

botek[®]

DEEP HOLE DRILLING SYSTEMS
SOLID CARBIDE TOOLS

Deep hole drilling tools

Type 01, 02, 07, 07A



botek

NEW: Stock program Type 01



System single flute gundrills



The botek company

Manufacturing deep and precise holes is a technical challenge when processing metal. Accordingly specialising in deep hole drilling technology was the founding idea in 1974 of botek Präzisionsbohrtechnik GmbH in Riederich.

Botek grew to be an international supplier of deep hole drilling tools. Over 550 employees in the main company develop and manufacture single and two fluted tools, deep hole drilling tools BTA and Ejector systems as well as special tools.

A complete product program, regarding all deep hole drilling aspects and a team of highly qualified and dedicated cutting specialists make botek a competent partner for the automobile industry and their suppliers, shipbuilding industry, hydraulic industry as well as motor, gear and machine building companies.



- Please note our safety pointers at www.botek.de.
- Our General Standard Terms and Conditions, which we assume as known, apply.
- We reserve the right to make modifications in the interest of technical improvement. Such modifications cannot, in principle, be accepted as justifiable reasons for complaints.
- Subject to change. The manufacturer accepts no responsibility for misprints and other errors.

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Contents

- P. 2 The botek company
- P. 2 General terms and conditions, important notes
- P. 3 Contents

Tool Type 01

- P. 4, 5 Overview of types/ Areas of application
- P. 6 Advantages/Overview
- P. 7 Ordering data Ø 12.00 to 17.99 mm
- P. 8 Ordering data Ø 18.00 to 43.99 mm
- P. 9 Technical information
- P. 10 New chip breaker SP91 for Type 01 Ø 12.00 to 43.99 mm

Tool Type 02

- P. 11 Advantages/Overview
- P. 12 Ordering data Ø 37.00 to 74.99 mm
- P. 13 Technical information

Tool Type 07

- P. 14 Advantages/Overview
- P. 15 Ordering data Ø 25.00 to 50.99 mm

Tool Type 07 A

- P. 16 Advantages/Overview
- P. 17, 18 Ordering data Solid drill head Type 07 A Ø 51.00 to 113.99 mm
- P. 19 Ordering data Tool shaft Type 07 A Ø 51.00 to 113.99 mm
- P. 20 Technical information

Special tools

- P. 21 Single flute counterboring and form boring tools
- P. 22 Trepanning tool/Core cutter

Drivers

- P. 23 Type 01/Type 02/Type 07/Type 08/Type 09








Rotating coolant connector

- P. 24 For deep hole drilling tools with inner coolant supply Ø 12.00 to 113.99 mm

Technical appendix

- P. 25 Chip breakers
- P. 26 Requirements for application/Dimensions for the guide hole
- P. 27 Safety notes
- P. 28, 29 Drilling quality
- P. 30 Express order line/Stock program/Service
- P. 31 Tool lay-out

Overview of types

	Solid drilling tool Type 01
	Gundrill for solid drilling Type 02
	Gundrill for solid drilling Type 07
	Gundrill for solid drilling Type 07A
	Special tool Type 99-04
	Trepanning tool Type 99-08
	Core cutter Type 99-09

Areas of application

Page	Surface quality Ra	Drilling tolerance	Workpiece material					
			Steel			Cast iron	Alu	Cu
			Carbon steel	austenitic/ duplex	martenitic			
6	2 µm	IT 8	• • •	• • •	• • •	• • •	• • •	• • •
11	2 µm	IT 8	• • •	•	• • •	• • •	• • •	•
14	2 µm	IT 10	• • •	•	• • •	• • •	• • •	•
16	2 µm	IT 10	• • •	•	• • •	• • •	• • •	•
on request	2 µm	IT 8 (IT 7)	• • •	• •	• • •	• • •	• • •	• •
22	4 µm	IT 10	• • •	•	• •	• • •	• • •	•
22			• •	•	• •	• • •	• • •	•

• • • = good

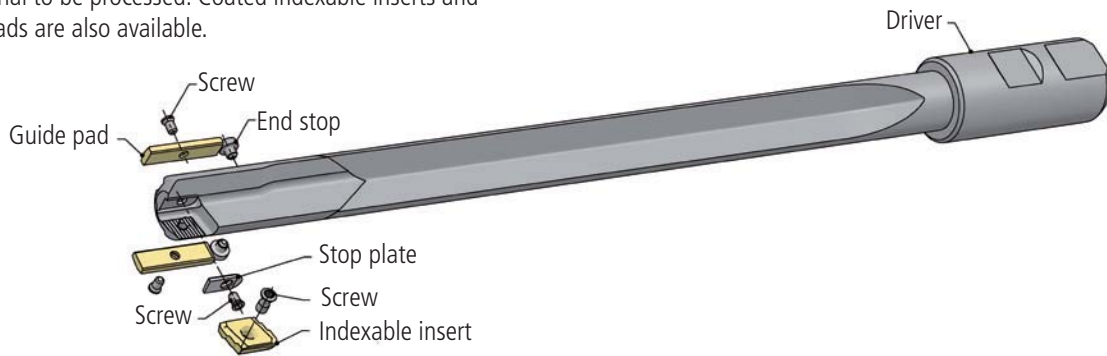
• = on average

Advantages/Overview

Type 01

Advantages

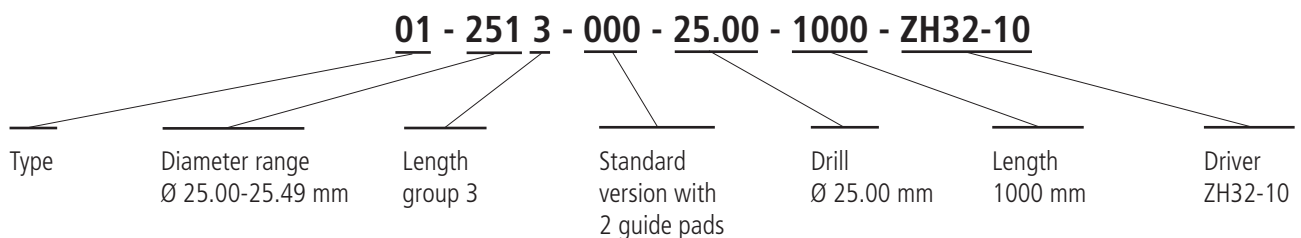
1. New, high-performance deep hole drilling tool with a modern, user-friendly design.
2. Very high operational efficiency combined with optimum cutting capacity.
3. Ideally suited to CNC machines with a coolant system. Drilling depths up to $40 \times D$ are possible in a single drilling cycle. Tools also produce excellent results when used on deep hole drilling machines.
4. No regrinding needed.
5. Various indexable insert chip breakers are available according to material to be processed. Coated indexable inserts and guide pads are also available.
6. Easy exchange of indexable inserts and guide pads. No need to adjust setting within ± 0.01 mm diameter.
7. When using matching interchangeable parts, the drill head \varnothing may, however, be adjusted within a range of 0.5 mm.
8. The model with extended guide pads (Type 01-010) is also suitable for crosshole drilling.
9. Drilling grades up to IT 8 are possible.
10. Retipping is possible.



Overview

Type	Drilling range	
Type 01-001 Gundrill for solid drilling	Standard version with 2 guide pads Drilling range: \varnothing 12.00 - 17.99 mm	
Type 01-000 Gundrill for solid drilling	Standard version with 2 guide pads Drilling range: \varnothing 18.00 - 43.99 mm	
Type 01-011 Gundrill for solid drilling	Version with extended guide pads 4 pieces Drilling range: \varnothing 12.00 - 17.99 mm	
Type 01-010 Gundrill for solid drilling	Version with extended guide pads 5 pieces Drilling range: \varnothing 18.00 - 43.99 mm	
Type 01-020 Gundrill for solid drilling	Milled shank with 2 guide pads Drilling range: \varnothing 18.00 - 43.99 mm limited length depending on drill diameter, on request	

Ordering example: 01-2513-000-25.00-1000-ZH32-10



Ordering data Type 01

Ø 12.00 to 17.99

Diameter range	Drilling tool	
	Type 01-001 Standard version with 2 guide pads	Type 01-011 Version with extended guide pads (4 pcs)
Ø (mm)		
12.00 - 12.49	01-121* -001	01-121* -011
12.50 - 12.99	01-122* -001	01-122* -011
13.00 - 13.49	01-131* -001	01-131* -011
13.50 - 13.99	01-132* -001	01-132* -011
14.00 - 14.49	01-141* -001	01-141* -011
14.50 - 14.99	01-142* -001	01-142* -011
15.00 - 15.49	01-151* -001	01-151* -011
15.50 - 15.99	01-152* -001	01-152* -011
16.00 - 16.49	01-161* -001	01-161* -011
16.50 - 16.99	01-162* -001	01-162* -011
17.00 - 17.49	01-171* -001	01-171* -011
17.50 - 17.99	01-172* -001	01-172* -011

The tools are available in steps of 0.05 mm in diameter.
Dimensions in between can be achieved in steps of 0.025 mm by using smaller guide pads only.
The tool diameter tolerance is ± 0.01 mm.

Length (mm) up to							
500	800	1,250	1,600	2,000	2,500	3,200	4,500
1	2	3	4	5	6	7	8
* Length groups							

Drill diameter					Replaceable insert			Indexable guide pads		Guide pad end stop		
Ø (mm)												
					1x	1x (alternative)	1x	2x (Type 01-001) 4x (Type 01-011)	2x (Type 01-001) 4x (Type 01-011)	2x	2x	
12.00	12.50	13.00	-	-	01-0675-321	-	Screw 21-0200-860 (M2.5 x 4.7)	Key 22-0600-925	01-0500-410/12	Screw 01-1300-840 (M2.2 x 4)	Key 01-1300-945	
12.05	12.55	13.05	-	-	01-0677-321	-			01-0501-410/12			
12.10	12.60	13.10	-	-	01-0680-321	-			01-0502-410/12			
12.15	12.65	13.15	-	-	01-0682-321	-			01-0503-410/12			
12.20	12.70	13.20	-	-	01-0685-321	-			01-0504-410/12			
12.25	12.75	13.25	-	-	01-0687-321	-			01-0505-410/12			
12.30	12.80	13.30	-	-	01-0690-321	-			01-0506-410/12			
12.35	12.85	13.35	-	-	01-0692-321	-			01-0507-410/12			
12.40	12.90	13.40	-	-	01-0695-321	-			01-0508-410/12			
12.45	12.95	13.45	-	-	01-0697-321	-			01-0509-410/12			
12.49	12.99	13.49	-	-	01-0699-321	-	01-0510-410/12					
13.50	14.00	14.50	15.00	-	01-0775-321	01-0775-311	Screw 22-0610-840 (M2.5 x 5.9)	Key 22-0600-925	01-0500-410/13	Screw 01-1300-840 (M2.2 x 4)	Key 01-1300-945	
13.55	14.05	14.55	15.05	-	01-0777-321	01-0777-311			01-0501-410/13			
13.60	14.10	14.60	15.10	-	01-0780-321	01-0780-311			01-0502-410/13			
13.65	14.15	14.65	15.15	-	01-0782-321	01-0782-311			01-0503-410/13			
13.70	14.20	14.70	15.20	-	01-0785-321	01-0785-311			01-0504-410/13			
13.75	14.25	14.75	15.25	-	01-0787-321	01-0787-311			01-0505-410/13			
13.80	14.30	14.80	15.30	-	01-0790-321	01-0790-311			01-0506-410/13			
13.85	14.35	14.85	15.35	-	01-0792-321	01-0792-311			01-0507-410/13			
13.90	14.40	14.90	15.40	-	01-0795-321	01-0795-311			01-0508-410/13			
13.95	14.45	14.95	15.45	-	01-0797-321	01-0797-311			01-0509-410/13			
13.99	14.49	14.99	15.49	-	01-0799-321	01-0799-311			01-0510-410/13			
15.50	16.00	16.50	17.00	17.50	01-0905-321	01-0905-311			01-0500-410/15			
15.55	16.05	16.55	17.05	17.55	01-0907-321	01-0907-311			01-0501-410/15			
15.60	16.10	16.60	17.10	17.60	01-0910-321	01-0910-311			01-0502-410/15			
15.65	16.15	16.65	17.15	17.65	01-0912-321	01-0912-311			01-0503-410/15			
15.70	16.20	16.70	17.20	17.70	01-0915-321	01-0915-311			01-0504-410/15			
15.75	16.25	16.75	17.25	17.75	01-0917-321	01-0917-311			01-0505-410/15			
15.80	16.30	16.80	17.30	17.80	01-0920-321	01-0920-311			01-0506-410/15			
15.85	16.35	16.85	17.35	17.85	01-0922-321	01-0922-311			01-0507-410/15			
15.90	16.40	16.90	17.40	17.90	01-0925-321	01-0925-311	01-0508-410/15					
15.95	16.45	16.95	17.45	17.95	01-0927-321	01-0927-311	01-0509-410/15					
15.99	16.49	16.99	17.49	17.99	01-0929-321	01-0929-311	01-0510-410/15					

Ordering data Single flute gundrill Type 01

Ø 18.00 to 43.99

Drilling range from - up to	Drilling tool		Indexable insert				Stop plate		Guide pads		Guide pad end stop				
	Type 01-000 Standard version with 2 guide pads	Type 01-010 Version with extended guide pads (5 pcs)	Indexable insert	Indexable insert alternative	Screw	Key	Stop plate	Screw	Guide pads	Screw	Screw				
Ø (mm)															
			1x	1x	1x		1x	1x	2x / 5x	2x / 5x	2x				
18.00 - 18.49	01-181*-000	01-181*-010	01-1810-310	01-1810-320	21-0100-830	22-0600-935	01-2050-610-S... Order no. depends on drill diameter. Please specify when ordering	01-0200-860 (M 2.5 x 4.3)	01-1800-410	21-0200-860 (M 2.5 x 4.7)	DIN 7984-M3x3				
18.50 - 18.99	01-182*-000	01-182*-010	01-1820-310	01-1820-320	(M 3 x 6.9)				22-0600-830 (M 3 x 8.4)	01-1900-410		22-0600-925			
19.00 - 19.49	01-191*-000	01-191*-010	01-1910-310	01-1910-320						01-2000-410					
19.50 - 19.99	01-192*-000	01-192*-010	01-1920-310	01-1920-320						01-2100-410		22-0610-840 (M 2.5 x 5.9)			
20.00 - 20.49	01-201*-000	01-201*-010	01-2010-310	01-2010-320						01-2200-410		22-0600-925			
20.50 - 20.99	01-202*-000	01-202*-010	01-2020-310	01-2020-320						01-2300-410					
21.00 - 21.49	01-211*-000	01-211*-010	01-2110-310	01-2110-320											
21.50 - 21.99	01-212*-000	01-212*-010	01-2120-310	01-2120-320											
22.00 - 22.49	01-221*-000	01-221*-010	01-2210-310	01-2210-320											
22.50 - 22.99	01-222*-000	01-222*-010	01-2220-310	01-2220-320											
23.00 - 23.49	01-231*-000	01-231*-010	01-2310-310	01-2310-320											
23.50 - 23.99	01-232*-000	01-232*-010	01-2320-310	01-2320-320											
24.00 - 24.49	01-241*-000	01-241*-010	01-2410-310	01-2410-320	21-0400-830 (M 4 x 9)				22-0900-935	01-2400-610-S... Order no. depends on drill diameter. Please specify when ordering		21-0200-860 (M 2.5 x 4.7)	01-2400-410		DIN 7984-M4x4
24.50 - 24.99	01-242*-000	01-242*-010	01-2420-310	01-2420-320	22-0900-830 (M 4 x 11)								01-2500-410	22-0600-820 (M 2.5 x 8.2)	
25.00 - 25.49	01-251*-000	01-251*-010	01-2510-310	01-2510-320			01-2600-410								
25.50 - 25.99	01-252*-000	01-252*-010	01-2520-310	01-2520-320			01-2700-410	22-0600-925							
26.00 - 26.49	01-261*-000	01-261*-010	01-2610-310	01-2610-320			01-2800-410								
26.50 - 26.99	01-262*-000	01-262*-010	01-2620-310	01-2620-320			01-2900-410								
27.00 - 27.49	01-271*-000	01-271*-010	01-2710-310	01-2710-320			01-3000-410	22-0800-840 (M 3 x 8.2)							
27.50 - 27.99	01-272*-000	01-272*-010	01-2720-310	01-2720-320			01-3100-410								
28.00 - 28.49	01-281*-000	01-281*-010	01-2810-310	01-2810-320			01-3200-410	22-0600-935							
28.50 - 28.99	01-282*-000	01-282*-010	01-2820-310	01-2820-320			01-3300-410								
29.00 - 29.49	01-291*-000	01-291*-010	01-2910-310	01-2910-320											
29.50 - 29.99	01-292*-000	01-292*-010	01-2920-310	01-2920-320											
30.00 - 30.49	01-301*-000	01-301*-010	01-3010-310	01-3010-320											
30.50 - 30.99	01-302*-000	01-302*-010	01-3020-310	01-3020-320											
31.00 - 31.49	01-311*-000	01-311*-010	01-3110-310	01-3110-320											
31.50 - 31.99	01-312*-000	01-312*-010	01-3120-310	01-3120-320											
32.00 - 32.49	01-321*-000	01-321*-010	01-3210-310	01-3210-320											
32.50 - 32.99	01-322*-000	01-322*-010	01-3220-310	01-3220-320											
33.00 - 33.49	01-331*-000	01-331*-010	01-3310-310	01-3310-320	22-1200-830 (M 5 x 12.5)	22-1200-935	01-3750-610-S... Order no. depends on drill diameter. Please specify when ordering	21-0600-860 (M 3 x 6.7)	01-3400-410		DIN 7984-M5x5				
33.50 - 33.99	01-332*-000	01-332*-010	01-3320-310	01-3320-320						01-3500-410					
34.00 - 34.49	01-341*-000	01-341*-010	01-3410-310	01-3410-320						01-3600-410					
34.50 - 34.99	01-342*-000	01-342*-010	01-3420-310	01-3420-320											
35.00 - 35.49	01-351*-000	01-351*-010	01-3510-310	01-3510-320											
35.50 - 35.99	01-352*-000	01-352*-010	01-3520-310	01-3520-320											
36.00 - 36.49	01-361*-000	01-361*-010	01-3610-310	01-3610-320											
36.50 - 36.99	01-362*-000	01-362*-010	01-3620-310	01-3620-320											
37.00 - 37.49	01-371*-000	01-371*-010	01-3710-310							01-3700-410		22-1200-840 (M 3.5 x 11.4)			
37.50 - 37.99	01-372*-000	01-372*-010	01-3720-310							01-3800-410					
38.00 - 38.49	01-381*-000	01-381*-010	01-3810-310							01-3900-410					
38.50 - 38.99	01-382*-000	01-382*-010	01-3820-310							01-4000-410		22-0900-935			
39.00 - 39.49	01-391*-000	01-391*-010	01-3910-310							01-4100-410					
39.50 - 39.99	01-392*-000	01-392*-010	01-3920-310							01-4200-410					
40.00 - 40.49	01-401*-000	01-401*-010	01-4010-310												
40.50 - 40.99	01-402*-000	01-402*-010	01-4020-310												
41.00 - 41.49	01-411*-000	01-411*-010	01-4110-310												
41.50 - 41.99	01-412*-000	01-412*-010	01-4120-310												
42.00 - 42.49	01-421*-000	01-421*-010	01-4210-310												
42.50 - 42.99	01-422*-000	01-422*-010	01-4220-310												
43.00 - 43.49	01-431*-000	01-431*-010	01-4310-310												
43.50 - 43.99	01-432*-000	01-432*-010	01-4320-310												

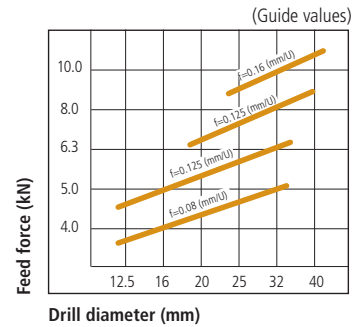
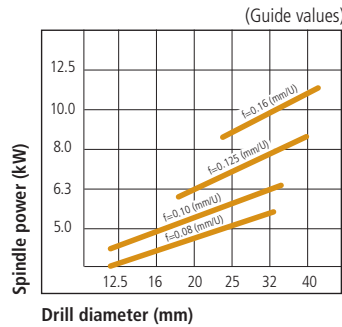
Length (mm) up to

500	800	1.250	1.600	2.000	2.500	3.200	4.500
1	2	3	4	5	6	7	8

* Length groups

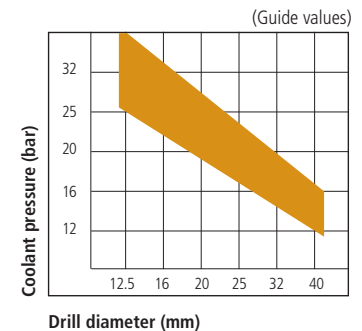
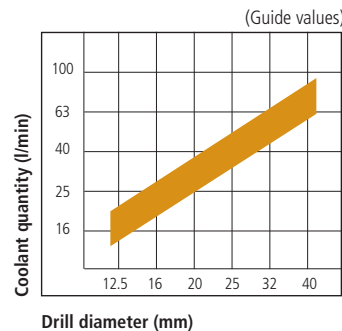
Performance diagrams

These values are guide values for toughened steel rated $\sim 800 \text{ N/mm}^2$ and may deviate depending on workpiece material and characteristics, as well as tool condition.



Coolant information

Proper chip removal is only assured if the coolant is supplied to the tool in sufficient quantity and under sufficient pressure.



Guide values for deep hole drilling of different materials

Guide values for cutting speed and feed rate are shown in the table below.

As there are many factors that can affect the results of deep-hole drilling, these values must be adjusted if necessary.

Material / Mechanical strength properties	Cutting speed (m/min)	Feed (mm/rev) for drill diameter (mm)				Carbide grades		
		12.00 - 17.99	18.00 - 24.99	25.00 - 31.99	32.00 - ...	Indexable insert		Guide pad
						up to $\varnothing 17.99$	from $\varnothing 18.00$	
Construction steel $\leq 700 \text{ N/mm}^2$	80 - 100	0.06 - 0.10	0.08 - 0.11	0.10 - 0.14	0.13 - 0.16	K 30 B - 1	P 25 B - 1	P 20 B
Case hardened steel $\leq 700 \text{ N/mm}^2$				0.10 - 0.13	0.12 - 0.15			
Case hardened steel $\leq 1,100 \text{ N/mm}^2$	70 - 80	0.06 - 0.09	0.08 - 0.10	0.10 - 0.14	0.13 - 0.16	K 30 BX - 91	P 25 BX - 91	
Heat treated steel $\leq 700 \text{ N/mm}^2$	70 - 90			0.10 - 0.13	0.12 - 0.15			
Heat treated steel $\leq 1,100 \text{ N/mm}^2$	55 - 75			0.10 - 0.13	0.12 - 0.15			
Nitriding steel $\leq 1,100 \text{ N/mm}^2$		0.06 - 0.09	0.08 - 0.10	0.09 - 0.12	0.11 - 0.14			
Ferritic steel $\leq 900 \text{ N/mm}^2$	60 - 80	0.06 - 0.10	0.08 - 0.11	0.10 - 0.14	0.13 - 0.16	K 10 B - 1	K 10 B-2	
Austenitic steel (stainless)		0.06 - 0.09	0.08 - 0.10	0.10 - 0.12	0.12 - 0.14			
Heat resisting steel (stainless), Tool steel	50 - 70	0.06 - 0.10	0.08 - 0.11	0.10 - 0.14	0.13 - 0.16	K 30 BX - 91	P 25 BX - 91	
Steel castings $\leq 700 \text{ N/mm}^2$	60 - 80							
Nodular cast iron $\leq 1,100 \text{ N/mm}^2$	65 - 80	0.08 - 0.12	0.10 - 0.13	0.12 - 0.15	0.14 - 0.18			
Cast iron, alloyed and unalloyed	70 - 100							
Aluminium and Aluminium alloys	100 - 200	0.07 - 0.11	0.09 - 0.12	0.10 - 0.14	0.12 - 0.18	K 10 - 1	K 10 - 1	
Copper Cu-content < 99%	120 - ...	0.04 - 0.09	0.06 - 0.10	0.08 - 0.12	0.10 - 0.14			

High performance inserts for high productivity and wide range of application

New chip breaker SP91 for Type 01 Ø 12.00 to 43.99 mm

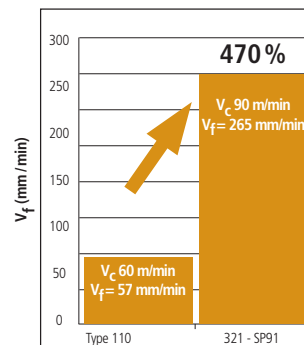
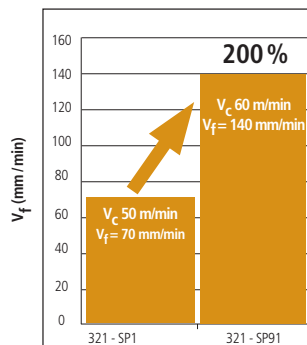
Advantages

1. **Higher feedrate and higher cutting speed** compared to chip breakers SP1 and SP2.
2. **Up to 400% higher productivity and more** compared to conventional gundrills.
3. **Higher lifetime per insert** together with improved process reliability.
4. Positive chip breaker for good chip control also with long chipping steels.
5. Application for material groups **ISO P** and **ISO M**.
6. Available in **standard grades K30BX** (Ø 12.00 - 17.99 mm) and **P25BX** (Ø 18.00 - 43.99 mm).



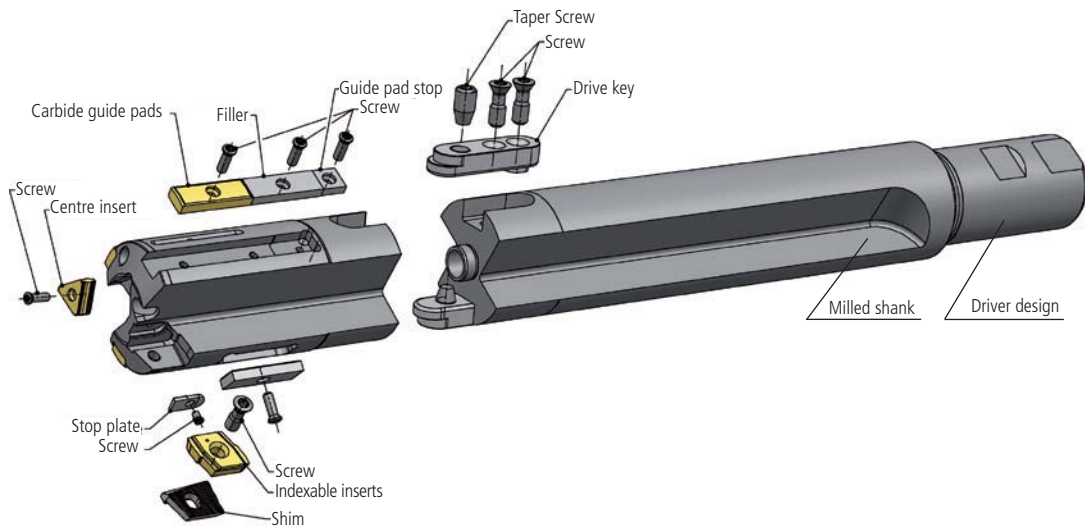
Sample applications Type 01/Comparison

Material:	40CrMnNiMo8-6-4/1.2738	X17CrNi16-2/1.4057
Strength:	1100 N/mm ²	950 N/mm ²
Application:	Mold production	Special machine
Type of tool:	Type 01 (Gundrill)	Type 01 (Gundrill)
Drill-Ø:	15 mm	13.5 mm
Drilling depth:	1100 mm	260 mm
Cutting speed v_c :	60 m/min	90 m/min
Feed f :	0.11 mm/rev.	0.125 mm/rev.
Coolant:	Water soluble/Emulsion	Oil



Advantages

1. New, high-performance deep hole drilling tool with a modern, user-friendly design.
2. Very high operational efficiency combined with optimum cutting capacity.
3. Ideally suited to CNC machines with a coolant system. Drilling depths up to $40 \times D$ are possible in a single drilling cycle. Tools also produce excellent results when used on deep hole drilling machines.
4. No regrinding needed.
5. Various indexable insert chip breakers are available according to material to be processed. Coated indexable inserts and guide pads are also available.
6. Easy exchange of indexable inserts and guide pads. No need to adjust setting within ± 0.01 mm diameter.
7. When using matching interchangeable parts, the drill head diameter may, however, be adjusted within a range of 0.5 mm.
8. The model with extended guide pads (Type 02-010) is also suitable for crosshole drilling.
9. Drilling grades up to IT 8 are possible.
10. Centre insert with 6 cutting edges.



Overview

Type	Drilling range	
Type 02-000 Solid drilling tool	Standard version with 3 guide pads Drilling range: Ø 37.00 - 74.99 mm (larger diameters on request)	
Type 02-010 Solid drilling tool	Version with extended guide pads (7 pcs) Drilling range: Ø 37.00 - 74.99 mm (larger diameters on request)	

Ordering data Single flute gundrill Type 02

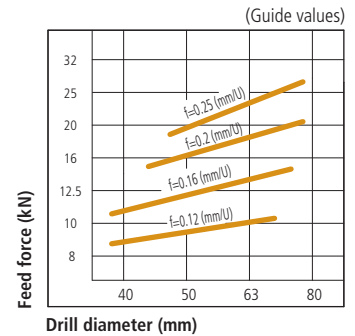
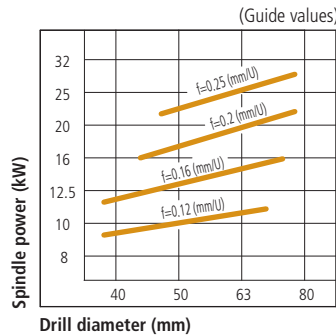
Ø 37.00 to 74.99 mm

Drilling range from - up to	Drill head complete ...000=3xHMFL ...010=7xHMFL	Milled shank (No. assignment after order entry)	Shank spares		Peripheral insert			Stop plate		Centre inserts		Guide pads		
			Drive Key	Taper screw / Screw	Shim	Indexable inserts	Screw / Key	Stop plate	Screw / Key	Centre inserts	Screw / Key	Guide pads	Guide pad end stop	Screw / Key
Ø (mm)														
			2x	2x	1x	1x	1x	1x	1x	1x	1x	3x (7x)	3x	3x
37.00-37.49	02-3701-...	99-023720...	99-023713-100	Taper screw: 99-024414-047 Screw: 22-1200-830	22-0910-710	02-1200-310	Screw: 22-0900-831 (M4x12) Key: 22-0900-935	01-2050-610S... When re-ordering please state dimension S.	Screw: 01-0200-860 (M2.5x4.4) Key: 22-0600-925	22-0800-211	Screw: 22-0800-820 (M3x10.3) Key: 22-0600-935	10-0800-410/36	Guide pad end stop: 10-0800-419S... S = 0.025; S = 0.05; S = 0.10 When re-ordering please state dimension S. End stop: 10-0800-625	Screw: 22-0800-840 (M3x8.2) Key: 22-0600-935
37.50-37.99	02-3703-...	99-023820...												
38.00-38.49	02-3801-...	99-023820...												
38.50-38.99	02-3803-...	99-023920...												
39.00-39.49	02-3901-...	99-024020...												
39.50-39.99	02-3903-...	99-024120...												
40.00-40.49	02-4001-...	99-024220...												
40.50-40.99	02-4003-...	99-024320...												
41.00-41.49	02-4101-...	99-024420...												
41.50-41.99	02-4103-...	99-024520...												
42.00-42.49	02-4201-...	99-024620...	99-024013-090	Taper screw: 99-024014-090 Screw: 22-1500-830	22-1030-710	02-1350-310	Screw: 22-1200-831 (M5x14.2) Key: 22-1200-935	01-2400-610S... When re-ordering please state dimension S.	Screw: 21-0200-860 (M2.5x4.7) Key: 22-0600-925	22-1100-211	Screw: 22-1200-840 (M3.5x11.4) Key: 22-0900-935	10-0800-410/40	Guide pad end stop: 10-1000-419S... S = 0.025; S = 0.05; S = 0.10 When re-ordering please state dimension S. End stop: 10-1000-625	Screw: 22-1200-840 (M3.5x11.4) Key: 22-0900-935
42.50-42.99	02-4203-...	99-024720...												
43.00-43.49	02-4301-...	99-024820...												
43.50-43.99	02-4303-...	99-024920...												
44.00-44.49	02-4401-...	99-025020...												
44.50-44.99	02-4403-...	99-025120...												
45.00-45.49	02-4501-...	99-025220...												
45.50-45.99	02-4503-...	99-025320...												
46.00-46.49	02-4601-...	99-025420...												
46.50-46.99	02-4603-...	99-025520...												
47.00-47.49	02-4701-...	99-025620...	99-025013-076	Taper screw: 99-025214-059 Screw: 22-1500-831	22-1240-710	02-1650-310	Screw: 22-1200-831 (M5x14.2) Key: 22-1200-935	01-2400-610S... When re-ordering please state dimension S.	Screw: 21-0200-860 (M2.5x4.7) Key: 22-0600-925	22-1300-211	Screw: 22-1200-840 (M3.5x11.4) Key: 22-0900-935	10-1000-410/46	Guide pad end stop: 10-1000-419S... S = 0.025; S = 0.05; S = 0.10 When re-ordering please state dimension S. End stop: 10-1000-625	Screw: 22-1200-840 (M3.5x11.4) Key: 22-0900-935
47.50-47.99	02-4703-...	99-025720...												
48.00-48.49	02-4801-...	99-025820...												
48.50-48.99	02-4803-...	99-025920...												
49.00-49.49	02-4901-...	99-026020...												
49.50-49.99	02-4903-...	99-026120...												
50.00-50.49	02-5001-...	99-026220...												
50.50-50.99	02-5003-...	99-026320...												
51.00-51.49	02-5101-...	99-026420...												
51.50-51.99	02-5103-...	99-026520...												
52.00-52.49	02-5201-...	99-026620...	99-025013-078	Taper screw: 99-025214-059 Screw: 22-1500-831	22-1340-710	02-1800-310	Screw: 22-1200-831 (M5x14.2) Key: 22-1200-935	01-2400-610S... When re-ordering please state dimension S.	Screw: 21-0200-860 (M2.5x4.7) Key: 22-0600-925	22-1500-211	Screw: 22-1500-820 (M3.5x14) Key: 22-0900-935	10-1000-410/47	Guide pad end stop: 10-1200-419S... S = 0.025; S = 0.05; S = 0.10 When re-ordering please state dimension S. End stop: 10-1200-625	Screw: 22-1200-840 (M3.5x11.4) Key: 22-0900-935
52.50-52.99	02-5203-...	99-026720...												
53.00-53.49	02-5301-...	99-026820...												
53.50-53.99	02-5303-...	99-026920...												
54.00-54.49	02-5401-...	99-027020...												
54.50-54.99	02-5403-...	99-027120...												
55.00-55.49	02-5501-...	99-027220...												
55.50-55.99	02-5503-...	99-027320...												
56.00-56.49	02-5601-...	99-027420...												
56.50-56.99	02-5603-...													
57.00-57.49	02-5701-...		99-027013-078	Taper screw: 99-027014-078 Screw: 99-027008-078	22-1500-710	02-1900-310	Screw: 22-1500-831 (M6x17.5) Key: 22-1500-935	01-3750-610S... When re-ordering please state dimension S.	Screw: 01-0600-860 (M3x6.7) Key: 22-0600-935	22-1500-211	Screw: 22-1500-820 (M3.5x14) Key: 22-0900-935	10-1000-410/49	Guide pad end stop: 10-1200-419S... S = 0.025; S = 0.05; S = 0.10 When re-ordering please state dimension S. End stop: 10-1200-625	Screw: 22-1600-840 (M5x15) Key: 22-1200-935
57.50-57.99	02-5703-...													
58.00-58.49	02-5801-...													
58.50-58.99	02-5803-...													
59.00-59.49	02-5901-...													
59.50-59.99	02-5903-...													
60.00-60.49	02-6001-...													
60.50-60.99	02-6003-...													
61.00-61.49	02-6101-...													
61.50-61.99	02-6103-...													
62.00-62.49	02-6201-...		99-027013-078	Taper screw: 99-027014-078 Screw: 99-027008-078	22-1630-710	02-2150-310	Screw: 22-1500-831 (M6x17.5) Key: 22-1500-935	01-3750-610S... When re-ordering please state dimension S.	Screw: 01-0600-860 (M3x6.7) Key: 22-0600-935	22-1500-211	Screw: 22-1500-820 (M3.5x14) Key: 22-0900-935	10-1000-410/51	Guide pad end stop: 10-1500-419S... S = 0.025; S = 0.05; S = 0.10 When re-ordering please state dimension S. End stop: 10-1500-625	Screw: 22-1600-840 (M5x15) Key: 22-1200-935
62.50-62.99	02-6203-...													
63.00-63.49	02-6301-...													
63.50-63.99	02-6303-...													
64.00-64.49	02-6401-...													
64.50-64.99	02-6403-...													
65.00-65.49	02-6501-...													
65.50-65.99	02-6503-...													
66.00-66.49	02-6601-...													
66.50-66.99	02-6603-...													
67.00-67.49	02-6701-...		99-027013-078	Taper screw: 99-027014-078 Screw: 99-027008-078	22-1630-710	02-2370-310	Screw: 22-1500-831 (M6x17.5) Key: 22-1500-935	01-3750-610S... When re-ordering please state dimension S.	Screw: 01-0600-860 (M3x6.7) Key: 22-0600-935	22-1500-211	Screw: 22-1500-820 (M3.5x14) Key: 22-0900-935	10-1000-410/53	Guide pad end stop: 10-1500-419S... S = 0.025; S = 0.05; S = 0.10 When re-ordering please state dimension S. End stop: 10-1500-625	Screw: 22-1600-840 (M5x15) Key: 22-1200-935
67.50-67.99	02-6703-...													
68.00-68.49	02-6801-...													
68.50-68.99	02-6803-...													
69.00-69.49	02-6901-...													
69.50-69.99	02-6903-...													
70.00-70.49	02-7001-...													
70.50-70.99	02-7003-...													
71.00-71.49	02-7101-...													
71.50-71.99	02-7103-...													
72.00-72.49	02-7201-...		99-027013-078	Taper screw: 99-027014-078 Screw: 99-027008-078	22-1630-710	02-2370-310	Screw: 22-1500-831 (M6x17.5) Key: 22-1500-935	01-3750-610S... When re-ordering please state dimension S.	Screw: 01-0600-860 (M3x6.7) Key: 22-0600-935	22-1500-211	Screw: 22-1500-820 (M3.5x14) Key: 22-0900-935	10-1000-410/55	Guide pad end stop: 10-1500-419S... S = 0.025; S = 0.05; S = 0.10 When re-ordering please state dimension S. End stop: 10-1500-625	Screw: 22-1600-840 (M5x15) Key: 22-1200-935
72.50-72.99	02-7203-...													
73.00-73.49	02-7301-...													
73.50-73.99	02-7303-...													
74.00-74.49	02-7401-...													
74.50-74.99	02-7403-...													

Larger diameters on request.

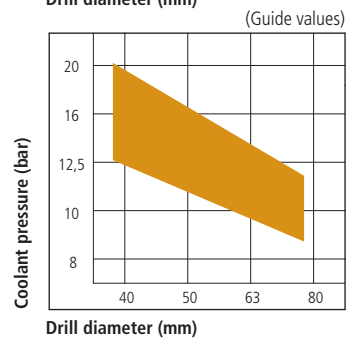
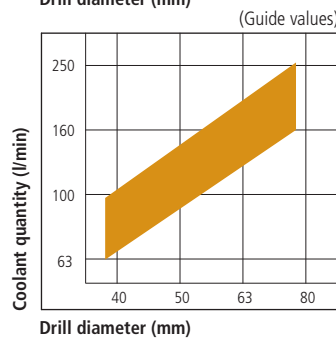
Performance diagrams

These guide values are for drilling alloyed steel (800 N/mm²) and can vary for other workpiece materials and tool conditions (wear).



Coolant information

Sufficient coolant must be supplied to the tool for troublefree chip removal.



Guide values for deep hole drilling of different materials

Guide values for cutting speed and feed rate are shown in the table below.

As there are many factors that can affect the results of deep-hole drilling, these values must be adjusted if necessary.

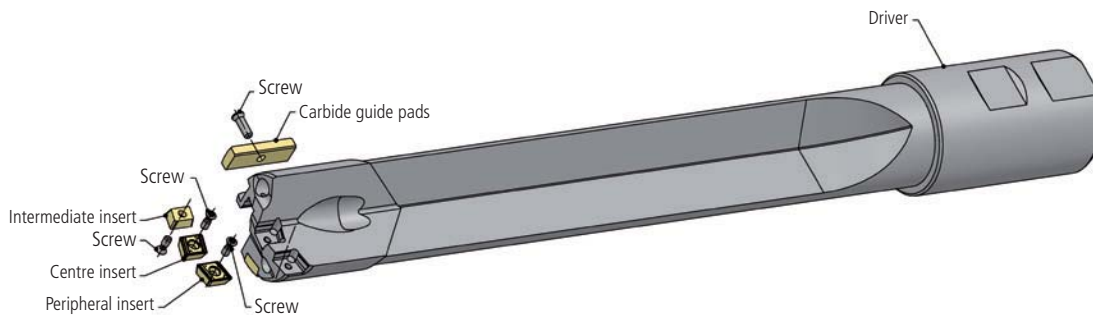
Material / Mechanical strength properties	Cutting speed (m/min)	Feed (mm/rev) for drill diameter (mm)			Carbide grades		
		37.00 - 51.99	52.00 - 67.99	68.00 - 74.99	Indexable insert	Centre insert	Guide pads
Free machining steel ≤ 700 N/mm ²	80 - 100	0.14 - 0.20	0.16 - 0.22	0.18 - 0.25	P 25 B - 2	P 40 B - 1	P 20 B
Case hardening steel ≤ 700 N/mm ²							
Case hardening steel ≤ 1,100 N/mm ²	70 - 80	0.12 - 0.18	0.14 - 0.20	0.16 - 0.22	P 25 B - 5	P 40 B - 1	
Heat treated steel ≤ 700 N/mm ²	70 - 90	0.14 - 0.20	0.16 - 0.22	0.18 - 0.25			
Heat treated steel ≤ 1,100 N/mm ²	55 - 75	0.12 - 0.18	0.14 - 0.20	0.16 - 0.22	K 10 B - 2	K 10 - 1	
Nitriding steel ≤ 1,100 N/mm ²							
Ferritic steel ≤ 900 N/mm ²	60 - 80	0.12 - 0.16	0.14 - 0.18	0.16 - 0.20	P 25 B - 5	P 40 B - 1	
Austenitic steel (stainless)							
Heat resisting steel (stainless), Tool steel	50 - 70	0.12 - 0.18	0.14 - 0.20	0.16 - 0.22	P 25 B - 5	P 40 B - 1	
Steel castings ≤ 700 N/mm ²	60 - 80	0.14 - 0.20	0.16 - 0.22	0.18 - 0.25			
Nodular cast iron ≤ 1,100 N/mm ²	65 - 80	0.16 - 0.20	0.18 - 0.25	0.20 - 0.25	K 10 - 1	K 10 - 1	
Cast iron, alloyed and unalloyed	70 - 100						
Aluminium and Aluminium alloys	100 - 200	0.12 - 0.16	0.14 - 0.18	0.16 - 0.20	K 10 - 1	K 10 - 1	
Copper Cu-content < 99%	120 - ...	0.10 - 0.14	0.12 - 0.16	0.14 - 0.18			

Advantages/Overview

Type 07

Advantages

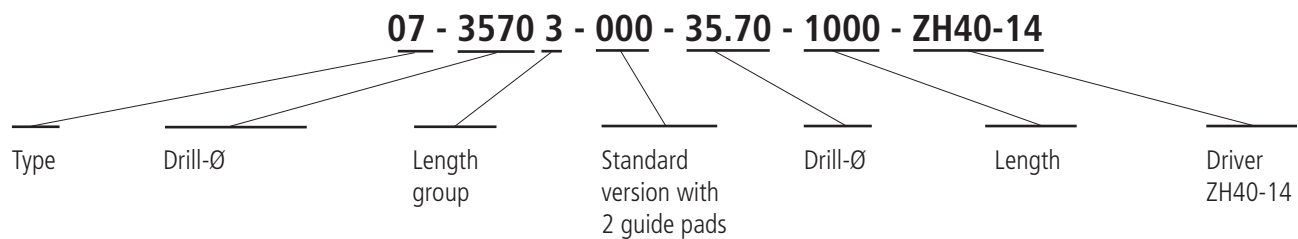
1. Newly developed high performance drilling tool for roughing.
2. Few exchangeable spare parts for the whole drilling range.
3. Minimal universal chip breaker design for high feed rates and high productivity.
4. Simple handling through fixed insert pockets.
5. Suitable for almost all machines with inner coolant supply.
6. Retipping is possible.



Overview









Type	Drilling range	
Type 07-000 Solid drilling tool	Version with 2 guide pads Drilling range: Ø 25.00 - 50.99 mm (larger diameters on request)	
Type 07-010 Solid drilling tool	Version with 5 guide pads Drilling range: Ø 25.00 - 50.99 mm (larger diameters on request)	

Ordering example: 07-35703-000-35.70-1000-ZH40-14



Ordering data Single flute gundrill Type 07

Ø 25.00 to 50.99 mm

Drilling range	Peripheral insert		Intermediate insert		Centre insert		Carbide guide pads		
Ø (mm)									
	1x	1x	1x	1x	1x	1x	2x	2x	
25.00 - 28.99	70-0550-310	Screw 22-0610-840 M 2.5 x 5.9	70-0550-310	Screw 22-0610-840 M 2.5 x 5.9	70-0550-210	Screw 22-0610-840 M 2.5 x 5.9	70-0600-410/24	Screw 22-0610-840 M 2.5 x 5.9	
29.00 - 29.99					70-0650-210				Key 22-0600-925
30.00 - 31.99	70-0650-310	Key 22-0600-925	70-0650-310	Key 22-0600-925	70-0800-210	Key 22-0600-925	70-0700-410/28	Key 22-0600-925	
32.00 - 34.99									
35.00 - 38.99	70-0800-310	Screw 22-0600-830 M 3 x 8.4	70-0800-310	Screw 22-0600-830 M 3 x 8.4	70-0950-210	Key 22-0600-935	10-0800-410/38	Screw 22-0600-830 M 3 x 8.4	
39.00 - 41.99									Key 22-0600-935
42.00 - 44.99									
45.00 - 47.99	70-0950-310	Key 22-0600-935	70-0950-310	Key 22-0600-935	10-1000-410/45	Key 22-0900-935	Screw 22-1200-840 M 3.5 x 11.4		
48.00 - 50.99								Key 22-0900-935	

Length groups

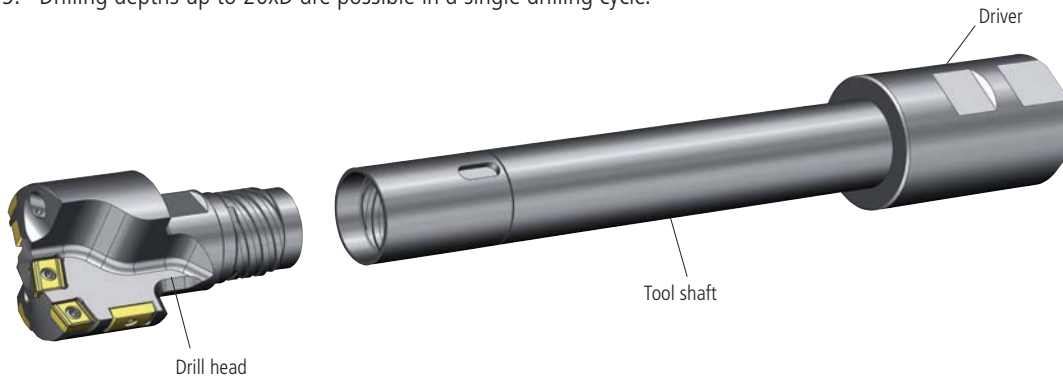
Length (mm) up to							
500	800	1,250	1,600	2,000	2,500	3,200	4,500
1	2	3	4	5	6	7	8
Length groups							

Advantages/Overview

Type 07 A

Advantages

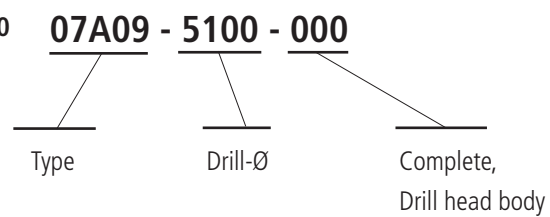
1. Suitable for almost all machines (machining center, conventional lathe, deep hole drilling machine).
2. Few and cost-effective spare parts for the whole drilling range.
3. Best dimensional accuracy at large drilling depths and smallest centerline deviation.
4. Excellent surface quality realizable.
5. Drilling depths up to 20xD are possible in a single drilling cycle.



Overview

Type	Drilling range	
Type 07 A Solid drilling tool	Version with 3 guide pads Drilling range: Ø 51.00 - 113.99 mm (larger diameters on request)	


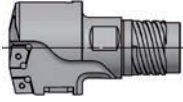

Drill head Ordering example: 07A09-5100-000






Ordering data Type 07A

Ø 51.00 to 113.99 mm

Type 07 A Ø 51.00 - 64.99 mm (without cassettes)

Drill tube size	Drill tube outer Ø Da (mm)	Drilling range from - to	Solid drill head		
			Complete	Drill head body	Key
09	33	51.00 - 56.99			
10	36	57.00 - 64.99	07A09 - xxx - 000	07A09 - xxx - 100	30
			07A10 - xxx - 000	07A10 - xxx - 100	32

Type 07 A Ø 65.00 - 113.99 mm (with cassettes)











Drill tube size	Drill tube outer Ø Da (mm)	Drilling range from - to	Solid drill head		
			Complete	Drill head body	Key
12	43	65.00 - 73.99			
14	51	74.00 - 84.99	07A12 - xxx - 000	07A12 - xxx - 100	38
16	56	85.00 - 96.49	07A14 - xxx - 000	07A14 - xxx - 100	46
18	68	96.50 - 113.99	07A16 - xxx - 000	07A16 - xxx - 100	50
			07A18 - xxx - 000	07A18 - xxx - 100	34-1800-910










Note:











Drill heads beyond the drill range Ø 51.00 - 113.99 and divergent drill tube Ø may be supplied on request as **special drill head 99-07...**

Ordering data Type 07 A

Drilling range Ø 51.00 to 113.99 mm

Drilling range	Peripheral insert		Stop plate		Centre insert		Support pad		Guide pads	
from - up to										
	1x	1x	1x	1x	1x	1x	1x	1x	2x	2x
51.00 - 56.99	70-0950-310	22-0600-830 (M 3 x 8.4)	70-0950-310	22-0600-830 (M 3 x 8.4)	70-1250-210	22-0600-830 (M 3 x 8.4)	10-0890-410/38	22-0600-830 (M 3 x 8.4)	10-1000-410/45	22-1200-840 (M 3 x 11.4) 22-0600-935
57.00 - 62.99	70-1250-310	22-0600-935	70-1250-310	22-0600-935		22-0600-935		22-0600-935	10-1200-410/62	
63.00 - 64.99										

Drilling range	Peripheral insert				Intermediate insert 1+2							
from - up to												
	1x	1x	1x	1x	1x	1x	1x	1x	4x			
65.00 - 73.99	70-1250-310	22-0600-830 (M 3 x 8.4) 22-0600-935	70-1250-720	M 4 x 10 (DIN 912) 29-0300-900	70-0950-310	70-0950-740	70-0950-310	70-0950-740	22-0600-830 (M 3 x 8.4) 22-0600-935			
74.00 - 76.49	70-0950-310		70-0950-720		70-0950-720	70-0800-310	70-0800-740	70-0800-310		70-0800-740		
76.50 - 79.49						70-1250-310	70-1250-720	70-1250-310		70-1250-740	70-1250-310	70-1250-740
79.50 - 85.49												
85.50 - 91.49												
91.50 - 95.99												
96.00 - 101.99												
102.00 - 113.99												

Drilling range	Intermediate insert 3			Centre insert			Support pad		Guide pads							
from - up to																
	1x	1x	2x	1x	1x	2x	1x	1x	2x	2x						
65.00 - 73.99	–	–	–	70-0950-210	70-0950-750	22-0600-830 (M 3 x 8.4) 22-0600-935	10-0890-410/38	22-0600-830 (M 3 x 8.4) 22-0600-935	10-1000-410/45	22-1200-840 (M 3.5 x 11.4) 22-0900-935						
74.00 - 76.49	70-0800-310	70-0800-740														
76.50 - 79.49	70-0950-310	70-0950-740	22-0600-830 (M 3 x 8.4) 22-0600-935						70-1250-210		70-1250-750				10-1200-410/62	
79.50 - 85.49																
85.50 - 91.49																
91.50 - 95.99																
96.00 - 101.99																
102.00 - 113.99	70-1250-310	70-1250-740														

Note:

Drill heads beyond the drill range Ø 51.00 - 113.99 and divergent drill tube Ø may be supplied on request as **special drill head 99-07...**

Ordering data Tool shaft Type 07A

Drilling range Ø 51.00 to 113.99 mm

Drilling range from - up to	Size	Da	Length groups (mm)							recommended Tool holder	Order number
			500	800	1250	1600	2000	2500	3200		
51.00 - 56.99	09	33	●	●	●	●	●	●	●	Weldon Ø 32 - Ø 50	For orders and enquiries please specify drilling depth and tool holder
57.00 - 64.99	10	36	●	●	●	●	●	●	Weldon Ø 32 - Ø 50		
65.00 - 73.99	12	43	●	●	●	●	●	●	Weldon Ø 40 + Ø 50		
74.00 - 84.99	14	51	●	●	●	●	●	●	Weldon Ø 40 + Ø 50		
85.00 - 95.99	16	56	●	●	●	●	●	●	Weldon Ø 50		
96.00 - 113.99	18	68	●	●	●	●	●	●	Weldon Ø 50		

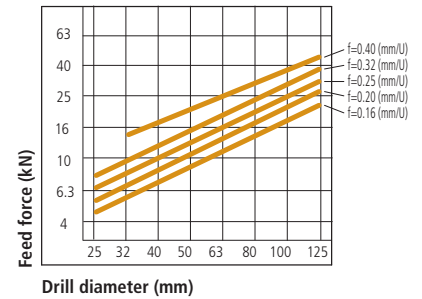
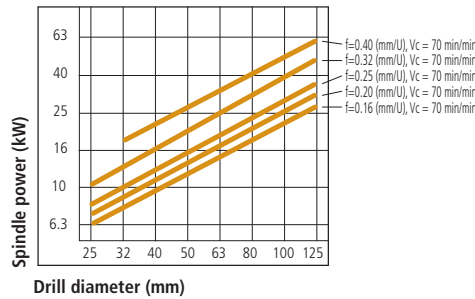
●	max. length for standard drill tube	Construction-, case hardening-, nitriding steel
●	max. length for standard drill tube	easy to machine steels
●	max. length for standard drill tube	Grey cast iron to modular graphite iron Aluminium/Brass/Graphite
●	not recommended (at own risk)	

Technical information

Single flute gundrill Type 07/07A

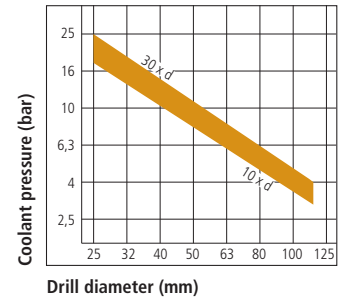
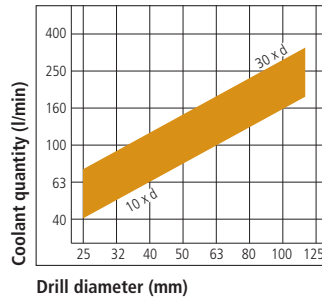
Performance diagrams

These guide values are for drilling alloyed steel (800 N/mm²) and can vary for other workpiece materials and tool conditions (wear).



Coolant information

Sufficient coolant must be supplied to the tool for troublefree chip removal.



Guide values for deep hole drilling of different materials

Guide values for cutting speed and feed rate are shown in the table below.

As there are many factors that can affect the results of deep-hole drilling, these values must be adjusted if necessary.

Material / Mechanical strength properties	Cutting speed (m/min)	Feed (mm/rev) for drill diameter (mm)			Carbide grades		
		25.00 - 29.99	30.00 - 44.99	45.00 - 113.99	AS + ZWS	ZS	FL
Construction steel < 700 N/mm ²	80 - 100	0.10 - 0.20	0.10 - 0.30	0.10 - 0.30	U 225 BX - 5		
Case hardening steel < 750 N/mm ²							
Case hardening steel < 1,100 N/mm ²	70 - 80	0.20 - 0.30	0.20 - 0.35	0.25 - 0.40			
Heat treated steel < 700 N/mm ²							
Heat treated steel < 1,100 N/mm ²	55 - 75	0.25 - 0.30	0.25 - 0.30	0.25 - 0.30			
Nitriding steel < 1,100 N/mm ²							
Ferritic steel < 900 N/mm ²	60 - 80	0.15 - 0.25	0.25 - 0.30	0.25 - 0.30	U 225 BX - 2	U 440 BX - 5	P 20 B
Austenitic steel							
Heat resisting steel stainless	50 - 70	0.15 - 0.20	0.15 - 0.20	0.15 - 0.25	U 225 BX - 5		
Steel castings < 700 N/mm ²	60 - 80	0.20 - 0.25	0.25 - 0.30	0.20 - 0.35			
Nodular cast iron < 1,100 N/mm ²	65 - 80	0.20 - 0.35	0.25 - 0.40	0.30 - 0.40	U 225 BX - 5		
Cast iron, alloyed and unalloyed							
Aluminium and Aluminium alloys	80 - 200	0.05 - 0.25	0.05 - 0.30	0.05 - 0.45			
Copper Cu-content < 99%	120 - ...	0.05 - 0.15	0.05 - 0.15	0.05 - 0.15			

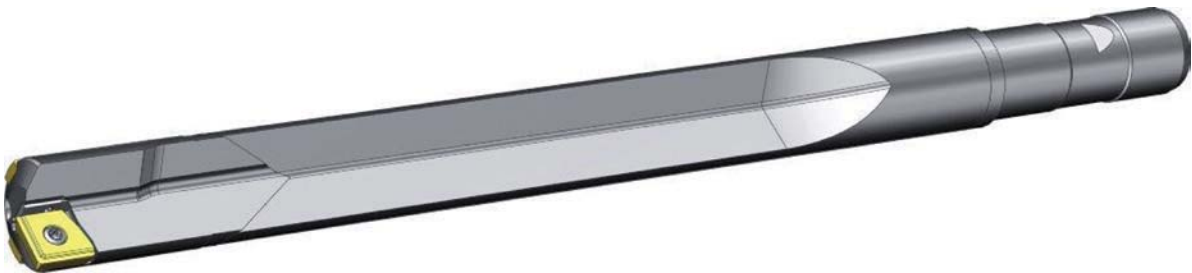
Special tools
Single flute counterboring and form boring tools Type 99
Ø 12.00 to 100.00 mm

With guiding pilot



Example: Tools for exact concentricity of two holes with different diameter following each other

Flat hole bottom



Hole bottom with radius



Tools on request

Special tools

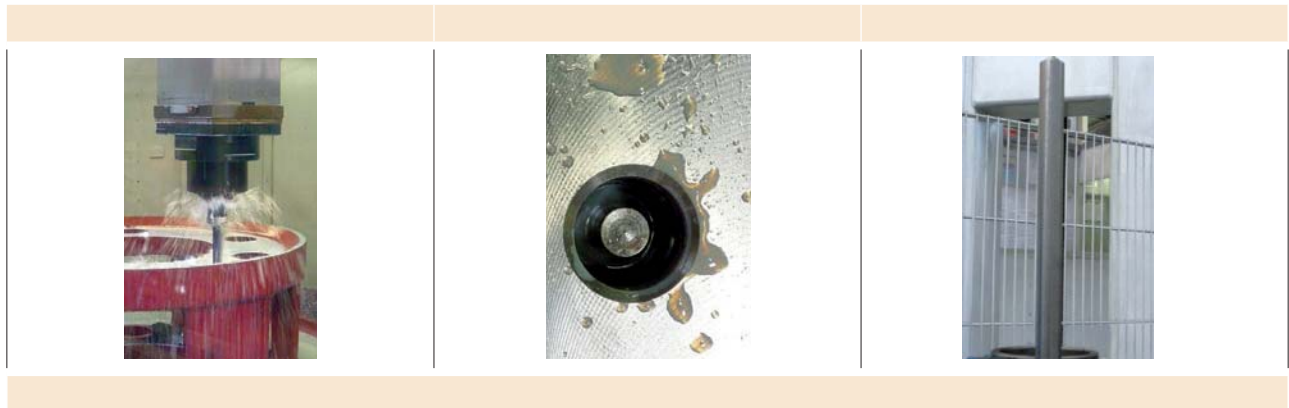
Type 99-08 Trepanning tool/Type 99-09 Core cutter

<p>Trepanning tool Type 99-08 \varnothing 25.00 - 100.00 mm</p>	
<p>Core cutter Type 99-09 \varnothing 37.00 - 70.00 mm</p>	

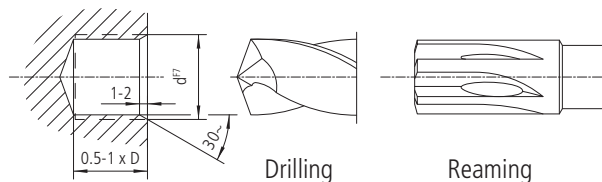
Tool length (depending on length to diameter ratio) max. 1600 mm

For blind holes and to remove a core for material samples
 (not available for difficult to machine materials)

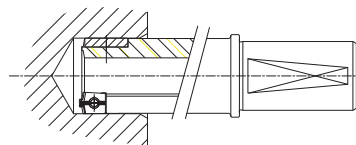
Machining example: Taking a sample \varnothing 41.5 mm out of a cast iron francis turbine.



1. Pilot hole



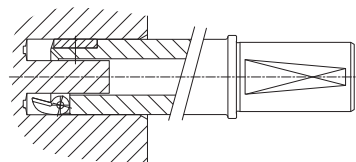
2. Trepanning



Insert trepanning tool (without rotation) into the pilot hole up to approx. 3-5 mm before reaching the bottom of the bore. Start rotational speed and feed rate.

Cutting values for general construction steel $V_C = 60$ m/min $f = 0.10 - 0.18$ mm/rev.

3. Core cutting



Insert trepanning tool (without rotation) into the pilot hole up to approx. 3-5 mm before reaching the bottom of the bore. Start rotational speed and feed rate.

Cutting values for general construction steel $V_C = 20 - 30$ m/min $f = 0.03 - 0.06$ mm/rev. **based on the core- \varnothing**

Drivers normally are supplied in compliance with DIN 1835 B or DIN 6535 HA, HB and HE, but they can also be made to order.

DCON Driver (mm)	Type	Illustration	botek order no.	For tool setup	
				For drill dia. (mm) from - up to	LS Driver (mm)
25	DIN 1835 - B 25		ZH25-22	12.00 - 19.50	56
32	DIN 1835 - B 32		ZH32-10	18.00 - 50.99	60
40	DIN 1835 - B 40		ZH40-13	25.00 - 74.99	70
50	DIN 1835 - B 50		ZH50-05	32.00 - 113.99	80
25	DIN 1835 - E 25		ZH25-36	12.00 - 19.59	56
32	DIN 1835 - E 32		ZH32-12	18.00 - 50.99	60
25			ZH25-00	12.00 - 19.59	70/78
25.4	Inch		ZH25.4-00	12.00 - 19.59	70
31.7	Inch		ZH31.7-00	18.00 - 50.99	70
38.1	Inch		ZH38.1-00	18.00 - 74.99	70

DCON = Connection-Ø

LS = Shank length

Rotating coolant connector

For deep hole drilling tools with inner coolant supply \varnothing 12.00 to 113.99 mm

High pressure (on request)

93-014/93-015

Drill range \varnothing 2.5 - 25 mm

- to 100 bar
- High suitable for botek deep hole drilling tools
Type 110/113 (01)

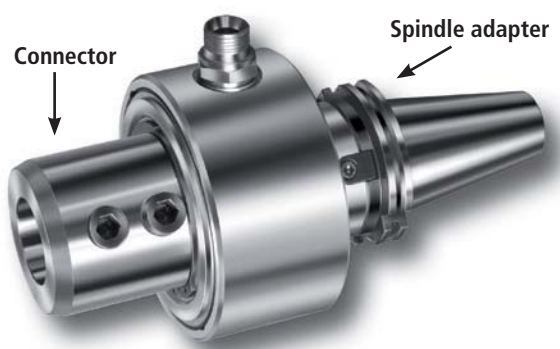


Low pressure/high amount

93-003

Drill range \varnothing 12 - 113.99 mm

- Coolant flow up to 250 l/min.
- High suitable for botek deep hole drilling tools
Type 01/02/07/07A/08/09



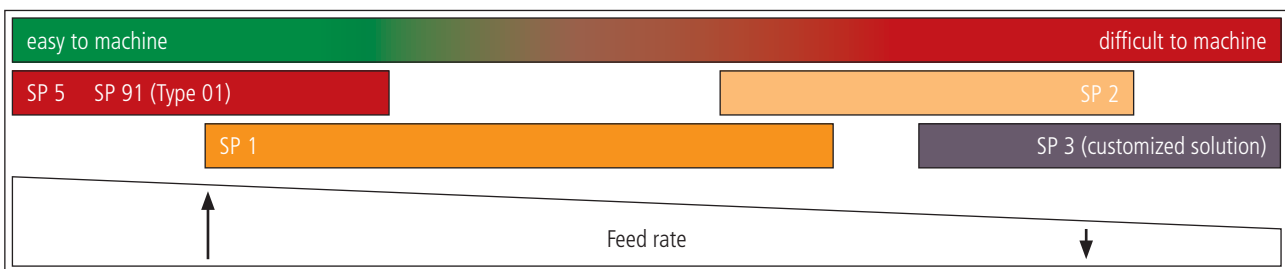
Connector for driver	Spindle adapter	Technical information	
Weldon 25, Weldon DIN 1835-B/6535-HB Order-No. 93-003400-2563	ISO 50 DIN 69871 Order-No. 97-2001-5063027	Max. 3000 RPM Coolant pressure: max. 20 bar Recommended filtration: 30 μ m Coolant quantity: max. 160 l/min	
	ISO 50 DIN 2080 Order-No. 97-2003-5063027		
Weldon 32 Order-No. 93-003400-3263	HSK 100 Order-No. 97-2004-10063090		
	Capto C6 Order-No. 97-2005-C6-V63080		
Weldon 40 Order-No. 93-003600-4080	ISO 50 DIN 69871 Order-No. 97-2001-5080027	Max. 2000 U/min Coolant pressure: max. 12 bar Recommended filtration: 30 μ m Coolant quantity: max. ax. 250 l/min	
	ISO 60 DIN 69871 Order-No. 97-2001-6080030		
Weldon 50 Order-No. 93-003600-5080	ISO 50 DIN 2080 Order-No. 97-2003-5080027		
	HSK 100 Order-No. 97-2004-10080090		Capto C8 Order-No. 97-2005-C8-V80065

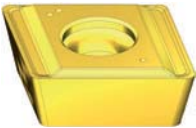
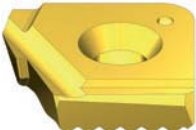
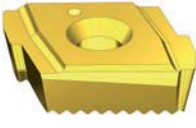
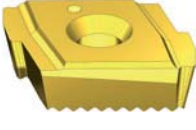
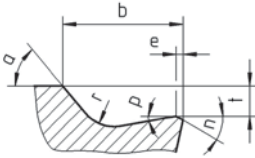
additional spindle adapters on request

Chip breakers

1. The chip breaker has a decisive influence on the chip form.
2. To achieve a trouble-free chip flow and optimum tool life, the aim is to produce an ideal chip form.
3. The chips should be fractured in such a way that a chip congestion is avoided.
4. Too short and compressed chips strain the cutting edges and lead to an early wear, or even destruction of the insert.

Processed material



<p>SP 5 (positive chip breaker Type 02/07/07A)</p>		<ul style="list-style-type: none"> - unalloyed + alloyed steels - Case-hardened steel + heat treated steel - Nitriding steel + tool steel - martensitic steel - Grey cast iron + ductile iron - Aluminium alloys <p>in combination with highest feed rates</p>
<p>SP 91 (positive chip breaker Type 01)</p> <p>(only Type 01 available)</p>		<ul style="list-style-type: none"> - unalloyed + alloyed steels - Case-hardened steel + heat treated steel - Nitriding steel + tool steel - martensitic steel - Grey cast iron + ductile iron - Aluminium alloys <p>in combination with highest feed rates</p>
<p>SP 1 Chip breaker – 0° chip angle (Type 01/02/08)</p>		<ul style="list-style-type: none"> - unalloyed + alloyed steels - Case-hardened steel + heat treated steel - Nitriding steel + tool steel - martensitic + austenitic steel - Grey cast iron + ductile iron - Aluminium alloys - Copper alloys
<p>SP 2 Chip breaker – 0° chip angle, Length shorter than SP 1 (Type 01/02/07/07A/08)</p>		<ul style="list-style-type: none"> - Structural steel with high elongation - Nickel alloyed steels - Stainless steel (austenitic/ferritic/duplex) - Aluminium + copper - Super-alloys - Titanium
<p>SP 3 Chip breaker as per customer's choice</p>		<ul style="list-style-type: none"> - as per customer specifications → length; width; depth; radius, angle → see VU-00-0614-B

Technical appendix

Requirements for application/Dimensions for the guide hole

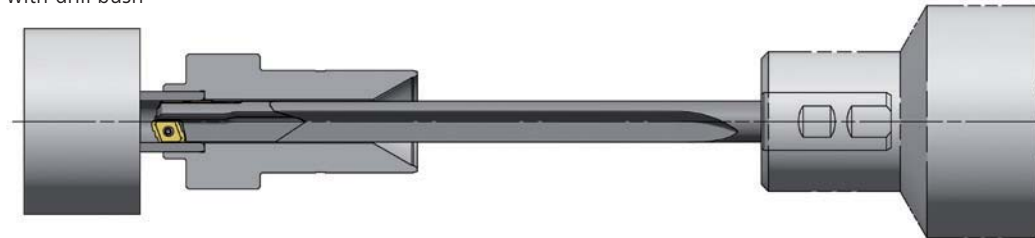
The characteristic of the single flute gundrilling process is that coolant is fed through the coolant hole in the tool and exits along with the chips in the V-shaped groove (flute) on the drill tube from the drilled hole. The coolant also provides lubrication to the drill periphery.

The gundrill is a single-edged tool without self-centering. When positioning the drill, the tool must be guided through a drill bush or a pilot hole.

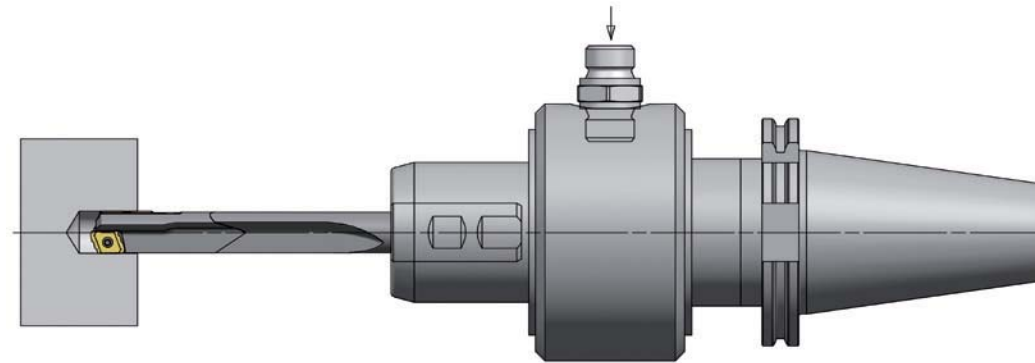
The quality of the guide hole affects the drilling performance:

1. An efficient coolant and filtration system with a coolant filtration of 20 μm to 30 μm (the smaller the drill diameter, the better the coolant and filtration system should be).
2. **Suitable coolant**, i.e. deep hole drilling oil or emulsion (min. 10-12% concentration, with additives) has to be provided in sufficient quantity and pressure. Minimum quantity lubrication (MQL) may be used under certain conditions.
3. **Guidance** with a drill bush (deep hole drilling machine) or a pilot hole (machining centre).

with drill bush



In application with deep hole drilling machine we recommend to use drill bush with F7 hole tolerance.

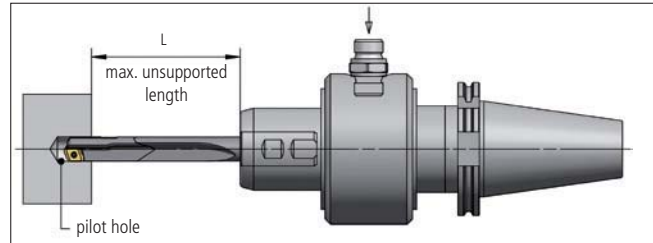


Dimensions for the guide hole

	Drill diameter (mm)	Dimensions for guide hole (pilot hole/drill bush)	
		L (mm)	D (mm) to tool- \emptyset
	12.00 - 17.99	approx. 1.50 x D	+ 0.016 to 0.034
	18.00 - 29.99	approx. 1.50 x D	+ 0.020 to 0.041
	30.00 - 49.99	approx. 1.25 x D	+ 0.025 to 0.050
	50.00 - ...	approx. 1.00 x D	+ 0.030 to 0.060

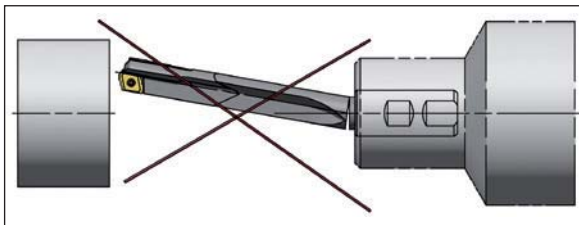
The dimensions specified in the table are guide values and comply with ISO tolerance field F7. ISO tolerance F8 is possible under specific conditions. To avoid chipping of the cutting edge, a chamfered pilot hole (F) is recommended depending on machining requirements.

1. **Before using the drills make sure the machine has the necessary equipment to do proper deep hole drilling. The machine should have suitable safety guarding for protection from cutting chips and coolant for operator.** Check with machine builder!
2. **Improper use or handling of deep hole drilling tools can cause serious injuries**, e.g. skin cuts from the cutting edge
3. Deep hole drilling tools are not self centering and can be unbalanced. Therefore the drills must be guided **during the start of the drilling cycle** by means of a sufficiently long drill bush or pilot hole (see detail „Z“ on below illustration). For information on the guide hole (pilot hole).
4. **Tool support: Unsupported drill length** should never exceed the dimensions as shown on table. If the unsupported drill length is exceeded the drill might cause injury!



Type	Max. unsupported length of the tool	
	Drill diameter D	Max. unsupported length L
Type 01/Type 07	12.00 - 20.99	approx. 40 x D
	21.00 - 30.99	approx. 35 x D
	31.00 - 40.99	approx. 30 x D
	41.00 - ...	approx. 25 x D
Type 02	37.00 - 44.99	approx. 40 x D
	45.00 - 59.99	approx. 30 x D
	60.00 - 74.99	approx. 25 x D
Type 07A	51.00 - 113.99	approx. 25 x D

5. The gundrill is fed into the drill bush or pilot hole **while non rotating** or rotated slowly at < 50 RPM. Then the coolant and the machine spindle should be started.
6. **After reaching the drilling depth** switch off the coolant and retract with the spindle stopped or slowly rotating at < 50 RPM.
7. Grinding of carbide produces dust (cobalt, etc.) that may be potentially hazardous. Use adequate ventilation and safety glasses during grinding.
8. **Consequences of not following** our application notes No. 1 - 7.



Using botek gundrills other than directed may cause personal injury.

Tool breakage and unsupported gundrills can be extremely dangerous. **Please use with caution and care!**

Please note that all application notes and values contained herein are intended as guidelines only. We do not accept any liability for damages caused by improper handling of botek deep hole drilling tools, operating errors, unsuitable machinery or misuse while using our tools!

Do you have any further queries? Please call up at +49 7123 38 08-0. We will be pleased to offer you advice.

Technical appendix

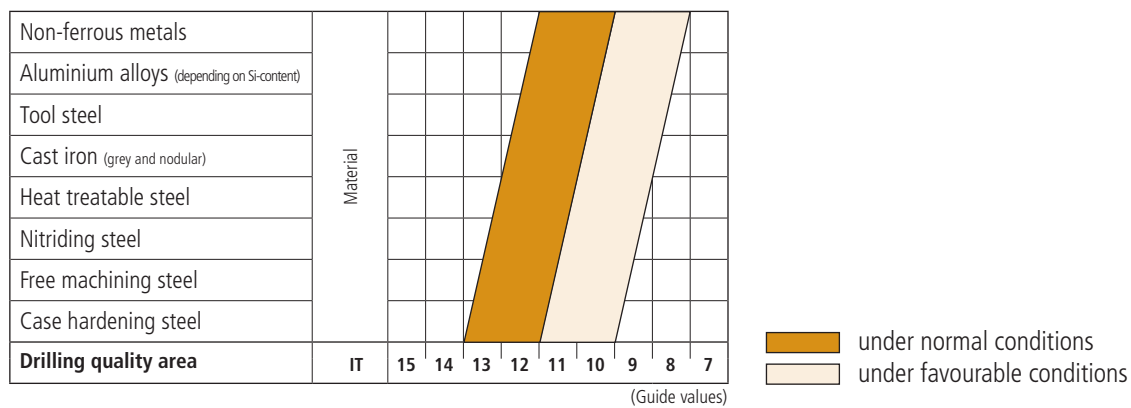
Drilling quality

To achieve optimum drilling results when using **deep hole drilling tools** with indexable inserts and guide pads, various criteria must be applied. In addition to tool design, key factors are machine design and construction, process techniques, pressurised and filtered deep hole drilling coolant. Selection of proper cutting parameters is also a significant factor.

The key factors botek considers when designing gundrills:

1. Material type
2. Diameter, tolerance and surface finish
3. Carbide grade and coating
4. Chip breaker

Achievable drilling tolerances



Surface quality

Roughness class		N8	N7	N6	N5
Quality area					
Surface roughness	Rt μm	21	11.5	6.2	3.4
	Ra μm	3.2	1.6	0.8	0.4
	Rz μm	14	7.6	4.5	2.2

(Guide values)

under normal conditions
 under favourable conditions

Centerline deviation (drift)

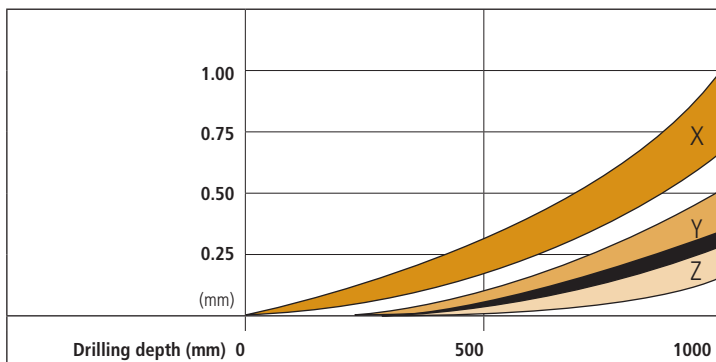
Counter-rotation: The optimum results are achieved with a rotating tool and simultaneous workpiece counter-rotation: See „Z”.

Workpiece rotating: The next best technique involves the workpiece rotating with the gundrill non-rotating: See „Y”.

Tool rotating: See „X”.

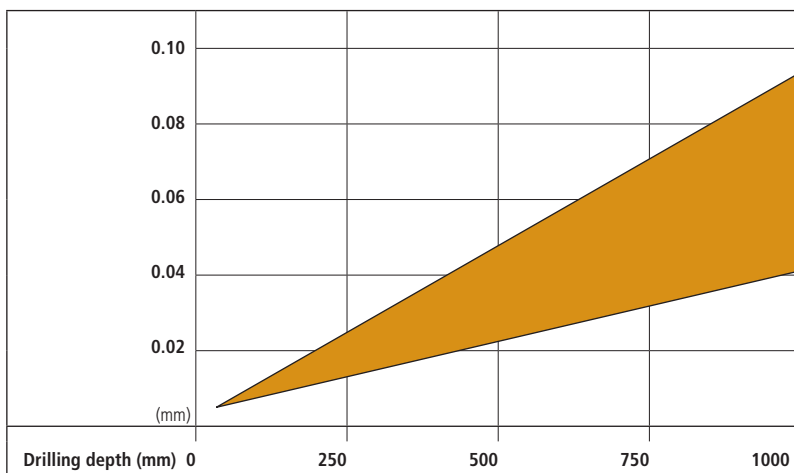
In all applications tool drift is minimised by using a close fitting pilot bore or guide bushing during gundrilling. Angular alignment of pilot bore with desired gundrill bore is imperative.

With a guide bushing, alignment and distance from the workpiece are also important.



Hole straightness

Whipping or deflection of the gundrill flute plays a decisive role in hole straightness and run out in the workpiece. Carbide tipped gundrills must be supported by a steady rest or whip guide every 40 diameters.



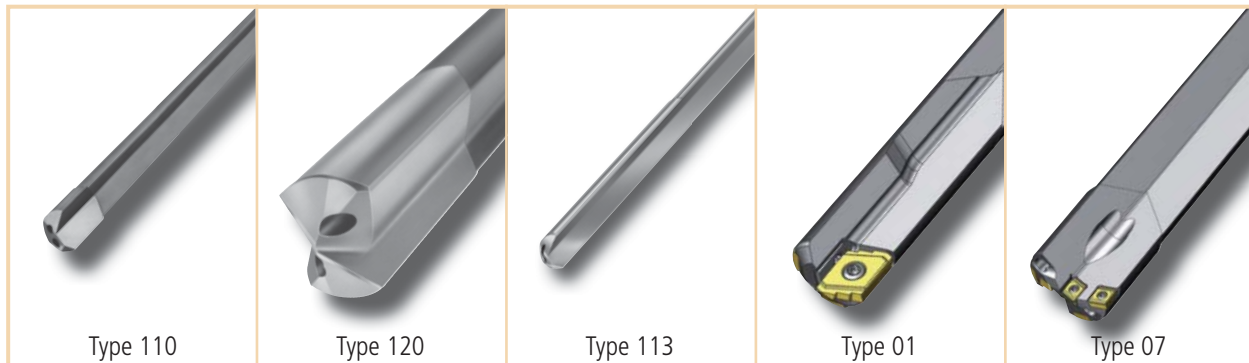
Roundness

Hole roundness is a primary advantage of gundrilling over conventional twist drilling. Hole roundness measurements as low as 10 μm are possible.

Express Order Line/Stock program

Express order line:

specialized in manufacturing **certain tools quickly**.



We have established an Express production line which specializes in manufacturing certain tools quickly.

Product range:

- Single flute gundrills/twin fluted drills with brazed carbide tip **Type 110/Type 120**
- Single flute gundrills in solid carbide design **Type 113**
- Single flute gundrill with indexable inserts and guide pads **Type 01/Type 07**

You can order by fax or e-Mail straightforward and quickly.

We are pleased to send you our order form.

Contact person:

Mr. Andreas Lehmann
P +49 7123 38 08-394
F +49 7123 38 08-138
E-Mail Lehmann@botek.de

Stock program:

- **Worldwide first stock program for gundrills** with indexable inserts and guide pads **Type 01**
- **Single flute gundrills** Type 110 with brazed carbide tip – **extended size range**

More information regarding the Express order line and our stock program please see our new homepage, www.botek.de.

Service

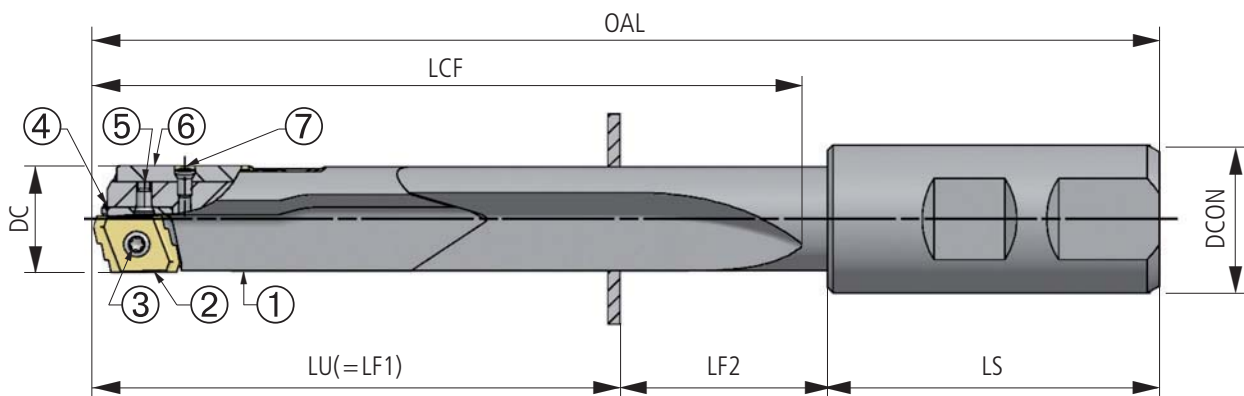
Retipping

Tools with brazed drill head can be refitted with a new head.
You will receive an almost new tool – resource friendly and cost-efficient.

Accessories

Accessories for our deep hole drilling tools Type 01, 02, 07 are also available.

More information can be found at www.botek.de



Tool Components

1. Tool complete
2. Insert
3. Screw for insert
4. Stop plate
5. Screw for stop plate
6. Guide pads
7. Screw for guide pads

Cutting tool data according to ISO 13399

- DC = Cutting diameter
- OAL = Over all length
- DCON = Connection-Ø
- LS = Shank length
- LCF = Flute length
- LU = Usable length/Drilling depth
- LF2 = Chip clearance min.

LF2	Ø 12 - 17.99 mm	Ø 18 - 31.99 mm	Ø 32 - ... mm
Type 01/02/07/07A	50 mm	80 mm	100 mm

Tool length calculation

Example: 2nd Insert

$$LU + LF2 + LS = OAL$$

$$LU (330 \text{ mm}) + LF2 (65 \text{ mm}) + LS (60 \text{ mm}) = OAL (445 \text{ mm})$$



DEEP HOLE DRILLING SYSTEMS
SOLID CARBIDE TOOLS

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