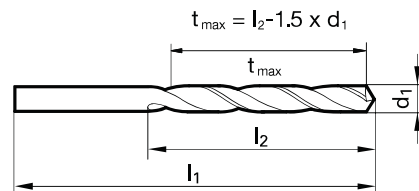


Tool material **HSS**

Surface **S**

- | | | |
|--------------------------|---|--|
| P Steel | • | web thinning $\geq \varnothing 1.000$ • relieved cone • for drilling through drill bushes |
| M Stainless steel | | |
| K Cast iron | • | alloyed/unalloyed steel and cast steel • grey cast iron, malleable and spheroidal iron • sintered powder metal, German silver and graphite |
| N Aluminum | • | |
| S Titanium alloys | | |
| H Hardened steel | | |
- =Optimal
○=Limited



Speeds and feeds information on pg. 519

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	48.00	24.50	26.00	9006660010000
0.0433		1.10	50.00	26.35	28.00	9006660011000
0.0472		1.20	52.00	28.20	30.00	9006660012000
0.0512		1.30	52.00	28.05	30.00	9006660013000
0.0551	#54	1.40	55.00	30.90	33.00	9006660014000
0.0591		1.50	55.00	30.75	33.00	9006660015000
0.0630		1.60	58.00	32.60	35.00	9006660016000
0.0669	#51	1.70	58.00	32.45	35.00	9006660017000
0.0709		1.80	62.00	35.30	38.00	9006660018000
0.0748		1.90	62.00	35.15	38.00	9006660019000
0.0780	5/64	1.98	66.00	38.03	41.00	9006660019800
0.0787		2.00	66.00	38.00	41.00	9006660020000
0.0827		2.10	66.00	37.85	41.00	9006660021000
0.0866		2.20	70.00	40.70	44.00	9006660022000
0.0906		2.30	70.00	40.55	44.00	9006660023000
0.0945		2.40	74.00	43.40	47.00	9006660024000
0.0984		2.50	74.00	43.25	47.00	9006660025000
0.1024		2.60	74.00	43.10	47.00	9006660026000
0.1063		2.70	79.00	46.95	51.00	9006660027000
0.1102		2.80	79.00	46.80	51.00	9006660028000
0.1142		2.90	79.00	46.65	51.00	9006660029000
0.1181		3.00	79.00	46.50	51.00	9006660030000
0.1220		3.10	84.00	50.35	55.00	9006660031000
0.1260		3.20	84.00	50.20	55.00	9006660032000
0.1299		3.30	84.00	50.05	55.00	9006660033000
0.1339		3.40	91.00	54.90	60.00	9006660034000
0.1378		3.50	91.00	54.75	60.00	9006660035000
0.1406	9/64 #28	3.57	91.00	54.65	60.00	9006660035700
0.1417		3.60	91.00	54.60	60.00	9006660036000
0.1457		3.70	91.00	54.45	60.00	9006660037000
0.1496	#25	3.80	96.00	58.30	64.00	9006660038000
0.1535		3.90	96.00	58.15	64.00	9006660039000
0.1575		4.00	96.00	58.00	64.00	9006660040000
0.1614		4.10	96.00	57.85	64.00	9006660041000
0.1654		4.20	96.00	57.70	64.00	9006660042000
0.1693	#18	4.30	102.00	62.55	69.00	9006660043000
0.1732		4.40	102.00	62.40	69.00	9006660044000

Diameter (d ₁)			l ₁ mm	t _{max} mm	l ₂ mm	EDP #
inch	wire/ltr	mm				
0.1772	#16	4.50	102.00	62.25	69.00	9006660045000
0.1811		4.60	102.00	62.10	69.00	9006660046000
0.1890	#12	4.80	108.00	66.80	74.00	9006660048000
0.1929		4.90	108.00	66.65	74.00	9006660049000
0.1969		5.00	108.00	66.50	74.00	9006660050000
0.2008		5.10	108.00	66.35	74.00	9006660051000
0.2047		5.20	108.00	66.20	74.00	9006660052000
0.2087		5.30	108.00	66.05	74.00	9006660053000
0.2126		5.40	116.00	71.90	80.00	9006660054000
0.2165		5.50	116.00	71.75	80.00	9006660055000
0.2205		5.60	116.00	71.60	80.00	9006660056000
0.2244		5.70	116.00	71.45	80.00	9006660057000
0.2283		5.80	116.00	71.30	80.00	9006660058000
0.2362		6.00	116.00	71.00	80.00	9006660060000
0.2402		6.10	124.00	76.85	86.00	9006660061000
0.2441		6.20	124.00	76.70	86.00	9006660062000
0.2480		6.30	124.00	76.55	86.00	9006660063000
0.2559		6.50	124.00	76.25	86.00	9006660065000
0.2598		6.60	124.00	76.10	86.00	9006660066000
0.2638		6.70	124.00	75.95	86.00	9006660067000
0.2677		6.80	133.00	82.80	93.00	9006660068000
0.2717	I	6.90	133.00	82.65	93.00	9006660069000
0.2756		7.00	133.00	82.50	93.00	9006660070000
0.2835		7.20	133.00	82.20	93.00	9006660072000
0.2874		7.30	133.00	82.05	93.00	9006660073000
0.2953		7.50	133.00	81.75	93.00	9006660075000
0.3031		7.70	142.00	88.45	100.00	9006660077000
0.3071		7.80	142.00	88.30	100.00	9006660078000
0.3110		7.90	142.00	88.15	100.00	9006660079000
0.3126	5/16	7.94	142.00	88.09	100.00	9006660079400
0.3150		8.00	142.00	88.00	100.00	9006660080000
0.3228	P	8.20	142.00	87.70	100.00	9006660082000
0.3307		8.40	142.00	87.40	100.00	9006660084000
0.3346		8.50	142.00	87.25	100.00	9006660085000
0.3543		9.00	151.00	93.50	107.00	9006660090000
0.4528		11.50	173.00	107.75	125.00	9006660115000

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	130 100	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	130 100	0.0017 0.0015	0.0050 0.0040	0.0080 0.0065	0.0100 0.0080	0.0125 0.0100	0.0125 0.0100				
Unalloyed heat-treatable steels	≤ 20 ≤ 25 ≤ 32	≤ 220 ≤ 255 ≤ 301	130 100 50	0.0015 0.0015 0.0012	0.0040 0.0040 0.0030	0.0065 0.0065 0.0050	0.0080 0.0080 0.0065	0.0100 0.0100 0.0080	0.0100 0.0100 0.0080				
Alloyed heat-treatable steels	≤ 32 ≤ 43	≤ 301 ≤ 402	65	0.0012	0.0030	0.0050	0.0065	0.0080	0.0080				
Unalloyed case hardened steels	≤ 25	≤ 255	130	0.0017	0.0050	0.0080	0.0100	0.0125	0.0125				
Alloyed case hardened steels	≤ 32 ≤ 43	≤ 301 ≤ 402	55	0.0012	0.0030	0.0050	0.0065	0.0080	0.0080				
Nitriding steels	≤ 32 ≤ 43	≤ 301 ≤ 402	45	0.0012	0.0030	0.0050	0.0065	0.0080	0.0080				
Tool steels	≤ 25 ≤ 43	≤ 255 ≤ 402	65	0.0012	0.0030	0.0050	0.0065	0.0080	0.0080				
High speed steels	≤ 43	≤ 402											
Spring steels	≤ 38	≤ 354											
Hardened steels	≤ 48 ≤ 66	≤ 460 -											
Stainless steels, sulphured austenitic martensitic	≤ 28 ≤ 36 ≤ 46	≤ 273 ≤ 337 ≤ 435											
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				
Spheroidal graphite iron and malleable cast iron	≤ 23 ≤ 38	≤ 242 ≤ 354	115 80	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											
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	260 225	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	325	0.0017	0.0050	0.0080	0.0100	0.0125	0.0125				
Copper, low-alloyed	-	≤ 150	130	0.0015	0.0040	0.0065	0.0080	0.0100	0.0100				
Brass, short-chipping long-chipping	- -	≤ 180 ≤ 180	160	0.0015	0.0040	0.0065	0.0080	0.0100	0.0100				
Bronze, short-chipping	-	≤ 180	130	0.0012	0.0030	0.0050	0.0065	0.0080	0.0080				
	≤ 25	≤ 255	115	0.0012	0.0030	0.0050	0.0065	0.0080	0.0080				
Bronze, long-chipping	≤ 25 ≤ 32	≤ 255 ≤ 301	100 80	0.0012 0.0012	0.0030 0.0030	0.0050 0.0050	0.0065 0.0065	0.0080 0.0080	0.0080 0.0080				
Duroplastics Thermoplastics Reinforced plastics - Kevlar Reinforced plastics - GFK / CFK			65 100	0.0012 0.0015	0.0030 0.0040	0.0050 0.0065	0.0065 0.0080	0.0080 0.0100	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	115 90	0.0017 0.0015	0.0050 0.0040	0.0080 0.0065	0.0100 0.0080	0.0125 0.0100					
Free-cutting steels	≤ 25 ≤ 32	≤ 255 ≤ 301	115 90	0.0017 0.0015	0.0050 0.0040	0.0080 0.0065	0.0100 0.0080	0.0125 0.0100					
Unalloyed heat-treatable steels	≤ 20 ≤ 25 ≤ 32	≤ 220 ≤ 255 ≤ 301	115 90 70	0.0015 0.0015 0.0012	0.0040 0.0040 0.0030	0.0065 0.0065 0.0050	0.0080 0.0080 0.0065	0.0100 0.0100 0.0080					
Alloyed heat-treatable steels	≤ 32 ≤ 43	≤ 301 ≤ 402	55	0.0012	0.0030	0.0050	0.0065	0.0080					
Unalloyed case hardened steels	≤ 25	≤ 255	115	0.0017	0.0050	0.0080	0.0100	0.0125					
Alloyed case hardened steels	≤ 32 ≤ 43	≤ 301 ≤ 402	45	0.0012	0.0030	0.0050	0.0065	0.0080					
Nitriding steels	≤ 32 ≤ 43	≤ 301 ≤ 402	35	0.0012	0.0030	0.0050	0.0065	0.0080					
Tool steels	≤ 25 ≤ 43	≤ 255 ≤ 402	55 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											
Spring steels	≤ 38	≤ 354											
Hardened steels	≤ 48 ≤ 66	≤ 460 -											
Stainless steels, sulphured austenitic martensitic	≤ 28 ≤ 36 ≤ 46	≤ 273 ≤ 337 ≤ 435											
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					
Spheroidal graphite iron and malleable cast iron	≤ 23 ≤ 38	≤ 242 ≤ 354	90 70	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 ≤ 24 % Si	- -	≤ 180 ≤ 180	225 180	0.0020 0.0017	0.0065 0.0050	0.0100 0.0080	0.0125 0.0100	0.0160 0.0125					
Magnesium alloys	-	≤ 120	310	0.0017	0.0050	0.0080	0.0100	0.0125					
Copper, low-alloyed	-	≤ 150	115	0.0015	0.0040	0.0065	0.0080	0.0100					
Brass, short-chipping long-chipping	- -	≤ 180 ≤ 180	145	0.0015	0.0040	0.0065	0.0080	0.0100					
Bronze, short-chipping	-	≤ 180	115	0.0012	0.0030	0.0050	0.0065	0.0080					
	≤ 25	≤ 255	90	0.0012	0.0030	0.0050	0.0065	0.0080					
Bronze, long-chipping	≤ 25 ≤ 32	≤ 255 ≤ 301	90 70	0.0012 0.0012	0.0030 0.0030	0.0050 0.0050	0.0065 0.0065	0.0080 0.0080					
Duroplastics Thermoplastics Reinforced plastics - Kevlar Reinforced plastics - GFK / CFK			55 90	0.0012 0.0015	0.0030 0.0040	0.0050 0.0065	0.0065 0.0080	0.0080 0.0100					