



Tool material

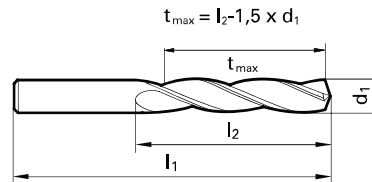
Solid Carbide

Surface



P	Steel	○	web thinning $\geq \varnothing 3.000$ • facet point grinding • for holes with high alignment accuracy • very good surface quality of hole • suitable for interrupted cutting
M	Stainless steel		
K	Cast iron	○	cast steel • alloyed/unalloyed steels up to 1000 N/mm ²
N	Aluminum	○	
S	Titanium alloys		
H	Hardened steel		

●=Optimal
○=Limited



Speeds and feeds information on pg. 511

Shank diameter = cut diameter

Diameter (d1)							Diameter (d1)						
inch	wire/ltr	mm	l1 mm	t _{max} mm	l2 mm	EDP #	inch	wire/ltr	mm	l1 mm	t _{max} mm	l2 mm	EDP #
0.1181		3.00	46.00	17.50	22.00	9006090030000	0.2500	1/4 E	6.35	70.00	32.48	42.00	9006090063500
0.1220		3.10	49.00	19.35	24.00	9006090031000	0.2520		6.40	70.00	32.40	42.00	9006090064000
0.1248	1/8	3.17	49.00	19.25	24.00	9006090031700	0.2559		6.50	70.00	32.25	42.00	9006090065000
0.1260		3.20	49.00	19.20	24.00	9006090032000	0.2598		6.60	70.00	32.10	42.00	9006090066000
0.1299		3.30	49.00	19.05	24.00	9006090033000	0.2638		6.70	70.00	31.95	42.00	9006090067000
0.1339		3.40	52.00	21.90	27.00	9006090034000	0.2657	17/64 H	6.75	74.00	34.88	45.00	9006090067500
0.1378		3.50	52.00	21.75	27.00	9006090035000	0.2677		6.80	74.00	34.80	45.00	9006090068000
0.1406	9/64 #28	3.57	52.00	21.65	27.00	9006090035700	0.2717	I	6.90	74.00	34.65	45.00	9006090069000
0.1417		3.60	52.00	21.60	27.00	9006090036000	0.2756		7.00	74.00	34.50	45.00	9006090070000
0.1457		3.70	52.00	21.45	27.00	9006090037000	0.2795		7.10	74.00	34.35	45.00	9006090071000
0.1496	#25	3.80	55.00	24.30	30.00	9006090038000	0.2811	9/32 K	7.14	74.00	34.29	45.00	9006090071400
0.1535		3.90	55.00	24.15	30.00	9006090039000	0.2835		7.20	74.00	34.20	45.00	9006090072000
0.1563	5/32	3.97	55.00	24.05	30.00	9006090039700	0.2874		7.30	74.00	34.05	45.00	9006090073000
0.1575		4.00	55.00	24.00	30.00	9006090040000	0.2913		7.40	74.00	33.90	45.00	9006090074000
0.1614		4.10	55.00	23.85	30.00	9006090041000	0.2953		7.50	74.00	33.75	45.00	9006090075000
0.1654		4.20	55.00	23.70	30.00	9006090042000	0.2969	19/64	7.54	79.00	36.69	48.00	9006090075400
0.1693	#18	4.30	58.00	25.55	32.00	9006090043000	0.2992		7.60	79.00	36.60	48.00	9006090076000
0.1720	11/64	4.37	58.00	25.45	32.00	9006090043700	0.3031		7.70	79.00	36.45	48.00	9006090077000
0.1732		4.40	58.00	25.40	32.00	9006090044000	0.3071		7.80	79.00	36.30	48.00	9006090078000
0.1772	#16	4.50	58.00	25.25	32.00	9006090045000	0.3110		7.90	79.00	36.15	48.00	9006090079000
0.1811		4.60	58.00	25.10	32.00	9006090046000	0.3126	5/16	7.94	79.00	36.09	48.00	9006090079400
0.1850	#13	4.70	58.00	24.95	32.00	9006090047000	0.3150		8.00	79.00	36.00	48.00	9006090080000
0.1874	3/16	4.76	62.00	27.86	35.00	9006090047600	0.3189		8.10	79.00	35.85	48.00	9006090081000
0.1890	#12	4.80	62.00	27.80	35.00	9006090048000	0.3228	P	8.20	79.00	35.70	48.00	9006090082000
0.1929		4.90	62.00	27.65	35.00	9006090049000	0.3268		8.30	79.00	35.55	48.00	9006090083000
0.1969		5.00	62.00	27.50	35.00	9006090050000	0.3280	21/64	8.33	79.00	35.51	48.00	9006090083300
0.2008		5.10	62.00	27.35	35.00	9006090051000	0.3307		8.40	79.00	35.40	48.00	9006090084000
0.2031	13/64	5.16	62.00	27.26	35.00	9006090051600	0.3346		8.50	79.00	35.25	48.00	9006090085000
0.2047		5.20	62.00	27.20	35.00	9006090052000	0.3386		8.60	84.00	39.10	52.00	9006090086000
0.2087		5.30	62.00	27.05	35.00	9006090053000	0.3425		8.70	84.00	38.95	52.00	9006090087000
0.2126		5.40	66.00	30.90	39.00	9006090054000	0.3437	11/32	8.73	84.00	38.91	52.00	9006090087300
0.2165		5.50	66.00	30.75	39.00	9006090055000	0.3465		8.80	84.00	38.80	52.00	9006090088000
0.2189	7/32	5.56	66.00	30.66	39.00	9006090055600	0.3504		8.90	84.00	38.65	52.00	9006090089000
0.2205		5.60	66.00	30.60	39.00	9006090056000	0.3543		9.00	84.00	38.50	52.00	9006090090000
0.2244		5.70	66.00	30.45	39.00	9006090057000	0.3583		9.10	84.00	38.35	52.00	9006090091000
0.2283		5.80	66.00	30.30	39.00	9006090058000	0.3594	23/64	9.13	84.00	38.31	52.00	9006090091300
0.2323		5.90	66.00	30.15	39.00	9006090059000	0.3622		9.20	84.00	38.20	52.00	9006090092000
0.2343	15/64	5.95	66.00	30.08	39.00	9006090059500	0.3661		9.30	84.00	38.05	52.00	9006090093000
0.2362		6.00	66.00	30.00	39.00	9006090060000	0.3701		9.40	84.00	37.90	52.00	9006090094000
0.2402		6.10	70.00	32.85	42.00	9006090061000	0.3740		9.50	84.00	37.75	52.00	9006090095000
0.2441		6.20	70.00	32.70	42.00	9006090062000	0.3748	3/8	9.52	89.00	40.72	55.00	9006090095200
0.2480		6.30	70.00	32.55	42.00	9006090063000	0.3780		9.60	89.00	40.60	55.00	9006090096000

Diameter (d1)			l1 mm	t _{max} mm	l2 mm	EDP #
inch	wire/ltr	mm				
0.3819	W	9.70	89.00	40.45	55.00	9006090097000
0.3858		9.80	89.00	40.30	55.00	9006090098000
0.3898		9.90	89.00	40.15	55.00	9006090099000
0.3906	25/64	9.92	89.00	40.12	55.00	9006090099200
0.3937		10.00	89.00	40.00	55.00	9006090100000
0.3976		10.10	89.00	39.85	55.00	9006090101000
0.4016	13/32	10.20	89.00	39.70	55.00	9006090102000
0.4055		10.30	89.00	39.55	55.00	9006090103000
0.4063		10.32	89.00	39.52	55.00	9006090103200
0.4094	27/64	10.40	89.00	39.40	55.00	9006090104000
0.4134		10.50	89.00	39.25	55.00	9006090105000
0.4173		10.60	89.00	39.10	55.00	9006090106000
0.4213	7/16	10.70	95.00	43.95	60.00	9006090107000
0.4220		10.72	95.00	43.92	60.00	9006090107200
0.4252		10.80	95.00	43.80	60.00	9006090108000
0.4291	29/64	10.90	95.00	43.65	60.00	9006090109000
0.4331		11.00	95.00	43.50	60.00	9006090110000
0.4370		11.10	95.00	43.35	60.00	9006090111000
0.4374	15/32	11.11	95.00	43.34	60.00	9006090111100
0.4409		11.20	95.00	43.20	60.00	9006090112000
0.4449		11.30	95.00	43.05	60.00	9006090113000
0.4488	31/64	11.40	95.00	42.90	60.00	9006090114000
0.4528		11.50	95.00	42.75	60.00	9006090115000
0.4531		11.51	95.00	42.74	60.00	9006090115100
0.4567	1/2	11.60	95.00	42.60	60.00	9006090116000
0.4606		11.70	95.00	42.45	60.00	9006090117000
0.4646		11.80	95.00	42.30	60.00	9006090118000
0.4685	3/4	11.90	102.00	47.15	65.00	9006090119000
0.4689		11.91	102.00	47.14	65.00	9006090119100
0.4724		12.00	102.00	47.00	65.00	9006090120000
0.4764	1 1/8	12.10	102.00	46.85	65.00	9006090121000
0.4803		12.20	102.00	46.70	65.00	9006090122000
0.4843		12.30	102.00	46.55	65.00	9006090123000
0.4882	1 1/4	12.40	102.00	46.40	65.00	9006090124000
0.4921		12.50	102.00	46.25	65.00	9006090125000
0.4961		12.60	102.00	46.10	65.00	9006090126000
0.5000	1 1/2	12.70	102.00	45.95	65.00	9006090127000
0.5039		12.80	102.00	45.80	65.00	9006090128000
0.5079		12.90	102.00	45.65	65.00	9006090129000

Diameter (d1)			l1 mm	t _{max} mm	l2 mm	EDP #
inch	wire/ltr	mm				
0.5118	33/64	13.00	102.00	45.50	65.00	9006090130000
0.5157		13.10	102.00	45.35	65.00	9006090131000
0.5197		13.20	102.00	45.20	65.00	9006090132000
0.5236	1 1/8	13.30	107.00	46.05	66.00	9006090133000
0.5276		13.40	107.00	45.90	66.00	9006090134000
0.5315		13.50	107.00	45.75	66.00	9006090135000
0.5354	1 1/4	13.60	107.00	45.60	66.00	9006090136000
0.5394		13.70	107.00	45.45	66.00	9006090137000
0.5433		13.80	107.00	45.30	66.00	9006090138000
0.5472	1 1/2	13.90	107.00	45.15	66.00	9006090139000
0.5512		14.00	107.00	45.00	66.00	9006090140000
0.5551		14.10	111.00	48.85	70.00	9006090141000
0.5591	1 3/8	14.20	111.00	48.70	70.00	9006090142000
0.5626		14.29	111.00	48.57	70.00	9006090142900
0.5630		14.30	111.00	48.55	70.00	9006090143000
0.5669	1 1/2	14.40	111.00	48.40	70.00	9006090144000
0.5709		14.50	111.00	48.25	70.00	9006090145000
0.5748		14.60	111.00	48.10	70.00	9006090146000
0.5787	1 3/4	14.70	111.00	47.95	70.00	9006090147000
0.5827		14.80	111.00	47.80	70.00	9006090148000
0.5866		14.90	111.00	47.65	70.00	9006090149000
0.5906	1 3/4	15.00	111.00	47.50	70.00	9006090150000
0.5945		15.10	115.00	50.35	73.00	9006090151000
0.5984		15.20	115.00	50.20	73.00	9006090152000
0.6024	1 3/4	15.30	115.00	50.05	73.00	9006090153000
0.6063		15.40	115.00	49.90	73.00	9006090154000
0.6102		15.50	115.00	49.75	73.00	9006090155000
0.6142	1 3/4	15.60	115.00	49.60	73.00	9006090156000
0.6181		15.70	115.00	49.45	73.00	9006090157000
0.6220		15.80	115.00	49.30	73.00	9006090158000
0.6248	1 3/4	15.87	115.00	49.20	73.00	9006090158700
0.6260		15.90	115.00	49.15	73.00	9006090159000
0.6693		17.00	119.00	47.50	73.00	9006090170000
0.7087	1 3/4	18.00	123.00	49.00	76.00	9006090180000
0.7283		18.50	127.00	48.25	76.00	9006090185000
0.7480		19.00	127.00	47.50	76.00	9006090190000
0.7500	1 3/4	19.05	131.00	50.43	79.00	9006090190500
0.7677		19.50	131.00	49.75	79.00	9006090195000
0.7874		20.00	131.00	49.00	79.00	9006090200000

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	-	≤ 150											
	≤ 32	≤ 301											
Free-cutting steels	≤ 25	≤ 255											
	≤ 32	≤ 301											
Unalloyed heat-treatable steels	≤ 20	≤ 220											
	≤ 25	≤ 255											
	≤ 32	≤ 301											
Alloyed heat-treatable steels	≤ 32	≤ 301	45	0,0010	0,0025	0,0040	0,0050	0,0065	0,0065	0,0070			
	≤ 43	≤ 402											
Unalloyed case hardened steels	≤ 25	≤ 255											
Alloyed case hardened steels	≤ 32	≤ 301	35	0,0010	0,0025	0,0040	0,0050	0,0065	0,0065	0,0070			
	≤ 43	≤ 402											
Nitriding steels	≤ 32	≤ 301	30	0,0010	0,0025	0,0040	0,0050	0,0065	0,0065	0,0070			
	≤ 43	≤ 402											
Tool steels	≤ 25	≤ 255	30	0,0010	0,0025	0,0040	0,0050	0,0065	0,0065	0,0070			
	≤ 43	≤ 402											
High speed steels	≤ 43	≤ 402	30	0,0010	0,0025	0,0040	0,0050	0,0065	0,0065	0,0070			
Spring steels	≤ 38	≤ 354	25	0,0007	0,0020	0,0030	0,0040	0,0050	0,0050	0,0055			
Hardened steels	≤ 48	≤ 460											
	≤ 66	-											
Stainless steels, sulphured	≤ 28	≤ 273	45	0,0012	0,0030	0,0050	0,0065	0,0080	0,0080	0,0090			
austenitic	≤ 36	≤ 337	30	0,0010	0,0025	0,0040	0,0050	0,0065	0,0065	0,0070			
martensitic	≤ 46	≤ 435	35	0,0010	0,0025	0,0040	0,0050	0,0065	0,0065	0,0070			
Cast iron	≤ 23	≤ 242											
	≤ 38	≤ 354											
Spheroidal graphite iron and malleable cast iron	≤ 23	≤ 242											
	≤ 38	≤ 354											
Chilled cast iron	≤ 38	≤ 354	25	0,0010	0,0025	0,0040	0,0050	0,0065	0,0065	0,0070			
New cast materials GGV	≤ 20	≤ 220											
	≤ 32	≤ 301											
New cast materials ADI	≤ 32	≤ 301											
	≤ 43	≤ 402											
Special alloys	≤ 54	≤ 549	15	0,0005	0,0015	0,0025	0,0030	0,0040	0,0040	0,0045			
Ti and Ti-alloys	≤ 25	≤ 255	30	0,0007	0,0020	0,0030	0,0040	0,0050	0,0050	0,0055			
	≤ 43	≤ 402	15	0,0007	0,0020	0,0030	0,0040	0,0050	0,0050	0,0055			
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											
	≤ 25	≤ 255											
Bronze, long-chipping	≤ 25	≤ 255											
	≤ 32	≤ 301											
Duroplastics													
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	-	≤ 150		0,0040	0,0065	0,0080	0,0100	0,0100					
	≤ 32	≤ 301		0,0030	0,0050	0,0065	0,0080	0,0080					
Free-cutting steels	≤ 25	≤ 255		0,0050	0,0080	0,0100	0,0125	0,0125					
	≤ 32	≤ 301		0,0040	0,0065	0,0080	0,0100	0,0100					
Unalloyed heat-treatable steels	≤ 20	≤ 220		0,0040	0,0065	0,0080	0,0100	0,0100					
	≤ 25	≤ 255		0,0040	0,0065	0,0080	0,0100	0,0100					
	≤ 32	≤ 301		0,0040	0,0065	0,0080	0,0100	0,0100					
Alloyed heat-treatable steels	≤ 32	≤ 301		0,0040	0,0065	0,0080	0,0100	0,0100					
	≤ 43	≤ 402		0,0030	0,0050	0,0065	0,0080	0,0080					
Unalloyed case hardened steels	≤ 25	≤ 255		0,0050	0,0080	0,0100	0,0125	0,0125					
Alloyed case hardened steels	≤ 32	≤ 301		0,0040	0,0065	0,0080	0,0100	0,0100					
	≤ 43	≤ 402		0,0030	0,0050	0,0065	0,0080	0,0080					
Nitriding steels	≤ 32	≤ 301		0,0030	0,0050	0,0065	0,0080	0,0080					
	≤ 43	≤ 402		0,0030	0,0050	0,0065	0,0080	0,0080					
Tool steels	≤ 25	≤ 255		0,0030	0,0050	0,0065	0,0080	0,0080					
	≤ 43	≤ 402		0,0030	0,0050	0,0065	0,0080	0,0080					
High speed steels	≤ 43	≤ 402		0,0025	0,0040	0,0050	0,0065	0,0065					
Spring steels	≤ 38	≤ 354											
Hardened steels	≤ 48	≤ 460											
	≤ 66	-											
Stainless steels, sulphured	≤ 28	≤ 273		0,0025	0,0040	0,0050	0,0065	0,0065					
austenitic	≤ 36	≤ 337		0,0025	0,0040	0,0050	0,0065	0,0065					
martensitic	≤ 46	≤ 435		0,0020	0,0030	0,0040	0,0050	0,0050					
Cast iron	≤ 23	≤ 242		0,0050	0,0080	0,0100	0,0125	0,0125					
	≤ 38	≤ 354		0,0050	0,0080	0,0100	0,0125	0,0125					
Spheroidal graphite iron and malleable cast iron	≤ 23	≤ 242		0,0050	0,0080	0,0100	0,0125	0,0125					
	≤ 38	≤ 354		0,0050	0,0080	0,0100	0,0125	0,0125					
Chilled cast iron	≤ 38	≤ 354											
New cast materials GGV	≤ 20	≤ 220											
	≤ 32	≤ 301											
New cast materials ADI	≤ 32	≤ 301											
	≤ 43	≤ 402											
Special alloys	≤ 54	≤ 549											
Ti and Ti-alloys	≤ 25	≤ 255		0,0025	0,0040	0,0050	0,0065	0,0065					
	≤ 43	≤ 402		0,0020	0,0030	0,0040	0,0050	0,0050					
Aluminium and Al-alloys	-	≤ 120		0,0065	0,0100	0,0125	0,0160	0,0160					
Al wrought alloys	-	≤ 200		0,0050	0,0080	0,0100	0,0125	0,0125					
Al cast alloys ≤ 10 % Si	-	≤ 180		0,0065	0,0100	0,0125	0,0160	0,0160					
≤ 24 % Si	-	≤ 180		0,0050	0,0080	0,0100	0,0125	0,0125					
Magnesium alloys	-	≤ 120		0,0050	0,0080	0,0100	0,0125	0,0125					
Copper, low-alloyed	-	≤ 150											
Brass, short-chipping	-	≤ 180		0,0050	0,0080	0,0100	0,0125	0,0125					
long-chipping	-	≤ 180		0,0050	0,0080	0,0100	0,0125	0,0125					
Bronze, short-chipping	-	≤ 180		0,0025	0,0040	0,0050	0,0065	0,0065					
	≤ 25	≤ 255											
Bronze, long-chipping	≤ 25	≤ 255											
	≤ 32	≤ 301											
Duroplastics													
Thermoplastics													
Reinforced plastics - Kevlar													
Reinforced plastics - GFK / CFK													