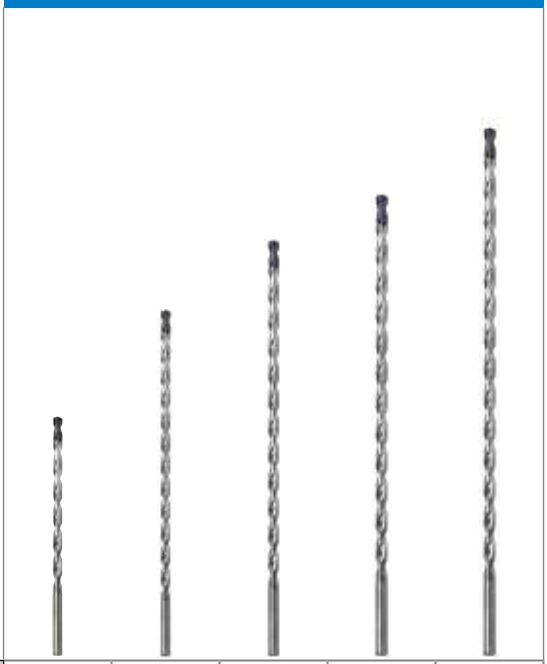
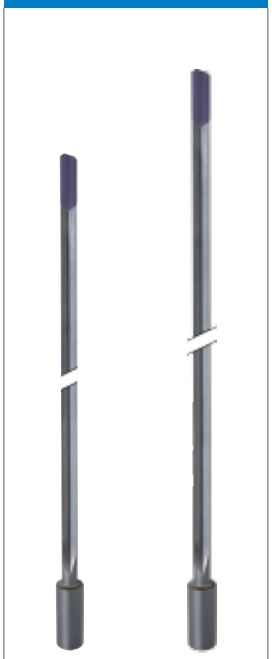
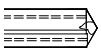
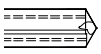
GUHRING

Deep Hole Drills

- RT 100 T coolant fed, solid carbide twist drills
- EB 100 solid carbide gun drills
- EB 80 Conventional brazed head gun drills

	RT 100 T High penetration rate carbide twist drill					EB 100 Solid carbide ratio length gun drill			EB 80 Conventional brazed head gun drill	
										
SERIES	**6509**	**6511**	**6512**	**6513**	**6514**	**5646**	**5647**	**5648**	**5641**	**5642**
Style	RT 100 T	RT 100 T	RT 100 T	RT 100 T	RT 100 T	EB 100	EB 100	EB 100	EB 80	EB 80
Point Angle	135°	135°	135°	135°	135°	Special	Special	Special	Special	Special
Length	15 x D	20 x D	25 x D	30 x D	40 x D	25 x D	50 x D	75 x D	45 x D	80 x D
Shank										
Coolant										
Carbide Grade	DK460UF	DK460UF	DK460UF	DK460UF	DK460UF	K30/K40	K30/K40	K30/K40	K30/K40	K30/K40
Surface Finish	TiAlN	TiAlN	TiAlN	TiAlN	TiAlN	nano-A™	nano-A™	nano-A™	TiCN	TiCN
Std. Dia. Range mm	3.0 - 14.0	3.0 - 14.0	3.0 - 12.0	3.0 - 10.0	3.0 - 8.0	2.38 - 12.0	2.38 - 8.0	2.38 - 6.0	3.97 - 12.70	4.95 - 12.65
Std. Dia. Range In.	0.1181-0.5512	0.1181-0.5512	0.1181-0.4724	0.1181-0.3937	0.1181-0.3150	0.0937-0.4724	0.0937-0.3150	0.0937-0.2362	0.1563-0.5000	0.1949-0.4980

RT 100 T - High penetration rates

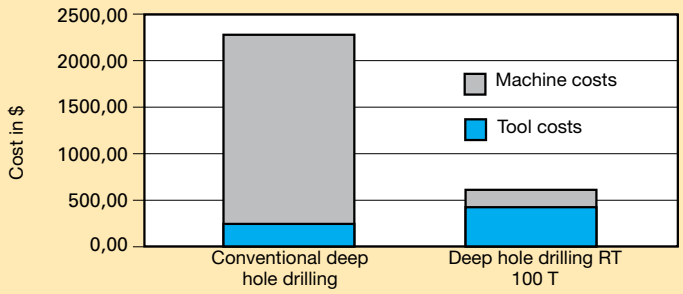
- *3 to 5 times the penetration rate of gun drills or cobalt deep hole drills*
- *Eliminates peck cycles*
- *Reduces cycle times and increases production*

Optimized flute geometry
These spiral-flute deep hole carbide drills possess an advanced flute geometry designed for optimal chip evacuation from deep holes in a wide range of materials.

Maximized coolant duct profile
To provide the cutting edge with an optimum coolant supply, the tools possess a maximized coolant duct profile. It ensures an effecient coolant supply to the cutting edge as well as excellent chip evacuation.

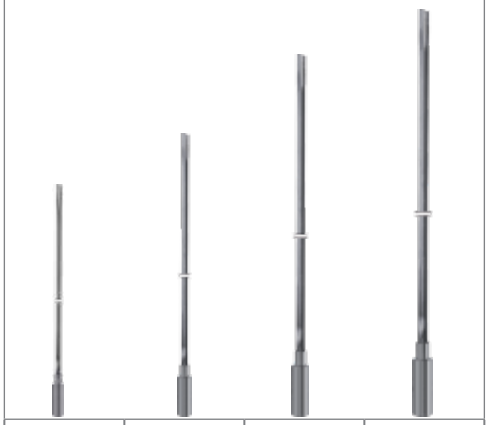
Problem-free chips
The design features of this drill – with the appropriate cutting parameters – result in chips that are evacuated problem-free even from deep holes. Chip packing and a subsequent binding of the tool is effectively prevented.

Production cost
machining example: drilling oil holes in crankshafts



Ultimate cost-efficiency:
Applied on machining centers, where the drilling operation is a time-relevant criterion, RT 100 T can display its superiority. Its high feed rates lead to a shorter production time, its long tool life reduces the number of tool changes.

EB 100
Solid carbide fixed length gun drill



5024	5020	5026	5021
EB 100	EB 100	EB 100	EB 100
Special	Special	Special	Special
45mm FL	80mm FL	120mm FL	160mm FL
K30/K40	K30/K40	K30/K40	K30/K40
Bright	Bright	Bright	Bright
1.2- 3.2 mm	1.2- 5.0 mm	1.5- 5.0 mm	1.5- 8.0 mm
0.0472- 0.1260”	0.0472- 0.1969”	0.0591- 0.1969”	0.0591- 0.3150”

EB 100 - Fixed Length Gun Drills

- *Solid carbide flute construction*
- *Small diameter deep hole drilling capabilities on CNC equipment*
- *Oversized steel shank design*

Small diameter, extra length drilling
EB 100 fixed length gun drills are two-piece construction with a carbide tube running the entire flute length and brazed into an over-sized steel shank. These rigid single flute gun drills are best suited for small diameter extra length drilling operations where conventional drills can‘t be effectively used.

Coolant through the drill
EB 100 fixed length gun drills start at 1.2 mm diameter (0.0472”) and can be used on any CNC machining center that is equipped with high pressure through spindle coolant capabilities. These drills require a pilot hole. Guhring recommends using Series 6400 carbide micro-precision drills for piloting operations.

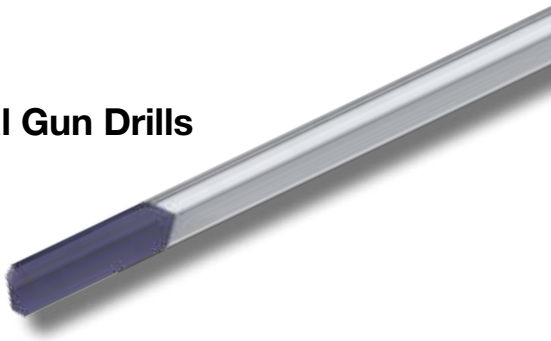
EB 100 - Ratio length gun drills

- *Solid carbide flute construction*
- *Precision hole making*
- *Extra deep hole drilling on CNC equipment*

The best of both worlds
EB 100 gun drills are a single flute tool designed to drill extra deep holes on conventional CNC machining centers without the need for specialized gun drill equipment. Drilling depths of over 75xD can be reached with Guhring‘s EB 100 CNC style gun drill.

An excellent job shop selection
These precision deep hole drills have full solid carbide one-piece construction from the shank to the cutting edge using Guhring’s ultra fine grain carbide. The nano-A™ coated point improves abrasion resistance at the cutting edge and increases the temperature at which these drills can effectively operate. The specialized point grind is a universal design that is well suited to the job shop environment.

Performance matters
Solid carbide construction provides improved rigidity within the cut and precision hole size and location accuracies. EB 100 gun drills do not require peck cycles in most applications. They are best suited for hole depths that are beyond the reach of the RT 100 T twist drill. Pilot hole drilling is required before any application of the EB 100 style gun drill.



EB 80 - Conventional Gun Drills

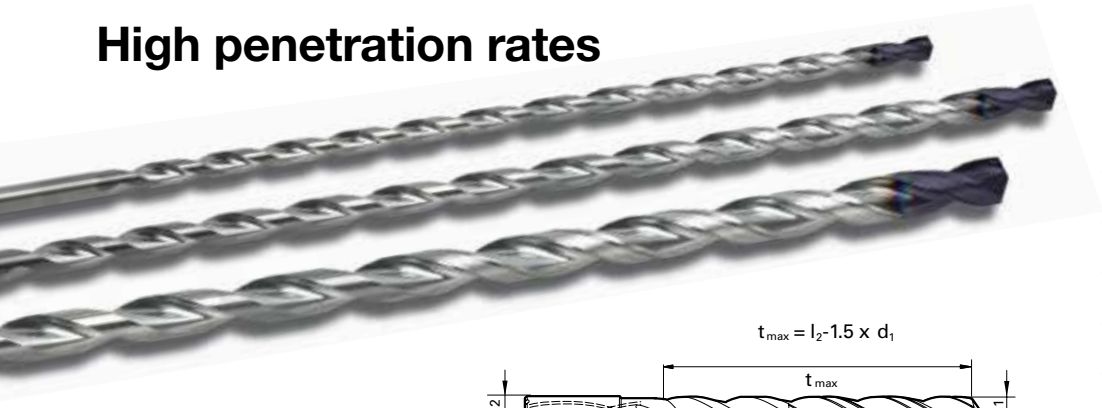
- *Brazed head construction*
- *Single flute design*
- *TiCN coated head*

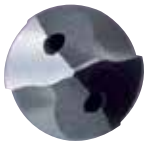
Maximum drilling depths
Designed for maximum drilling depths, Guhring conventional gun drills are coated carbide headed drills that allow manufacturers to achieve precision holes in a wide variety of materials. Brazed carbide headed gun drills are typically used for precise drilling of deep holes when conventional style drills cannot be employed.

Wide range of stocked standards; special designs available
Conventional gun drills provide excellent surface finish quality and hole concentricity when properly applied. All gun drills must have a pilot hole (conventional machines) or support bushings (gun drilling machines) to operate effectively. Guhring offers a wide range of styles and sizes with the series 5641 (45xD) and 5642 (80xD) versions highlighted in this brochure. Contact Guhring for a more complete listing of standard stocked conventional style gun drills or have Guhring quote a special design to meet your specific requirements.

RT 100 T

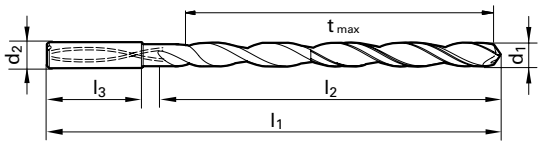
High penetration rates





- High peneration rates
- Unique double margin design
- Specialized flute form
- High polished flute
- TiAlN coated tip
- 135° point angle

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



Series 6509 (15xD)

Diameter (d1) Dec. inch	Fract. inch	Wire / letter	mm	d2 mm	l1 mm	l2 mm	t_{max} mm
0.1181			3.000	6.00	95.00	55.00	50.50
0.1250	1/8		3.170	6.00	106.00	67.00	62.20
0.1378			3.500	6.00	116.00	76.00	70.70
0.1406	9/64	28	3.570	6.00	116.00	76.00	70.60
0.1563	5/32		3.970	6.00	116.00	76.00	70.00
0.1575			4.000	6.00	116.00	76.00	70.00
0.1719	11/64		4.370	6.00	133.00	93.00	86.40
0.1772			4.500	6.00	133.00	93.00	86.20
0.1874	3/16		4.760	6.00	133.00	93.00	85.80
0.1969			5.000	6.00	133.00	93.00	85.50
0.2008			5.100	6.00	150.00	110.00	102.30
0.2030	13/64		5.160	6.00	150.00	110.00	102.20
0.2130		3	5.410	6.00	150.00	110.00	101.80
0.2165			5.500	6.00	150.00	110.00	101.70
0.2189	7/32		5.560	6.00	150.00	110.00	101.60
0.2344	15/64		5.950	6.00	150.00	110.00	101.00
0.2362			6.000	6.00	150.00	110.00	101.00
0.2500	1/4	E	6.350	8.00	167.00	127.00	117.40
0.2559			6.500	8.00	167.00	127.00	117.20
0.2656	17/64	H	6.750	8.00	167.00	127.00	116.80
0.2756			7.000	8.00	167.00	127.00	116.50
0.2811	9/32	K	7.140	8.00	183.00	143.00	132.20
0.2953			7.500	8.00	183.00	143.00	131.70
0.2969	19/64		7.540	8.00	183.00	143.00	131.60
0.3125	5/16		7.940	8.00	183.00	143.00	131.00
0.3150			8.000	8.00	183.00	143.00	131.00
0.3281	21/64		8.330	10.00	204.00	160.00	147.50
0.3346			8.500	10.00	204.00	160.00	147.20
0.3438	11/32		8.730	10.00	204.00	160.00	146.90
0.3543			9.000	10.00	204.00	160.00	146.50
0.3594	23/64		9.130	10.00	221.00	177.00	163.30
0.3750	3/8		9.520	10.00	221.00	177.00	162.70
0.3906	25/64		9.920	10.00	221.00	177.00	162.10
0.3937			10.000	10.00	221.00	177.00	162.00
0.4063	13/32		10.320	12.00	247.00	198.00	182.50
0.4219	27/64		10.720	12.00	247.00	198.00	181.90
0.4330			11.000	12.00	247.00	198.00	181.50
0.4370	7/16		11.110	12.00	263.00	214.00	197.30
0.4531	29/64		11.510	12.00	263.00	214.00	196.70
0.4688	15/32		11.910	12.00	263.00	214.00	196.10
0.4724			12.000	12.00	263.00	214.00	196.00
0.4843	31/64		12.300	14.00	297.00	248.00	229.50
0.5000	1/2		12.700	14.00	297.00	248.00	228.90
0.5157	33/64		13.100	14.00	297.00	248.00	228.30
0.5311	17/32		13.490	14.00	297.00	248.00	227.70
0.5469	35/64		13.890	14.00	297.00	248.00	227.10
0.5512			14.000	14.00	297.00	248.00	227.00

Series 6511 (20xD)

Diameter (d1) Dec. inch	Fract. inch	Wire / letter	mm	d2 mm	l1 mm	l2 mm	t_{max} mm
0.1181			3.000	6.00	110.00	70.00	65.50
0.1220			3.100	6.00	123.00	83.00	78.30
0.1250	1/8		3.170	6.00	123.00	83.00	78.20
0.1378			3.500	6.00	136.00	96.00	90.70
0.1406	9/64	28	3.570	6.00	136.00	96.00	90.60
0.1563	5/32		3.970	6.00	136.00	96.00	90.00
0.1575			4.000	6.00	136.00	96.00	90.00
0.1654			4.200	6.00	158.00	118.00	111.70
0.1719	11/64		4.370	6.00	158.00	118.00	111.40
0.1772			4.500	6.00	158.00	118.00	111.20
0.1874	3/16		4.760	6.00	158.00	118.00	110.80
0.1969			5.000	6.00	158.00	118.00	110.50
0.2008			5.100	6.00	180.00	140.00	132.30
0.2030	13/64		5.160	6.00	180.00	140.00	132.20
0.2130		3	5.410	6.00	180.00	140.00	131.80
0.2165			5.500	6.00	180.00	140.00	131.70
0.2189	7/32		5.560	6.00	180.00	140.00	131.60
0.2344	15/64		5.950	6.00	180.00	140.00	131.00
0.2362			6.000	6.00	180.00	140.00	131.00
0.2500	1/4	E	6.350	8.00	202.00	162.00	152.40
0.2559			6.500	8.00	202.00	162.00	152.20
0.2656	17/64	H	6.750	8.00	202.00	162.00	151.80
0.2756			7.000	8.00	202.00	162.00	151.50
0.2811	9/32	K	7.140	8.00	223.00	183.00	172.20
0.2953			7.500	8.00	223.00	183.00	171.70
0.2969	19/64		7.540	8.00	223.00	183.00	171.60
0.3125	5/16		7.940	8.00	223.00	183.00	171.00
0.3150			8.000	8.00	223.00	183.00	171.00
0.3281	21/64		8.330	10.00	249.00	205.00	192.50
0.3346			8.500	10.00	249.00	205.00	192.20
0.3438	11/32		8.730	10.00	249.00	205.00	191.90
0.3543			9.000	10.00	249.00	205.00	191.50
0.3594	23/64		9.130	10.00	271.00	227.00	213.30
0.3750	3/8		9.520	10.00	271.00	227.00	212.70
0.3906	25/64		9.920	10.00	271.00	227.00	212.10
0.3937			10.000	10.00	271.00	227.00	212.00
0.4063	13/32		10.320	12.00	302.00	242.00	226.50
0.4219	27/64		10.720	12.00	302.00	242.00	225.90
0.4330			11.000	12.00	302.00	253.00	236.50
0.4370	7/16		11.110	12.00	323.00	274.00	257.30
0.4531	29/64		11.510	12.00	323.00	274.00	256.70
0.4688	15/32		11.910	12.00	323.00	274.00	256.10
0.4724			12.000	12.00	323.00	274.00	256.00
0.4843	31/64		12.300	14.00	367.00	318.00	299.50
0.5000	1/2		12.700	14.00	367.00	318.00	298.90
0.5157	33/64		13.100	14.00	367.00	318.00	298.30
0.5311	17/32		13.490	14.00	367.00	318.00	297.70
0.5469	35/64		13.890	14.00	367.00	318.00	297.10
0.5512			14.000	14.00	367.00	318.00	297.00

t_{max} = maximum drilling depth

Series 6512 (25xD)

Diameter (d1) Dec. inch	Fract. inch	Wire / letter	mm	d2 mm	l1 mm	l2 mm	t_{max} mm
0.1181			3.00	6.00	125.00	85.00	80.50
0.1220			3.10	6.00	141.00	101.00	96.30
0.1250	1/8		3.17	6.00	141.00	101.00	96.20
0.1378			3.50	6.00	156.00	116.00	110.70
0.1406	9/64	28	3.57	6.00	156.00	116.00	110.60
0.1496			3.80	6.00	156.00	116.00	110.30
0.1563	5/32		3.97	6.00	156.00	116.00	110.00
0.1575			4.00	6.00	156.00	116.00	110.00
0.1654			4.20	6.00	183.00	143.00	136.70
0.1719	11/64		4.37	6.00	183.00	143.00	136.40
0.1772			4.50	6.00	183.00	143.00	136.20
0.1874	3/16		4.76	6.00	183.00	143.00	135.80
0.1969			5.00	6.00	183.00	143.00	135.50
0.2008			5.10	6.00	210.00	170.00	162.30
0.2030	13/64		5.16	6.00	210.00	170.00	162.20
0.2130		3	5.41	6.00	210.00	170.00	161.80
0.2165			5.50	6.00	210.00	170.00	161.70
0.2189	7/32		5.56	6.00	210.00	170.00	161.60
0.2344	15/64		5.95	6.00	210.00	170.00	161.00
0.2362			6.00	6.00	210.00	170.00	161.00
0.2500	1/4	E	6.35	8.00	237.00	197.00	187.40
0.2559			6.50	8.00	237.00	197.00	187.20
0.2656	17/64	H	6.75	8.00	237.00	197.00	186.80
0.2756			7.00	8.00	237.00	197.00	186.50
0.2811	9/32	K	7.14	8.00	263.00	223.00	212.20
0.2953			7.50	8.00	263.00	223.00	211.70
0.2969	19/64		7.54	8.00	263.00	223.00	211.60
0.3125	5/16		7.94	8.00	263.00	223.00	211.00
0.3150			8.00	8.00	263.00	223.00	211.00
0.3281	21/64		8.33	10.00	294.00	250.00	237.50
0.3346			8.50	10.00	294.00	250.00	237.20
0.3438	11/32		8.73	10.00	294.00	250.00	236.90
0.3543			9.00	10.00	294.00	250.00	236.50
0.3594	23/64		9.13	10.00	294.00	250.00	236.30
0.3750	3/8		9.52	10.00	321.00	277.00	262.70
0.3906	25/64		9.92	10.00	321.00	277.00	262.10
0.3937			10.00	10.00	321.00	277.00	262.00
0.4063	13/32		10.32	12.00	359.00	310.00	294.50
0.4219	27/64		10.72	12.00	359.00	310.00	293.90
0.4330			11.00	12.00	396.00	337.00	320.50
0.4370	7/16		11.11	12.00	386.00	337.00	320.30
0.4531	29/64		11.51	12.00	386.00	337.00	319.70
0.4689	15/32		11.91	12.00	386.00	337.00	319.10
0.4724			12.00	12.00	386.00	337.00	319.00

See chart on back cover for coolant pressure recommendations.

All deep hole drills must utilize a pilot hole.

Deep hole drills must never operate at full speed without support in the pilot hole.

Procedure:

- Machine a pilot hole with an m7 toleranced Guhring type RT 100 drill (i.e., series 5514) to a minimum pilot depth of 1 to 1.5 x D.
- Enter the pilot hole at a speed of approx. 300 RPM, and with a feed rate of approx. 19 - 20 IPM staying just shy of the bottom of the hole.
- Start high coolant pressure and increase RPM to recommended value.
- Feed drill at recommended feed rate to final hole depth. No peck cycle required.
- For through holes with oblique exit, reduce the feed rate to 40% approx. 1 mm prior to break-through.
- After reaching hole depth reduce machine spindle to 300 RPM and withdraw the drill.

Series 6513 (30xD)

Diameter (d1) Dec. inch	Fract. inch	Wire / letter	mm	d2 mm	l1 mm	l2 mm	t_{max} mm
0.1181			3.00	6.00	140.00	100.00	95.50
0.1220			3.10	6.00	158.00	118.00	113.30
0.1250	1/8		3.17	6.00	158.00	118.00	113.20
0.1378			3.50	6.00	176.00	136.00	130.70
0.1406	9/64	28	3.57	6.00	176.00	136.00	130.60
0.1496			3.80	6.00	176.00	136.00	130.30
0.1563	5/32		3.97	6.00	176.00	136.00	130.00
0.1575			4.00	6.00	176.00	136.00	130.00
0.6540			4.20	6.00	208.00	168.00	161.70
0.1719	11/64		4.37	6.00	208.00	168.00	161.40
0.1772			4.50	6.00	208.00	168.00	161.20
0.1874	3/16		4.76	6.00	208.00	168.00	160.80
0.1969			5.00	6.00	208.00	168.00	160.50
0.2008			5.10	6.00	240.00	200.00	192.30
0.2030	13/64		5.16	6.00	240.00	200.00	192.20
0.2130		3	5.41	6.00	240.00	200.00	191.80
0.2165			5.50	6.00	240.00	200.00	191.70
0.2189	7/32		5.56	6.00	240.00	200.00	191.60
0.2344	15/64		5.95	6.00	240.00	200.00	191.00
0.2362			6.00	6.00	240.00	200.00	191.00
0.2500	1/4	E	6.35	8.00	272.00	232.00	222.40
0.2559			6.50	8.00	272.00	232.00	222.20
0.2656	17/64	H	6.75	8.00	272.00	232.00	221.80
0.2756			7.00	8.00	272.00	232.00	221.50
0.2811	9/32	K	7.14	8.00	303.00	263.00	252.20
0.2953			7.50	8.00	303.00	263.00	251.70
0.2969	19/64		7.54	8.00	303.00	263.00	251.60
0.3125	5/16		7.94	8.00	303.00	263.00	251.00
0.3150			8.00	8.00	303.00	263.00	251.00
0.3281	21/64		8.33	10.00	339.00	295.00	282.50
0.3346			8.50	10.00	339.00	295.00	282.20
0.3438	11/32		8.73	10.00	339.00	295.00	281.90
0.3543			9.00	10.00	339.00	295.00	281.50
0.3594	23/64		9.13	10.00	371.00	327.00	313.30
0.3750	3/8		9.52	10.00	371.00	327.00	312.70
0.3906	25/64		9.92	10.00	371.00	327.00	312.10
0.3937			10.00	10.00	371.00	327.00	312.00

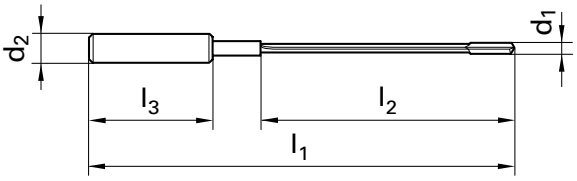
Series 6514 (40xD)

Diameter (d1) Dec. inch	Fract. inch	Wire / letter	mm	d2 mm	l1 mm	l2 mm	t_{max} mm
0.1181			3.000	6.00	170.00	130.00	125.50
0.1220			3.100	6.00	193.00	153.00	148.30
0.1248	1/8		3.170	6.00	193.00	153.00	148.20
0.1378			3.500	6.00	193.00	153.00	147.70
0.1406	9/64	28	3.570	6.00	216.00	176.00	170.60
0.1496			3.800	6.00	216.00	176.00	170.30
0.1563	5/32		3.970	6.00	216.00	176.00	170.00
0.1575			4.000	6.00	216.00	176.00	170.00
0.1654			4.200	6.00	238.00	198.00	191.70
0.1720	11/64		4.370	6.00	238.00	198.00	191.40
0.1772			4.500	6.00	238.00	198.00	191.20
0.1874	3/16		4.760	6.00	258.00	218.00	210.80
0.1969			5.000	6.00	258.00	218.00	210.50
0.2008			5.100	6.00	280.00	240.00	232.30
0.2031	13/64		5.160	6.00	280.00	240.00	232.20
0.2129		3	5.410	6.00	280.00	240.00	231.80
0.2165			5.500	6.00	280.00	240.00	231.70
0.2189	7/32		5.560	6.00	300.00	260.00	251.60
0.2343	15/64		5.950	6.00	300.00	260.00	251.00
0.2362			6.000	6.00	300.00	260.00	251.00
0.2480			6.300	8.00	322.00	282.00	272.50
0.2500	1/4	E	6.350	8.00	322.00	282.00	272.40
0.2559			6.500	8.00	322.00	282.00	272.20
0.2657	17/64	H	6.750	8.00	342.00	302.00	291.80
0.2756			7.000	8.00	342.00	302.00	291.50
0.2811	9/32	K	7.140	8.00	363.00	323.00	312.20
0.2953			7.500	8.00	363.00	323.00	311.70
0.2969	19/64		7.540	8.00	383.00	343.00	331.60
0.3125	5/16		7.940	8.00	383.00	343.00	331.00
0.3150			8.000	8.00	383.00	343.00	331.00

EB 100

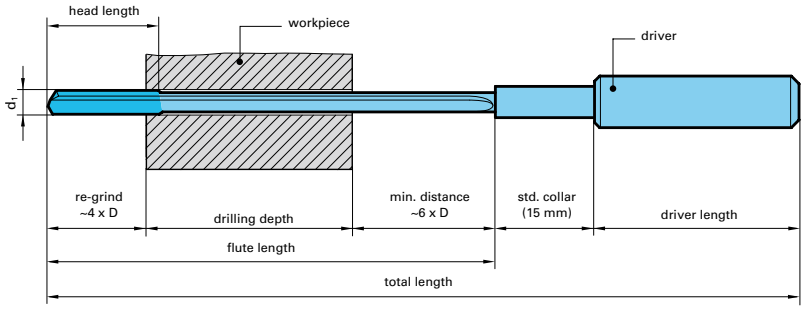
Miniature single flute CNC style gun drill

Fixed flute lengths



- **Solid carbide flute gun drill -** *carbide tube brazed into steel shank*
- **Designed for CNC equipment -** *no special gun drill machine needed*
- **Coolant through the drill**
- **Excellent hole accuracy and surface finish**

Diameter (d1)				Series 5024 45 mm flute			Series 5020 80 mm flute			Series 5026 120 mm flute			Series 5021 160 mm flute		
Dec. inch	Wire / letter	mm	d2 mm	l1 mm	l2 mm	l3 mm	l1 mm	l2 mm	l3 mm	l1 mm	l2 mm	l3 mm	l1 mm	l2 mm	l3 mm
0.0472		1.200	4.00	90.00	45.00	28.00	125.00	80.00	28.00						
0.0591		1.500	4.000	90.00	45.00	28.00	125.00	80.00	28.00	165.00	120.00	28.00	205.00	160.00	28.00
0.0626	1/16	1.590	4.000	90.00	45.00	28.00	125.00	80.00	28.00	165.00	120.00	28.00	205.00	160.00	28.00
0.0630		1.600	4.000	90.00	45.00	28.00	125.00	80.00	28.00	165.00	120.00	28.00	205.00	160.00	28.00
0.0780	5/64	1.980	4.000	90.00	45.00	28.00	125.00	80.00	28.00	165.00	120.00	28.00	205.00	160.00	28.00
0.0787		2.000	4.000	90.00	45.00	28.00	125.00	80.00	28.00	165.00	120.00	28.00	205.00	160.00	28.00
0.0984		2.500	10.000	100.00	45.00	40.00	135.00	80.00	40.00	175.00	120.00	40.00	215.00	160.00	40.00
0.1063		2.700	10.000	100.00	45.00	40.00	135.00	80.00	40.00	175.00	120.00	40.00	215.00	160.00	40.00
0.1181		3.000	10.000	100.00	45.00	40.00	135.00	80.00	40.00	175.00	120.00	40.00	215.00	160.00	40.00
0.1260		3.200	10.000	100.00	45.00	40.00	135.00	80.00	40.00	175.00	120.00	40.00	215.00	160.00	40.00
0.1378		3.500	10.000				135.00	80.00	40.00	175.00	120.00	40.00	215.00	160.00	40.00
0.1575		4.000	10.000				135.00	80.00	40.00	175.00	120.00	40.00	215.00	160.00	40.00
0.1654		4.200	10.000				135.00	80.00	40.00	175.00	120.00	40.00	215.00	160.00	40.00
0.1772	16	4.500	10.000				135.00	80.00	40.00	175.00	120.00	40.00	215.00	160.00	40.00
0.1969		5.000	10.000				135.00	80.00	40.00	175.00	120.00	40.00	215.00	160.00	40.00
0.2362		6.000	16.000										225.00	160.00	48.00
0.3150		8.000	16.000										225.00	160.00	48.00



All deep hole drills must utilize a pilot hole.

Procedure:

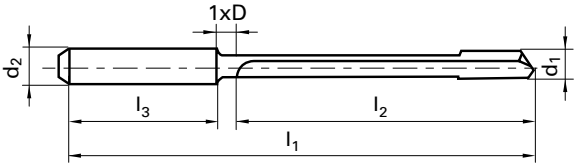
- Machine a pilot hole with an m7 toleranced Guhring RT 100 drill (i.e., series 5514) to a minimum pilot depth of 1 to 1.5 x D.
- Enter the pilot hole at a speed of approx. 300 RPM, and with a feed rate of approx. 19 - 20 IPM staying just shy of the bottom of the hole.
- Start high coolant pressure and increase RPM to recommended value.
- Feed drill at recommended feed rate to final hole depth. No peck cycle required.
- For through holes with oblique exit, reduce the feed rate to 40% approx. 1 mm prior to break-through.
- After reaching hole depth reduce machine spindle to 300 RPM and withdraw the drill.

EB 100

Single flute CNC style gun drill

25xD, 50xD or 75xD

- **Coolant fed carbide drill**
- **nano-A™ coated point**
- **Designed for CNC equipment -** *no special gun drill machine needed*
- **Solid carbide flute gun drill -** *single piece carbide construction*



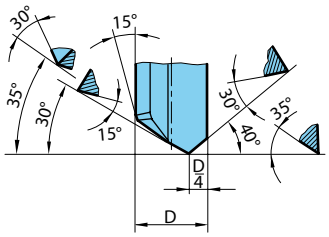
Diameter (d1)				Series 5646 25 x D			Series 5647 50 x D			Series 5648 75 x D		
Dec. inch	Fract. inch	mm	d2 mm	l1 mm	l2 mm	l3 mm	l1 mm	l2 mm	l3 mm	l1 mm	l2 mm	l3 mm
0.0937	3/32	2.380	4.00	100.00	70.00	28.00	160.00	130.00	28.00	220.00	190.00	28.00
0.0984		2.500	4.00	115.00	85.00	28.00	185.00	155.00	28.00	255.00	220.00	28.00
0.1094	7/64	2.780	4.00	115.00	85.00	28.00	185.00	155.00	28.00	255.00	220.00	28.00
0.1181		3.000	6.00	145.00	105.00	36.00	230.00	190.00	36.00	320.00	280.00	36.00
0.1248	1/8	3.170	6.00	145.00	105.00	36.00	230.00	190.00	36.00	320.00	280.00	36.00
0.1378		3.500	6.00	145.00	105.00	36.00	230.00	190.00	36.00	320.00	280.00	36.00
0.1406	9/64	3.570	6.00	160.00	120.00	36.00	260.00	220.00	36.00	360.00	320.00	36.00
0.1563	5/32	3.970	6.00	160.00	120.00	36.00	260.00	220.00	36.00	360.00	320.00	36.00
0.1575		4.000	6.00	160.00	120.00	36.00	260.00	220.00	36.00	360.00	320.00	36.00
0.1720	11/64	4.370	6.00	220.00	180.00	36.00	370.00	330.00	36.00	525.00	485.00	36.00
0.1874	3/16	4.760	6.00	220.00	180.00	36.00	370.00	330.00	36.00	525.00	485.00	36.00
0.1969		5.000	6.00	220.00	180.00	36.00	370.00	330.00	36.00	525.00	485.00	36.00
0.2031	13/64	5.160	6.00	220.00	180.00	36.00	370.00	330.00	36.00	525.00	485.00	36.00
0.2189	7/32	5.560	6.00	220.00	180.00	36.00	370.00	330.00	36.00	525.00	485.00	36.00
0.2343	15/64	5.950	6.00	220.00	180.00	36.00	370.00	330.00	36.00	525.00	485.00	36.00
0.2362		6.000	6.00	220.00	180.00	36.00	370.00	330.00	36.00	525.00	485.00	36.00
0.2500	1/4	6.350	8.00	260.00	210.00	36.00	430.00	385.00	36.00			
0.2657	17/64	6.750	8.00	260.00	210.00	36.00	430.00	385.00	36.00			
0.2756		7.000	8.00	260.00	210.00	36.00	430.00	385.00	36.00			
0.2811	9/32	7.140	8.00	285.00	240.00	36.00	485.00	440.00	36.00			
0.2969	19/64	7.540	8.00	285.00	240.00	36.00	485.00	440.00	36.00			
0.3125	5/16	7.940	8.00	285.00	240.00	36.00	485.00	440.00	36.00			
0.3150		8.000	8.00	285.00	240.00	36.00	485.00	440.00	36.00			
0.3543		9.000	10.00	350.00	300.00	40.00						
0.3937		10.000	10.00	350.00	300.00	40.00						
0.4331		11.000	12.00	420.00	360.00	45.00						
0.4724		12.000	12.00	420.00	360.00	45.00						

EB 100

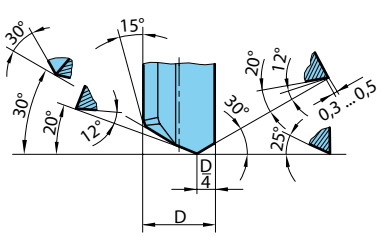
Standard point grinds

(special point grinds on request)

Ø 2...4.00 mm



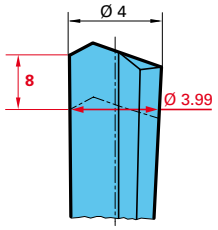
Ø > 4.01...20 mm



EB 100

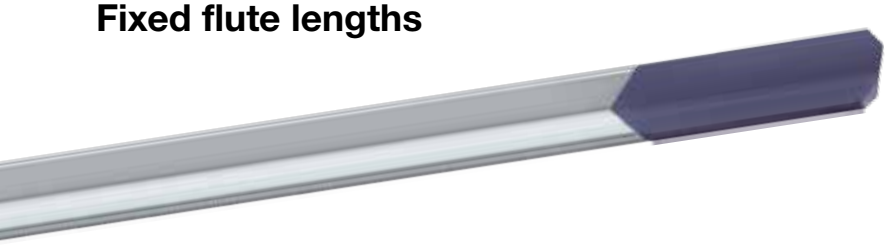
Back taper ratio 1:800 (standard)

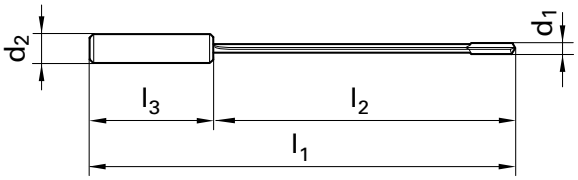
(dimensions in mm)



EB 80

Brazed single flute gun drill
Fixed flute lengths





- **Brazed head construction**
- **Oversized universal shank**
- **TiCN coated tip**
- **Excellent hole accuracy and surface finish**

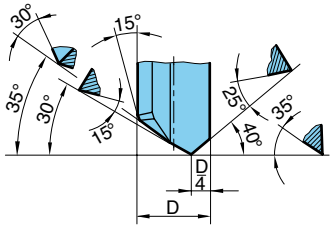
Diameter (d1)				Series 5641 40 x D		
Dec. inch	Fract. inch	mm	d2 mm	l1 mm	l2 mm	l3 mm
0.1563	5/32	3.970	10.00	230.00	185.00	40.00
0.1575		4.000	12.00	230.00	185.00	40.00
0.1969		5.000	16.00	280.00	232.00	48.00
0.2030	13/64	5.156	16.00	280.00	232.00	48.00
0.2362		6.000	16.00	320.00	272.00	48.00
0.2500	1/4	6.350	16.00	340.00	292.00	48.00
0.2756		7.000	16.00	370.00	322.00	48.00
0.3125	5/16	7.938	16.00	430.00	372.00	48.00
0.3150		8.000	16.00	430.00	372.00	48.00
0.3543		9.000	16.00	450.00	402.00	48.00
0.3750	3/8	9.525	16.00	480.00	432.00	48.00
0.3937		10.000	20.00	510.00	460.00	50.00
0.4331		11.000	20.00	550.00	500.00	50.00
0.4375	7/16	11.113	20.00	550.00	500.00	50.00
0.4724		12.000	20.00	600.00	550.00	50.00
0.5000	1/2	12.700	20.00	635.00	585.00	50.00

Diameter (d1)				Series 5642 80 x D		
Dec. inch	Fract. inch	mm	d2 mm	l1 mm	l2 mm	l3 mm
0.1949		4.950	16.00	480.00	432.00	48.00
0.2010		5.106	16.00	480.00	432.00	48.00
0.2343		5.950	16.00	560.00	512.00	48.00
0.2480		6.300	16.00	590.00	542.00	48.00
0.2736		6.950	16.00	650.00	602.00	48.00
0.3106		7.888	16.00	740.00	692.00	48.00
0.3130		7.950	16.00	740.00	692.00	48.00
0.3524		8.950	16.00	820.00	772.00	48.00
0.3730		9.475	16.00	870.00	822.00	48.00
0.3917		9.950	20.00	910.00	860.00	50.00
0.4311		10.950	20.00	995.00	945.00	50.00
0.4356		11.063	20.00	995.00	945.00	50.00
0.4705		11.950	20.00	1080.00	1030.00	50.00
0.4980		12.650	20.00	1140.00	1090.00	50.00

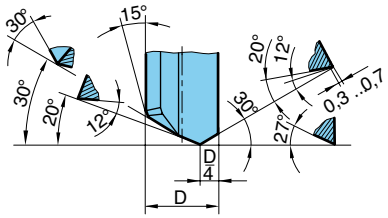
Drill diameters for the 80xD EB 80 Series 5642 are offered as stocked standards in increments of -0.05mm (0.0019") below the nominal diameter of the pilot tool, which is normally an RT 100 T high penetration rate drill or EB 80 40xD series 5641 standard gun drill. Guhring recommends a full depth pilot drill of 40xD followed by series 5642 EB 80 finish drill.

EB 80 standard point grinds
(special point grinds available)

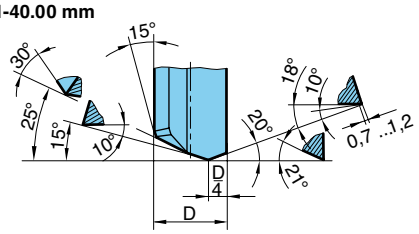
Ø 2.00-4.00 mm



Ø 4.01-20. 00 mm



Ø 20.01-40.00 mm



Tech Tip:

Gun drills hold location to precise tolerances in extremely deep hole applications. Conventional gun drills consist of a steel body and driver with a brazed carbide head for extended tool life and performance. When applying standard gun drills some basic steps should be observed:

- Drilling a pilot hole (tol. h8) is advisable. Enter the pilot hole at low RPM and feed rate (example: 200 RPM at 20 in/min)
- Gun drills for drilling depths over 40xD should enter pilot hole in a counterclockwise direction.
- Continuous drilling without pecking is required.
- Switch off coolant supply after reaching maximum drilling depth.
- Use a rapid withdrawal with a stationary spindle.

Operating Parameters

Series # 6509

Note: Pilot holes (depth >1xD) are recommended when using RT100T drills. Use a series 5514 or similar drill to drill a minimum of 1xD deep. Then enter the pilot hole with the RT100T drill at approx 300 RPM and 20 IPM, start high coolant pressure and increase RPM. Drill to hole depth without pecking.

Material group	Hardness HRc	Hardness Bhn	SFM	Feed Rate - IPR 1/64 in. .5 mm	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
Common structural steels	- ≤ 32	≤ 150 ≤ 301	360 360			0.0065 0.0065	0.0100 0.0100	0.0155 0.0155	0.0155 0.0155	0.0195 0.0195		
Free-cutting steels	≤ 25 ≤ 32	≤ 255 ≤ 301	395 395			0.0065 0.0065	0.0100 0.0100	0.0155 0.0155	0.0155 0.0155	0.0195 0.0195		
Unalloyed heat-treatable steels	≤ 20 ≤ 25 ≤ 32	≤ 220 ≤ 255 ≤ 301	360 360 330			0.0040 0.0065 0.0050	0.0065 0.0100 0.0080	0.0100 0.0155 0.0125	0.0100 0.0155 0.0125	0.0125 0.0195 0.0155		
Alloyed heat-treatable steels	≤ 32 ≤ 43	≤ 301 ≤ 402	360 360			0.0050 0.0040	0.0080 0.0065	0.0125 0.0100	0.0125 0.0100	0.0155 0.0125		
Unalloyed case hardened steels	≤ 25	≤ 255	360			0.0065	0.0100	0.0155	0.0155	0.0195		
Alloyed case hardened steels	≤ 32 ≤ 43	≤ 301 ≤ 402	360 360			0.0050 0.0040	0.0080 0.0065	0.0125 0.0100	0.0125 0.0100	0.0155 0.0125		
Nitriding steels	≤ 32 ≤ 43	≤ 301 ≤ 402	330 260			0.0030 0.0030	0.0050 0.0050	0.0080 0.0080	0.0080 0.0080	0.0100 0.0100		
Tool steels	≤ 25 ≤ 43	≤ 255 ≤ 402	330 260			0.0040 0.0030	0.0065 0.0050	0.0100 0.0080	0.0100 0.0080	0.0125 0.0100		
High speed steels	≤ 43	≤ 402	165			0.0030	0.0050	0.0080	0.0080	0.0100		
Spring steels	≤ 38	≤ 354	165			0.0030	0.0050	0.0080	0.0080	0.0100		
Hardened steels	≤ 48 ≤ 66	≤ 460 -	165			0.0025	0.0040	0.0065	0.0065	0.0080		
Stainless steels, sulphured austenitic martensitic	≤ 28 ≤ 36 ≤ 46	≤ 273 ≤ 337 ≤ 435	330 230 330			0.0030 0.0020 0.0030	0.0050 0.0030 0.0050	0.0080 0.0050 0.0080	0.0080 0.0050 0.0080	0.0100 0.0065 0.0100		
Cast iron	≤ 23 ≤ 38	≤ 242 ≤ 354	460 330			0.0065 0.0065	0.0100 0.0100	0.0155 0.0155	0.0155 0.0155	0.0195 0.0195		
Spheroidal graphite iron and malleable cast iron	≤ 23 ≤ 38	≤ 242 ≤ 354	460 330			0.0065 0.0065	0.0100 0.0100	0.0155 0.0155	0.0155 0.0155	0.0195 0.0195		
Chilled cast iron	≤ 38	≤ 354										
New cast materials GGV	≤ 20 ≤ 32	≤ 220 ≤ 301	330 330			0.0040 0.0040	0.0065 0.0065	0.0100 0.0100	0.0100 0.0100	0.0125 0.0125		
New cast materials ADI	≤ 32 ≤ 43	≤ 301 ≤ 402	295			0.0065	0.0100	0.0155	0.0155	0.0195		
Special alloys	≤ 54	≤ 549	100			0.0015	0.0025	0.0040	0.0040	0.0050		
Ti and Ti-alloys	≤ 25 ≤ 43	≤ 255 ≤ 402	115			0.0015	0.0025	0.0040	0.0040	0.0050		
Aluminium and Al-alloys	-	≤ 120										
Al wrought alloys	-	≤ 200										
Al cast alloys ≤ 10 % Si > 10 % Si	- -	≤ 180 ≤ 180										
Magnesium alloys	-	≤ 120										
Copper, low-alloyed	-	≤ 150	395			0.0015	0.0020	0.0030	0.0030	0.0040		
Brass, short-chipping long-chipping	- -	≤ 180 ≤ 180	395			0.0065	0.0100	0.0155	0.0155	0.0195		
Bronze, short-chipping	- ≤ 25	≤ 180 ≤ 255										
Bronze, long-chipping	≤ 25 ≤ 32	≤ 255 ≤ 301										

Series # 6511

Material group	Hardness HRc	Hardness Bhn	SFM	Feed Rate - IPR 1/64 in. .5 mm	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
Common structural steels	- ≤ 32	≤ 150 ≤ 301	330 330			0.0065 0.0065	0.0100 0.0100	0.0155 0.0155	0.0155 0.0155	0.0195 0.0195		
Free-cutting steels	≤ 25 ≤ 32	≤ 255 ≤ 301	395 330			0.0065 0.0065	0.0100 0.0100	0.0155 0.0155	0.0155 0.0155	0.0195 0.0195		
Unalloyed heat-treatable steels	≤ 20 ≤ 25 ≤ 32	≤ 220 ≤ 255 ≤ 301	360 330 330			0.0040 0.0065 0.0050	0.0065 0.0100 0.0080	0.0100 0.0155 0.0125	0.0100 0.0155 0.0125	0.0125 0.0195 0.0155		
Alloyed heat-treatable steels	≤ 32 ≤ 43	≤ 301 ≤ 402	330 330			0.0050 0.0040	0.0080 0.0065	0.0125 0.0100	0.0125 0.0100	0.0155 0.0125		
Unalloyed case hardened steels	≤ 25	≤ 255	330			0.0065	0.0100	0.0155	0.0155	0.0195		
Alloyed case hardened steels	≤ 32 ≤ 43	≤ 301 ≤ 402	330 330			0.0050 0.0040	0.0080 0.0065	0.0125 0.0100	0.0125 0.0100	0.0155 0.0125		
Nitriding steels	≤ 32 ≤ 43	≤ 301 ≤ 402	260 195			0.0030 0.0030	0.0050 0.0050	0.0080 0.0080	0.0080 0.0080	0.0100 0.0100		
Tool steels	≤ 25 ≤ 43	≤ 255 ≤ 402	295 230			0.0040 0.0030	0.0065 0.0050	0.0100 0.0080	0.0100 0.0080	0.0125 0.0100		
High speed steels	≤ 43	≤ 402	165			0.0030	0.0050	0.0080	0.0080	0.0100		
Spring steels	≤ 38	≤ 354	165			0.0030	0.0050	0.0080	0.0080	0.0100		
Hardened steels	≤ 48 ≤ 66	≤ 460 -	165			0.0025	0.0040	0.0065	0.0065	0.0080		
Stainless steels, sulphured austenitic martensitic	≤ 28 ≤ 36 ≤ 46	≤ 273 ≤ 337 ≤ 435	330 195 330			0.0030 0.0020 0.0030	0.0050 0.0030 0.0050	0.0080 0.0050 0.0080	0.0080 0.0050 0.0080	0.0100 0.0065 0.0100		
Cast iron	≤ 23 ≤ 38	≤ 242 ≤ 354	425 295			0.0065 0.0065	0.0100 0.0100	0.0155 0.0155	0.0155 0.0155	0.0195 0.0195		
Spheroidal graphite iron and malleable cast iron	≤ 23 ≤ 38	≤ 242 ≤ 354	425 295			0.0065 0.0065	0.0100 0.0100	0.0155 0.0155	0.0155 0.0155	0.0195 0.0195		
Chilled cast iron	≤ 38	≤ 354										
New cast materials GGV	≤ 20 ≤ 32	≤ 220 ≤ 301	295 295			0.0040 0.0040	0.0065 0.0065	0.0100 0.0100	0.0100 0.0100	0.0125 0.0125		
New cast materials ADI	≤ 32 ≤ 43	≤ 301 ≤ 402	260			0.0065	0.0100	0.0155	0.0155	0.0195		
Special alloys	≤ 54	≤ 549	100			0.0015	0.0025	0.0040	0.0040	0.0050		
Ti and Ti-alloys	≤ 25 ≤ 43	≤ 255 ≤ 402	115			0.0015	0.0025	0.0040	0.0040	0.0050		
Aluminium and Al-alloys	-	≤ 120										
Al wrought alloys	-	≤ 200										
Al cast alloys ≤ 10 % Si > 10 % Si	- -	≤ 180 ≤ 180										
Magnesium alloys	-	≤ 120										
Copper, low-alloyed	-	≤ 150	395			0.0015	0.0020	0.0030	0.0030	0.0040		
Brass, short-chipping long-chipping	- -	≤ 180 ≤ 180	360			0.0065	0.0100	0.0155	0.0155	0.0195		
Bronze, short-chipping	- ≤ 25	≤ 180 ≤ 255										
Bronze, long-chipping	≤ 25 ≤ 32	≤ 255 ≤ 301										

Note: Pilot holes (depth >1xD) are recommended when using RT100T drills. Use a series 5514 or similar drill to drill a minimum of 1xD deep. Then enter the pilot hole with the RT100T drill at approx 300 RPM and 20 IPM, start high coolant pressure and increase RPM. Drill to hole depth without pecking.

Series # 6512

Material group	Hardness HRc	Hardness Bhn	SFM	Feed Rate - IPR 1/64 in. .5 mm	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
Common structural steels	-	≤ 150	360			0.0065	0.0100	0.0155	0.0155	0.0195		
	≤ 32	≤ 301	360			0.0065	0.0100	0.0155	0.0155	0.0195		
Free-cutting steels	≤ 25	≤ 255	395			0.0065	0.0100	0.0155	0.0155	0.0195		
	≤ 32	≤ 301	395			0.0065	0.0100	0.0155	0.0155	0.0195		
Unalloyed heat-treatable steels	≤ 20	≤ 220	360			0.0040	0.0065	0.0100	0.0100	0.0125		
	≤ 25	≤ 255	360			0.0065	0.0100	0.0155	0.0155	0.0195		
	≤ 32	≤ 301	330			0.0050	0.0080	0.0125	0.0125	0.0155		
Alloyed heat-treatable steels	≤ 32	≤ 301	360			0.0050	0.0080	0.0125	0.0125	0.0155		
	≤ 43	≤ 402	360			0.0040	0.0065	0.0100	0.0100	0.0125		
Unalloyed case hardened steels	≤ 25	≤ 255	360			0.0065	0.0100	0.0155	0.0155	0.0195		
Alloyed case hardened steels	≤ 32	≤ 301	360			0.0050	0.0080	0.0125	0.0125	0.0155		
	≤ 43	≤ 402	360			0.0040	0.0065	0.0100	0.0100	0.0125		
Nitriding steels	≤ 32	≤ 301	330			0.0030	0.0050	0.0080	0.0080	0.0100		
	≤ 43	≤ 402	260			0.0030	0.0050	0.0080	0.0080	0.0100		
Tool steels	≤ 25	≤ 255	330			0.0040	0.0065	0.0100	0.0100	0.0125		
	≤ 43	≤ 402	260			0.0025	0.0040	0.0065	0.0065	0.0080		
High speed steels	≤ 43	≤ 402	165			0.0025	0.0040	0.0065	0.0065	0.0080		
Spring steels	≤ 38	≤ 354	165			0.0025	0.0040	0.0065	0.0065	0.0080		
Hardened steels	≤ 48	≤ 460	165			0.0025	0.0040	0.0065	0.0065	0.0080		
	≤ 66	-										
Stainless steels, sulphured	≤ 28	≤ 273	330			0.0030	0.0050	0.0080	0.0080	0.0100		
austenitic	≤ 36	≤ 337	195			0.0020	0.0030	0.0050	0.0050	0.0065		
martensitic	≤ 46	≤ 435	330			0.0030	0.0050	0.0080	0.0080	0.0100		
Cast iron	≤ 23	≤ 242	460			0.0065	0.0100	0.0155	0.0155	0.0195		
	≤ 38	≤ 354	330			0.0065	0.0100	0.0155	0.0155	0.0195		
Spheroidal graphite iron and malleable cast iron	≤ 23	≤ 242	460			0.0065	0.0100	0.0155	0.0155	0.0195		
	≤ 38	≤ 354	330			0.0065	0.0100	0.0155	0.0155	0.0195		
Chilled cast iron	≤ 38	≤ 354										
New cast materials GGV	≤ 20	≤ 220	330			0.0040	0.0065	0.0100	0.0100	0.0125		
	≤ 32	≤ 301	330			0.0040	0.0065	0.0100	0.0100	0.0125		
New cast materials ADI	≤ 32	≤ 301	295			0.0065	0.0100	0.0155	0.0155	0.0195		
	≤ 43	≤ 402										
Special alloys	≤ 54	≤ 549	100			0.0015	0.0025	0.0040	0.0040	0.0050		
Ti and Ti-alloys	≤ 25	≤ 255	115			0.0015	0.0025	0.0040	0.0040	0.0050		
	≤ 43	≤ 402										
Aluminium and Al-alloys	-	≤ 120										
Al wrought alloys	-	≤ 200										
Al cast alloys ≤ 10 % Si	-	≤ 180										
> 10 % Si	-	≤ 180										
Magnesium alloys	-	≤ 120										
Copper, low-alloyed	-	≤ 150	395			0.0015	0.0020	0.0030	0.0030	0.0040		
Brass, short-chipping	-	≤ 180	395			0.0065	0.0100	0.0155	0.0155	0.0195		
long-chipping	-	≤ 180										
Bronze, short-chipping	-	≤ 180										
	≤ 25	≤ 255										
Bronze, long-chipping	≤ 25	≤ 255										
	≤ 32	≤ 301										

Series # 6513 & 6514

Material group	Hardness HRc	Hardness Bhn	SFM	Feed Rate - IPR 1/64 in. .5 mm	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
Common structural steels	-	≤ 150	260			0.0050	0.0080	0.0125	0.0125	0.0155		
	≤ 32	≤ 301	260			0.0050	0.0080	0.0125	0.0125	0.0155		
Free-cutting steels	≤ 25	≤ 255	330			0.0065	0.0100	0.0155	0.0155	0.0195		
	≤ 32	≤ 301	330			0.0065	0.0100	0.0155	0.0155	0.0195		
Unalloyed heat-treatable steels	≤ 20	≤ 220	360			0.0040	0.0065	0.0100	0.0100	0.0125		
	≤ 25	≤ 255	260			0.0050	0.0080	0.0125	0.0125	0.0155		
	≤ 32	≤ 301	260			0.0050	0.0080	0.0125	0.0125	0.0155		
Alloyed heat-treatable steels	≤ 32	≤ 301	260			0.0050	0.0080	0.0125	0.0125	0.0155		
	≤ 43	≤ 402	260			0.0040	0.0065	0.0100	0.0100	0.0125		
Unalloyed case hardened steels	≤ 25	≤ 255	260			0.0050	0.0080	0.0125	0.0125	0.0155		
Alloyed case hardened steels	≤ 32	≤ 301	260			0.0040	0.0065	0.0100	0.0100	0.0125		
	≤ 43	≤ 402	260			0.0040	0.0065	0.0100	0.0100	0.0125		
Nitriding steels	≤ 32	≤ 301	260			0.0030	0.0050	0.0080	0.0080	0.0100		
	≤ 43	≤ 402	195			0.0030	0.0050	0.0080	0.0080	0.0100		
Tool steels	≤ 25	≤ 255	260			0.0040	0.0065	0.0100	0.0100	0.0125		
	≤ 43	≤ 402	230			0.0025	0.0040	0.0065	0.0065	0.0080		
High speed steels	≤ 43	≤ 402	165			0.0025	0.0040	0.0065	0.0065	0.0080		
Spring steels	≤ 38	≤ 354	165			0.0025	0.0040	0.0065	0.0065	0.0080		
Hardened steels	≤ 48	≤ 460	165			0.0025	0.0040	0.0065	0.0065	0.0080		
	≤ 66	-										
Stainless steels, sulphured	≤ 28	≤ 273	260			0.0030	0.0050	0.0080	0.0080	0.0100		
austenitic	≤ 36	≤ 337	195			0.0020	0.0030	0.0050	0.0050	0.0065		
martensitic	≤ 46	≤ 435	260			0.0030	0.0050	0.0080	0.0080	0.0100		
Cast iron	≤ 23	≤ 242	395			0.0065	0.0100	0.0155	0.0155	0.0195		
	≤ 38	≤ 354	260			0.0065	0.0100	0.0155	0.0155	0.0195		
Spheroidal graphite iron and malleable cast iron	≤ 23	≤ 242	395			0.0065	0.0100	0.0155	0.0155	0.0195		
	≤ 38	≤ 354	260			0.0065	0.0100	0.0155	0.0155	0.0195		
Chilled cast iron	≤ 38	≤ 354										
New cast materials GGV	≤ 20	≤ 220	260			0.0040	0.0065	0.0100	0.0100	0.0125		
	≤ 32	≤ 301	260			0.0040	0.0065	0.0100	0.0100	0.0125		
New cast materials ADI	≤ 32	≤ 301	230			0.0065	0.0100	0.0155	0.0155	0.0195		
	≤ 43	≤ 402										
Special alloys	≤ 54	≤ 549	100			0.0015	0.0025	0.0040	0.0040	0.0050		
Ti and Ti-alloys	≤ 25	≤ 255	115			0.0015	0.0025	0.0040	0.0040	0.0050		
	≤ 43	≤ 402										
Aluminium and Al-alloys	-	≤ 120										
Al wrought alloys	-	≤ 200										
Al cast alloys ≤ 10 % Si	-	≤ 180										
> 10 % Si	-	≤ 180										
Magnesium alloys	-	≤ 120										
Copper, low-alloyed	-	≤ 150	395			0.0015	0.0020	0.0030	0.0030	0.0040		
Brass, short-chipping	-	≤ 180	330			0.0065	0.0100	0.0155	0.0155	0.0195		
long-chipping	-	≤ 180										
Bronze, short-chipping	-	≤ 180										
	≤ 25	≤ 255										
Bronze, long-chipping	≤ 25	≤ 255										
	≤ 32	≤ 301										

EB80 ≤ 35xD

Note: Pilot holes (depth >1xD) are recommended when using RT100T drills. Use a series 5514 or similar drill to drill a minimum of 1xD deep. Then enter the pilot hole with the RT100T drill at approx 300 RPM and 20 IPM, start high coolant pressure and increase RPM. Drill to hole depth without pecking.

Material group	Hardness HRc	Hardness Bhn	SFM	Feed Rate - IPR 1/64 in. .5 mm	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
Common structural steels	-	≤ 150	330		0.0003	0.0005	0.0009	0.0014	0.0018			
	≤ 32	≤ 301	280		0.0003	0.0005	0.0009	0.0014	0.0018			
Free-cutting steels	≤ 25	≤ 255	295		0.0003	0.0005	0.0009	0.0014	0.0018			
	≤ 32	≤ 301	260		0.0003	0.0005	0.0009	0.0014	0.0018			
Unalloyed heat-treatable steels	≤ 20	≤ 220	295		0.0002	0.0003	0.0005	0.0010	0.0012			
	≤ 25	≤ 255	260		0.0002	0.0003	0.0005	0.0010	0.0012			
	≤ 32	≤ 301	245		0.0002	0.0003	0.0005	0.0010	0.0012			
Alloyed heat-treatable steels	≤ 32	≤ 301	245		0.0002	0.0003	0.0005	0.0010	0.0012			
	≤ 43	≤ 402	215		0.0002	0.0003	0.0005	0.0010	0.0012			
Unalloyed case hardened steels	≤ 25	≤ 255	260		0.0003	0.0005	0.0009	0.0014	0.0018			
Alloyed case hardened steels	≤ 32	≤ 301	245		0.0002	0.0003	0.0005	0.0010	0.0012			
	≤ 43	≤ 402	215		0.0002	0.0003	0.0005	0.0010	0.0012			
Nitriding steels	≤ 32	≤ 301	245		0.0002	0.0003	0.0005	0.0010	0.0012			
	≤ 43	≤ 402	215		0.0002	0.0003	0.0005	0.0010	0.0012			
Tool steels	≤ 25	≤ 255	245		0.0002	0.0002	0.0004	0.0006	0.0008			
	≤ 43	≤ 402	215		0.0002	0.0002	0.0004	0.0006	0.0008			
High speed steels	≤ 43	≤ 402	180		0.0001	0.0002	0.0003	0.0004	0.0006			
Spring steels	≤ 38	≤ 354	215		0.0002	0.0002	0.0004	0.0006	0.0008			
Hardened steels	≤ 48	≤ 460	100		0.0002	0.0002	0.0004	0.0006	0.0008			
	≤ 66	-	80		0.0001	0.0002	0.0003	0.0004	0.0006			
Stainless steels, sulphured	≤ 28	≤ 273	180		0.0002	0.0003	0.0005	0.0010	0.0012			
austenitic	≤ 36	≤ 337	150		0.0002	0.0003	0.0005	0.0010	0.0012			
martensitic	≤ 46	≤ 435	115		0.0002	0.0003	0.0005	0.0010	0.0012			
Cast iron	≤ 23	≤ 242	280		0.0005	0.0007	0.0014	0.0020	0.0024			
	≤ 38	≤ 354	260		0.0005	0.0007	0.0014	0.0020	0.0024			
Spheroidal graphite iron and	≤ 23	≤ 242	260		0.0003	0.0005	0.0009	0.0014	0.0018			
malleable cast iron	≤ 38	≤ 354	230		0.0003	0.0005	0.0009	0.0014	0.0018			
Chilled cast iron	≤ 38	≤ 354	180		0.0002	0.0003	0.0005	0.0010	0.0012			
Special alloys	≤ 54	≤ 549	65		0.0001	0.0002	0.0003	0.0004	0.0006			
Ti and Ti-alloys	≤ 25	≤ 255	115		0.0001	0.0002	0.0003	0.0004	0.0006			
	≤ 43	≤ 402	100		0.0001	0.0002	0.0003	0.0004	0.0006			
Aluminium and Al-alloys	-	≤ 120	490		0.0008	0.0012	0.0240	0.0028	0.0031			
Al wrought alloys	-	≤ 200	395		0.0005	0.0007	0.0014	0.0020	0.0024			
Al cast alloys ≤ 10 % Si	-	≤ 180	490		0.0008	0.0012	0.0240	0.0028	0.0031			
> 10 % Si	-	≤ 180	425		0.0008	0.0012	0.0240	0.0028	0.0031			
Magnesium alloys	-	≤ 120	360		0.0008	0.0012	0.0240	0.0028	0.0031			
Copper, low-alloyed	-	≤ 150	245		0.0003	0.0005	0.0009	0.0014	0.0018			
Brass, short-chipping	-	≤ 180	395		0.0013	0.0021	0.0033	0.0043	0.0049			
long-chipping	-	≤ 180	295		0.0013	0.0021	0.0033	0.0043	0.0049			
Bronze, short-chipping	-	≤ 180	310		0.0008	0.0012	0.0240	0.0028	0.0031			
	≤ 25	≤ 255	245		0.0008	0.0012	0.0240	0.0028	0.0031			
Bronze, long-chipping	≤ 25	≤ 255	230		0.0008	0.0012	0.0240	0.0028	0.0031			
	≤ 32	≤ 301	195		0.0008	0.0012	0.0240	0.0028	0.0031			
Duroplastics	-	-	245		0.0003	0.0005	0.0009	0.0014	0.0018			
Thermoplastics	-	-	230		0.0003	0.0005	0.0009	0.0014	0.0018			
Kevlar	-	-	195		0.0002	0.0003	0.0005	0.0010	0.0012			
Glass, carbon concentrated plastics	-	-	165		0.0002	0.0003	0.0005	0.0010	0.0012			

EB80 Greater than 35xD

Material group	Hardness HRc	Hardness Bhn	SFM	Feed Rate - IPR 1/64 in. .5 mm	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
Common structural steels	-	≤ 150	310		0.0002	0.0003	0.0005	0.0010	0.0012			
	≤ 32	≤ 301	260		0.0002	0.0003	0.0005	0.0010	0.0012			
Free-cutting steels	≤ 25	≤ 255	280		0.0002	0.0003	0.0005	0.0010	0.0012			
	≤ 32	≤ 301	245		0.0002	0.0003	0.0005	0.0010	0.0012			
Unalloyed heat-treatable steels	≤ 20	≤ 220	280		0.0002	0.0002	0.0004	0.0006	0.0008			
	≤ 25	≤ 255	245		0.0002	0.0002	0.0004	0.0006	0.0008			
	≤ 32	≤ 301	230		0.0002	0.0002	0.0004	0.0006	0.0008			
Alloyed heat-treatable steels	≤ 32	≤ 301	230		0.0002	0.0002	0.0004	0.0006	0.0008			
	≤ 43	≤ 402	195		0.0002	0.0002	0.0004	0.0006	0.0008			
Unalloyed case hardened steels	≤ 25	≤ 255	245		0.0002	0.0003	0.0005	0.0010	0.0012			
Alloyed case hardened steels	≤ 32	≤ 301	230		0.0002	0.0002	0.0004	0.0006	0.0008			
	≤ 43	≤ 402	195		0.0002	0.0002	0.0004	0.0006	0.0008			
Nitriding steels	≤ 32	≤ 301	230		0.0002	0.0002	0.0004	0.0006	0.0008			
	≤ 43	≤ 402	195		0.0002	0.0002	0.0004	0.0006	0.0008			
Tool steels	≤ 25	≤ 255	230		0.0001	0.0002	0.0003	0.0004	0.0006			
	≤ 43	≤ 402	195		0.0001	0.0002	0.0003	0.0004	0.0006			
High speed steels	≤ 43	≤ 402	165		0.0001	0.0002	0.0003	0.0004	0.0006			
Spring steels	≤ 38	≤ 354	195		0.0002	0.0002	0.0004	0.0006	0.0008			
Hardened steels	≤ 48	≤ 460	80		0.0001	0.0002	0.0003	0.0004	0.0006			
	≤ 66	-	65		0.0001	0.0002	0.0003	0.0004	0.0006			
Stainless steels, sulphured	≤ 28	≤ 273	165		0.0002	0.0002	0.0004	0.0006	0.0008			
austenitic	≤ 36	≤ 337	130		0.0002	0.0002	0.0004	0.0006	0.0008			
martensitic	≤ 46	≤ 435	115		0.0002	0.0002	0.0004	0.0006	0.0008			
Cast iron	≤ 23	≤ 242	260		0.0003	0.0005	0.0009	0.0014	0.0018			
	≤ 38	≤ 354	245		0.0003	0.0005	0.0009	0.0014	0.0018			
Spheroidal graphite iron and	≤ 23	≤ 242	245		0.0002	0.0003	0.0005	0.0010	0.0012			
malleable cast iron	≤ 38	≤ 354	215		0.0002	0.0003	0.0005	0.0010	0.0012			
Chilled cast iron	≤ 38	≤ 354	165		0.0002	0.0002	0.0004	0.0006	0.0008			
Special alloys	≤ 54	≤ 549	65		0.0001	0.0002	0.0003	0.0004	0.0006			
Ti and Ti-alloys	≤ 25	≤ 255	100		0.0001	0.0002	0.0003	0.0004	0.0006			
	≤ 43	≤ 402	80		0.0001	0.0002	0.0003	0.0004	0.0006			
Aluminium and Al-alloys	-	≤ 120	460		0.0005	0.0007	0.0014	0.0020	0.0024			
Al wrought alloys	-	≤ 200	375		0.0003	0.0005	0.0009	0.0014	0.0018			
Al cast alloys ≤ 10 % Si	-	≤ 180	460		0.0005	0.0007	0.0014	0.0020	0.0024			
> 10 % Si	-	≤ 180	395		0.0005	0.0007	0.0014	0.0020	0.0024			
Magnesium alloys	-	≤ 120	330		0.0005	0.0007	0.0014	0.0020	0.0024			
Copper, low-alloyed	-	≤ 150	230		0.0002	0.0003	0.0005	0.0010	0.0012			
Brass, short-chipping	-	≤ 180	375		0.0008	0.0012	0.0240	0.0028	0.0031			
long-chipping	-	≤ 180	280		0.0008	0.0012	0.0240	0.0028	0.0031			
Bronze, short-chipping	-	≤ 180	295		0.0005	0.0007	0.0014	0.0020	0.0024			
	≤ 25	≤ 255	230		0.0005	0.0007	0.0014	0.0020	0.0024			
Bronze, long-chipping	≤ 25	≤ 255	215		0.0005	0.0007	0.0014	0.0020	0.0024			
	≤ 32	≤ 301	180		0.0005	0.0007	0.0014	0.0020	0.0024			
Duroplastics	-	-	230		0.0002	0.0003	0.0005	0.0010	0.0012			
Thermoplastics	-	-	215		0.0002	0.0003	0.0005	0.0010	0.0012			
Kevlar	-	-	180		0.0002	0.0002	0.0004	0.0006	0.0008			
Glass, carbon concentrated plastics	-	-	150		0.0002	0.0002	0.0004	0.0006	0.0008			

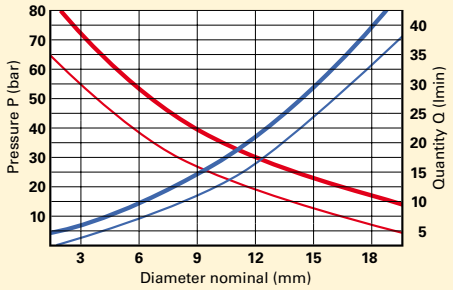
EB 100 - All lengths

Note: Pilot holes (depth >1xD) are recommended when using RT100T drills. Use a series 5514 or similar drill to drill a minimum of 1xD deep. Then enter the pilot hole with the RT100T drill at approx 300 RPM and 20 IPM, start high coolant pressure and increase RPM. Drill to hole depth without pecking.

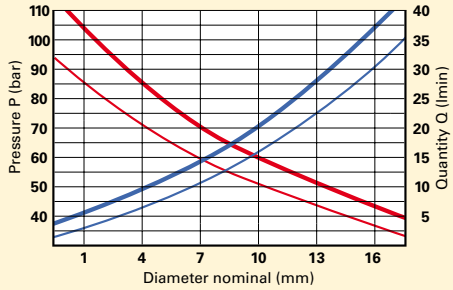
Material group	Hardness HRc	Hardness Bhn	SFM	Feed Rate - IPR 1/64 in. .5 mm	1/16 in. 1.590 mm	1/8 in. 3.170 mm	1/4 in. 6.350 mm	3/8 in. 9.520 mm	1/2 in. 12.700 mm	5/8 in. 15.870 mm	3/4 in. 19.050 mm	1 in. 25.400 mm
Common structural steels	-	≤ 150	330		0.0005	0.0007	0.0014	0.0020	0.0024			
	≤ 32	≤ 301	280		0.0005	0.0007	0.0014	0.0020	0.0024			
Free-cutting steels	≤ 25	≤ 255	295		0.0005	0.0007	0.0014	0.0020	0.0024			
	≤ 32	≤ 301	260		0.0005	0.0007	0.0014	0.0020	0.0024			
Unalloyed heat-treatable steels	≤ 20	≤ 220	260		0.0003	0.0005	0.0009	0.0014	0.0018			
	≤ 25	≤ 255	245		0.0003	0.0005	0.0009	0.0014	0.0018			
	≤ 32	≤ 301	245		0.0003	0.0005	0.0009	0.0014	0.0018			
Alloyed heat-treatable steels	≤ 32	≤ 301	245		0.0003	0.0005	0.0009	0.0014	0.0018			
	≤ 43	≤ 402	215		0.0003	0.0005	0.0009	0.0014	0.0018			
Unalloyed case hardened steels	≤ 25	≤ 255	260		0.0005	0.0007	0.0014	0.0020	0.0024			
Alloyed case hardened steels	≤ 32	≤ 301	245		0.0003	0.0005	0.0009	0.0014	0.0018			
	≤ 43	≤ 402	215		0.0003	0.0005	0.0009	0.0014	0.0018			
Nitriding steels	≤ 32	≤ 301	245		0.0003	0.0005	0.0009	0.0014	0.0018			
	≤ 43	≤ 402	215		0.0003	0.0005	0.0009	0.0014	0.0018			
Tool steels	≤ 25	≤ 255	245		0.0002	0.0003	0.0005	0.0010	0.0012			
	≤ 43	≤ 402	215		0.0002	0.0003	0.0005	0.0010	0.0012			
High speed steels	≤ 43	≤ 402	180		0.0002	0.0002	0.0004	0.0006	0.0008			
Spring steels	≤ 38	≤ 354	215		0.0002	0.0003	0.0005	0.0010	0.0012			
Hardened steels	≤ 48	≤ 460	100		0.0002	0.0003	0.0005	0.0010	0.0012			
	≤ 66	-	80		0.0001	0.0002	0.0003	0.0006	0.0008			
Stainless steels, sulphured	≤ 28	≤ 273	130		0.0003	0.0005	0.0009	0.0014	0.0018			
austenitic	≤ 36	≤ 337	115		0.0003	0.0005	0.0009	0.0014	0.0018			
martensitic	≤ 46	≤ 435	115		0.0003	0.0005	0.0009	0.0014	0.0018			
Cast iron	≤ 23	≤ 242	280		0.0008	0.0012	0.0240	0.0028	0.0031			
	≤ 38	≤ 354	260		0.0008	0.0012	0.0240	0.0028	0.0031			
Spheroidal graphite iron and	≤ 23	≤ 242	260		0.0005	0.0007	0.0014	0.0020	0.0024			
malleable cast iron	≤ 38	≤ 354	230		0.0005	0.0007	0.0014	0.0020	0.0024			
Chilled cast iron	≤ 38	≤ 354	180		0.0003	0.0005	0.0009	0.0014	0.0018			
Special alloys	≤ 54	≤ 549	65		0.0002	0.0002	0.0004	0.0006	0.0008			
Ti and Ti-alloys	≤ 25	≤ 255	115		0.0002	0.0002	0.0004	0.0006	0.0008			
	≤ 43	≤ 402	100		0.0002	0.0002	0.0004	0.0006	0.0008			
Aluminium and Al-alloys	-	≤ 120	490		0.0013	0.0021	0.0033	0.0043	0.0049			
Al wrought alloys	-	≤ 200	395		0.0018	0.0030	0.0071	0.0106	0.0146			
Al cast alloys ≤ 10 % Si	-	≤ 180	395		0.0030	0.0049	0.0142	0.0213	0.0264			
> 10 % Si	-	≤ 180	425		0.0018	0.0028	0.0047	0.0061	0.0067			
Magnesium alloys	-	≤ 120	360		0.0013	0.0021	0.0033	0.0043	0.0049			
Copper, low-alloyed	-	≤ 150	245		0.0005	0.0007	0.0014	0.0020	0.0024			
Brass, short-chipping	-	≤ 180	395		0.0018	0.0028	0.0047	0.0061	0.0067			
long-chipping	-	≤ 180	295		0.0018	0.0028	0.0047	0.0061	0.0067			
Bronze, short-chipping	-	≤ 180	310		0.0013	0.0021	0.0033	0.0043	0.0049			
	≤ 25	≤ 255	245		0.0013	0.0021	0.0033	0.0043	0.0049			
Bronze, long-chipping	≤ 25	≤ 255	230		0.0013	0.0021	0.0033	0.0043	0.0049			
	≤ 32	≤ 301	195		0.0013	0.0021	0.0033	0.0043	0.0049			
Duroplastics	-	-	245		0.0005	0.0007	0.0014	0.0020	0.0024			
Thermoplastics	-	-	230		0.0005	0.0007	0.0014	0.0020	0.0024			
Kevlar	-	-	195		0.0003	0.0005	0.0009	0.0014	0.0018			
Glass, carbon concentrated plastics	-	-	165		0.0003	0.0005	0.0009	0.0014	0.0018			

Recommended Coolant Pressure

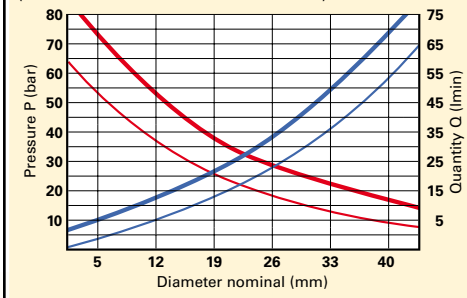
Coolant values RT 100T
(Recommended values for soluble oil)



Coolant values EB 100
(Recommended values for soluble oil)



Coolant values EB 80
(Recommended values for soluble oil)



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