

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 and 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

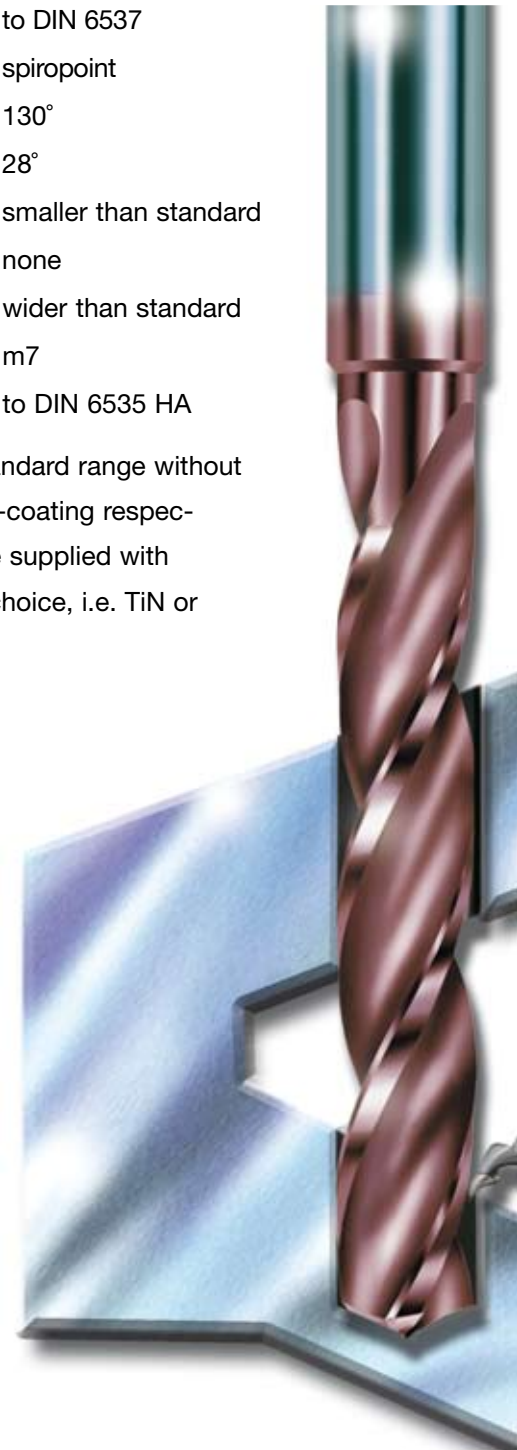
HSC/high performance cutting and

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 	FIRE 	FIRE 	bright 	TiAlN	TiN
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	AISI 7/Mg0.5	AISI 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


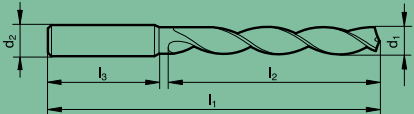



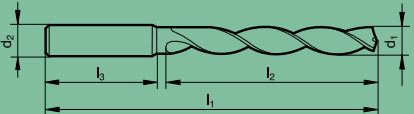
Tool description	TS 3 G	TS 3 G	TS 3 G	TS 3 G
Hartner no.	89247	89245	89245	89245
Diameter	7.5	10.0	10.0	10.0
Coating	bright 	FIRE 	FIRE 	FIRE 
Material group	Al-alloy	Al-alloy	long-chipping copper	heat treatable steels
Material description	AlMg/Si 0.5	AlCu2/MgNi		42 CrMo4
Drilling depth [a _p]	28	30	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		
surface finish		
Hartner no.	89247	89245

tool material	Carbide-UF	
carbide grade	K	K/P
discount group	155	109
drilling depth	5 x D	5 x D
cutting direction		
surface finish		
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	
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	●

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	
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	● ●

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



Material	Material examples, new description (old description in brackets) Figures in bold = material no. to DIN EN 10027	Tens.strength N/mm ²	Hard- ness	Cool- ant	Vc		Feed column no.	
					m/min	m/min		
Common structural steels	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), P265GH(H2) 1.0050 E295(St50-2), 1.0070 E360(St70-2), 1.8937 P500NH(WStE500)	≤500 >500-850		○ ○				
Free-cutting steels	1.0718 11SMnPb30(9SMnPb28), 1.0736 11SMn37(9SMnPb36) 1.0727 46 S20(45S20), 1.0728 60 S20(60S20), 1.0757 46SPb20(45SPb20)	≤850 850-1000		○ ○				
Unalloyed heat-treatable steels	1.0402 C22, 1.1178 C30E(Ck30) 1.0503 C45, 1.1191 C45E(Ck45) 1.0601 C60, 1.1221 C60E(Ck60)	≤ 700 700-850 850-1000		○ ○ ○				
Alloyed heat-treatable steels	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-1000 1000-1200		○ ○				
Unalloyed case hardened steels	1.0301 (C10), 1.1121 (C10E)	≤750		○				
Alloyed case hardened steels	1.7043 38Cr4 1.5752 15NiCr13(15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850-1000 1000-1200		● ●				
Nitriding steels	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850-1000 1000-1200		● ●				
Tool steels	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 850-1000		○ ○				
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 austenitic martensitic	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18 9 1.4301 X5CrNi18-10, 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17 12 2 1.4057 X20CrNi17-2, 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18 2	≤850 ≤850 ≤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) 0.6025 EN-GJL-250(GG25), 0.6035 EN-GJL-350(GG35)	≤240 HB ≤300 HB		○ ○	100 80	145 105	6 6	7 7
Spheroidal graphite and malleable cast iron	0.7050 EN-GJS-500-7(GGG50), 0.8035 EN-GJMW-350-4(GTW35) 0.7070 EN-GJS-700-2(GGG70), 0.8170 EN-GJMB-700-2(GTS70)	≤240 HB ≤300 HB		○ ○	80 70	105 95	6 6	7 7
Chilled cast iron	-	≤350 HB		○				
Ti and Ti-alloys	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7164 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 850-1200		● ●				
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 long-chipping	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		○ ○	180	220	6	7
Bronze, short-chipping	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 >600-850		○ ●				
Bronze, long-chipping	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 850-1000		● ●				
Duroplastics	Bakelite, Resopal, Pertinax, Moltopren	-		○				
Thermoplastics	Plexiglass, Hostalen, Novodur, Makralon	-		○ ○				
Kevlar	Kevlar	-		○				
Glass, carbon concentr. plastics	GFK/CFK	-		○				

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