GUN DRILLS

Recommendation for deep hole gun drills

Drill Ø mm	Code-Letter	K	L	M	N	O	P	Q	R
	1.50	0.002	0.004	0.006	0.008	0.012	0.020	0.032	0.045
	2.00	0.003	0.005	0.007	0.010	0.016	0.028	0.046	0.055
	2.50	0.004	0.006	0.008	0.012	0.018	0.030	0.054	0.070
	4.00	0.005	0.007	0.010	0.016	0.025	0.043	0.065	0.085
	6.00	0.007	0.009	0.013	0.024	0.035	0.061	0.085	0.120
	8.00	0.010	0.014	0.022	0.032	0.045	0.068	0.100	0.150
	10.00	0.012	0.016	0.028	0.040	0.055	0.075	0.120	0.160
	14.00	0.020	0.025	0.035	0.050	0.065	0.085	0.130	0.180
	18.00	0.025	0.030	0.040	0.055	0.070	0.095	0.145	0.200
	20.00	0.026	0.035	0.045	0.060	0.080	0.110	0.180	0.250
	24.00	0.027	0.036	0.047	0.065	0.085	0.130	0.185	0.300
	28.00	0.028	0.038	0.049	0.068	0.090	0.140	0.195	0.350
	30.00	0.030	0.040	0.050	0.070	0.100	0.150	0.200	0.400
	35.00	0.035	0.045	0.055	0.075	0.120	0.180	0.250	0.450
	40.00	0.040	0.050	0.060	0.080	0.150	0.200	0.300	0.500

Feed f (mm/rev)

Feed column no.

*The feed rates always relate to tools with the recommended coating. In some cases the successful application of un-coated tools cannot be guaranteed.

STOP

Gun drills must be guided during spot-drilling.
Gun drills must never operate at full speed without support in the machine shop.

Please consider the additional information on page 385!

Lubricants:

- cutting oil, highly activated, surface active lubricant with effective additives which chemically react and result in a special adhesive and abrasion reducing lubricant film. ■
- soluble oil (emulsion) ■
- without lubricant □
- air only ▯

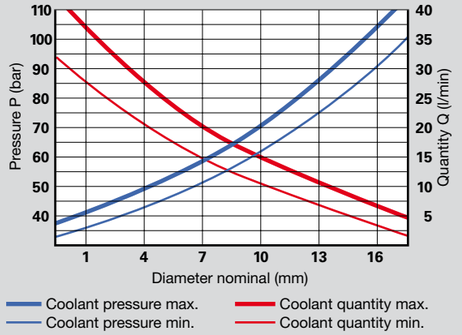
Material group	Materials examples, **new designations** (old designation in brackets) Figures in bold = material no. to DIN EN	Tensile strength MPa (N/mm²)	Hard-ness	Coolant
General purpose steels	**1.0035** S185(St33),**1.0486** P275N(StE285),**1.0345** P235GH(H1),**1.0425** P265GH(H2)	≤500		■
	1.0050 E295 (St50-2), **1.0070** E360 (St70-2), **1.8937** P500NH (WStE500)	>500-850		
Free-cutting steels	**1.0718** 11SMnPb30 (9SMnPb28), **1.0736** 11SMn37 (9SMn36)	≤850		■
	1.0727 46S20 (45S20), **1.0728** (60S20), **1.0757** 46SPb20 (45SPb20)	850-1000		
Unalloyed tempering 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 tempering 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 (Ck10)	≤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 (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 (V2A), **1.4541** X6CrNiTi18-10, **1.4571** X6CrNiMoTi 17-12-2 (V4A)	≤850		■
martensitic	**1.4057** X20CrNi 17 2 (X17CrNi16-2), **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	■ □
	0.6025 EN-GJL-250(GG25), **0.6035** EN-GJL-350(GG35)		<300 HB	
Spheroidal graphit iron and	**0.7050** EN-GJS-500-7(GGG50), **0.8035** EN-GJMW-350-4(GTW35)		≤240 HB	■
maleable cast iron	**0.7070** EN-GJS-700-2(GGG70), **0.8170** EN-GJMB-700-2(GTS70)		<300 HB	
Chilled cast iron	–		≤350 HB	■
Ti and Ti-alloys	**3.7024** Ti99,5, **3.7114** TiAl5Sn2,5, **3.7124** TiCu2	≤850		■
	3.7154 TiAl6Zr5, **3.7165** TiAl6V4, **3.7184** TiAl4Mo4Sn2,5, - TiAl8Mo1V1	>850-1200		
Aluminium and Al-alloys	**3.0255** Al99,5, **3.2315** AlMgSi1, **3.3515** AlMg1	≤400		■
Al wrought alloys	**3.0615** AlMgSiPb, **3.1325** AlCuMg1, **3.3245** AlMg3Si, **3.4365** AlZnMgCu1,5	≤450		■
Al cast alloys ≤ 10 % Si	**3.2131** G-AlSi5Cu1, **3.2153** G-AlSi7Cu3, **3.2573** G-AlSi9	≤600		■
> 10 % Si	**3.2581** G-AlSi12, **3.2583** G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		
Magnesium alloys	**3.5200** MgMn2, **3.5812.05** G-MgAl8Zn1, **3.5612.05** G-MgAl6Zn1	≤450		▯
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		■ ■
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	Epoxy resin, Resopal, Pertinax, Moltopren		–	□
Thermoplastics	Plexiglass, Hostalen, Novodur, Makralon		–	■ □
Kevlar	Kevlar		–	□
Glass/carbon-concentr. plastics	GFK/CFK		–	

	TBE-solid carbide/SuperT-AL				SuperT-N/SuperT-NX				SuperT-GG			
												
	single-fluted gun drill				single-fluted gun drill				two-fluted gun drill			
Tool material	**solid carbide**				**solid carbide head**				**solid carbide head**			
Ø range	1.2 ... 8.0 mm				2.0 ... 40.0 mm				6.0 ... 27.0 mm			
	≤35×D		**>35×D**		**≤35×D**		**>35×D**		**≤35×D**		**>35×D**	
recom. coating*	v_c m/min	Feed col. no.	v_c m/min	Feed col. no.	recom. coating*	v_c m/min	Feed col. no.	v_c m/min	Feed col. no.	v_c m/min	Feed col. no.	v_c m/min	Feed col. no.
	100	O	*95*	N		*100*	N	*95*	M				
	85	O	*80*	N	**TiN**	*85*	N	*80*	M				
	90	O	*85*	N		*90*	N	*85*	M				
	80	O	*75*	N	**TiN**	*80*	N	*75*	M				
	90	N	*85*	M		*90*	M	*85*	L				
	80	N	*75*	M	**TiN**	*80*	M	*75*	L				
	75	N	*70*	M		*75*	M	*70*	L				
AlTiN	*75*	N	*70*	M	**TiN**	*75*	M	*70*	L				
	65	N	*60*	M		*65*	M	*60*	L				
AlTiN	*80*	O	*75*	N	**TiN**	*80*	N	*75*	M				
	75	N	*70*	M	**TiN**	*75*	M	*70*	L				
	65	N	*60*	M		*65*	M	*60*	L				
AlTiN	*75*	N	*70*	M	**TiCN**	*75*	M	*70*	L				
	65	N	*60*	M		*65*	M	*60*	L				
AlTiN	*75*	M	*70*	L	**TiCN**	*75*	L	*70*	K				
	65	M	*60*	L		*65*	L	*60*	K				
AlTiN	*55*	L	*50*	K	**TiCN**	*55*	K	*50*	K				
AlTiN	*65*	M	*60*	L	**TiCN**	*65*	L	*60*	L				
	55	N	*50*	M		*55*	M	*50*	L				
AlTiN	*45*	N	*40*	M	**TiCN**	*45*	M	*40*	L				
	35	N	*35*	M		*35*	M	*35*	L				
	30	M	*25*	L	**TiCN**	*30*	L	*25*	K				
	25	K	*20*	K		*25*	K	*20*	K				
	35	L	*30*	K	**TiCN**	*35*	K	*30*	K				
	85	P	*80*	O		*85*	O	*80*	N	*85*	R	*80*	Q
	80	P	*75*	O		*80*	O	*75*	N	*80*	R	*75*	Q
	80	O	*75*	N		*80*	N	*75*	M	*75*	Q	*70*	P
	70	O	*65*	N		*70*	N	*65*	M	*70*	Q	*65*	P
	55	N	*50*	M		*55*	M	*50*	L	*65*	P	*60*	O
AlTiN	*35*	L	*30*	K	**TiCN**	*35*	K	*30*	K				
	30	L	*25*	K		*30*	K	*25*	K				
	150	Q	*140*	P		*150*	P	*140*	N	*120*	R	*115*	Q
	120	Q	*115*	P		*120*	P	*115*	N	*110*	R	*105*	Q
	150	R	*140*	Q		*150*	Q	*140*	P	*135*	R	*130*	Q
	130	R	*120*	Q		*130*	Q	*120*	P	*120*	Q	*115*	P
	110	Q		P		*110*	P		O				
AlTiN	*75*	O	*70*	N	**TiCN**	*75*	N	*70*	M				
	120	R	*115*	Q		*120*	Q	*115*	P	*130*	R	*125*	Q
	90	R	*85*	Q		*90*	Q	*85*	P	*120*	R	*115*	Q
	95	Q	*90*	P		*95*	P	*90*	O	*110*	Q	*105*	P
	75	Q	*70*	P		*75*	P	*70*	O	*110*	Q	*105*	P
	70	Q	*65*	P		*70*	P	*65*	O	*95*	Q	*90*	P
	60	Q	*55*	P		*60*	P	*55*	O	*95*	Q	*90*	P
	75	O	*70*	N		*75*	N	*70*	M				
	70	O	*65*	N		*70*	N	*65*	M				
	60	N	*55*	M		*60*	M	*55*	L				
	50	N	*45*	M		*50*	M	*45*	L				

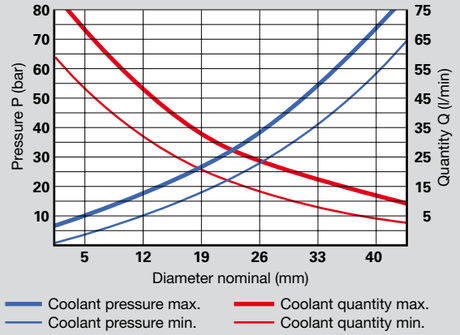
Stock Gun Drills

Coolant values recommendations

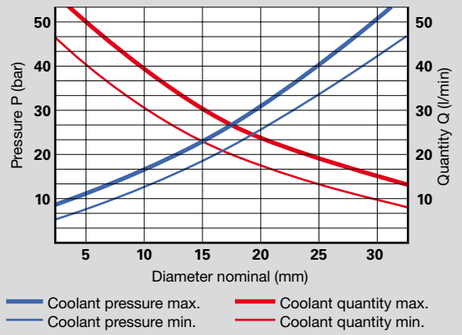
Coolant values TBE-VHM/SuperT-AL
(Recommended values for soluble oil)



Coolant values SuperT-N/-NX
(Recommended values for soluble oil)



Coolant values SuperT-GG
(Recommended values for soluble oil)



Stock Gun Drills

Procedure

Recommendations

- For drilling depths in excess than 40xD we recommend the use of two or more gun drills, e.g. dia.10x400mm and dia.9,95x800mm.
- For machining of long-chipping materials we recommend the use of gun drills with polished flutes.
- Generally we recommend the use of soluble oil with a minimum oil content of 10%.
- When drilling in aluminium with a Si-content of less than 1% with the recommended cutting rates of i.e. Vc160m/min we advise to advance to the final speed in several steps.

Cutting parameters can be reduced if cooling parameters are insufficient. Pressure increase systems are also an option.

The sequence of operations

In order to achieve optimal machining results when producing deep holes with type SuperV-T especially spotting on radii or on an uneven surface structure, we recommend the following machining steps:

1. Initial milling of surface, i.e. with our SuperF-UT-N. The surface must be machined at right angles to the entry angle of the drilling operation.
2. Production of a cylindrical pilot hole (tolerance H8) with a minimum drilling depth of 3 x D. For this operation we recommend our SuperV drills respectively. Thanks to a 140° point angle and a m7 tolerance on diameter these drills are especially suitable for this machining task.
3. Entry of gun drill in the pilot hole at a speed of approx. 200 rev./min and with a feed rate of approx. 500 mm/min.
4. Setting of coolant pressure and speed.
5. Continuous drilling to complete hole depth without pecking.
6. For through holes with plain - i.e. 90° - exit, reduce feed rate v_f to 50 % approx. 1 mm prior to break-through.
7. For through holes with oblique exit, reduce the feed rate v_f to 40% approx. 1 mm prior to break-through.
8. When applying gun drills with increased length-diameter-ratio (e.g. TBE-Solid Carbide from flute length 160 mm), we recommend machining with reduced cutting parameters (approx. 75% of the optimal cutting speed) up to a drilling depth of approx. 25 mm.
9. After reaching hole depth stop machine spindle and coolant supply, withdrawal in top gear.

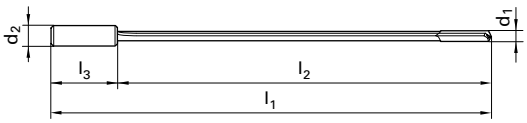
Gun drills with 2 cutting lips

Two-fluted gun drill, Type SuperT-GG

Catalog no. 75030

Two-fluted gun drill for machining cast iron (GG), spheroidal graphite iron and malleable cast iron (GGG), cast iron with
vermicular graphite (GJV) upto a hardness of 44 HRC. Also for non-ferrous metals. For drilling depths upto 10xD we recommend our Type SuperV-GG.

Stock std.	30xD
Tool material	Carbide
Surface	bright
Type	*SuperT-GG*
Cutting direction	right-hand
Point grinding	
Point angle °	
Web thinned ≥Ø	
Tolerance on Ø	h5



Catalog no.	75030
Tool material	Carbide
Carbide grade	K15
Discount group	123
Surface	bright
Type	SuperT-GG
Drilling depth	30xD

d1 mm	d2 mm	l1 mm	l2 mm	l3 mm	price per piece
8.000	16.000	330.00	280.00	48.00	●
10.000	20.000	390.00	340.00	50.00	●
12.000	20.000	450.00	400.00	50.00	●