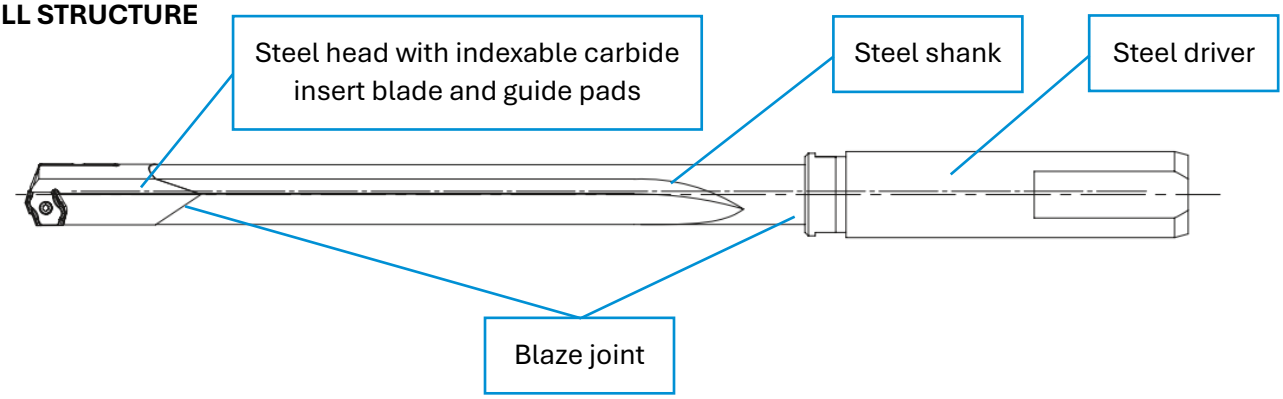
- *More drivers are available on request!*
- *We are happy to produce special drivers for you to your drawing!*

KGD120S/L - SINGLE FLUTE GUNDRILLS WITH INDEXABLE INSERTS

Type	Description	Drill - D (mm)
KGD120S	Standard drill with short head	From 12,000 - 28,000 mm
KGD120L	Standard drill with long head	From 12,000 - 28,000 mm

- *Tool length depending on the diameter, up to 5000 mm!*

DRILL STRUCTURE

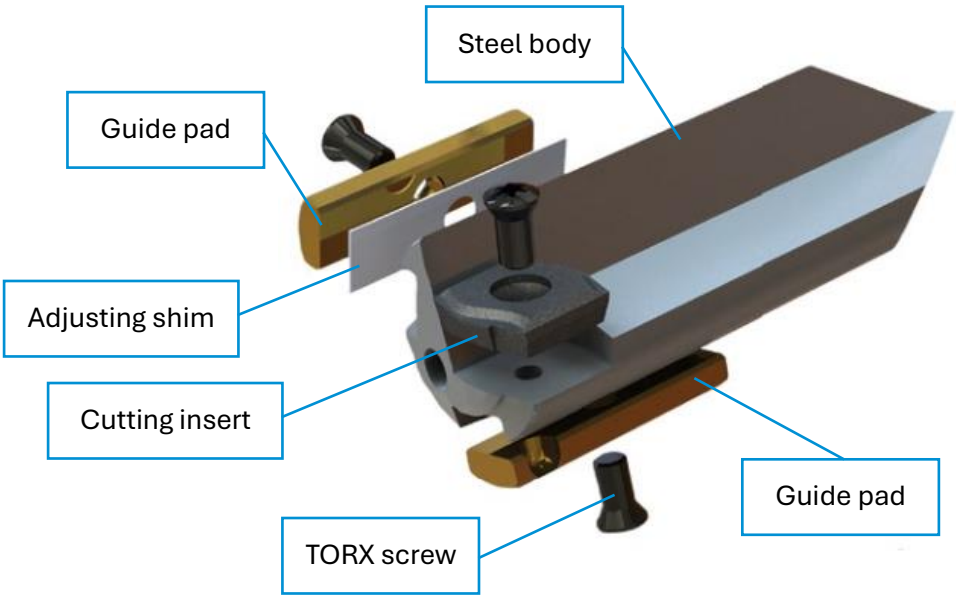


The single flute gun drills with a brazed steel body with cutting insert Type KGD120L(S) are connected by braze consisting of the following components:

- Steel body made of tempered steel;
- Coated cutting insert of carbide;
- Coated guide pads of carbide;
- Shank of tempered steel;
- Driver of steel.

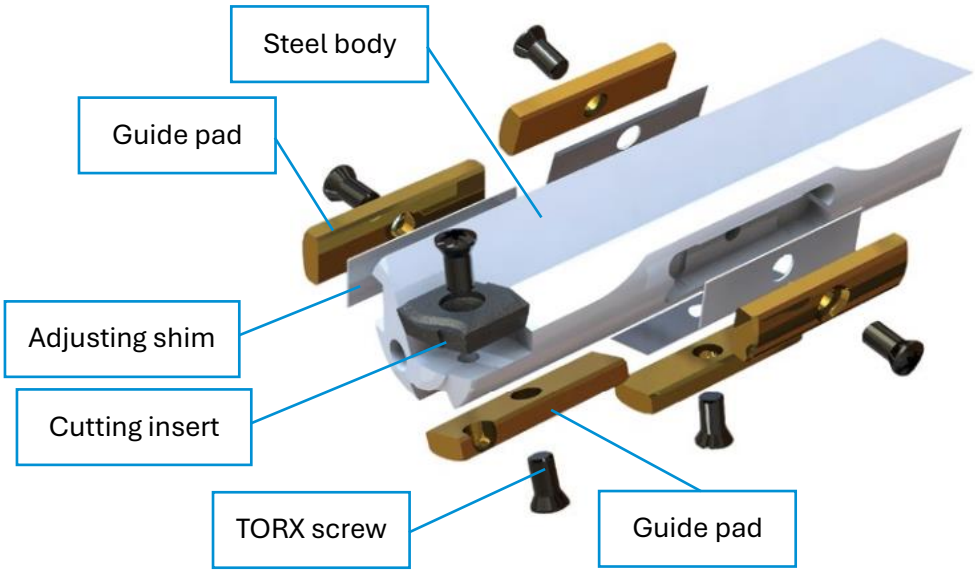
DRILL HEAD

Version with short head with adjusting shim for standard deep drilling tasks



DRILL HEAD

Version with long head body with adjusting shims for cross drilling



- *Driver see Type KGD1000 - single flute gundrills with brazed carbide drill head!*

INQUIRIES AND DELIVERY

- Please indicate the required diameter, the overall length and the driver style
- Tools fully equipped and ready to use.
- Each tool is supplied with the appropriate Torx wrench for the replacement of wear parts

REQUIREMENTS DEEP HOLE DRILLING

For good hole drilling results, cooling, lubrication and high-pressure coolant systems are required (see page 19).

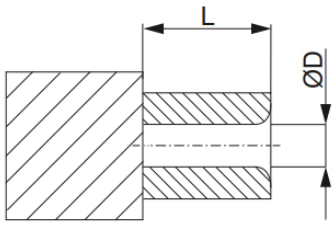
Single flue gundrilling cannot only be achieved on deep hole drilling machines but is also very good on machining centers (drilling, turning and milling centers) with

- Deep-hole drilling oil;
- Emulsion (min. 10 - 12% concentration, with additives);
- And under certain conditions, with a minimum quantity air/lubrication system.

DRILL GUIDE

The asymmetric geometry single-edged single flute gundrill is not self-starting, therefore a pilot hole or drill bushing is required

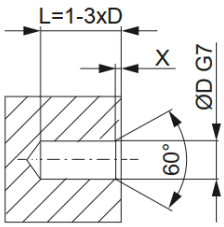
DRILL BUSH



Recommendation: Bushes DIN 179A medium (see page 30)

Drill bushing has a form set against the workpiece

PILOT DRILLING



Recommendation: pilot drill with m7 tolerance (see page 32)

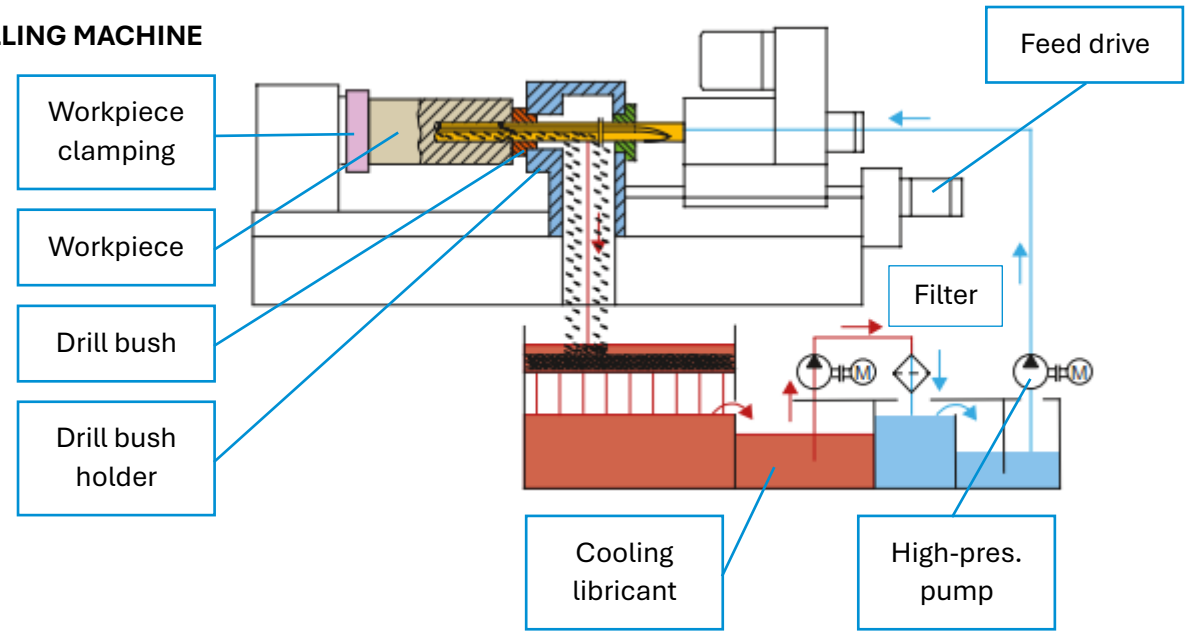
To prevent outbreaks during retraction of single flute gundrill we recommend a chamfer (X) of 60°

Too big a diameter difference between the tool and drill bush or pilot hole can cause the

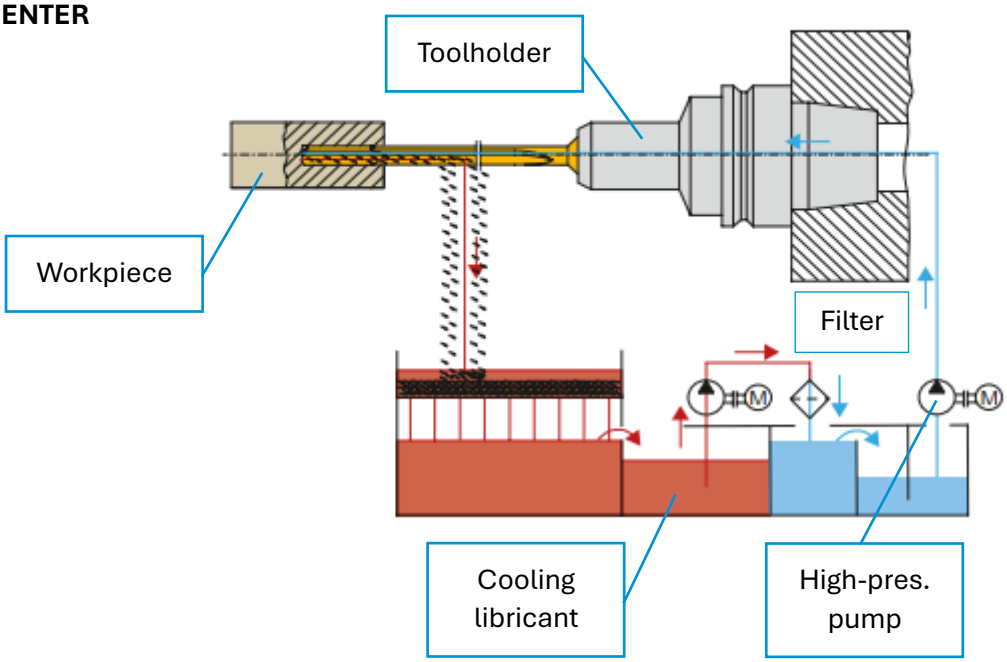
- following problems:
- *poor hole quality;*
- excessive hole straightness deviation;
- drill breakage.

APPLICATIONS

DEEP DRILLING MACHINE



MACHINING CENTER



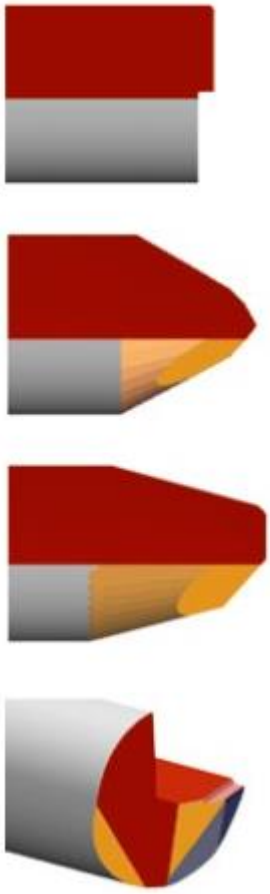
PROCEDURE

- Make a pilot hole;
- Enter with stationary spindle or speed< 50 rpm;
- Set coolant pressure, speed and feed;
- Continuous drilling to depth without peck;
- Switch off coolant supply after reaching hole depth;
- Retraction with stationary spindle or < 50 rpm.

- *Failure to comply may result in tool breakage!*

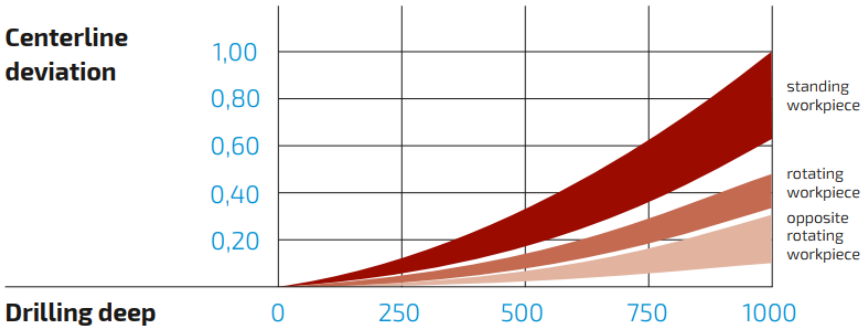
SPECIAL NOSE GRINDS

VARIOUS FORMS

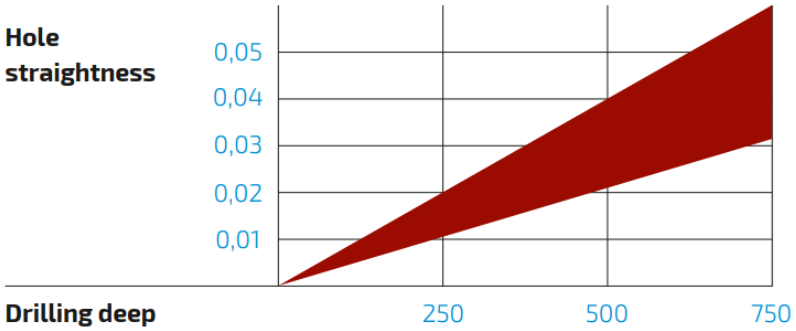


- *Please contact us if you need a special grind for your tools!*

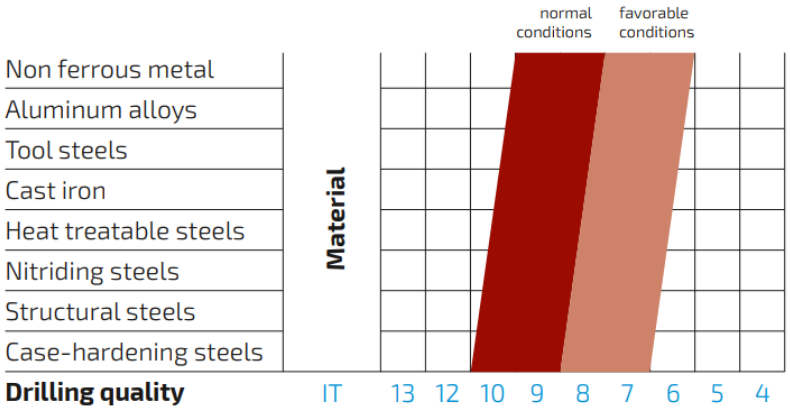
CENTERLINE DEVIATION *in mm*



HOLE STRAIGHTNESS *in mm*



ACHIEVABLE DRILLING TOLERANCES



SURFACE QUALITY

Roughness class		N8	N7	N6	N5	N4	N3
Quality area		normal conditions			favorable conditions		
Surface roughness	Rz µm	16 - 25	10	4 - 6,3	2,5	1,6	1
Values	Ra µm	3,2	1,6	0,8	0,4	0,2	0,1

KGD1000 – CUTTING PARAMETERS

- *The information below are average values as a guide. They depend on material, bore diameter, unsupported tool length, cooling lubricant, drilling conditions and stability of the machine!*

MATERIALS GROUP			Structural steel, Carbon steel, Case hardening steel, Low alloyed steel, "good processable" (< 900N/MM²)			Alloyed tempered steels, case-hardened steels, nitriding steels, tool steels (> 900N/MM²)			Spring steels, hardened steels, high-temperature steels, cast steel / chilled cast iron, Special alloys, e.g. Nimonic, Inconel, titanium, titanium alloys			Stainless, acid-resistant steel + cast steel, austenitic 18-25% Cr, Ni > 8%			Stainless steel + cast steel, martensitic / ferritic 13-25% Cr (sulphurated), " good processable"		
Cutting speed in m/min			70 - 100			60 - 80			25 - 60			30 - 60			40 - 70		
Drill-Ø in mm			Feed														
from	-	to	from	-	to	from	-	to	from	-	bis	from	-	to	from	-	to
1,85	-	2,49	0,003	-	0,007	0,002	-	0,005	0,001	-	0,002	0,002	-	0,005	0,002	-	0,006
2,50	-	2,99	0,005	-	0,010	0,004	-	0,006	0,001	-	0,005	0,004	-	0,007	0,004	-	0,007
3,00	-	3,49	0,007	-	0,013	0,005	-	0,007	0,002	-	0,007	0,006	-	0,008	0,005	-	0,009
3,50	-	3,99	0,009	-	0,015	0,007	-	0,010	0,004	-	0,008	0,008	-	0,009	0,007	-	0,011
4,00	-	4,49	0,012	-	0,019	0,008	-	0,012	0,006	-	0,009	0,009	-	0,010	0,008	-	0,013
4,50	-	4,99	0,014	-	0,020	0,011	-	0,015	0,008	-	0,011	0,010	-	0,013	0,009	-	0,017
5,00	-	5,99	0,016	-	0,026	0,013	-	0,018	0,010	-	0,014	0,012	-	0,015	0,013	-	0,019
6,00	-	6,99	0,018	-	0,028	0,015	-	0,022	0,012	-	0,016	0,014	-	0,017	0,015	-	0,023
7,00	-	7,99	0,021	-	0,035	0,018	-	0,025	0,015	-	0,018	0,016	-	0,019	0,018	-	0,026
8,00	-	8,99	0,024	-	0,036	0,020	-	0,027	0,018	-	0,021	0,018	-	0,021	0,020	-	0,031
9,00	-	9,99	0,027	-	0,040	0,023	-	0,030	0,021	-	0,025	0,020	-	0,028	0,023	-	0,034
10,00	-	11,99	0,030	-	0,049	0,025	-	0,038	0,024	-	0,030	0,025	-	0,033	0,025	-	0,041
12,00	-	13,99	0,036	-	0,060	0,029	-	0,044	0,027	-	0,033	0,030	-	0,038	0,030	-	0,045
14,00	-	15,99	0,042	-	0,071	0,035	-	0,050	0,029	-	0,040	0,035	-	0,044	0,035	-	0,052
16,00	-	17,99	0,048	-	0,079	0,039	-	0,053	0,033	-	0,044	0,041	-	0,050	0,042	-	0,060
18,00	-	19,99	0,054	-	0,091	0,044	-	0,060	0,037	-	0,049	0,045	-	0,062	0,045	-	0,067
20,00	-	23,99	0,060	-	0,107	0,049	-	0,069	0,041	-	0,054	0,049	-	0,071	0,050	-	0,079
24,00	-	27,99	0,069	-	0,117	0,054	-	0,077	0,045	-	0,057	0,052	-	0,083	0,054	-	0,090
28,00	-	31,99	0,079	-	0,134	0,059	-	0,085	0,049	-	0,062	0,057	-	0,091	0,059	-	0,098
32,00	-	39,99	0,085	-	0,154	0,063	-	0,098	0,052	-	0,065	0,063	-	0,098	0,065	-	0,107
40,00	-	50,00	0,091	-	0,169	0,068	-	0,105	0,055	-	0,069	0,068	-	0,105	0,071	-	0,113

KGD1000 – CUTTING PARAMETERS

MATERIALS GROUP	Cast iron, grey cast iron (>300N/mm²), ductile cast iron (> 400N/mm²), general steel casting	Cast iron, grey cast iron (<300N/mm²), ductile cast iron (< 400N/mm²), malleable cast iron, whiteheart malleable iron, blackheart malleable iron, "good processable"	Copper, bronze, brass, plastics	Aluminium + cast aluminium Si content > 5%, "good processable"	Aluminium + aluminium alloy< 5%, "not hardened"
Cutting speed in m/min	60 - 90	70 - 100	70 - 100	80 - 160	100 - 300
Drill-Ø in mm	Feed in mm				

from - to	from - to	from - to	from - to	von - to	von - to
1,85 - 2,49	0,005 - 0,018	0,005 - 0,019	0,003 - 0,015	0,002 - 0,012	0,002 - 0,005
2,50 - 2,99	0,008 - 0,028	0,008 - 0,026	0,005 - 0,020	0,004 - 0,026	0,004 - 0,008
3,00 - 3,49	0,009 - 0,038	0,009 - 0,038	0,006 - 0,030	0,006 - 0,037	0,006 - 0,012
3,50 - 3,99	0,011 - 0,042	0,011 - 0,046	0,007 - 0,045	0,007 - 0,055	0,007 - 0,025
4,00 - 4,49	0,012 - 0,047	0,012 - 0,050	0,008 - 0,050	0,008 - 0,071	0,008 - 0,026
4,50 - 4,99	0,016 - 0,052	0,016 - 0,057	0,009 - 0,057	0,009 - 0,094	0,009 - 0,028
5,00 - 5,99	0,018 - 0,065	0,018 - 0,068	0,010 - 0,069	0,010 - 0,109	0,010 - 0,036
6,00 - 6,99	0,024 - 0,071	0,024 - 0,074	0,012 - 0,079	0,012 - 0,125	0,012 - 0,045
7,00 - 7,99	0,028 - 0,084	0,028 - 0,085	0,014 - 0,092	0,018 - 0,130	0,014 - 0,049
8,00 - 8,99	0,032 - 0,092	0,032 - 0,096	0,016 - 0,101	0,020 - 0,144	0,016 - 0,056
9,00 - 9,99	0,036 - 0,110	0,036 - 0,114	0,018 - 0,113	0,023 - 0,158	0,018 - 0,064
10,00 - 11,99	0,045 - 0,116	0,050 - 0,120	0,020 - 0,139	0,025 - 0,174	0,020 - 0,074
12,00 - 13,99	0,051 - 0,126	0,060 - 0,138	0,024 - 0,156	0,030 - 0,182	0,024 - 0,087
14,00 - 15,99	0,057 - 0,138	0,070 - 0,154	0,028 - 0,179	0,035 - 0,194	0,028 - 0,099
16,00 - 17,99	0,062 - 0,158	0,079 - 0,170	0,033 - 0,199	0,050 - 0,209	0,033 - 0,108
18,00 - 19,99	0,066 - 0,173	0,090 - 0,191	0,036 - 0,224	0,054 - 0,228	0,036 - 0,130
20,00 - 23,99	0,069 - 0,189	0,106 - 0,207	0,040 - 0,249	0,060 - 0,254	0,040 - 0,146
24,00 - 27,99	0,076 - 0,210	0,120 - 0,221	0,048 - 0,291	0,072 - 0,295	0,048 - 0,169
28,00 - 31,99	0,079 - 0,212	0,140 - 0,237	0,056 - 0,327	0,084 - 0,360	0,056 - 0,194
32,00 - 39,99	0,086 - 0,228	0,160 - 0,245	0,064 - 0,380	0,096 - 0,455	0,064 - 0,221
40,00 - 50,00	0,089 - 0,239	0,180 - 0,254	0,072 - 0,399	0,105 - 0,488	0,072 - 0,239

KGD1100 – CUTTING PARAMETERS

MATERIALS GROUP	Structural steel, Carbon steel, Case hardening steel, Low alloyed steel, "good processable" (< 900N/MM²)	Alloyed tempered steels, case-hardened steels, nitriding steels, tool steels (> 900N/MM²)	Spring steels, hardened steels, high-temperature steels, cast steel / chilled cast iron, Special alloys, e.g. Nimonic, Inconel, titanium, titanium alloys	Stainless, acid-resistant steel + cast steel, austenitic 18-25% Cr, Ni > 8%	Stainless steel + cast steel, martensitic / ferritic 13-25% Cr (sulphurated) "good processable"
Cutting speed in m/min	70 - 100	60 - 80	25 - 60	30 - 60	40 - 70
Drill-Ø in mm	Feed in mm				
from - to	from - to	from - to	from - to	from - to	from - to
0,70 - 0,79	0,0004 - 0,0018	0,0005 - 0,0012	0,0004 - 0,0012	0,0005 - 0,0012	0,0007 - 0,0012
0,80 - 0,89	0,0004 - 0,0022	0,0006 - 0,0015	0,0006 - 0,0016	0,0007 - 0,0014	0,0011 - 0,0014
0,90 - 0,99	0,0007 - 0,0026	0,0009 - 0,0019	0,0009 - 0,0020	0,0011 - 0,0019	0,0014 - 0,0017
1,00 - 1,09	0,0010 - 0,0032	0,0010 - 0,0023	0,0013 - 0,0024	0,0014 - 0,0022	0,0019 - 0,0022
1,10 - 1,19	0,0014 - 0,0038	0,0013 - 0,0029	0,0017 - 0,0028	0,0017 - 0,0025	0,0022 - 0,0026
1,20 - 1,29	0,0018 - 0,0041	0,0015 - 0,0035	0,0020 - 0,0033	0,0020 - 0,0027	0,0024 - 0,0028
1,30 - 1,39	0,0020 - 0,0050	0,0020 - 0,0041	0,0023 - 0,0036	0,0022 - 0,0029	0,0031 - 0,0035
1,40 - 1,49	0,0021 - 0,0054	0,0021 - 0,0047	0,0026 - 0,0038	0,0023 - 0,0031	0,0034 - 0,0037
1,50 - 1,59	0,0021 - 0,0067	0,0021 - 0,0051	0,0029 - 0,0042	0,0024 - 0,0035	0,0035 - 0,0042
1,60 - 1,79	0,0028 - 0,0075	0,0024 - 0,0066	0,0035 - 0,0054	0,0036 - 0,0049	0,0040 - 0,0051
1,80 - 1,99	0,0030 - 0,0095	0,0030 - 0,0075	0,0040 - 0,0065	0,0040 - 0,0065	0,0050 - 0,0065
2,00 - 2,49	0,0040 - 0,0120	0,0030 - 0,0095	0,0050 - 0,0075	0,0050 - 0,0075	0,0050 - 0,0075
2,50 - 2,99	0,0050 - 0,0160	0,0040 - 0,0110	0,0060 - 0,0095	0,0060 - 0,0095	0,0060 - 0,0110
3,00 - 3,49	0,0080 - 0,0180	0,0050 - 0,0140	0,0080 - 0,0110	0,0080 - 0,0110	0,0080 - 0,0130
3,50 - 3,99	0,0090 - 0,0230	0,0070 - 0,0160	0,0090 - 0,0125	0,0100 - 0,0160	0,0090 - 0,0160
4,00 - 4,49	0,0120 - 0,0260	0,0080 - 0,0190	0,0100 - 0,0135	0,0110 - 0,0180	0,0100 - 0,0190
4,50 - 4,99	0,0140 - 0,0280	0,0110 - 0,0210	0,0110 - 0,0160	0,0140 - 0,0220	0,0110 - 0,0220
5,00 - 5,99	0,0150 - 0,0380	0,0120 - 0,0250	0,0130 - 0,0220	0,0150 - 0,0240	0,0130 - 0,0250
6,00 - 7,99	0,0180 - 0,0490	0,0150 - 0,0330	0,0150 - 0,0290	0,0180 - 0,0290	0,0150 - 0,0370
8,00 - 12,00	0,0210 - 0,0570	0,0180 - 0,0380	0,0170 - 0,0360	0,0210 - 0,0330	0,0170 - 0,0410

KGD1100 – CUTTING PARAMETERS

MATERIALS GROUP	Cast iron, grey cast iron (>300N/mm²), ductile cast iron (> 400N/mm²), general steel casting	Cast iron, grey cast iron (<300N/mm²), ductile cast iron (< 400N/mm²), malleable cast iron, whiteheart malleable iron, blackheart malleable iron, "good processable"	Copper, bronze, brass, plastics	Aluminium + cast aluminium Si content > 5%, "good processable"	Aluminium + aluminium alloy< 5%, "not hardened"
Cutting speed in m/min	60 - 90	70 - 100	70 - 100	80 - 160	100 - 300
Drill-Ø in mm	Feed in mm				
from - to	from - to	from - to	from - to	from - to	from - to
0,70 - 0,79	0,0009 - 0,0014	0,0007 - 0,0018	0,0005 - 0,0012	0,0007 - 0,0012	0,0005 - 0,0009
0,80 - 0,89	0,0012 - 0,0018	0,0010 - 0,0023	0,0008 - 0,0015	0,0012 - 0,0014	0,0008 - 0,0012
0,90 - 0,99	0,0015 - 0,0024	0,0014 - 0,0028	0,0011 - 0,0019	0,0017 - 0,0020	0,0011 - 0,0017
1,00 - 1,09	0,0019 - 0,0029	0,0018 - 0,0032	0,0015 - 0,0024	0,0020 - 0,0024	0,0015 - 0,0024
1,10 - 1,19	0,0025 - 0,0035	0,0022 - 0,0038	0,0019 - 0,0029	0,0022 - 0,0029	0,0019 - 0,0034
1,20 - 1,29	0,0031 - 0,0041	0,0030 - 0,0048	0,0024 - 0,0034	0,0024 - 0,0034	0,0024 - 0,0041
1,30 - 1,39	0,0040 - 0,0051	0,0039 - 0,0060	0,0028 - 0,0039	0,0026 - 0,0045	0,0026 - 0,0044
1,40 - 1,49	0,0047 - 0,0060	0,0049 - 0,0079	0,0031 - 0,0047	0,0028 - 0,0055	0,0032 - 0,0048
1,50 - 1,59	0,0053 - 0,0068	0,0056 - 0,0100	0,0032 - 0,0053	0,0035 - 0,0066	0,0038 - 0,0059
1,60 - 1,79	0,0064 - 0,0095	0,0064 - 0,0150	0,0035 - 0,0095	0,0040 - 0,0085	0,0040 - 0,0075
1,80 - 1,99	0,0070 - 0,0130	0,0070 - 0,0220	0,0040 - 0,0130	0,0050 - 0,0110	0,0050 - 0,0110
2,00 - 2,49	0,0100 - 0,0220	0,0090 - 0,0330	0,0040 - 0,0180	0,0050 - 0,0200	0,0070 - 0,0130
2,50 - 2,99	0,0130 - 0,0320	0,0110 - 0,0430	0,0050 - 0,0250	0,0060 - 0,0360	0,0080 - 0,0170
3,00 - 3,49	0,0150 - 0,0390	0,0140 - 0,0530	0,0060 - 0,0370	0,0080 - 0,0540	0,0100 - 0,0200
3,50 - 3,99	0,0180 - 0,0480	0,0180 - 0,0620	0,0070 - 0,0490	0,0110 - 0,0750	0,0100 - 0,0250
4,00 - 4,49	0,0200 - 0,0560	0,0200 - 0,0690	0,0080 - 0,0600	0,0120 - 0,0950	0,0130 - 0,0300
4,50 - 4,99	0,0230 - 0,0640	0,0230 - 0,0780	0,0090 - 0,0690	0,0140 - 0,1300	0,0160 - 0,0360
5,00 - 5,99	0,0250 - 0,0760	0,0250 - 0,0950	0,0100 - 0,0800	0,0150 - 0,1550	0,0200 - 0,0470
6,00 - 7,99	0,0300 - 0,1100	0,0300 - 0,1250	0,0120 - 0,0960	0,0180 - 0,2050	0,0260 - 0,0660
8,00 - 12,00	0,0330 - 0,1190	0,0350 - 0,1360	0,0140 - 0,1100	0,0210 - 0,2080	0,0290 - 0,0780

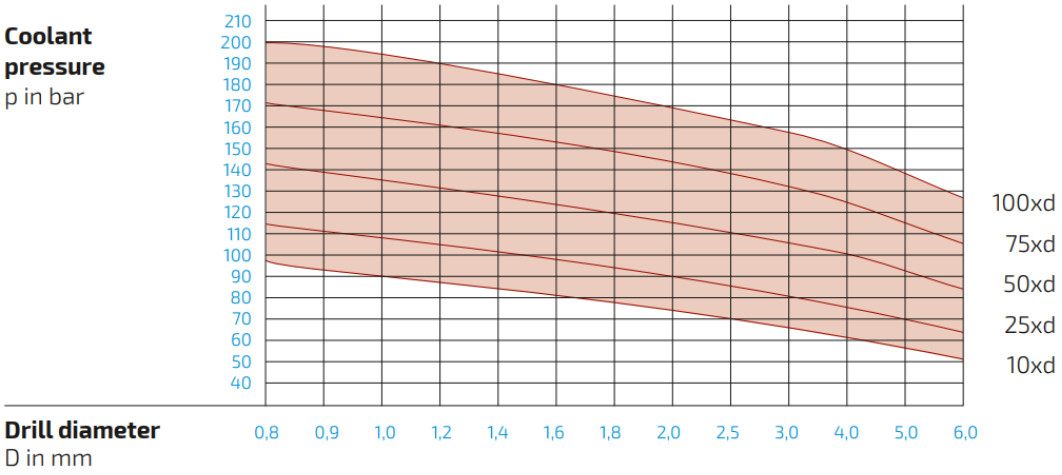
KGD120S/L – CUTTING PARAMETERS

MATERIALS GROUP	Structural steel (< 700N/mm²)		Hardening steel (< 700N/mm²)		Hardening steel (< 1100N/mm²)		Heat-treated steel (< 700N/mm²)		Heat-treated steel (< 1100N/mm²)		Nitriding steels (< 1100N/mm²)		Ferritic steel (< 900N/mm²)	
Cutting speed in m/min	70 - 100		80 - 100		70 - 80		70 - 90		55 - 75		55 - 75		60 - 80	
Drill-Ø in mm	Feed in mm													
from - to	from	to	from	to	from	to	from	to	from	to	from	to	from	to
12,00 - 17,99	0,05	0,10	0,05	0,10	0,07	0,10	0,07	0,10	0,07	0,1	0,07	0,09	0,07	0,10
18,00 - 24,99	0,08	0,11	0,08	0,11	0,08	0,11	0,08	0,11	0,08	0,11	0,08	0,10	0,08	0,11
25,00 - 30,00	0,10	0,14	0,10	0,14	0,10	0,13	0,10	0,14	0,10	0,13	0,09	0,12	0,10	0,14

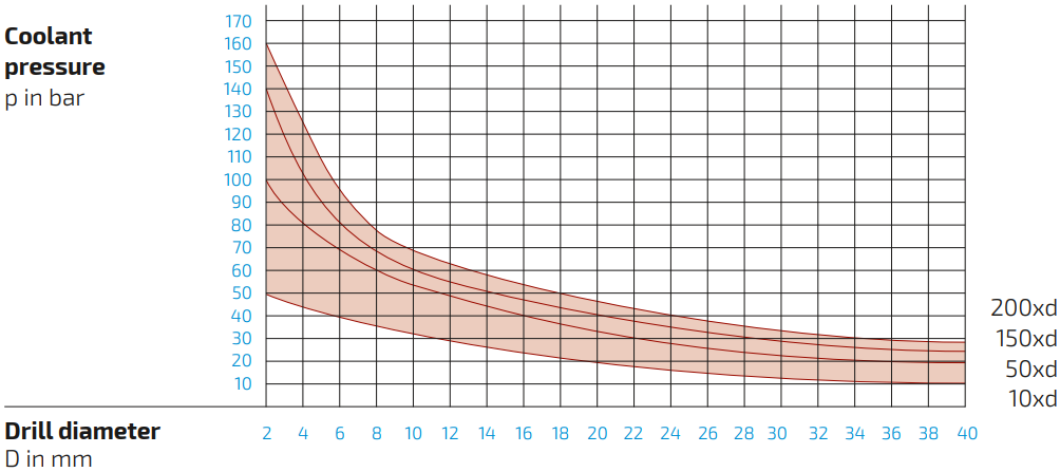
MATERIALS GROUP	Austenitic steel		Heat-resistant steel, tool steel (< 700N/mm²)		Cast steel (< 700N/mm²),		Spheroidal graphite iron		Cast iron		Aluminium		Copper Cu-contents < 99%	
Cutting speed in m/min	60 - 80		50 - 70		60 - 80		65 - 80		70 - 100		100 - 120		120 - 300	
Drill-Ø in mm	Feed in mm													
from - to	from	to	from	to	from	to	from	to	from	to	from	to	from	to
12,00 - 17,99	0,07	0,09	0,07	0,09	0,07	0,10	0,09	0,12	0,09	0,12	0,08	0,11	0,05	0,09
18,00 - 24,99	0,08	0,10	0,08	0,10	0,08	0,11	0,10	0,13	0,10	0,13	0,09	0,12	0,06	0,10
25,00 - 30,00	0,09	0,12	0,09	0,12	0,10	0,14	0,12	0,15	0,12	0,15	0,10	0,14	0,08	0,12

REQUIRED PRESSURE

KGD1100 for deep-hole drilling oil

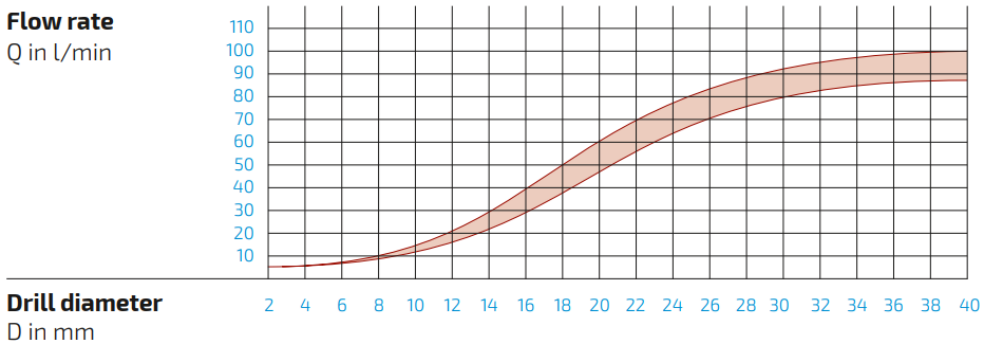


KGD1000 + KGD120S/L for deep-hole drilling oil



- *using emulsion pressures can be reduced by up to 20%!*

FLOW RATES



OIL KINEMATIC VISCOSITY

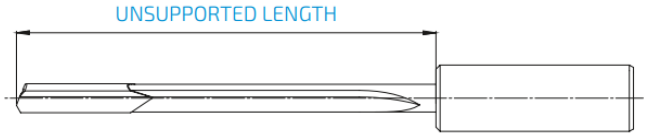
Drill-ø [mm] from - to	Kinematic viscosity at 40°c [mm^2/s]
0,800 - 1,500	8 - 10
1,501 - 18,000	10 - 15
18,001 - max	>15

FILTERING

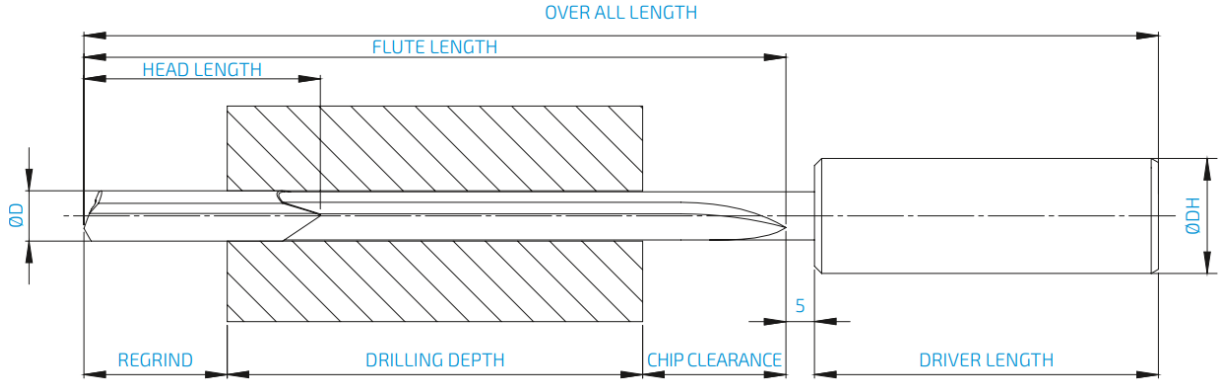
Drill-ø [mm] from - to	Filtering [µm]
0,800 - 2,000	5 - 10
2,001 - max	5 -20

UNSUPPORTED LENGTH

Type	Unsupported length
KGD1000	30xd – 40xd
KGD1100	70xd – 100xd
KGD120S/L	30xd – 40xd

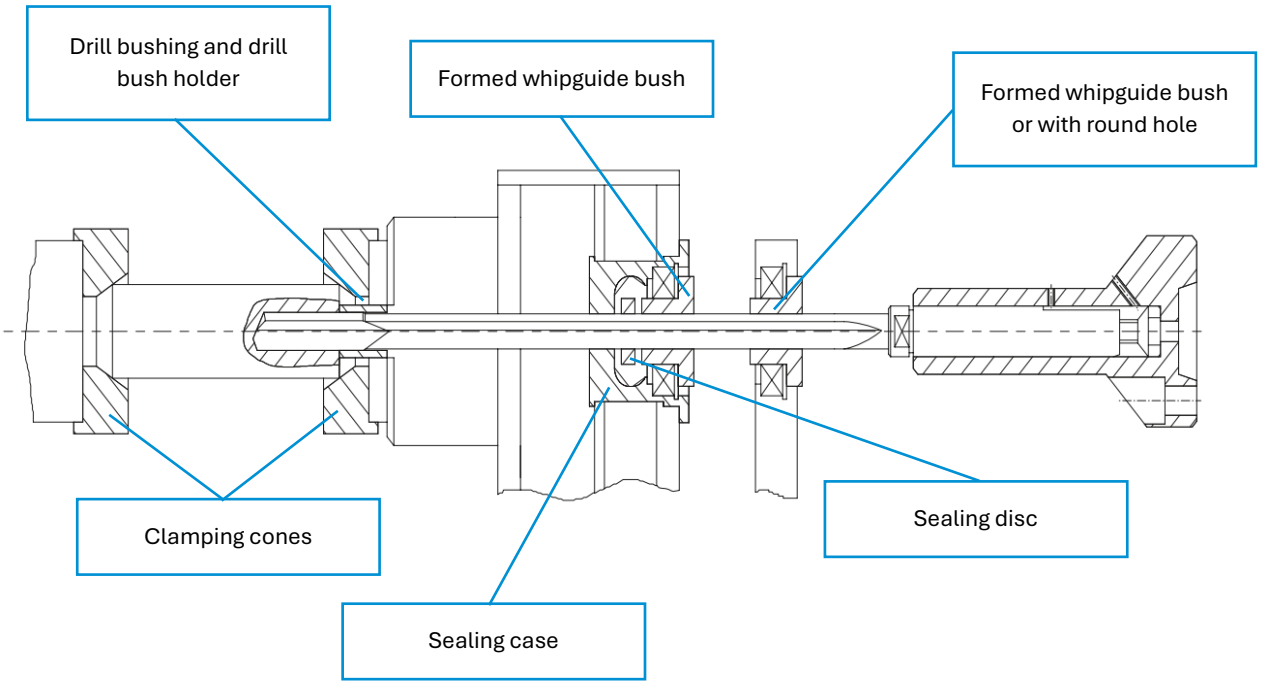


ENGTH CALCULATION OF DEPTH ON TOTAL LENGTH

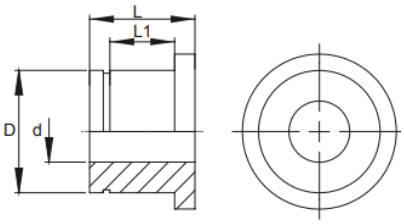


Drill-ø	From – to 0,90 – 1,89	From – to 1,90 – 2,49	From – to 2,50 – 3,09	From – to 3,10 – 5,09	From – to 5,10 – 8,09	From – to 8,10 – 18,09	From – to 18,1 - max
Regrind approx.	12	12	14	15	20	30	30
Chip clearance approx.	20	22	25	30	35	55	70

ACCESSORIES FOR DEEP HOLE DRILLING MACHINES



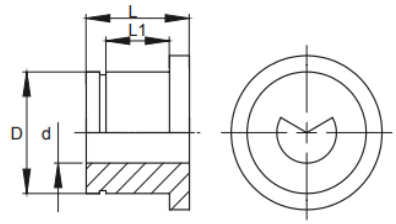
WHIPGUIDE BUSH



Part-no.	Tool-ø [mm] from - to	D [mm]	L [mm]	L1 [mm]
WB020-dddd	1,850 - 11,790	20	20	12
WB030-dddd	1,850 - 25,600	30	26	14
WB045-dddd	1,850 - 36,690	45	26	16

- *Bearing diameter 20 mm, Drill-Ø 5 mm: Part-No.: WB020-0500*

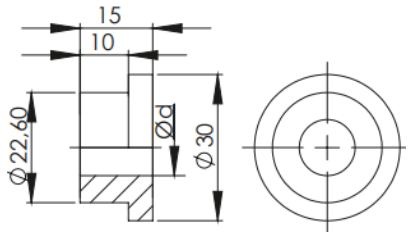
WHIPGUIDE BUSH (FORMED)



Part-no.	Tool-ø [mm] from - to	D [mm]	L [mm]	L1 [mm]
WBF20-dddd	3,960 - 12,390	20	20	12
WBF30-dddd	5,750 - 22,600	30	26	14
WBF45-dddd	7,800 - 34,699	45	26	16

- *Bearing diameter 20 mm, Dril-Ø 5 mm: Part-No.: WBF20-0500*

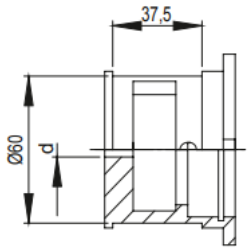
WHIPGUIDE BUSH



Part-no.	Tool-ø [mm] from - to	D [mm]	L [mm]
WB023-dddd	1,850 - 12,399	22,6	15

- *Drill-Ø 5 mm: Part-No.: WB023-0475*

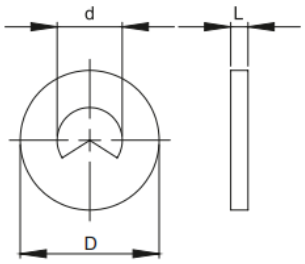
SEALING CASE



Part-no.	D [mm]	Execution
SC60-1	60	without bearing
SC60-2	60	with bearing

- *Please specify tool diameter d when ordering!*

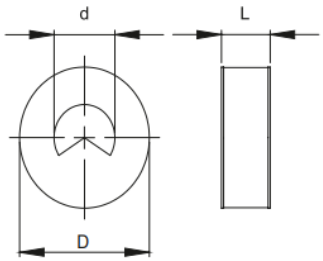
SEALING DISC



Part-no.	Tool-ø [mm] from - to	D [mm]	L [mm]
SD020-dddd	1,850 - 5,749	20	3
SD032-dddd	3,960 - 5,759	32	3
	5,750 - 20,509	32	4
SD040-dddd	5,750 - 20,509	40	4
SD090-dddd	23,610 - 40,999	90	4

- *Outside diameter 32, Drill-Ø 5 mm: Part-No.: SD032-0500!*

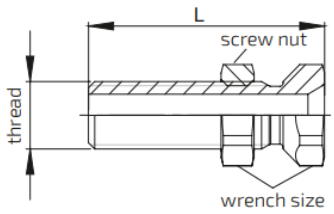
SEALING DISC (SPECIAL)



Part-no.	Tool-ø [mm] from - to	D [mm]	L [mm]
SDS20-dddd	2,900 - 5,249	20	7
SDS32-dddd	5,250 - 16,399	32	11
SDS40-dddd	16,400 - 25,609	40	12
SDS90-dddd	25,610 - 40,999	90	12

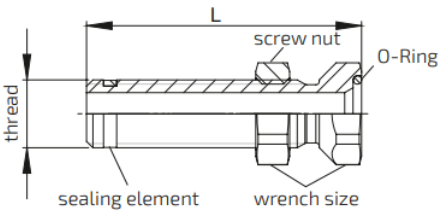
- *Drill-Ø 5 mm: Part-No.: SDS20-0500*

ADJUSTING SCREWS
WITHOUT SEALING ELEMENT



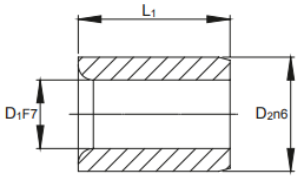
Part-no.	Thread	L [mm]	Sw [mm]
S06026	M6 x 0,5	26	9
S06045	M6 x 0,5	45	9
S10038	M10 x 1,0	38	13
S16057	M16 x 1,5	57	22

ADJUSTING SCREWS
WITH SEALING ELEMENT



Part-no.	Thread	L [mm]	Sw [mm]
S10050-1	M10 x 1,0	50	13
S16065-1	M16 x 1,5	65	22
S24090-1	M24 x 1,5	90	30

DRILL BUSHING



Cylindrical drill bushings to DIN 179A are available in intermediate design from through hardened tool steel or carbide.

Bushes also available in tolerance G6.

Minimum order for steel: in 0,1 mm range: 1 piece,
in 0,01 mm range: 3 piece
Minimum order for carbide: 5 piece

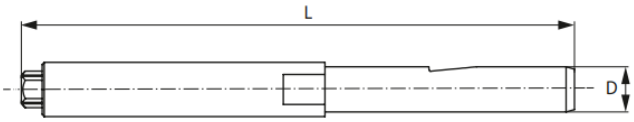
Part-no.	Tool-ø [mm] from - to	D1 [mm]	D2 [mm]	l1 [mm]
DB0003X09	0,800 - 1,099	0,800 - 1,099	3,00	9,00
DB0004X09	1,100 - 1,899	1,100 - 1,899	4,00	9,00
DB0005X09	1,900 - 2,699	1,900 - 2,699	5,00	9,00
DB0006X12	2,700 - 3,399	2,700 - 3,399	6,00	12,00
DB0007X12	3,400 - 4,099	3,400 - 4,099	7,00	12,00
DB0008X12	4,100 - 5,099	4,100 - 5,099	8,00	12,00
DB0010X16	5,100 - 6,099	5,100 - 6,099	10,00	16,00
DB0012X16	6,100 - 8,099	6,100 - 8,099	12,00	16,00
DB0015X20	8,100 - 10,099	8,100 - 10,099	15,00	20,00
DB0018X20	10,100 - 12,099	10,100 - 12,099	18,00	20,00
DB0022X28	12,100 - 15,099	12,100 - 15,099	22,00	28,00
DB0026X28	15,100 - 18,099	15,100 - 18,099	26,00	28,00
DB0030X36	18,100 - 22,099	18,100 - 22,099	30,00	36,00
DB0035X36	22,100 - 26,099	22,100 - 26,099	35,00	36,00
DB0042X45	26,100 - 30,099	26,100 - 30,099	42,00	45,00
DB0048X45	30,100 - 35,099	30,100 - 35,099	48,00	45,00
DB0055X56	35,100 - 40,000	35,100 - 40,000	55,00	56,00

- *Drill-Ø 10,00 Steel: Part-No.: DB0015X20ST*
- *Carbide Part-No.: DB0015X20HM*

DRILL BUSH HOLDER

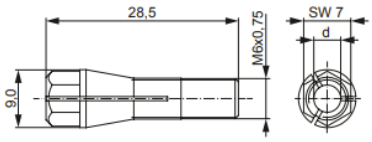
- *Drill bush holders in different sizes available. Please specify when ordering machine type.*

COLLET HOLDERS FOR SOLID CARBIDE SINGLE FLUTE DRILLS



- *Collet chucks in various dimensions available. Please specify when ordering dimensions.*

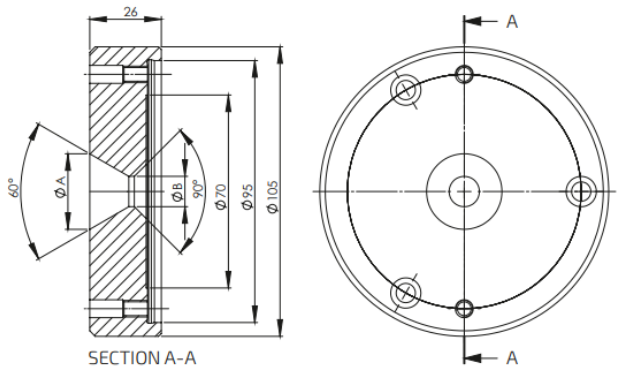
COLLETS FOR SOLID CARBIDE SINGLE FLUTE DRILLS



Part-no.	D1 [mm]
SW7-030	3
SW7-040	4

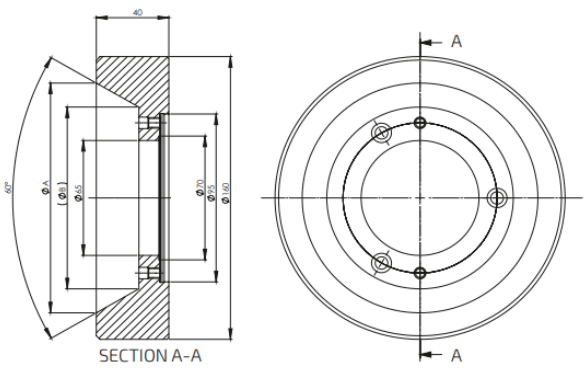
- *Special versions available from 1,0 mm to 3,9 mm in a pitch of 0,1 mm!*

CLAMPING CONES



Part-no.	ØA	ØB
CC0084015	8,4	1,5
CC0095025	9,5	2,5
CC0104035	10,4	3,5
CC0114045	11,4	4,5
CC0130055	13,0	5,5
CC0144065	14,4	6,5
CC0200075	20,0	7,5
CC0240085	24,0	8,5
CC0274110	27,4	11
CC0310130	31,0	13
CC0335160	33,5	16
CC0372190	37,2	19

CLAMPING CONES (SPECIAL)

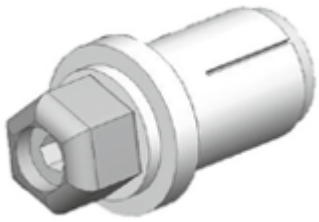


Part-no.	ØA	ØB
CC0410230	41,0	23
CC0430270	43,0	27
CC0530270	53,0	27
CC0650270	65,0	27
CC0750270	75,0	27
CC0820310	82,0	31
CC0930310	93,0	31
CC1040310	104,0	31
CC1150310	115,0	31
CC1260310	126,0	31
CC1320310	132,0	31

Part-no.	ØA	ØB
CC1300S1	130	102,86
CC1500S1	150	122,86

HOLE PLUG

Minimum order 20 pieces per order
Special sizes from 25 pieces available



- *Can plug and seal holes in the tolerance class H7, up to a maximum pressure of 130 bar.*

Part-no.	Hole-ø [mm]
HP0080	8
HP0090	9
HP0100	10
HP0110	11
HP0120	12
HP0130	13
HP0140	14
HP0150	15
HP0160	16

Part-no.	Hole-ø [mm]
HP0170	17
HP0180	18
HP0190	19
HP0200	20
HP0210	21
HP0220	22
HP0230	23
HP0240	24
HP0250	25

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