

Tool material

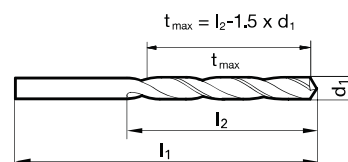
HSCo

Surface



P Steel	•	web thinning $\geq \varnothing 1.000$ • relieved cone • Co-alloyed high speed steel
M Stainless steel	•	• wide flutes • increased wear resistance • in case of unsatisfactory chip evacuation
K Cast iron	•	
N Aluminum	•	alloyed/unalloyed steels and castings over 800 N/mm ² • hot and cold rolled steels • antifriction bearing steels • high-alloyed steels • heat treatable and case hardened steels
S Titanium alloys	•	
H Hardened steel	○	

●=Optimal
○=Limited



Speeds and feeds information on pg. 491

Shank diameter = cut diameter

Diameter (d ₁)			l ₁ mm	t _{max} mm	l ₂ mm	EDP #
inch	wire/ltr	mm				
0.0394		1.00	56.00	31.50	33.00	9003360010000
0.0402	#60	1.02	56.00	31.47	33.00	9003360010200
0.0409	#59	1.04	56.00	31.44	33.00	9003360010400
0.0421	#58	1.07	60.00	35.40	37.00	9003360010700
0.0429	#57	1.09	60.00	35.37	37.00	9003360010900
0.0433		1.10	60.00	35.35	37.00	9003360011000
0.0465	#56	1.18	60.00	35.23	37.00	9003360011800
0.0469	3/64	1.19	65.00	39.22	41.00	9003360011900
0.0472		1.20	65.00	39.20	41.00	9003360012000
0.0492		1.25	65.00	39.13	41.00	9003360012500
0.0512		1.30	65.00	39.05	41.00	9003360013000
0.0520	#55	1.32	65.00	39.02	41.00	9003360013200
0.0551	#54	1.40	70.00	42.90	45.00	9003360014000
0.0591		1.50	70.00	42.75	45.00	9003360015000
0.0594	#53	1.51	76.00	47.74	50.00	9003360015100
0.0610		1.55	76.00	47.68	50.00	9003360015500
0.0626	1/16	1.59	76.00	47.62	50.00	9003360015900
0.0630		1.60	76.00	47.60	50.00	9003360016000
0.0634	#52	1.61	76.00	47.59	50.00	9003360016100
0.0669	#51	1.70	76.00	47.45	50.00	9003360017000
0.0689		1.75	80.00	50.38	53.00	9003360017500
0.0701	#50	1.78	80.00	50.33	53.00	9003360017800
0.0709		1.80	80.00	50.30	53.00	9003360018000
0.0728	#49	1.85	80.00	50.23	53.00	9003360018500
0.0748		1.90	80.00	50.15	53.00	9003360019000
0.0760	#48	1.93	85.00	53.11	56.00	9003360019300
0.0780	5/64	1.98	85.00	53.03	56.00	9003360019800
0.0783	#47	1.99	85.00	53.02	56.00	9003360019900
0.0787		2.00	85.00	53.00	56.00	9003360020000
0.0807		2.05	85.00	52.93	56.00	9003360020500
0.0811	#46	2.06	85.00	52.91	56.00	9003360020600
0.0819	#45	2.08	85.00	52.88	56.00	9003360020800
0.0827		2.10	85.00	52.85	56.00	9003360021000
0.0858	#44	2.18	90.00	55.73	59.00	9003360021800
0.0866		2.20	90.00	55.70	59.00	9003360022000
0.0886		2.25	90.00	55.63	59.00	9003360022500
0.0890	#43	2.26	90.00	55.61	59.00	9003360022600
0.0906		2.30	90.00	55.55	59.00	9003360023000
0.0925		2.35	90.00	55.48	59.00	9003360023500
0.0933	#42	2.37	95.00	58.45	62.00	9003360023700
0.0937	3/32	2.38	95.00	58.43	62.00	9003360023800
0.0945		2.40	95.00	58.40	62.00	9003360024000
0.0961	#41	2.44	95.00	58.34	62.00	9003360024400

Diameter (d ₁)			l ₁ mm	t _{max} mm	l ₂ mm	EDP #
inch	wire/ltr	mm				
0.0965		2.45	95.00	58.33	62.00	9003360024500
0.0980	#40	2.49	95.00	58.27	62.00	9003360024900
0.0984		2.50	95.00	58.25	62.00	9003360025000
0.0996	#39	2.53	95.00	58.21	62.00	9003360025300
0.1004		2.55	95.00	58.18	62.00	9003360025500
0.1016	#38	2.58	95.00	58.13	62.00	9003360025800
0.1024		2.60	95.00	58.10	62.00	9003360026000
0.1039	#37	2.64	95.00	58.04	62.00	9003360026400
0.1063		2.70	100.00	61.95	66.00	9003360027000
0.1067	#36	2.71	100.00	61.94	66.00	9003360027100
0.1083		2.75	100.00	61.88	66.00	9003360027500
0.1094	7/64	2.78	100.00	61.83	66.00	9003360027800
0.1098	#35	2.79	100.00	61.82	66.00	9003360027900
0.1102		2.80	100.00	61.80	66.00	9003360028000
0.1110	#34	2.82	100.00	61.77	66.00	9003360028200
0.1122		2.85	100.00	61.73	66.00	9003360028500
0.1130	#33	2.87	100.00	61.70	66.00	9003360028700
0.1142		2.90	100.00	61.65	66.00	9003360029000
0.1161	#32	2.95	100.00	61.58	66.00	9003360029500
0.1181		3.00	100.00	61.50	66.00	9003360030000
0.1201	#31	3.05	106.00	64.43	69.00	9003360030500
0.1220		3.10	106.00	64.35	69.00	9003360031000
0.1248	1/8	3.17	106.00	64.25	69.00	9003360031700
0.1260		3.20	106.00	64.20	69.00	9003360032000
0.1283	#30	3.26	106.00	64.11	69.00	9003360032600
0.1299		3.30	106.00	64.05	69.00	9003360033000
0.1339		3.40	112.00	67.90	73.00	9003360034000
0.1354		3.44	112.00	67.84	73.00	9003360034400
0.1358	#29	3.45	112.00	67.83	73.00	9003360034500
0.1378		3.50	112.00	67.75	73.00	9003360035000
0.1406	9/64	3.57	112.00	67.65	73.00	9003360035700
0.1417		3.60	112.00	67.60	73.00	9003360036000
0.1441	#27	3.66	112.00	67.51	73.00	9003360036600
0.1457		3.70	112.00	67.45	73.00	9003360037000
0.1469	#26	3.73	112.00	67.41	73.00	9003360037300
0.1496	#25	3.80	119.00	72.30	78.00	9003360038000
0.1520	#24	3.86	119.00	72.21	78.00	9003360038600
0.1535		3.90	119.00	72.15	78.00	9003360039000
0.1539	#23	3.91	119.00	72.14	78.00	9003360039100
0.1563	5/32	3.97	119.00	72.05	78.00	9003360039700
0.1571	#22	3.99	119.00	72.02	78.00	9003360039900
0.1575		4.00	119.00	72.00	78.00	9003360040000
0.1591	#21	4.04	119.00	71.94	78.00	9003360040400

Diameter (d ₁)			l ₁ mm	t _{max} mm	l ₂ mm	EDP #
inch	wire/ltr	mm				
0.1610	#20	4.09	119.00	71.87	78.00	9003360040900
0.1614		4.10	119.00	71.85	78.00	9003360041000
0.1654		4.20	119.00	71.70	78.00	9003360042000
0.1661	#19	4.22	119.00	71.67	78.00	9003360042200
0.1693	#18	4.30	126.00	75.55	82.00	9003360043000
0.1720	11/64	4.37	126.00	75.45	82.00	9003360043700
0.1728	#17	4.39	126.00	75.42	82.00	9003360043900
0.1732		4.40	126.00	75.40	82.00	9003360044000
0.1772	#16	4.50	126.00	75.25	82.00	9003360045000
0.1799	#15	4.57	126.00	75.15	82.00	9003360045700
0.1811		4.60	126.00	75.10	82.00	9003360046000
0.1819	#14	4.62	126.00	75.07	82.00	9003360046200
0.1850	#13	4.70	126.00	74.95	82.00	9003360047000
0.1874	3/16	4.76	132.00	79.86	87.00	9003360047600
0.1890	#12	4.80	132.00	79.80	87.00	9003360048000
0.1909	#11	4.85	132.00	79.73	87.00	9003360048500
0.1929		4.90	132.00	79.65	87.00	9003360049000
0.1937	#10	4.92	132.00	79.62	87.00	9003360049200
0.1961	#9	4.98	132.00	79.53	87.00	9003360049800
0.1969		5.00	132.00	79.50	87.00	9003360050000
0.1992	#8	5.06	132.00	79.41	87.00	9003360050600
0.2008		5.10	132.00	79.35	87.00	9003360051000
0.2012	#7	5.11	132.00	79.34	87.00	9003360051100
0.2031	13/64	5.16	132.00	79.26	87.00	9003360051600
0.2039	#6	5.18	132.00	79.23	87.00	9003360051800
0.2047		5.20	132.00	79.20	87.00	9003360052000
0.2055	#5	5.22	132.00	79.17	87.00	9003360052200
0.2087		5.30	132.00	79.05	87.00	9003360053000
0.2091	#4	5.31	139.00	83.04	91.00	9003360053100
0.2126		5.40	139.00	82.90	91.00	9003360054000
0.2130	#3	5.41	139.00	82.89	91.00	9003360054100
0.2165		5.50	139.00	82.75	91.00	9003360055000
0.2189	7/32	5.56	139.00	82.66	91.00	9003360055600
0.2205		5.60	139.00	82.60	91.00	9003360056000
0.2244		5.70	139.00	82.45	91.00	9003360057000
0.2280	#1	5.79	139.00	82.32	91.00	9003360057900
0.2283		5.80	139.00	82.30	91.00	9003360058000
0.2323		5.90	139.00	82.15	91.00	9003360059000
0.2343	15/64	5.95	139.00	82.08	91.00	9003360059500
0.2362		6.00	139.00	82.00	91.00	9003360060000
0.2378	B	6.04	148.00	87.94	97.00	9003360060400
0.2402		6.10	148.00	87.85	97.00	9003360061000
0.2421	C	6.15	148.00	87.78	97.00	9003360061500
0.2441		6.20	148.00	87.70	97.00	9003360062000
0.2461	D	6.25	148.00	87.63	97.00	9003360062500
0.2480		6.30	148.00	87.55	97.00	9003360063000
0.2500	1/4	6.35	148.00	87.48	97.00	9003360063500
0.2520		6.40	148.00	87.40	97.00	9003360064000
0.2559		6.50	148.00	87.25	97.00	9003360065000
0.2571		6.53	148.00	87.21	97.00	9003360065300
0.2598		6.60	148.00	87.10	97.00	9003360066000
0.2610	G	6.63	148.00	87.06	97.00	9003360066300
0.2638		6.70	148.00	86.95	97.00	9003360067000

Diameter (d ₁)				l ₁ mm	t _{max} mm	l ₂ mm	EDP #
inch	wire/ltr	mm					
0.2657	17/64	H	6.75	156.00	91.88	102.00	9003360067500
0.2677			6.80	156.00	91.80	102.00	9003360068000
0.2717		I	6.90	156.00	91.65	102.00	9003360069000
0.2756			7.00	156.00	91.50	102.00	9003360070000
0.2768		J	7.03	156.00	91.46	102.00	9003360070300
0.2795			7.10	156.00	91.35	102.00	9003360071000
0.2811	9/32	K	7.14	156.00	91.29	102.00	9003360071400
0.2835			7.20	156.00	91.20	102.00	9003360072000
0.2874			7.30	156.00	91.05	102.00	9003360073000
0.2913			7.40	156.00	90.90	102.00	9003360074000
0.2953			7.50	156.00	90.75	102.00	9003360075000
0.2969	19/64		7.54	165.00	97.69	109.00	9003360075400
0.3020		N	7.67	165.00	97.50	109.00	9003360076700
0.3031			7.70	165.00	97.45	109.00	9003360077000
0.3071			7.80	165.00	97.30	109.00	9003360078000
0.3110			7.90	165.00	97.15	109.00	9003360079000
0.3126	5/16		7.94	165.00	97.09	109.00	9003360079400
0.3150			8.00	165.00	97.00	109.00	9003360080000
0.3161		O	8.03	165.00	96.96	109.00	9003360080300
0.3189			8.10	165.00	96.85	109.00	9003360081000
0.3228		P	8.20	165.00	96.70	109.00	9003360082000
0.3268			8.30	165.00	96.55	109.00	9003360083000
0.3307			8.40	165.00	96.40	109.00	9003360084000
0.3346			8.50	165.00	96.25	109.00	9003360085000
0.3386			8.60	175.00	102.10	115.00	9003360086000
0.3390		R	8.61	175.00	102.09	115.00	9003360086100
0.3425			8.70	175.00	101.95	115.00	9003360087000
0.3437	11/32		8.73	175.00	101.91	115.00	9003360087300
0.3465			8.80	175.00	101.80	115.00	9003360088000
0.3480		S	8.84	175.00	101.74	115.00	9003360088400
0.3504			8.90	175.00	101.65	115.00	9003360089000
0.3543			9.00	175.00	101.50	115.00	9003360090000
0.3579		T	9.09	175.00	101.37	115.00	9003360090900
0.3583			9.10	175.00	101.35	115.00	9003360091000
0.3622			9.20	175.00	101.20	115.00	9003360092000
0.3661			9.30	175.00	101.05	115.00	9003360093000
0.3677		U	9.34	175.00	100.99	115.00	9003360093400
0.3701			9.40	175.00	100.90	115.00	9003360094000
0.3740			9.50	175.00	100.75	115.00	9003360095000
0.3748	3/8		9.52	184.00	106.72	121.00	9003360095200
0.3819			9.70	184.00	106.45	121.00	9003360097000
0.3839			9.75	184.00	106.38	121.00	9003360097500
0.3858		W	9.80	184.00	106.30	121.00	9003360098000
0.3898			9.90	184.00	106.15	121.00	9003360099000
0.3937			10.00	184.00	106.00	121.00	9003360100000
0.4016			10.20	184.00	105.70	121.00	9003360102000
0.4134			10.50	184.00	105.25	121.00	9003360105000
0.4252			10.80	195.00	111.80	128.00	9003360108000
0.4331			11.00	195.00	111.50	128.00	9003360110000
0.4528			11.50	195.00	110.75	128.00	9003360115000
0.4646			11.80	195.00	110.30	128.00	9003360118000
0.4689	15/32		11.91	205.00	116.14	134.00	9003360119100
0.4724			12.00	205.00	116.00	134.00	9003360120000

Material group	Hardness		SFM	Feed Rate - IPR									
	HRC	Bhn		1/16 in. 1.590 mm	1/8 in. 3.170 mm	1/4 in. 6.350 mm	3/8 in. 9.520 mm	1/2 in. 12.700 mm	5/8 in. 15.870 mm	3/4 in. 19.050 mm	1 in. 25.400 mm	1 1/4 in. 31.750 mm	1 1/2 in. 38.100 mm
Common structural steels	- ≤ 32	≤ 150 ≤ 301											
Free-cutting steels	≤ 25 ≤ 32	≤ 255 ≤ 301	95	0,0015	0,0040	0,0065	0,0080	0,0100	0,0100	0,0110	0,0125		
Unalloyed heat-treatable steels	≤ 20 ≤ 25 ≤ 32	≤ 220 ≤ 255 ≤ 301	95	0,0015	0,0040	0,0065	0,0080	0,0100	0,0100	0,0110	0,0125		
Alloyed heat-treatable steels	≤ 32 ≤ 43	≤ 301 ≤ 402	65 50	0,0012 0,0010	0,0030 0,0025	0,0050 0,0040	0,0065 0,0050	0,0080 0,0065	0,0080 0,0065	0,0090 0,0070	0,0100 0,0080		
Unalloyed case hardened steels	≤ 25	≤ 255											
Alloyed case hardened steels	≤ 32 ≤ 43	≤ 301 ≤ 402	55 45	0,0012 0,0010	0,0030 0,0025	0,0050 0,0040	0,0065 0,0050	0,0080 0,0065	0,0080 0,0065	0,0090 0,0070	0,0100 0,0080		
Nitriding steels	≤ 32 ≤ 43	≤ 301 ≤ 402	50 35	0,0012 0,0010	0,0030 0,0025	0,0050 0,0040	0,0065 0,0050	0,0080 0,0065	0,0080 0,0065	0,0090 0,0070	0,0100 0,0080		
Tool steels	≤ 25 ≤ 43	≤ 255 ≤ 402	65 35	0,0012 0,0010	0,0030 0,0025	0,0050 0,0040	0,0065 0,0050	0,0080 0,0065	0,0080 0,0065	0,0090 0,0070	0,0100 0,0080		
High speed steels	≤ 43	≤ 402	35	0,0010	0,0025	0,0040	0,0050	0,0065	0,0065	0,0070	0,0080		
Spring steels	≤ 38	≤ 354	30	0,0007	0,0020	0,0030	0,0040	0,0050	0,0050	0,0055	0,0065		
Hardened steels	≤ 48 ≤ 66	≤ 460 -											
Stainless steels, sulphured austenitic martensitic	≤ 28 ≤ 36 ≤ 46	≤ 273 ≤ 337 ≤ 435	50 35 45	0,0012 0,0010 0,0010	0,0030 0,0025 0,0025	0,0050 0,0040 0,0040	0,0065 0,0050 0,0050	0,0080 0,0065 0,0065	0,0080 0,0065 0,0065	0,0090 0,0070 0,0070	0,0100 0,0080 0,0080		
Cast iron	≤ 23 ≤ 38	≤ 242 ≤ 354	130 95	0,0017 0,0017	0,0050 0,0050	0,0080 0,0080	0,0100 0,0100	0,0125 0,0125	0,0125 0,0125	0,0140 0,0140	0,0160 0,0160		
Spheroidal graphite iron and malleable cast iron	≤ 23 ≤ 38	≤ 242 ≤ 354	115 90	0,0017 0,0017	0,0050 0,0050	0,0080 0,0080	0,0100 0,0100	0,0125 0,0125	0,0125 0,0125	0,0140 0,0140	0,0160 0,0160		
Chilled cast iron	≤ 38	≤ 354	30	0,0010	0,0025	0,0040	0,0050	0,0065	0,0065	0,0070	0,0080		
New cast materials GGV	≤ 20 ≤ 32	≤ 220 ≤ 301											
New cast materials ADI	≤ 32 ≤ 43	≤ 301 ≤ 402											
Special alloys	≤ 54	≤ 549	25	0,0005	0,0015	0,0025	0,0030	0,0040	0,0040	0,0045	0,0050		
Ti and Ti-alloys	≤ 25 ≤ 43	≤ 255 ≤ 402	35 25	0,0007 0,0007	0,0020 0,0020	0,0030 0,0030	0,0040 0,0040	0,0050 0,0050	0,0050 0,0050	0,0055 0,0055	0,0065 0,0065		
Aluminium and Al-alloys	-	≤ 120											
Al wrought alloys	-	≤ 200											
Al cast alloys ≤ 10 % Si	-	≤ 180											
≤ 24 % Si	-	≤ 180											
Magnesium alloys	-	≤ 120											
Copper, low-alloyed	-	≤ 150											
Brass, short-chipping	-	≤ 180											
long-chipping	-	≤ 180											
Bronze, short-chipping	-	≤ 180	130	0,0012	0,0030	0,0050	0,0065	0,0080	0,0080	0,0090	0,0100	0,0125	
	≤ 25	≤ 255	115	0,0012	0,0030	0,0050	0,0065	0,0080	0,0080	0,0090	0,0100	0,0125	
Bronze, long-chipping	≤ 25	≤ 255	95	0,0012	0,0030	0,0050	0,0065	0,0080	0,0080	0,0090	0,0100	0,0125	
	≤ 32	≤ 301	80	0,0012	0,0030	0,0050	0,0065	0,0080	0,0080	0,0090	0,0100	0,0125	
Duroplastics			65	0,0012	0,0030	0,0050	0,0065	0,0080	0,0080	0,0090	0,0100	0,0125	
Thermoplastics													
Reinforced plastics - Kevlar													
Reinforced plastics - GFK / CFK													

Material group	Hardness		SFM	Feed Rate - IPR									
	HRC	Bhn		1/16 in. 1.590 mm	1/8 in. 3.170 mm	1/4 in. 6.350 mm	3/8 in. 9.520 mm	1/2 in. 12.700 mm	5/8 in. 15.870 mm	3/4 in. 19.050 mm	1 in. 25.400 mm	1 1/4 in. 31.750 mm	1 1/2 in. 38.100 mm
Common structural steels	- ≤ 32	≤ 150 ≤ 301											
Free-cutting steels	≤ 25 ≤ 32	≤ 255 ≤ 301	75	0,0015	0,0040	0,0065	0,0080	0,0100					
Unalloyed heat-treatable steels	≤ 20 ≤ 25 ≤ 32	≤ 220 ≤ 255 ≤ 301	75	0,0015	0,0040	0,0065	0,0080	0,0100					
Alloyed heat-treatable steels	≤ 32 ≤ 43	≤ 301 ≤ 402	50 35	0,0012 0,0010	0,0030 0,0025	0,0050 0,0040	0,0065 0,0050	0,0080 0,0065					
Unalloyed case hardened steels	≤ 25	≤ 255											
Alloyed case hardened steels	≤ 32 ≤ 43	≤ 301 ≤ 402	45 30	0,0012 0,0010	0,0030 0,0025	0,0050 0,0040	0,0065 0,0050	0,0080 0,0065					
Nitriding steels	≤ 32 ≤ 43	≤ 301 ≤ 402	35 25	0,0012 0,0010	0,0030 0,0025	0,0050 0,0040	0,0065 0,0050	0,0080 0,0065					
Tool steels	≤ 25 ≤ 43	≤ 255 ≤ 402	50 25	0,0012 0,0010	0,0030 0,0025	0,0050 0,0040	0,0065 0,0050	0,0080 0,0065					
High speed steels	≤ 43	≤ 402	25	0,0010	0,0025	0,0040	0,0050	0,0065					
Spring steels	≤ 38	≤ 354	15	0,0007	0,0020	0,0030	0,0040	0,0050					
Hardened steels	≤ 48 ≤ 66	≤ 460 -											
Stainless steels, sulphured austenitic martensitic	≤ 28 ≤ 36 ≤ 46	≤ 273 ≤ 337 ≤ 435	35 25 30	0,0012 0,0005 0,0010	0,0030 0,0015 0,0025	0,0050 0,0025 0,0040	0,0065 0,0030 0,0040	0,0080 0,0040 0,0050					
Cast iron	≤ 23 ≤ 38	≤ 242 ≤ 354	95 75	0,0017 0,0017	0,0050 0,0050	0,0080 0,0080	0,0100 0,0100	0,0125 0,0125					
Spheroidal graphite iron and malleable cast iron	≤ 23 ≤ 38	≤ 242 ≤ 354	75 65	0,0017 0,0017	0,0050 0,0050	0,0080 0,0080	0,0100 0,0100	0,0125 0,0125					
Chilled cast iron	≤ 38	≤ 354											
New cast materials GGV	≤ 20 ≤ 32	≤ 220 ≤ 301											
New cast materials ADI	≤ 32 ≤ 43	≤ 301 ≤ 402											
Special alloys	≤ 54	≤ 549											
Ti and Ti-alloys	≤ 25 ≤ 43	≤ 255 ≤ 402											
Aluminium and Al-alloys	-	≤ 120											
Al wrought alloys	-	≤ 200											
Al cast alloys ≤ 10 % Si	-	≤ 180	195	0,0020	0,0065	0,0100	0,0125	0,0160					
≤ 24 % Si	-	≤ 180	160	0,0017	0,0050	0,0080	0,0100	0,0125					
Magnesium alloys	-	≤ 120											
Copper, low-alloyed	-	≤ 150	95	0,0015	0,0040	0,0065	0,0080	0,0100					
Brass, short-chipping	-	≤ 180											
long-chipping	-	≤ 180	120	0,0015	0,0040	0,0065	0,0080	0,0100					
Bronze, short-chipping	-	≤ 180											
	≤ 25	≤ 255											
Bronze, long-chipping	≤ 25	≤ 255	75	0,0012	0,0030	0,0050	0,0065	0,0080					
	≤ 32	≤ 301	65	0,0012	0,0030	0,0050	0,0065	0,0080					
Duroplastics			50	0,0012	0,0030	0,0050	0,0065	0,0080					
Thermoplastics													
Reinforced plastics - Kevlar													
Reinforced plastics - GFK / CFK													