RT 150 GG Ratio drills

Series no. **5513**

Tool material **Solid Carbide**

Surface

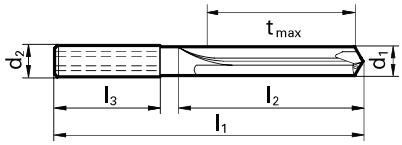
P	Steel	
M	Stainless steel	
K	Cast iron	○
N	Aluminum	●
S	Titanium alloys	
H	Hardened steel	

●=Optimal
○=Limited

web thinning ≥ Ø 3.000 • relieved cone • close diameter tolerances • very good surface quality of hole • observe coolant pressure

aluminum and Al-alloys • Al materials with high Si-content

$t_{max} = l_2 - (1.5 \times d_1)$



Speeds and feeds information on pg. 551

Diameter (d1) inch	wire/ltr	mm	d2 mm	l1 mm	t_{max} mm	l2 mm	EDP #
0.1181		3.00	6.00	91.00	37.50	42.00	**9055130030000**
0.1220		3.10	6.00	91.00	37.35	42.00	**9055130031000**
0.1248	1/8	3.17	6.00	91.00	37.25	42.00	**9055130031700**
0.1260		3.20	6.00	91.00	37.20	42.00	**9055130032000**
0.1280		3.25	6.00	91.00	37.13	42.00	**9055130032500**
0.1299		3.30	6.00	91.00	37.05	42.00	**9055130033000**
0.1339		3.40	6.00	91.00	42.90	48.00	**9055130034000**
0.1378		3.50	6.00	91.00	42.75	48.00	**9055130035000**
0.1406	9/64	#28 3.57	6.00	91.00	42.65	48.00	**9055130035700**
0.1417		3.60	6.00	91.00	42.60	48.00	**9055130036000**
0.1457		#25 3.70	6.00	91.00	42.45	48.00	**9055130037000**
0.1496		#25 3.80	6.00	121.00	71.30	77.00	**9055130038000**
0.1535		3.90	6.00	121.00	71.15	77.00	**9055130039000**
0.1563	5/32	3.97	6.00	121.00	71.05	77.00	**9055130039700**
0.1575		4.00	6.00	121.00	71.00	77.00	**9055130040000**
0.1654		4.20	6.00	121.00	70.70	77.00	**9055130042000**
0.1772		#16 4.50	6.00	121.00	70.25	77.00	**9055130045000**
0.1969		5.00	6.00	121.00	74.50	82.00	**9055130050000**
0.2165		5.50	6.00	121.00	73.75	82.00	**9055130055000**
0.2362		6.00	6.00	121.00	73.00	82.00	**9055130060000**
0.2500	1/4	E 6.35	8.00	146.00	96.48	106.00	**9055130063500**
0.2559		6.50	8.00	146.00	96.25	106.00	**9055130065000**
0.2677		6.80	8.00	146.00	95.80	106.00	**9055130068000**

Diameter (d1) inch	wire/ltr	mm	d2 mm	l1 mm	t_{max} mm	l2 mm	EDP #
0.2756		7.00	8.00	146.00	95.50	106.00	**9055130070000**
0.2953		7.50	8.00	146.00	94.75	106.00	**9055130075000**
0.3071		7.80	8.00	146.00	94.30	106.00	**9055130078000**
0.3150		8.00	8.00	146.00	94.00	106.00	**9055130080000**
0.3346		8.50	10.00	175.00	117.25	130.00	**9055130085000**
0.3543		9.00	10.00	175.00	116.50	130.00	**9055130090000**
0.3740		9.50	10.00	175.00	115.75	130.00	**9055130095000**
0.3748	3/8	9.52	10.00	175.00	115.72	130.00	**9055130095200**
0.3937		10.00	10.00	175.00	115.00	130.00	**9055130100000**
0.4016		10.20	12.00	209.00	143.70	159.00	**9055130102000**
0.4134		10.50	12.00	209.00	143.25	159.00	**9055130105000**
0.4331		11.00	12.00	209.00	142.50	159.00	**9055130110000**
0.4528		11.50	12.00	209.00	141.75	159.00	**9055130115000**
0.4724		12.00	12.00	209.00	141.00	159.00	**9055130120000**
0.4921		12.50	14.00	233.00	164.25	183.00	**9055130125000**
0.5000	1/2	12.70	14.00	233.00	163.95	183.00	**9055130127000**
0.5118		13.00	14.00	233.00	163.50	183.00	**9055130130000**
0.5315		13.50	14.00	233.00	162.75	183.00	**9055130135000**
0.5512		14.00	14.00	233.00	162.00	183.00	**9055130140000**
0.5709		14.50	16.00	260.00	185.25	207.00	**9055130145000**
0.5906		15.00	16.00	260.00	184.50	207.00	**9055130150000**
0.6102		15.50	16.00	260.00	183.75	207.00	**9055130155000**
0.6299		16.00	16.00	260.00	183.00	207.00	**9055130160000**

Series # 5512

Material group	Hardness HRc	Hardness Bhn	SFM	Feed Rate - IPR 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	460		0.0050	0.0080	0.0100	0.0125	0.0125	0.0140	0.0160		
	≤ 32	≤ 301	395		0.0040	0.0065	0.0080	0.0100	0.0100	0.0110	0.0125		
Free-cutting steels	≤ 25	≤ 255	550		0.0065	0.0100	0.0125	0.0160	0.0160	0.0180	0.0200		
	≤ 32	≤ 301	480		0.0065	0.0100	0.0125	0.0160	0.0160	0.0180	0.0200		
Unalloyed heat-treatable steels	≤ 20	≤ 220	415		0.0065	0.0100	0.0125	0.0160	0.0160	0.0180	0.0200		
	≤ 25	≤ 255	400		0.0050	0.0080	0.0100	0.0125	0.0125	0.0140	0.0160		
	≤ 32	≤ 301	395		0.0050	0.0080	0.0100	0.0125	0.0125	0.0140	0.0160		
Alloyed heat-treatable steels	≤ 32	≤ 301	395		0.0050	0.0080	0.0100	0.0125	0.0125	0.0140	0.0160		
	≤ 43	≤ 402	335		0.0050	0.0080	0.0100	0.0125	0.0125	0.0140	0.0160		
Unalloyed case hardened steels	≤ 25	≤ 255	465		0.0065	0.0100	0.0125	0.0160	0.0160	0.0180	0.0200		
Alloyed case hardened steels	≤ 32	≤ 301	395		0.0050	0.0080	0.0100	0.0125	0.0125	0.0140	0.0160		
	≤ 43	≤ 402	270		0.0030	0.0050	0.0065	0.0080	0.0080	0.0090	0.0100		
Nitriding steels	≤ 32	≤ 301	340		0.0050	0.0080	0.0100	0.0125	0.0125	0.0140	0.0160		
	≤ 43	≤ 402	325		0.0040	0.0065	0.0080	0.0100	0.0100	0.0110	0.0125		
Tool steels	≤ 25	≤ 255	230		0.0040	0.0065	0.0080	0.0100	0.0100	0.0110	0.0125		
	≤ 43	≤ 402	175		0.0030	0.0050	0.0065	0.0080	0.0080	0.0090	0.0100		
High speed steels	≤ 43	≤ 402	195		0.0025	0.0040	0.0050	0.0065	0.0065	0.0070	0.0080		
Spring steels	≤ 38	≤ 354	195		0.0020	0.0030	0.0040	0.0050	0.0050	0.0055	0.0065		
Hardened steels	≤ 48	≤ 460	175		0.0020	0.0030	0.0040	0.0050	0.0050	0.0055	0.0065		
	≤ 66	-	110		0.0020	0.0030	0.0040	0.0050	0.0050	0.0055	0.0065		
Stainless steels, sulphured	≤ 28	≤ 273	195		0.0030	0.0050	0.0065	0.0080	0.0080	0.0090	0.0100		
austenitic	≤ 36	≤ 337	175		0.0030	0.0050	0.0065	0.0080	0.0080	0.0090	0.0100		
martensitic	≤ 46	≤ 435	155		0.0030	0.0050	0.0065	0.0080	0.0080	0.0090	0.0100		
Cast iron	≤ 23	≤ 242	640		0.0080	0.0125	0.0160	0.0200	0.0200	0.0220	0.0245		
	≤ 38	≤ 354	525		0.0080	0.0125	0.0160	0.0200	0.0200	0.0220	0.0245		
Spheroidal graphite iron and malleable cast iron	≤ 23	≤ 242	435		0.0080	0.0125	0.0160	0.0200	0.0200	0.0220	0.0245		
	≤ 38	≤ 354	415		0.0065	0.0100	0.0125	0.0160	0.0160	0.0180	0.0200		
Chilled cast iron	≤ 38	≤ 354	130		0.0020	0.0030	0.0040	0.0050	0.0050	0.0055	0.0065		
New cast materials GGV	≤ 20	≤ 220											
	≤ 32	≤ 301											
New cast materials ADI	≤ 32	≤ 301											
	≤ 43	≤ 402											
Special alloys	≤ 54	≤ 549	110		0.0025	0.0040	0.0050	0.0065	0.0065	0.0070	0.0080		
Ti and Ti-alloys	≤ 25	≤ 255	140		0.0020	0.0030	0.0040	0.0050	0.0050	0.0055	0.0065		
	≤ 43	≤ 402	130		0.0020	0.0030	0.0040	0.0050	0.0050	0.0055	0.0065		
Aluminium and Al-alloys	-	≤ 120	1000		0.0080	0.0125	0.0160	0.0200	0.0200	0.0220	0.0245		
Al wrought alloys	-	≤ 200	1000		0.0080	0.0125	0.0160	0.0200	0.0200	0.0220	0.0245		
Al cast alloys ≤ 10 % Si	-	≤ 180	845		0.0080	0.0125	0.0160	0.0200	0.0200	0.0220	0.0245		
≤ 24 % Si	-	≤ 180	710		0.0080	0.0125	0.0160	0.0200	0.0200	0.0220	0.0245		
Magnesium alloys	-	≤ 120	900		0.0065	0.0100	0.0125	0.0160	0.0160	0.0180	0.0200		
Copper, low-alloyed	-	≤ 150	400		0.0065	0.0100	0.0125	0.0160	0.0160	0.0180	0.0200		
Brass, short-chipping	-	≤ 180	1050		0.0080	0.0125	0.0160	0.0200	0.0200	0.0220	0.0245		
long-chipping	-	≤ 180	710		0.0065	0.0100	0.0125	0.0160	0.0160	0.0180	0.0200		
Bronze, short-chipping	-	≤ 180	410		0.0065	0.0100	0.0125	0.0160	0.0160	0.0180	0.0200		
	≤ 25	≤ 255	345		0.0050	0.0080	0.0100	0.0125	0.0125	0.0140	0.0160		
Bronze, long-chipping	≤ 25	≤ 255	285		0.0050	0.0080	0.0100	0.0125	0.0125	0.0140	0.0160		
	≤ 32	≤ 301	250		0.0050	0.0080	0.0100	0.0125	0.0125	0.0140	0.0160		
Duroplastics													
Thermoplastics													
Reinforced plastics - Kevlar													
Reinforced plastics - GFK / CFK													

Series # 5513

Material group	Hardness HRc	Hardness Bhn	SFM	Feed Rate - IPR 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											
	≤ 43	≤ 402											
Unalloyed case hardened steels	≤ 25	≤ 255											
Alloyed case hardened steels	≤ 32	≤ 301											
	≤ 43	≤ 402											
Nitriding steels	≤ 32	≤ 301											
	≤ 43	≤ 402											
Tool steels	≤ 25	≤ 255											
	≤ 43	≤ 402											
High speed steels	≤ 43	≤ 402											
Spring steels	≤ 38	≤ 354											
Cast iron	≤ 23	≤ 242	395		0.0040	0.0065	0.0080	0.0100	0.0100	0.0110			
	≤ 38	≤ 354	330		0.0040	0.0065	0.0080	0.0100	0.0100	0.0110			
Spheroidal graphite iron and malleable cast iron	≤ 23	≤ 242	295		0.0040	0.0065	0.0080	0.0100	0.0100	0.0110			
	≤ 38	≤ 354	260		0.0040	0.0065	0.0080	0.0100	0.0100	0.0110			
Chilled cast iron	≤ 38	≤ 354	130		0.0020	0.0030	0.0040	0.0050	0.0055	0.0065			
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											
	≤ 43	≤ 402											
Aluminium and Al-alloys	-	≤ 120	1345		0.0065	0.0100	0.0125	0.0160	0.0180	0.0200			
Al wrought alloys	-	≤ 200	1345		0.0065	0.0100	0.0125	0.0160	0.0180	0.0200			
Al cast alloys ≤ 10 % Si	-	≤ 180	1245		0.0065	0.0100	0.0125	0.0160	0.0180	0.0200			
≤ 24 % Si	-	≤ 180	1080		0.0065	0.0100	0.0125	0.0160	0.0180	0.0200			
Magnesium alloys	-	≤ 120											
Copper, low-alloyed	-	≤ 150											
Brass, short-chipping	-	≤ 180	920		0.0050	0.0080	0.0100	0.0125	0.0125	0.0140			
long-chipping	-	≤ 180											
Bronze, short-chipping	-	≤ 180	360		0.0040	0.0065	0.0080	0.0100	0.0100	0.0110			
	≤ 25	≤ 255	260		0.0030	0.0050	0.0065	0.0080	0.0080	0.0090			
Bronze, long-chipping	≤ 25	≤ 255											
	≤ 32	≤ 301											
Duroplastics													
Thermoplastics													
Reinforced plastics - Kevlar													
Reinforced plastics - GFK / CFK													

Note: Pilot holes (depth >1xD) are recommended when drilling depths greater than 7xD. The pilot hole can be produced with a short, rigid drill. The diameter should be 0.01 - 0.02 mm larger than the diameter of the finish drill. Ratio drills can produce their own pilot hole by reducing speed and feed rates by 30-40%.