



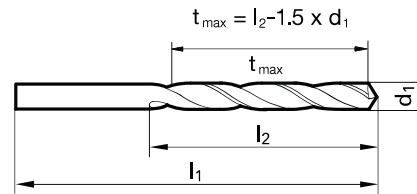
Tool material **HSS-E-PM**

Surface



P Steel	●	web thinning $\geq \varnothing 1.000$ • relieved cone point geometry with special type B web thinning • PM-Co-alloyed high speed steel • especially high rigidity • especially high wear resistance
M Stainless steel	○	
K Cast iron	●	high-tensile materials, high-alloyed steels • heat treatable and case hardened steels • cast iron, brass, bronze
N Aluminum	○	
S Titanium alloys	○	
H Hardened steel	○	

●=Optimal
○=Limited



Speeds and feeds information on pg. 497

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	34.00	10.50	12.00	9005300010000
0.0402	#60	1.02	34.00	10.47	12.00	9005300010200
0.0409	#59	1.04	34.00	10.44	12.00	9005300010400
0.0421	#58	1.07	36.00	12.40	14.00	9005300010700
0.0429	#57	1.09	36.00	12.37	14.00	9005300010900
0.0433		1.10	36.00	12.35	14.00	9005300011000
0.0465	#56	1.18	36.00	12.23	14.00	9005300011800
0.0469	3/64	1.19	38.00	14.22	16.00	9005300011900
0.0472		1.20	38.00	14.20	16.00	9005300012000
0.0512		1.30	38.00	14.05	16.00	9005300013000
0.0520	#55	1.32	38.00	14.02	16.00	9005300013200
0.0551	#54	1.40	40.00	15.90	18.00	9005300014000
0.0591		1.50	40.00	15.75	18.00	9005300015000
0.0594	#53	1.51	43.00	17.74	20.00	9005300015100
0.0626	1/16	1.59	43.00	17.62	20.00	9005300015900
0.0630		1.60	43.00	17.60	20.00	9005300016000
0.0634	#52	1.61	43.00	17.59	20.00	9005300016100
0.0669	#51	1.70	43.00	17.45	20.00	9005300017000
0.0701	#50	1.78	46.00	19.33	22.00	9005300017800
0.0709		1.80	46.00	19.30	22.00	9005300018000
0.0728	#49	1.85	46.00	19.23	22.00	9005300018500
0.0748		1.90	46.00	19.15	22.00	9005300019000
0.0760	#48	1.93	49.00	21.11	24.00	9005300019300
0.0780	5/64	1.98	49.00	21.03	24.00	9005300019800
0.0783	#47	1.99	49.00	21.02	24.00	9005300019900
0.0787		2.00	49.00	21.00	24.00	9005300020000
0.0811	#46	2.06	49.00	20.91	24.00	9005300020600
0.0819	#45	2.08	49.00	20.88	24.00	9005300020800
0.0827		2.10	49.00	20.85	24.00	9005300021000
0.0858	#44	2.18	53.00	23.73	27.00	9005300021800
0.0866		2.20	53.00	23.70	27.00	9005300022000
0.0890	#43	2.26	53.00	23.61	27.00	9005300022600
0.0906		2.30	53.00	23.55	27.00	9005300023000
0.0933	#42	2.37	57.00	26.45	30.00	9005300023700
0.0937	3/32	2.38	57.00	26.43	30.00	9005300023800
0.0945		2.40	57.00	26.40	30.00	9005300024000
0.0961	#41	2.44	57.00	26.34	30.00	9005300024400
0.0980	#40	2.49	57.00	26.27	30.00	9005300024900
0.0984		2.50	57.00	26.25	30.00	9005300025000
0.0996	#39	2.53	57.00	26.21	30.00	9005300025300
0.1016	#38	2.58	57.00	26.13	30.00	9005300025800
0.1024		2.60	57.00	26.10	30.00	9005300026000

Diameter (d ₁)			l ₁ mm	t _{max} mm	l ₂ mm	EDP #
inch	wire/ltr	mm				
0.1039	#37	2.64	57.00	26.04	30.00	9005300026400
0.1063		2.70	61.00	28.95	33.00	9005300027000
0.1067	#36	2.71	61.00	28.94	33.00	9005300027100
0.1094	7/64	2.78	61.00	28.83	33.00	9005300027800
0.1098	#35	2.79	61.00	28.82	33.00	9005300027900
0.1102		2.80	61.00	28.80	33.00	9005300028000
0.1110	#34	2.82	61.00	28.77	33.00	9005300028200
0.1130	#33	2.87	61.00	28.70	33.00	9005300028700
0.1142		2.90	61.00	28.65	33.00	9005300029000
0.1161	#32	2.95	61.00	28.58	33.00	9005300029500
0.1181		3.00	61.00	28.50	33.00	9005300030000
0.1201	#31	3.05	65.00	31.43	36.00	9005300030500
0.1220		3.10	65.00	31.35	36.00	9005300031000
0.1248	1/8	3.17	65.00	31.25	36.00	9005300031700
0.1260		3.20	65.00	31.20	36.00	9005300032000
0.1283	#30	3.26	65.00	31.11	36.00	9005300032600
0.1299		3.30	65.00	31.05	36.00	9005300033000
0.1339		3.40	70.00	33.90	39.00	9005300034000
0.1358	#29	3.45	70.00	33.83	39.00	9005300034500
0.1378		3.50	70.00	33.75	39.00	9005300035000
0.1406	9/64	3.57	70.00	33.65	39.00	9005300035700
0.1417		3.60	70.00	33.60	39.00	9005300036000
0.1441	#27	3.66	70.00	33.51	39.00	9005300036600
0.1457		3.70	70.00	33.45	39.00	9005300037000
0.1469	#26	3.73	70.00	33.41	39.00	9005300037300
0.1496	#25	3.80	75.00	37.30	43.00	9005300038000
0.1520	#24	3.86	75.00	37.21	43.00	9005300038600
0.1535		3.90	75.00	37.15	43.00	9005300039000
0.1539	#23	3.91	75.00	37.14	43.00	9005300039100
0.1563	5/32	3.97	75.00	37.05	43.00	9005300039700
0.1571	#22	3.99	75.00	37.02	43.00	9005300039900
0.1575		4.00	75.00	37.00	43.00	9005300040000
0.1591	#21	4.04	75.00	36.94	43.00	9005300040400
0.1610	#22	4.09	75.00	36.87	43.00	9005300040900
0.1614		4.10	75.00	36.85	43.00	9005300041000
0.1654		4.20	75.00	36.70	43.00	9005300042000
0.1661	#19	4.22	75.00	36.67	43.00	9005300042200
0.1693	#18	4.30	80.00	40.55	47.00	9005300043000
0.1720	11/64	4.37	80.00	40.45	47.00	9005300043700
0.1728	#17	4.39	80.00	40.42	47.00	9005300043900
0.1732		4.40	80.00	40.40	47.00	9005300044000
0.1772	#16	4.50	80.00	40.25	47.00	9005300045000

Diameter (d ₁)			l ₁ mm	t _{max} mm	l ₂ mm	EDP #
inch	wire/ltr	mm				
0.1799	#15	4.57	80.00	40.15	47.00	9005300045700
0.1811		4.60	80.00	40.10	47.00	9005300046000
0.1819	#14	4.62	80.00	40.07	47.00	9005300046200
0.1850	#13	4.70	80.00	39.95	47.00	9005300047000
0.1874	3/16	4.76	86.00	44.86	52.00	9005300047600
0.1890	#12	4.80	86.00	44.80	52.00	9005300048000
0.1909	#11	4.85	86.00	44.73	52.00	9005300048500
0.1929		4.90	86.00	44.65	52.00	9005300049000
0.1937	#10	4.92	86.00	44.62	52.00	9005300049200
0.1961	#9	4.98	86.00	44.53	52.00	9005300049800
0.1969		5.00	86.00	44.50	52.00	9005300050000
0.1992	#8	5.06	86.00	44.41	52.00	9005300050600
0.2008		5.10	86.00	44.35	52.00	9005300051000
0.2012	#7	5.11	86.00	44.34	52.00	9005300051100
0.2031	13/64	5.16	86.00	44.26	52.00	9005300051600
0.2039	#6	5.18	86.00	44.23	52.00	9005300051800
0.2047		5.20	86.00	44.20	52.00	9005300052000
0.2055	#5	5.22	86.00	44.17	52.00	9005300052200
0.2087		5.30	86.00	44.05	52.00	9005300053000
0.2091	#4	5.31	93.00	49.04	57.00	9005300053100
0.2126		5.40	93.00	48.90	57.00	9005300054000
0.2130	#3	5.41	93.00	48.89	57.00	9005300054100
0.2165		5.50	93.00	48.75	57.00	9005300055000
0.2189	7/32	5.56	93.00	48.66	57.00	9005300055600
0.2205		5.60	93.00	48.60	57.00	9005300056000
0.2209	#2	5.61	93.00	48.59	57.00	9005300056100
0.2244		5.70	93.00	48.45	57.00	9005300057000
0.2280	#1	5.79	93.00	48.32	57.00	9005300057900
0.2283		5.80	93.00	48.30	57.00	9005300058000
0.2323		5.90	93.00	48.15	57.00	9005300059000
0.2339	A	5.94	93.00	48.09	57.00	9005300059400
0.2343	15/64	5.95	93.00	48.08	57.00	9005300059500
0.2362		6.00	93.00	48.00	57.00	9005300060000
0.2378	B	6.04	101.00	53.94	63.00	9005300060400
0.2402		6.10	101.00	53.85	63.00	9005300061000
0.2421	C	6.15	101.00	53.78	63.00	9005300061500
0.2441		6.20	101.00	53.70	63.00	9005300062000
0.2461	D	6.25	101.00	53.63	63.00	9005300062500
0.2480		6.30	101.00	53.55	63.00	9005300063000
0.2500	1/4	6.35	101.00	53.48	63.00	9005300063500
0.2520		6.40	101.00	53.40	63.00	9005300064000
0.2559		6.50	101.00	53.25	63.00	9005300065000
0.2571		6.53	101.00	53.21	63.00	9005300065300
0.2598		6.60	101.00	53.10	63.00	9005300066000
0.2610	G	6.63	101.00	53.06	63.00	9005300066300
0.2638		6.70	101.00	52.95	63.00	9005300067000
0.2657	17/64	6.75	109.00	58.88	69.00	9005300067500
0.2677		6.80	109.00	58.80	69.00	9005300068000
0.2717	I	6.90	109.00	58.65	69.00	9005300069000
0.2756		7.00	109.00	58.50	69.00	9005300070000
0.2768	J	7.03	109.00	58.46	69.00	9005300070300
0.2795		7.10	109.00	58.35	69.00	9005300071000
0.2811	9/32	7.14	109.00	58.29	69.00	9005300071400
0.2835		7.20	109.00	58.20	69.00	9005300072000
0.2874		7.30	109.00	58.05	69.00	9005300073000
0.2902	L	7.37	109.00	57.95	69.00	9005300073700
0.2913		7.40	109.00	57.90	69.00	9005300074000
0.2949	M	7.49	109.00	57.77	69.00	9005300074900
0.2953		7.50	109.00	57.75	69.00	9005300075000
0.2969	19/64	7.54	117.00	63.69	75.00	9005300075400

Diameter (d ₁)			l ₁ mm	t _{max} mm	l ₂ mm	EDP #
inch	wire/ltr	mm				
0.2992		7.60	117.00	63.60	75.00	9005300076000
0.3020	N	7.67	117.00	63.50	75.00	9005300076700
0.3031		7.70	117.00	63.45	75.00	9005300077000
0.3071		7.80	117.00	63.30	75.00	9005300078000
0.3110		7.90	117.00	63.15	75.00	9005300079000
0.3126	5/16	7.94	117.00	63.09	75.00	9005300079400
0.3150		8.00	117.00	63.00	75.00	9005300080000
0.3161	O	8.03	117.00	62.96	75.00	9005300080300
0.3189		8.10	117.00	62.85	75.00	9005300081000
0.3228	P	8.20	117.00	62.70	75.00	9005300082000
0.3268		8.30	117.00	62.55	75.00	9005300083000
0.3280	21/64	8.33	117.00	62.51	75.00	9005300083300
0.3307		8.40	117.00	62.40	75.00	9005300084000
0.3319	Q	8.43	117.00	62.36	75.00	9005300084300
0.3346		8.50	117.00	62.25	75.00	9005300085000
0.3390	R	8.61	125.00	68.09	81.00	9005300086100
0.3437	11/32	8.73	125.00	67.91	81.00	9005300087300
0.3465		8.80	125.00	67.80	81.00	9005300088000
0.3480	S	8.84	125.00	67.74	81.00	9005300088400
0.3504		8.90	125.00	67.65	81.00	9005300089000
0.3543		9.00	125.00	67.50	81.00	9005300090000
0.3579	T	9.09	125.00	67.37	81.00	9005300090900
0.3583		9.10	125.00	67.35	81.00	9005300091000
0.3594	23/64	9.13	125.00	67.31	81.00	9005300091300
0.3622		9.20	125.00	67.20	81.00	9005300092000
0.3661		9.30	125.00	67.05	81.00	9005300093000
0.3677	U	9.34	125.00	66.99	81.00	9005300093400
0.3701		9.40	125.00	66.90	81.00	9005300094000
0.3740		9.50	125.00	66.75	81.00	9005300095000
0.3748	3/8	9.52	133.00	72.72	87.00	9005300095200
0.3772	V	9.58	133.00	72.63	87.00	9005300095800
0.3780		9.60	133.00	72.60	87.00	9005300096000
0.3819		9.70	133.00	72.45	87.00	9005300097000
0.3858	W	9.80	133.00	72.30	87.00	9005300098000
0.3898		9.90	133.00	72.15	87.00	9005300099000
0.3906	25/64	9.92	133.00	72.12	87.00	9005300099200
0.3937		10.00	133.00	72.00	87.00	9005300100000
0.3969	X	10.08	133.00	71.88	87.00	9005300100800
0.4016		10.20	133.00	71.70	87.00	9005300102000
0.4039	Y	10.26	133.00	71.61	87.00	9005300102600
0.4063	13/32	10.32	133.00	71.52	87.00	9005300103200
0.4130	Z	10.49	133.00	71.27	87.00	9005300104900
0.4134		10.50	133.00	71.25	87.00	9005300105000
0.4220	27/64	10.72	142.00	77.92	94.00	9005300107200
0.4331		11.00	142.00	77.50	94.00	9005300110000
0.4374	7/16	11.11	142.00	77.34	94.00	9005300111100
0.4528		11.50	142.00	76.75	94.00	9005300115000
0.4531	29/64	11.51	142.00	76.74	94.00	9005300115100
0.4689	15/32	11.91	151.00	83.14	101.00	9005300119100
0.4724		12.00	151.00	83.00	101.00	9005300120000
0.4843	31/64	12.30	151.00	82.55	101.00	9005300123000
0.4921		12.50	151.00	82.25	101.00	9005300125000
0.5000	1/2	12.70	151.00	81.95	101.00	9005300127000
0.5118		13.00	151.00	81.50	101.00	9005300130000
0.5157	33/64	13.10	151.00	81.35	101.00	9005300131000
0.5311	17/32	13.49	160.00	87.77	108.00	9005300134900
0.5315		13.50	160.00	87.75	108.00	9005300135000
0.5512		14.00	160.00	87.00	108.00	9005300140000
0.5626	9/16	14.29	169.00	92.57	114.00	9005300142900

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	70 55				0.0080 0.0065	0.0100 0.0080	0.0100 0.0080	0.0110 0.0090	0.0125 0.0100		
Free-cutting steels	≤ 25 ≤ 32	≤ 255 ≤ 301	70 55				0.0080 0.0065	0.0100 0.0080	0.0100 0.0080	0.0110 0.0090	0.0125 0.0100		
Unalloyed heat-treatable steels	≤ 20 ≤ 25 ≤ 32	≤ 220 ≤ 255 ≤ 301	70 55				0.0065 0.0065	0.0080 0.0080	0.0080 0.0080	0.0090 0.0090	0.0100 0.0100		
Alloyed heat-treatable steels	≤ 32 ≤ 43	≤ 301 ≤ 402	35				0.0050	0.0065	0.0065	0.0070	0.0080		
Unalloyed case hardened steels	≤ 25	≤ 255	70				0.0080	0.0100	0.0100	0.0110	0.0125		
Alloyed case hardened steels	≤ 32 ≤ 43	≤ 301 ≤ 402	30				0.0050	0.0065	0.0065	0.0070	0.0080		
Nitriding steels	≤ 32 ≤ 43	≤ 301 ≤ 402	25				0.0050	0.0065	0.0065	0.0070	0.0080		
Tool steels	≤ 25 ≤ 43	≤ 255 ≤ 402	35 15				0.0050 0.0040	0.0065 0.0050	0.0065 0.0050	0.0070 0.0055	0.0080 0.0065		
High speed steels	≤ 43	≤ 402	15				0.0040	0.0050	0.0050	0.0055	0.0065		
Spring steels	≤ 38	≤ 354											
Hardened steels	≤ 48 ≤ 66	≤ 460 -											
Stainless steels, sulphured austenitic martensitic	≤ 28 ≤ 36 ≤ 46	≤ 273 ≤ 337 ≤ 435	25				0.0050	0.0065	0.0065	0.0070	0.0080		
Cast iron	≤ 23 ≤ 38	≤ 242 ≤ 354	70 55				0.0080 0.0080	0.0100 0.0100	0.0100 0.0100	0.0110 0.0110	0.0125 0.0125		
Spheroidal graphite iron and malleable cast iron	≤ 23 ≤ 38	≤ 242 ≤ 354	65 45				0.0080 0.0080	0.0100 0.0100	0.0100 0.0100	0.0110 0.0110	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 ≤ 24 % Si	-	≤ 180 ≤ 180	145 115				0.0100 0.0080	0.0125 0.0100	0.0125 0.0100	0.0140 0.0110	0.0160 0.0125		
Magnesium alloys	-	≤ 120	180				0.0080	0.0100	0.0100	0.0110	0.0125		
Copper, low-alloyed	-	≤ 150	70				0.0065	0.0080	0.0080	0.0090	0.0100		
Brass, short-chipping long-chipping	- -	≤ 180 ≤ 180	90				0.0065	0.0080	0.0080	0.0090	0.0100		
Bronze, short-chipping	-	≤ 180	70				0.0050	0.0065	0.0065	0.0070	0.0080		
Bronze, long-chipping	≤ 25 ≤ 32	≤ 255 ≤ 301	65 55				0.0050	0.0065	0.0065	0.0070	0.0080		
Duroplastics Thermoplastics Reinforced plastics - Kevlar Reinforced plastics - GFK / CFK			35 55				0.0050 0.0065	0.0065 0.0080	0.0065 0.0080	0.0070 0.0090	0.0080 0.0100		

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	160 130	0.0017 0.0015	0.0050 0.0040	0.0080 0.0065	0.0100 0.0080	0.0125 0.0100	0.0125 0.0100				
Free-cutting steels	≤ 25 ≤ 32	≤ 255 ≤ 301	195 160	0.0017 0.0017	0.0050 0.0050	0.0080 0.0080	0.0100 0.0080	0.0125 0.0125	0.0125 0.0125				
Unalloyed heat-treatable steels	≤ 20 ≤ 25 ≤ 32	≤ 220 ≤ 255 ≤ 301	130 130 100	0.0017 0.0017 0.0015	0.0050 0.0050 0.0040	0.0080 0.0080 0.0065	0.0100 0.0100 0.0080	0.0125 0.0125 0.0100	0.0125 0.0125 0.0100				
Alloyed heat-treatable steels	≤ 32 ≤ 43	≤ 301 ≤ 402	100 100	0.0012 0.0012	0.0030 0.0030	0.0050 0.0050	0.0065 0.0065	0.0080 0.0080	0.0080 0.0080				
Unalloyed case hardened steels	≤ 25	≤ 255	130	0.0010	0.0025	0.0040	0.0050	0.0065	0.0065				
Alloyed case hardened steels	≤ 32 ≤ 43	≤ 301 ≤ 402	80 65	0.0012 0.0010	0.0030 0.0025	0.0050 0.0040	0.0065 0.0050	0.0080 0.0065	0.0080 0.0065				
Nitriding steels	≤ 32 ≤ 43	≤ 301 ≤ 402	65 65	0.0012 0.0010	0.0030 0.0025	0.0050 0.0040	0.0065 0.0050	0.0080 0.0065	0.0080 0.0065				
Tool steels	≤ 25 ≤ 43	≤ 255 ≤ 402	80 65	0.0012 0.0010	0.0030 0.0025	0.0050 0.0040	0.0065 0.0050	0.0080 0.0065	0.0080 0.0065				
High speed steels	≤ 43	≤ 402	65	0.0010	0.0025	0.0040	0.0050	0.0065	0.0065				
Spring steels	≤ 38	≤ 354	35	0.0007	0.0020	0.0030	0.0040	0.0050	0.0050				
Hardened steels	≤ 48 ≤ 66	≤ 460 -											
Stainless steels, sulphured austenitic martensitic	≤ 28 ≤ 36 ≤ 46	≤ 273 ≤ 337 ≤ 435	65 45 65	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				
Cast iron	≤ 23 ≤ 38	≤ 242 ≤ 354	145 115	0.0017 0.0017	0.0050 0.0050	0.0080 0.0080	0.0100 0.0100	0.0125 0.0125	0.0125 0.0125				
Spheroidal graphite iron and malleable cast iron	≤ 23 ≤ 38	≤ 242 ≤ 354	130 100	0.0017 0.0017	0.0050 0.0050	0.0080 0.0080	0.0100 0.0100	0.0125 0.0125	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	40	0.0007	0.0020	0.0030	0.0040	0.0050	0.0050				
Ti and Ti-alloys	≤ 25 ≤ 43	≤ 255 ≤ 402											
Aluminium and Al-alloys	-	≤ 120											
Al wrought alloys	-	≤ 200											
Al cast alloys ≤ 10 % Si ≤ 24 % Si	-	≤ 180 ≤ 180	295 260	0.0020 0.0017	0.0065 0.0050	0.0100 0.0080	0.0125 0.0100	0.0160 0.0125	0.0160 0.0125				
Magnesium alloys	-	≤ 120	260	0.0017	0.0050	0.0080	0.0100	0.0125	0.0125				
Copper, low-alloyed	-	≤ 150											
Brass, short-chipping long-chipping	- -	≤ 180 ≤ 180											
Bronze, short-chipping	-	≤ 180											
Bronze, long-chipping	≤ 25 ≤ 32	≤ 255 ≤ 301											
Duroplastics Thermoplastics Reinforced plastics - Kevlar Reinforced plastics - GFK / CFK													