TS 3 G

3-FLUTED DRILL

The specialist for positional accuracy, size and quality of holes up to 5 x D in cast iron and long-chipping Al-alloys

HARTNER

Precision Drilling Tools

Hartner has developed the three-fluted drill TS 3 G for particularly difficult machining tasks.

This includes applications such as oblique centering or interrupted drilling. To optimally solve these tasks, the drill is equipped with a spiropoint geometry. In addition, the drill is produced in ultra fine grain carbide DK460UF (K/P).

The advantages of TS 3 G:

- centering or spotting is not required.
- process reliable drilling from solid.
- precision in size and surface finish correspond to those achieved with core drills.
- highest feed rates and long tool life even under difficult conditions.
- excellent chip flow thanks to wide flutes.

Range of applications

A tool for drilling from the solid, achieving position, size and quality holes. Dimensional accuracy and surface finish correspond to those achieved with core drills. Centering or spotting is not normally required. Suitable for drilling Al-alloys, cast alloys an non-ferrous metals.
The 3-fluted TS 3 G enables very high feed rates and optimal centering for the machining of cast iron and aluminium. The open flute profile in conjunction with the short compact design, as well as our carbide grade DK 460 UF (K/P) achieve maximum process safety and enable applications under the most difficult of conditions, as for example oblique spotting or interrupted drilling.

Especially suitable for:

Art. 89245
HSC/high performance cutting and
MMS/minimum lubrication

Manufacturing specifications:

Design:	to DIN 6537
Point geometry:	spiropoint
Point angle:	130°
Helix angle:	28°
Web thickness:	smaller than standard
Web taper:	none
Flute form:	wider than standard
Tolerance on Ø:	m7
Shank:	to DIN 6535 HA

In addition to the standard range without coating or with FIRE-coating respectively, TS 3 G can be supplied with the coating of your choice, i.e. TiN or FIRE+MolyGlide.

Selected trial results with TS 3 G-drills

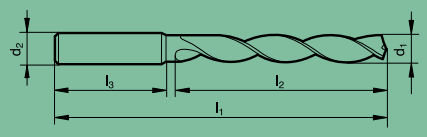
Tool description	TS 3 G	TS 3 G	TS 3 G	TS 3 G	TS 3 G	TS 3 G
Hartner no.	89245	89245	89245	89247	special tool	special tool
Diameter	**14.5**	**12.5**	**5.1**	**6.8**	**9.4**	**11.0**
Coating	FIRE (F)	FIRE (F)	FIRE (F)	bright ◯	TiAlN (A)	TiN (T)
Material group	grey cast iron	grey cast iron	grey cast iron	Al-alloy	Al-alloy	grey cast iron
Material description	EN-GJL 250	EN-GJL 250	EN-GJL 250	AlSi 7/Mg0.5	AlSi 132	EN-GJL 240
Drilling depth [a_p]	48	40	19	20	31	88
Coolant	external	external	external	external	external	–
Lubrication	soluble oil	soluble oil	soluble oil	soluble oil	soluble oil	dry
v_c [m/min]	180	150	100	150	140	100
f [mm/rev.]	0.3	0.3	0.2	0.21	0.315	0.2
Tool life [m]	200	200	200	1019	300	49,56

Tool description	TS 3 G	TS 3 G	TS 3 G	TS 3 G
Hartner no.	89247	89245	89245	89245
Diameter	**7.5**	**10.0**	**10.0**	**10.0**
Coating	bright ◯	FIRE (F)	FIRE (F)	FIRE (F)
Material group	Al-alloy	Al-alloy	long-chipping copper	heat treatable steels
Material description	AlMg/Si 0.5	AlCu2/MgNi		42 CrMo4
Drilling depth [a_p]	28	30	30	30
Coolant	external	external	external	external
Lubrication	min. lubrication	soluble oil	soluble oil	soluble oil
v_c [m/min]	118	230	250	75
f [mm/rev.]	0.3	0.4	0.15	0.25
Tool life [m]	application tests			

TS 3 G-drill
3-fluted, DIN 6537 L

tool material	Carbide-UF	
carbide grade	K	K/P
discount group	155	109
drilling depth	5 x D	5 x D
cutting direction	R	R
surface finish	○	F
Hartner no.	89247	89245

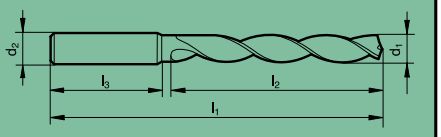
Ø range
3.00...8.60



diameter		lengths			availability	
nom. Ø d_1 mm	shank Ø d_2 mm	total length l_1 mm	flute length l_2 mm	shank length l_3 mm	K	K/P
3.00	6.00	66.00	28.00	36.00	●	
3.10	6.00	66.00	28.00	36.00	●	
3.20	6.00	66.00	28.00	36.00	●	
3.30	6.00	66.00	28.00	36.00	●	
3.50	6.00	66.00	28.00	36.00	●	
3.70	6.00	66.00	28.00	36.00	●	
3.80	6.00	74.00	36.00	36.00	●	
4.00	6.00	74.00	36.00	36.00	●	
4.10	6.00	74.00	36.00	36.00	●	
4.20	6.00	74.00	36.00	36.00	●	
4.50	6.00	74.00	36.00	36.00	●	
4.80	6.00	82.00	44.00	36.00	●	
5.00	6.00	82.00	44.00	36.00	●	●
5.10	6.00	82.00	44.00	36.00	●	
5.20	6.00	82.00	44.00	36.00	●	
5.30	6.00	82.00	44.00	36.00	●	
5.50	6.00	82.00	44.00	36.00	●	●
5.80	6.00	82.00	44.00	36.00	●	
6.00	6.00	82.00	44.00	36.00	●	●
6.10	8.00	91.00	53.00	36.00	●	
6.20	8.00	91.00	53.00	36.00	●	
6.40	8.00	91.00	53.00	36.00	●	
6.50	8.00	91.00	53.00	36.00	●	●
6.70	8.00	91.00	53.00	36.00	●	
6.80	8.00	91.00	53.00	36.00	●	●
7.00	8.00	91.00	53.00	36.00	●	●
7.10	8.00	91.00	53.00	36.00	●	
7.40	8.00	91.00	53.00	36.00	●	
7.50	8.00	91.00	53.00	36.00	●	●
7.80	8.00	91.00	53.00	36.00	●	
8.00	8.00	91.00	53.00	36.00	●	●
8.10	10.00	103.00	61.00	40.00	●	
8.20	10.00	103.00	61.00	40.00	●	
8.40	10.00	103.00	61.00	40.00	●	
8.50	10.00	103.00	61.00	40.00	●	●
8.60	10.00	103.00	61.00	40.00	●	

tool material	Carbide-UF	
carbide grade	K	K/P
discount group	155	109
drilling depth	5 x D	5 x D
cutting direction	R	R
surface finish	○	F
Hartner no.	89247	89245

Ø range
8.70...20.00



diameter		lengths			availability	
nom. Ø d_1 mm	shank Ø d_2 mm	total length l_1 mm	flute length l_2 mm	shank length l_3 mm	K	K/P
8.70	10.00	103.00	61.00	40.00	●	
8.80	10.00	103.00	61.00	40.00	●	
9.00	10.00	103.00	61.00	40.00	●	●
9.10	10.00	103.00	61.00	40.00	●	
9.50	10.00	103.00	61.00	40.00	●	●
9.80	10.00	103.00	61.00	40.00	●	
10.00	10.00	103.00	61.00	40.00	●	●
10.10	12.00	118.00	71.00	45.00	●	
10.20	12.00	118.00	71.00	45.00	●	●
10.30	12.00	118.00	71.00	45.00	●	
10.50	12.00	118.00	71.00	45.00	●	●
11.00	12.00	118.00	71.00	45.00	●	●
11.20	12.00	118.00	71.00	45.00	●	
11.50	12.00	118.00	71.00	45.00	●	●
11.80	12.00	118.00	71.00	45.00	●	
12.00	12.00	118.00	71.00	45.00	●	●
12.10	14.00	124.00	77.00	45.00	●	
12.50	14.00	124.00	77.00	45.00	●	●
13.00	14.00	124.00	77.00	45.00	●	●
13.50	14.00	124.00	77.00	45.00	●	●
14.00	14.00	124.00	77.00	45.00	●	●
14.50	16.00	133.00	83.00	48.00	●	●
15.00	16.00	133.00	83.00	48.00	●	●
15.50	16.00	133.00	83.00	48.00	●	●
16.00	16.00	133.00	83.00	48.00	●	●
16.50	18.00	143.00	93.00	48.00	●	●
17.00	18.00	143.00	93.00	48.00	●	●
17.50	18.00	143.00	93.00	48.00	●	●
18.00	18.00	143.00	93.00	48.00	●	●
18.50	20.00	153.00	101.00	50.00	●	●
19.00	20.00	153.00	101.00	50.00	●	●
19.50	20.00	153.00	101.00	50.00	●	●
20.00	20.00	153.00	101.00	50.00	●	●

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Application recommendations for TS 3 G

○ bright

Ⓕ FIRE-coated

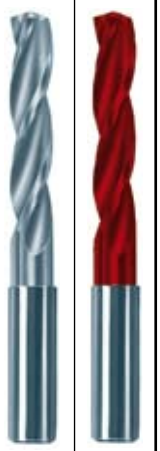
Tools suitable for minimum lubrication should be used with cutting speed reduced by 30%. Cutting feeds are the same as with conventional lubrication/coolant.

Tools for HSC/High performance.
Prerequisite for HSC-suitable machines. As a rule it is endeavoured to reduce the machining time by at least 50%. The cutting data needs to be individually determined for each application.
Our representatives will gladly offer advice.

Drill Ø mm	Feed column no. 1	2	3	4	5	6	7	8	9
	f (mm/rev.)								
0.50	0.004	0.006	0.007	0.008	0.010	0.012	0.014	0.016	0.019
1.00	0.006	0.008	0.012	0.014	0.016	0.018	0.020	0.023	0.025
2.00	0.020	0.025	0.032	0.040	0.050	0.063	0.080	0.100	0.125
2.50	0.025	0.032	0.040	0.050	0.063	0.080	0.100	0.125	0.160
3.15	0.032	0.040	0.050	0.063	0.080	0.100	0.125	0.160	0.160
4.00	0.040	0.050	0.063	0.080	0.100	0.125	0.160	0.200	0.200
5.00	0.040	0.050	0.063	0.080	0.100	0.125	0.160	0.200	0.250
6.30	0.050	0.063	0.080	0.100	0.125	0.160	0.200	0.250	0.315
8.00	0.063	0.080	0.100	0.125	0.160	0.200	0.250	0.315	0.315
10.00	0.080	0.100	0.125	0.160	0.200	0.250	0.315	0.400	0.400
12.50	0.080	0.100	0.125	0.160	0.200	0.250	0.315	0.400	0.500
16.00	0.100	0.125	0.160	0.200	0.250	0.315	0.400	0.500	0.630
20.00	0.125	0.160	0.200	0.250	0.315	0.400	0.500	0.630	0.630
25.00	0.160	0.200	0.250	0.315	0.400	0.500	0.630	0.800	0.800

Coolant:
- Soluble oil
- Oil
- Air

tool material	Carbide	
carbide description	K	K/P
carbide grade	Carb.-UF	Carb.-UF
surface finish	○	Ⓕ
Hartner no.	89247	89245



Material	Material examples, **new description** (old description in brackets) Figures in bold = material no. to DIN EN 10027	Tens.strength N/mm²	Hard-ness	Cool-ant	v_c m/min ○	v_c m/min Ⓕ	Feed column no. 1	2
Common structural steels	**1.0035** S185(St33), **1.0486** P275N(StE285), **1.0345** P235GH(H1), P265GH(H2)	≤500		●				
	1.0050 E295(St50-2), **1.0070** E360(St70-2), **1.8937** P500NH(WStE500)	>500-850		●				
Free-cutting steels	**1.0718** 11SMnPb30(9SMnPb28), **1.0736** 11SMn37(9SMnPb36)	≤850		●				
	1.0727 46 S20(45S20), **1.0728** 60 S20(60S20), **1.0757** 46SPb20(45SPb20)	850-1000		●				
Unalloyed heat-treatable steels	**1.0402** C22, **1.1178** C30E(Ck30)	≤ 700		●				
	1.0503 C45, **1.1191** C45E(Ck45)	700-850		●				
	1.0601 C60, **1.1221** C60E(Ck60)	850-1000		●				
Alloyed heat-treatable steels	**1.5131** 50MnSi4, **1.7003** 38Cr2, **1.7030** 28Cr4	850-1000		○				
	1.5710 36NiCr6, **1.7035** 41Cr4, **1.7225** 42CrMo4	1000-1200		○				
Unalloyed case hardened steels	**1.0301**(C10), **1.1121**(C10E)	≤750		●				
Alloyed case hardened steels	**1.7043** 38Cr4	850-1000		●				
	1.5752 15NiCr13(15NiCr13), **1.7131** 16MnCr5, **1.7264** 20CrMo5	1000-1200		●				
Nitriding steels	**1.8504** 34CrAl6	≥850-1000		●				
	1.8519 31CrMoV9, **1.8550** 34CrAlNi7	1000-1200		●				
Tool steels	**1.1750** C75W, **1.2067** 102Cr6, **1.2307** 29CrMoV9	≤850		○				
	1.2080 X210Cr12, **1.2083** X42Cr13, **1.2419** 105WCr6, **1.2767** X45NiCrMo4	850-1000		●				
High speed steels	**1.3243** S 6-5-2-5, **1.3343** S 6-5-2, **1.3344** S 6-5-3	≥650-1000		●				
Spring steels	**1.5026** 55Si7, **1.7176** 55Cr3, **1.8159** 51CrV4	≤330 HB		●				
Stainless steels, sulphured	**1.4005** X12CrS13, **1.4104** X14CrMoS17, **1.4105** X6CrMoS17, **1.4305** X8CrNiS18 9	≤850		●				
austenitic	**1.4301** X5CrNi18-10, **1.4541** X6CrNiTi18-10, **1.4571** X6CrNiMoTi 17 12 2	≤850		●				
martensitic	**1.4057** X20CrNi17-2, **1.4122** X39CrMo17-1, **1.4521** X2CrMoTi18 2	≤850		●				
Hardened steels	–	≤40-48 HRC		●				
		>48-60 HRC		●				
Special alloys	Nimonic, Inconel, Monel, Hastelloy	≤1200		●				
Cast iron	**0.6010** EN-GJL-100(GG10), **0.6020** EN-GJL-200(GG20)	≤240 HB		○ ○	100	145	6	7
	0.6025 EN-GJL-250(GG25), **0.6035** EN-GJL-350(GG35)	<300 HB		○ ○	80	105	6	7
Spheroidal graphite and	**0.7050** EN-GJS-500-7(GGG50), **0.8035** EN-GJMW-350-4(GTW35)	≤240 HB		●	80	105	6	7
malleable cast iron	**0.7070** EN-GJS-700-2(GGG70), **0.8170** EN-GJMB-700-2(GTS70)	<300 HB		●	70	95	6	7
Chilled cast iron	–	≤350 HB		○				
Ti and Ti-alloys	**3.7024** Ti99,5, **3.7114** TiAl5Sn2,5, **3.7124** TiCu2	≤850		●				
	3.7154 TiAl6Zr5, **3.7164** TiAl6V4, **3.7184** TiAl4Mo4Sn2,5, - TiAl8Mo1V1	850-1200		●				
Al and Ti-alloys	**3.0255** Al99,5, **3.2315** AlMgSi1, **3.3515** AlMg1	≤400		○	180	230	7	8
Al wrought alloys	**3.0615** AlMgSiPb, **3.1325** AlCuMg1, **3.3245** AlMg3Si, **3.4365** AlZnMgCu1,5	≤450		●	160	200	7	8
Al cast iron ≤ 10 % Si	**3.2131** G-AlSi5Cu1, **3.2153** G-AlSi7Cu3, **3.2573** G-AlSi9	≤600		○	150	190	7	8
> 10 % Si	**3.2581** G-AlSi12, **3.2583** G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		○	120	155	6	7
Magnesium alloys	MgMn2, G-MgAl8Zn1, G-MgAl6Zn3	≤450		○	180	215	6	7
copper, low-alloyed	**2.0070** SE-Cu, **2.1020** CuSn6, **2.1096** G-CuSn5ZnPb	≤400		○				
Brass, short-chipping	**2.0380** CuZn39Pb2, **2.0401** CuZn39Pb3, **2.0410** CuZn43Pb2	≤600		●	180	220	6	7
long-chipping	**2.0250** CuZn20, **2.0280** CuZn33, **2.0332** CuZn37Pb0,5	≤600		●				
Bronze, short-chipping	**2.1090** CuSn7ZnPb, **2.1170** CuPb5Sn5, **2.1176** CuPb10Sn	≤600		○ ●				
	2.0790 CuNi18Zn19Pb	>600-850		●				
Bronze, long-chipping	**2.0916** CuAl5, **2.0960** CuAl9Mn, **2.1050** CuSn10	≤850		●				
	2.0980 CuAl11Ni, **2.1247** CuBe2	850-1000		●				
Duroplastics	Bakelite, Resopal, Pertinax, Moltopren	–		○				
Thermoplastics	Plexiglass, Hostalen, Novodur, Makralon	–		○ ○				
Kevlar	Kevlar	–		○				
Glass, carbon concentr. plastics	GFK/CFK	–		○				

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