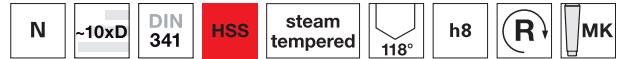


Taper shank twist drills

Bushing drills



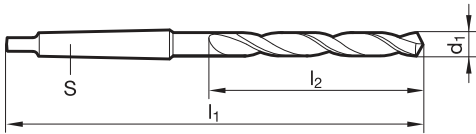
Catalog no. 71320



P	M	K	N	S	H
•		•			

Application
recomm. p. 186

- web thinning $\geq \varnothing 14.500$
- relieved cone
- also for drilling through drill bushes



d1 mm	S	l1 mm	l2 mm
6.000	MK-1	161.000	80.000
6.500	MK-1	167.000	86.000
6.800	MK-1	174.000	93.000
7.000	MK-1	174.000	93.000
8.000	MK-1	181.000	100.000
8.200	MK-1	181.000	100.000
8.500	MK-1	181.000	100.000
8.750	MK-1	188.000	107.000
8.800	MK-1	188.000	107.000
9.000	MK-1	188.000	107.000
9.500	MK-1	188.000	107.000
10.000	MK-1	197.000	116.000
10.100	MK-1	197.000	116.000
10.200	MK-1	197.000	116.000
11.000	MK-1	206.000	125.000
11.500	MK-1	206.000	125.000
12.000	MK-1	215.000	134.000
12.500	MK-1	215.000	134.000
12.750	MK-1	215.000	134.000
13.000	MK-1	215.000	134.000
13.500	MK-1	223.000	142.000
13.750	MK-1	223.000	142.000
13.800	MK-1	223.000	142.000
13.900	MK-1	223.000	142.000
14.000	MK-1	223.000	142.000
14.500	MK-2	245.000	147.000
15.000	MK-2	245.000	147.000
16.000	MK-2	251.000	153.000
16.250	MK-2	257.000	159.000
16.500	MK-2	257.000	159.000
16.750	MK-2	257.000	159.000
17.000	MK-2	257.000	159.000
17.500	MK-2	263.000	165.000
18.000	MK-2	263.000	165.000
18.500	MK-2	269.000	171.000
18.750	MK-2	269.000	171.000

d1 mm	S	l1 mm	l2 mm
19.000	MK-2	269.000	171.000
19.250	MK-2	275.000	177.000
19.500	MK-2	275.000	177.000
20.000	MK-2	275.000	177.000
21.000	MK-2	282.000	184.000
22.000	MK-2	289.000	191.000
22.500	MK-2	296.000	198.000
23.000	MK-2	296.000	198.000
24.000	MK-3	327.000	206.000
25.000	MK-3	327.000	206.000
26.000	MK-3	335.000	214.000
26.500	MK-3	335.000	214.000
27.000	MK-3	343.000	222.000
28.000	MK-3	343.000	222.000
29.500	MK-3	351.000	230.000
30.000	MK-3	351.000	230.000
31.000	MK-3	360.000	239.000
32.000	MK-4	397.000	248.000
33.000	MK-4	397.000	248.000
34.000	MK-4	406.000	257.000
35.000	MK-4	406.000	257.000
36.000	MK-4	416.000	267.000
38.000	MK-4	426.000	277.000
40.000	MK-4	426.000	277.000
45.000	MK-4	447.000	298.000

Application recommendations for drills

Feed column										
Code-letter	A	B	C	D	E	F	G	H	I	
Drill-Ø mm	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
	31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
	40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250

Tools with feed column no. in bold are preferred choices for listed material group.

- right-hand cutting (catalogue no. without symbol is always right-hand cutting)
- left-hand cutting

Lubricants:

- cutting oil, highly activated
- 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/mm ²)	Hardness	Coolant
General purpose steels	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Free-cutting steels	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Unalloyed tempering 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		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Alloyed tempering steels	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Unalloyed case hardened steels	1.0301 (C10), 1.1121 C10E (Ck10)	≤750		<input checked="" type="checkbox"/>
Alloyed case hardened steels	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Nitriding steels	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850-≤1000 >1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
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		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
High speed steels	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000		<input checked="" type="checkbox"/>
Spring steels	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤330 HB	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Hardened steels	-		≤40-48 HRC >48-60 HRC	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Stainless steels, sulphured austenitic martensitic	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi17.2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850 ≤850 ≤850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
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)	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Spheroidal graphite iron 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	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Chilled cast iron	-		≤350 HB	<input checked="" type="checkbox"/>
New Cast iron GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo6			<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
New Cast iron ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Special alloys	Nimonic, Inconel, Monel, Hastelloy	≤1200		<input checked="" type="checkbox"/>
Ti and Ti-alloys	3.7024 Ti99.5, 3.7114 TiAl5Sn2.5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2.5, - TiAl8Mo1V1	≤850 >850-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aluminium and Al-alloys	3.0255 Al99.5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		<input checked="" type="checkbox"/>
Al wrought alloys	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1.5	≤450		<input checked="" type="checkbox"/>
Al cast alloys ≤ 10 % Si > 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9 3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600 ≤600		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Magnesium alloys	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450		<input type="checkbox"/>
Copper, low alloyed	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤400		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
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		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Bronze, short-chipping	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 >600-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Bronze, long-chipping	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Duroplastics	Epoxy resin, Resopal, Pertinax, Moltopren			- <input type="checkbox"/>
Thermoplastics	Plexiglas, Hostalen, Novodur, Makralon			- <input checked="" type="checkbox"/>
Kevlar	Kevlar			- <input type="checkbox"/>
Glass/carbon-concentr. plastics	GFK/CFK			- <input type="checkbox"/>

$\leq 10 \times D$ drilling depth

Catalog no.	71136	71130	71135	71320	71150 71152	71322	71154
Tool material	HSS	HSS	HSS	HSS	HSS	HSS	HSS
Surface finish	bright	bright/st.	bright/st.	steam	bright	bright	nit. l.
DIN/Form	340	339	340	341	340	341	340
Type	N	N	N	N	V70	V70	V73
Page	265	264	266	305	275/276	306	278

71584
HSS
bright
Stock
V73-IK
290

61136	61150
HSS	HSS
TiN	TiN
340	340
N	V70
268	277

71225	71156
HSS-Co	
bright	nit. l.
340	340
V66	V73
274	280

71550	71553
HSS-Co	
steam	
Stock	
V70-IK	
310/311	



v_c m/min	Feed column no.							v_c m/min	Feed col. no.	v_c m/min	Feed column no.			v_c m/min	Feed column no.	v_c m/min	Feed col. no.
24	F	F	F	F	F	F	F	26	F	28	F	F				26	F
20	E	E	E	E	E	E	E	22	E	22	E	E			22	E	
27	F	F	F	F	F	F	F	30	F	30	F	F			30	F	
27	E	E	E	E	E	E	E	30	E	30	E	E	24		E	30	E
22	E	E	E	E	E	E	E	24	E	25	E	E			24	E	
22	E	E	E	E	E	E	E	24	E	25	E	E	24		E	24	E
								22	D	22	D	D	16		D	22	D
								20	D	18	D	D	16		D	20	D
								14	C				14	C	C	14	C
27		F	F	F	F	F	F	30	F	30	F	F				30	F
								17	D	14	D	D	14		D	17	D
								12	C				10		C	12	C
								14	D	12	D	D	12		D	14	D
								10	C				8		C	10	C
14		D	D	D	D	D	D	15	D	16	D	D	16		D	15	D
								10	C	10	C	C	8		C	10	C
								10	C				8		C	10	C
								7	B				6		B	7	B
12					D								12	D	D		
													8	C	A		
													10	C	C		
27	F	F	F	F	G	G	F	30	F	30	F	F	30		F	30	F
27	F	F	F	F	F	F	F	30	F	30	F	F	24		F	30	F
22	F	F	F	F	F	F	F	24	F	24	F	F	24		F	24	F
18	F	F	F	F	F	F	F	20	F	20	F	F	20		F	20	F
								7	C				6		C	7	C
													5		A		
													8		B		
													5		B		
70					G	G											
70					G	G		80	F							80	F
45	G	G	G	G	G	G	G	50	G	50	G	G	60		G	50	G
45	F	F	F	F	F	F	F	50	F	50	F	F	50		F	50	F
63	F	F	F	F	F	F	F			70	F		60		E		
54	E	E	E	E	F	F	F	60	E	60	E	E	30		E	60	E
36	E	E	E	E	F	F	F	40	E	40	E	E	38		E	40	E
28	D	D	D	D				40	E	30	D						
22	D	D	D	D				24	D	25	D					24	D
22	D	D	D	D	D	D	D	24	D	14	D	D	24		D	24	D
								22	D	12	D	D	13		D	22	D
14	D	D	D	D	D	D	D			18	D	D	16		D		
22	E	E	E	E				24	E	32	E		26		D	24	E