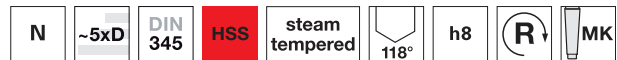


## Taper shank twist drills

### Twist drills



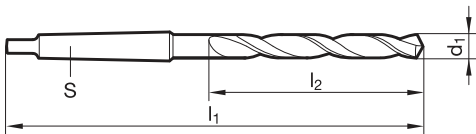
Catalog no. 71300



P	M	K	N	S	H
•		•	•		

Application  
recomm. p. 180

- web thinning  $\geq \varnothing 14.100$
- relieved cone



d1 mm	S	l1 mm	l2 mm
3.750	MK-1	120.000	39.000
4.000	MK-1	124.000	43.000
4.100	MK-1	124.000	43.000
4.200	MK-1	124.000	43.000
4.250	MK-1	124.000	43.000
4.500	MK-1	128.000	47.000
4.600	MK-1	128.000	47.000
4.900	MK-1	133.000	52.000
5.000	MK-1	133.000	52.000
5.100	MK-1	133.000	52.000
5.500	MK-1	138.000	57.000
5.750	MK-1	138.000	57.000
5.800	MK-1	138.000	57.000
6.000	MK-1	138.000	57.000
6.500	MK-1	144.000	63.000
6.750	MK-1	150.000	69.000
6.800	MK-1	150.000	69.000
7.000	MK-1	150.000	69.000
7.200	MK-1	150.000	69.000
7.250	MK-1	150.000	69.000
7.400	MK-1	150.000	69.000
7.500	MK-1	150.000	69.000
7.800	MK-1	156.000	75.000
7.900	MK-1	156.000	75.000
8.000	MK-1	156.000	75.000
8.100	MK-1	156.000	75.000
8.200	MK-1	156.000	75.000
8.250	MK-1	156.000	75.000
8.300	MK-1	156.000	75.000
8.500	MK-1	156.000	75.000
8.600	MK-1	162.000	81.000
8.700	MK-1	162.000	81.000
8.750	MK-1	162.000	81.000
8.900	MK-1	162.000	81.000
9.000	MK-1	162.000	81.000
9.200	MK-1	162.000	81.000
9.300	MK-1	162.000	81.000
9.400	MK-1	162.000	81.000
9.500	MK-1	162.000	81.000
9.750	MK-1	168.000	87.000
9.800	MK-1	168.000	87.000
9.900	MK-1	168.000	87.000
10.000	MK-1	168.000	87.000
10.100	MK-1	168.000	87.000
10.200	MK-1	168.000	87.000
10.250	MK-1	168.000	87.000
10.300	MK-1	168.000	87.000
10.400	MK-1	168.000	87.000

d1 mm	S	l1 mm	l2 mm
10.500	MK-1	168.000	87.000
10.600	MK-1	168.000	87.000
10.700	MK-1	175.000	94.000
10.750	MK-1	175.000	94.000
10.800	MK-1	175.000	94.000
10.900	MK-1	175.000	94.000
11.000	MK-1	175.000	94.000
11.100	MK-1	175.000	94.000
11.200	MK-1	175.000	94.000
11.300	MK-1	175.000	94.000
11.400	MK-1	175.000	94.000
11.500	MK-1	175.000	94.000
11.600	MK-1	175.000	94.000
11.700	MK-1	175.000	94.000
11.750	MK-1	175.000	94.000
11.800	MK-1	175.000	94.000
11.900	MK-1	182.000	101.000
12.000	MK-1	182.000	101.000
12.100	MK-1	182.000	101.000
12.200	MK-1	182.000	101.000
12.250	MK-1	182.000	101.000
12.300	MK-1	182.000	101.000
12.400	MK-1	182.000	101.000
12.500	MK-1	182.000	101.000
12.600	MK-1	182.000	101.000
12.700	MK-1	182.000	101.000
12.800	MK-1	182.000	101.000
12.900	MK-1	182.000	101.000
13.000	MK-1	182.000	101.000
13.100	MK-1	182.000	101.000
13.200	MK-1	182.000	101.000
13.300	MK-1	189.000	108.000
13.400	MK-1	189.000	108.000
13.500	MK-1	189.000	108.000
13.600	MK-1	189.000	108.000
13.700	MK-1	189.000	108.000
13.750	MK-1	189.000	108.000
13.800	MK-1	189.000	108.000
13.900	MK-1	189.000	108.000
14.000	MK-1	189.000	108.000
14.100	MK-2	212.000	114.000
14.200	MK-2	212.000	114.000
14.250	MK-2	212.000	114.000
14.300	MK-2	212.000	114.000
14.400	MK-2	212.000	114.000
14.500	MK-2	212.000	114.000
14.600	MK-2	212.000	114.000
14.700	MK-2	212.000	114.000

# Application recommendations for drills

Feed column											
Code-letter	A	B	C	D	E	F	G	H	I		
Drill-Ø mm	<b>0.50</b>	0.004	0.006	0.007	0.008	0.010	0.012	0.014	0.016	0.019	Feed f (mm/rev)
	<b>1.00</b>	0.006	0.008	0.012	0.014	0.016	0.018	0.020	0.023	0.025	
	<b>2.00</b>	0.020	0.025	0.032	0.040	0.050	0.063	0.080	0.100	0.125	
	<b>2.50</b>	0.025	0.032	0.040	0.050	0.063	0.080	0.100	0.125	0.160	
	<b>3.15</b>	0.032	0.040	0.050	0.063	0.080	0.100	0.125	0.160	0.160	
	<b>4.00</b>	0.040	0.050	0.063	0.080	0.100	0.125	0.160	0.200	0.200	
	<b>5.00</b>	0.040	0.050	0.063	0.080	0.100	0.125	0.160	0.200	0.250	
	<b>6.30</b>	0.050	0.063	0.080	0.100	0.125	0.160	0.200	0.250	0.315	
	<b>8.00</b>	0.063	0.080	0.100	0.125	0.160	0.200	0.250	0.315	0.315	
	<b>16.00</b>	0.100	0.125	0.160	0.200	0.250	0.315	0.400	0.500	0.630	
	<b>20.00</b>	0.125	0.160	0.200	0.250	0.315	0.400	0.500	0.630	0.630	
	<b>25.00</b>	0.160	0.200	0.250	0.315	0.400	0.500	0.630	0.800	0.800	
	<b>31.50</b>	0.160	0.200	0.250	0.315	0.400	0.500	0.630	0.800	1.000	
	<b>40.00</b>	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 <sup>2</sup> )	Hardness	Coolant
General purpose steels	<b>1.0035</b> S185(St33), <b>1.0486</b> P275N(StE285), <b>1.0345</b> P235GH(H1), <b>1.0425</b> P265GH(H2) <b>1.0050</b> E295 (St50-2), <b>1.0070</b> E360 (St70-2), <b>1.8937</b> P500NH (WStE500)	≤500 >500-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Free-cutting steels	<b>1.0718</b> 11SMnPb30 (9SMnPb28), <b>1.0736</b> 11SMn37 (9SMn36) <b>1.0727</b> 46S20 (45S20), <b>1.0728</b> (60S20), <b>1.0757</b> 46SPb20 (45SPb20)	≤850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Unalloyed tempering steels	<b>1.0402</b> C22, <b>1.1178</b> C30E (Ck30) <b>1.0503</b> C45, <b>1.1191</b> C45E (Ck45) <b>1.0601</b> C60, <b>1.1221</b> C60E (Ck60)	≤ 700 700-850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Alloyed tempering steels	<b>1.5131</b> 50MnSi4, <b>1.7003</b> 38Cr2, <b>1.7030</b> 28Cr4 <b>1.5710</b> 36NiCr6, <b>1.7035</b> 41Cr4, <b>1.7225</b> 42CrMo4	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Unalloyed case hardened steels	<b>1.0301</b> (C10), <b>1.1121</b> C10E (Ck10)	≤750		<input checked="" type="checkbox"/>
Alloyed case hardened steels	<b>1.7043</b> 38Cr4 <b>1.5752</b> 15NiCr13 (15NiCr13), <b>1.7131</b> 16MnCr5, <b>1.7264</b> 20CrMo5	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Nitriding steels	<b>1.8504</b> 34CrAl6 <b>1.8519</b> 31CrMoV9, <b>1.8550</b> 34CrAlNi7	≥850-≤1000 >1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Tool steels	<b>1.1750</b> C75W, <b>1.2067</b> 102Cr6, <b>1.2307</b> 29CrMoV9 <b>1.2080</b> X210Cr12, <b>1.2083</b> X42Cr13, <b>1.2419</b> 105WCr6, <b>1.2767</b> X45NiCrMo4	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
High speed steels	<b>1.3243</b> S 6-5-2-5, <b>1.3343</b> S 6-5-2, <b>1.3344</b> S 6-5-3	≥650-1000		<input checked="" type="checkbox"/>
Spring steels	<b>1.5026</b> 55Si7, <b>1.7176</b> 55Cr3, <b>1.8159</b> 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	<b>1.4005</b> X12CrS13, <b>1.4104</b> X14CrMoS17, <b>1.4105</b> X6CrMoS17, <b>1.4305</b> X8CrNiS18-9 <b>1.4301</b> X5CrNi18-10 (V2A), <b>1.4541</b> X6CrNiTi18-10, <b>1.4571</b> X6CrNiMoTi 17-12-2 (V4A) <b>1.4057</b> X20CrNi17.2 (X17CrNi16-2), <b>1.4122</b> X39CrMo17-1, <b>1.4521</b> X2CrMoTi18-2	≤850 ≤850 ≤850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Cast iron	<b>0.6010</b> EN-GJL-100(GG10), <b>0.6020</b> EN-GJL-200(GG20) <b>0.6025</b> EN-GJL-250(GG25), <b>0.6035</b> EN-GJL-350(GG35)	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Spheroidal graphite iron and malleable cast iron	<b>0.7050</b> EN-GJS-500-7(GGG50), <b>0.8035</b> EN-GJMW-350-4(GTW35) <b>0.7070</b> EN-GJS-700-2(GGG70), <b>0.8170</b> 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	<b>EN-GJV250</b> (GGV25), <b>EN-GJV350</b> (GGV35) <b>EN-GJV400</b> (GGV40), <b>EN-GJV500</b> (GGV50), SiMo6			<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
New Cast iron ADI	<b>EN-GJS-800-8</b> (ADI800), <b>EN-GJS-1000-5</b> (ADI1000) <b>EN-GJS-1200-2</b> (ADI1200), <b>EN-GJS-1400-1</b> (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	<b>3.7024</b> Ti99.5, <b>3.7114</b> TiAl5Sn2.5, <b>3.7124</b> TiCu2 <b>3.7154</b> TiAl6Zr5, <b>3.7165</b> TiAl6V4, <b>3.7184</b> TiAl4Mo4Sn2.5, - TiAl8Mo1V1	≤850 >850-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aluminium and Al-alloys	<b>3.0255</b> Al99.5, <b>3.2315</b> AlMgSi1, <b>3.3515</b> AlMg1	≤400		<input checked="" type="checkbox"/>
Al wrought alloys	<b>3.0615</b> AlMgSiPb, <b>3.1325</b> AlCuMg1, <b>3.3245</b> AlMg3Si, <b>3.4365</b> AlZnMgCu1.5	≤450		<input checked="" type="checkbox"/>
Al cast alloys ≤ 10 % Si > 10 % Si	<b>3.2131</b> G-AlSi5Cu1, <b>3.2153</b> G-AlSi7Cu3, <b>3.2573</b> G-AlSi9 <b>3.2581</b> G-AlSi12, <b>3.2583</b> G-AlSi12Cu, - G-AlSi12CuNiMg	≤600 ≤600		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Magnesium alloys	<b>3.5200</b> MgMn2, <b>3.5812.05</b> G-MgAl8Zn1, <b>3.5612.05</b> G-MgAl6Zn1	≤450		<input type="checkbox"/>
Copper, low alloyed	<b>2.0070</b> SE-Cu, <b>2.1020</b> CuSn6, <b>2.1096</b> G-CuSn5ZnPb	≤400		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Brass, short-chipping long-chipping	<b>2.0380</b> CuZn39Pb2, <b>2.0401</b> CuZn39Pb3, <b>2.0410</b> CuZn43Pb2 <b>2.0250</b> CuZn20, <b>2.0280</b> CuZn33, <b>2.0332</b> CuZn37Pb0.5	≤600 ≤600		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Bronze, short-chipping	<b>2.1090</b> CuSn7ZnPb, <b>2.1170</b> CuPb5Sn5, <b>2.1176</b> CuPb10Sn <b>2.0790</b> CuNi18Zn19Pb	≤600 >600-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Bronze, long-chipping	<b>2.0916</b> CuAl5, <b>2.0960</b> CuAl9Mn, <b>2.1050</b> CuSn10 <b>2.0980</b> CuAl11Ni, <b>2.1247</b> 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"/>

# ≤5×D drilling depth

Catalog no.	<b>71116</b> 71119 <sub>L</sub>	71115	71300	71117	71124 71126 <sub>L</sub>	71305	71128 71129 <sub>L</sub>
Tool material	<b>HSS</b>	<b>HSS</b>	<b>HSS</b>	<b>HSS</b>	<b>HSS</b>	<b>HSS</b>	<b>HSS</b>
Surface finish	bright	bright/st.	steam	bright	bright	bright	bright
DIN/Form	338	338	345	338	338	345	338
Type	<b>N</b>	<b>N</b>	<b>N</b>	<b>H</b>	<b>V70</b>	<b>V70</b>	<b>V72</b>
Page	212/214	215	298	226	239/241	302	248/250

<b>61116</b>	<b>61124</b>	<b>61115</b>	<b>61223</b>
<b>HSS</b>	<b>HSS</b>	<b>HSS</b>	<b>HSS-Co</b>
TiN	TiN	TiN-tipped	TiN
338	338	338	338
<b>N</b>	<b>V70</b>	<b>N</b>	<b>V66 Ti</b>
218	243	220	236



v <sub>c</sub> m/min	Feed column no.					
27	F	F	F	F	F	F
22	E	E	E	E	E	E
30	F	F	F	F	F	F
30	E	E	E	E	E	E
25	E	E	E	E	E	E
25	E	E	E	E	E	E
30	F	F	F	F	F	F
16	D	D	D	D	D	D
30	F	F	F	G	G	F
30	F	F	F	F	F	F
25	F	F	F	F	F	F
25	F	F	F	F	F	F
80				G	G	G
80				G	G	G
70	G	G	G	G	G	G
70	F	F	F	F	F	F
50	F	F	F	F	F	F
50	E	E	E	F	F	E
70				F	F	E
40	E	E	E	F	F	E
30	D	D	D	D		D
25	D	D	D			D
15	D	D	D	D	D	D
18	D	D	D	D	D	D
28	E	E	E	E	D	E

v <sub>c</sub> m/min	Feed column no.	
30	F	F
24	E	E
33	F	F
33	E	E
28	E	E
28	E	E
25	D	D
22	D	D
33	F	F
20	D	D
14	D	D
18	D	D
33	F	G
33	F	F
28	F	F
22	F	F
80	F	F
65	E	E
75	E	E
45	E	E
33	D	D
27	D	D
16	D	D
15	D	D
22	D	D
36	E	E

v <sub>c</sub> m/min	Feed col. no.
30	F
24	E
33	F
33	E
28	E
28	E
25	D
22	D
33	F
20	D
14	D
18	D
33	F
33	F
28	F
22	F
80	F
65	E
75	E
45	E
33	D
27	D
16	D
15	D
22	D
36	E

v <sub>c</sub> m/min	Feed col. no.
22	C
14	C
9	B
20	D
15	C
18	C
12	C
6	B
11	B
7	B
17	D