



# **GUHRING**

The Tool Company

## **Cutting Tools for Nickel & Titanium Alloys**



*Featuring the **RT 100 HF** **NEW**  
High Penetration Rate Drill for Nickel Alloys*



# Drilling RT 100 HF Carbide Drills

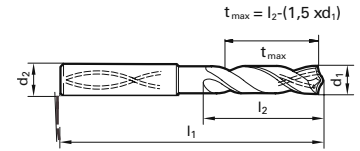
# 3xD



**Coolant Fed - Series 8520**  
**Solid - Series 8524**



- New "HF" style drill geometry improves tool life
- Self centering - no pre-spot drilling operation necessary
- Specialized flute form - no peck cycle required
- Double margin design improves surface finish
- New nano-Si® coating for longer tool life
- Ultra-fine grain carbide
- m7 cut diameter tolerance



Diameter (d1)			d2 mm	l1 mm	l2 mm	8520 EDP #	8524 EDP #	
Dec. inch	Fract. inch	Wire / letter						
0.1181			3.00	6.0	62.0	20.0	9085200030000	9085240030000
0.1220			3.10	6.0	62.0	20.0	9085200031000	9085240031000
0.1248	1/8		3.17	6.0	62.0	20.0	9085200031700	9085240031700
0.1260			3.20	6.0	62.0	20.0	9085200032000	9085240032000
0.1280			3.25	6.0	62.0	20.0	9085200032500	9085240032500
0.1299			3.30	6.0	62.0	20.0	9085200033000	9085240033000
0.1339			3.40	6.0	62.0	20.0	9085200034000	9085240034000
0.1378			3.50	6.0	62.0	20.0	9085200035000	9085240035000
0.1406	9/64	28	3.57	6.0	62.0	20.0	9085200035700	9085240035700
0.1417			3.60	6.0	62.0	20.0	9085200036000	9085240036000
0.1457			3.70	6.0	62.0	20.0	9085200037000	9085240037000
0.1496		25	3.80	6.0	66.0	24.0	9085200038000	9085240038000
0.1535			3.90	6.0	66.0	24.0	9085200039000	9085240039000
0.1563	5/32		3.97	6.0	66.0	24.0	9085200039700	9085240039700
0.1575			4.00	6.0	66.0	24.0	9085200040000	9085240040000
0.1614			4.10	6.0	66.0	24.0	9085200041000	9085240041000
0.1654			4.20	6.0	66.0	24.0	9085200042000	9085240042000
0.1693		18	4.30	6.0	66.0	24.0	9085200043000	9085240043000
0.1720	11/64		4.37	6.0	66.0	24.0	9085200043700	9085240043700
0.1732			4.40	6.0	66.0	24.0	9085200044000	9085240044000
0.1772		16	4.50	6.0	66.0	24.0	9085200045000	9085240045000
0.1811			4.60	6.0	66.0	24.0	9085200046000	9085240046000
0.1831			4.65	6.0	66.0	24.0	9085200046500	9085240046500
0.1850		13	4.70	6.0	66.0	24.0	9085200047000	9085240047000
0.1874	3/16		4.76	6.0	66.0	28.0	9085200047600	9085240047600
0.1890		12	4.80	6.0	66.0	28.0	9085200048000	9085240048000
0.1929			4.90	6.0	66.0	28.0	9085200049000	9085240049000
0.1969			5.00	6.0	66.0	28.0	9085200050000	9085240050000
0.2008			5.10	6.0	66.0	28.0	9085200051000	9085240051000
0.2031	13/64		5.16	6.0	66.0	28.0	9085200051600	9085240051600
0.2047			5.20	6.0	66.0	28.0	9085200052000	9085240052000
0.2087			5.30	6.0	66.0	28.0	9085200053000	9085240053000
0.2126			5.40	6.0	66.0	28.0	9085200054000	9085240054000
0.2165			5.50	6.0	66.0	28.0	9085200055000	9085240055000
0.2185			5.55	6.0	66.0	28.0	9085200055500	9085240055500
0.2189	7/32		5.56	6.0	66.0	28.0	9085200055600	9085240055600
0.2205			5.60	6.0	66.0	28.0	9085200056000	9085240056000
0.2244			5.70	6.0	66.0	28.0	9085200057000	9085240057000
0.2283			5.80	6.0	66.0	28.0	9085200058000	9085240058000
0.2323			5.90	6.0	66.0	28.0	9085200059000	9085240059000
0.2343	15/64		5.95	6.0	66.0	28.0	9085200059500	9085240059500
0.2362			6.00	6.0	66.0	28.0	9085200060000	9085240060000
0.2402			6.10	8.0	79.0	34.0	9085200061000	9085240061000
0.2441			6.20	8.0	79.0	34.0	9085200062000	9085240062000
0.2480			6.30	8.0	79.0	34.0	9085200063000	9085240063000
0.2500	1/4	E	6.35	8.0	79.0	34.0	9085200063500	9085240063500
0.2520			6.40	8.0	79.0	34.0	9085200064000	9085240064000
0.2559			6.50	8.0	79.0	34.0	9085200065000	9085240065000
0.2598			6.60	8.0	79.0	34.0	9085200066000	9085240066000
0.2638			6.70	8.0	79.0	34.0	9085200067000	9085240067000
0.2657	17/64	H	6.75	8.0	79.0	34.0	9085200067500	9085240067500
0.2677			6.80	8.0	79.0	34.0	9085200068000	9085240068000
0.2717		I	6.90	8.0	79.0	34.0	9085200069000	9085240069000
0.2756			7.00	8.0	79.0	34.0	9085200070000	9085240070000
0.2795			7.10	8.0	79.0	41.0	9085200071000	9085240071000
0.2811	9/32	K	7.14	8.0	79.0	41.0	9085200071400	9085240071400
0.2835			7.20	8.0	79.0	41.0	9085200072000	9085240072000

Diameter (d1)			d2 mm	l1 mm	l2 mm	8520 EDP #	8524 EDP #	
Dec. inch	Fract. inch	Wire / letter						
0.2874			7.30	8.0	79.0	41.0	9085200073000	9085240073000
0.2913			7.40	8.0	79.0	41.0	9085200074000	9085240074000
0.2953			7.50	8.0	79.0	41.0	9085200075000	9085240075000
0.2969	19/64		7.54	8.0	79.0	41.0	9085200075400	9085240075400
0.2992			7.60	8.0	79.0	41.0	9085200076000	9085240076000
0.3031			7.70	8.0	79.0	41.0	9085200077000	9085240077000
0.3071			7.80	8.0	79.0	41.0	9085200078000	9085240078000
0.3110			7.90	8.0	79.0	41.0	9085200079000	9085240079000
0.3126	5/16		7.94	8.0	79.0	41.0	9085200079400	9085240079400
0.3150			8.00	8.0	79.0	41.0	9085200080000	9085240080000
0.3189			8.10	10.0	89.0	47.0	9085200081000	9085240081000
0.3228		P	8.20	10.0	89.0	47.0	9085200082000	9085240082000
0.3268			8.30	10.0	89.0	47.0	9085200083000	9085240083000
0.3280	21/64		8.33	10.0	89.0	47.0	9085200083300	9085240083300
0.3307			8.40	10.0	89.0	47.0	9085200084000	9085240084000
0.3346			8.50	10.0	89.0	47.0	9085200085000	9085240085000
0.3386			8.60	10.0	89.0	47.0	9085200086000	9085240086000
0.3425			8.70	10.0	89.0	47.0	9085200087000	9085240087000
0.3437	11/32		8.73	10.0	89.0	47.0	9085200087300	9085240087300
0.3465			8.80	10.0	89.0	47.0	9085200088000	9085240088000
0.3504			8.90	10.0	89.0	47.0	9085200089000	9085240089000
0.3543			9.00	10.0	89.0	47.0	9085200090000	9085240090000
0.3583			9.10	10.0	89.0	47.0	9085200091000	9085240091000
0.3594	23/64		9.13	10.0	89.0	47.0	9085200091300	9085240091300
0.3622			9.20	10.0	89.0	47.0	9085200092000	9085240092000
0.3642			9.25	10.0	89.0	47.0	9085200092500	9085240092500
0.3661			9.30	10.0	89.0	47.0	9085200093000	9085240093000
0.3701			9.40	10.0	89.0	47.0	9085200094000	9085240094000
0.3740			9.50	10.0	89.0	47.0	9085200095000	9085240095000
0.3748	3/8		9.52	10.0	89.0	47.0	9085200095200	9085240095200
0.3780			9.60	10.0	89.0	47.0	9085200096000	9085240096000
0.3819			9.70	10.0	89.0	47.0	9085200097000	9085240097000
0.3858		W	9.80	10.0	89.0	47.0	9085200098000	9085240098000
0.3898			9.90	10.0	89.0	47.0	9085200099000	9085240099000
0.3906	25/64		9.92	10.0	89.0	47.0	9085200099200	9085240099200
0.3937			10.00	10.0	89.0	47.0	9085200100000	9085240100000
0.3976			10.10	12.0	102.0	55.0	9085200101000	9085240101000
0.4016			10.20	12.0	102.0	55.0	9085200102000	9085240102000
0.4055			10.30	12.0	102.0	55.0	9085200103000	9085240103000
0.4063	13/32		10.32	12.0	102.0	55.0	9085200103200	9085240103200
0.4094			10.40	12.0	102.0	55.0	9085200104000	9085240104000
0.4134			10.50	12.0	102.0	55.0	9085200105000	9085240105000
0.4173			10.60	12.0	102.0	55.0	9085200106000	9085240106000
0.4213			10.70	12.0	102.0	55.0	9085200107000	9085240107000
0.4220	27/64		10.72	12.0	102.0	55.0	9085200107200	9085240107200
0.4252			10.80	12.0	102.0	55.0	9085200108000	9085240108000
0.4291			10.90	12.0	102.0	55.0	9085200109000	9085240109000
0.4331			11.00	12.0	102.0	55.0	9085200110000	9085240110000
0.4370			11.10	12.0	102.0	55.0	9085200111000	9085240111000
0.4374	7/16		11.11	12.0	102.0	55.0	9085200111100	9085240111100
0.4409			11.20	12.0	102.0	55.0	9085200112000	9085240112000
0.4449			11.30	12.0	102.0	55.0	9085200113000	9085240113000
0.4488			11.40	12.0	102.0	55.0	9085200114000	9085240114000
0.4528			11.50	12.0	102.0	55.0	9085200115000	9085240115000
0.4531	29/64		11.51	12.0	102.0	55.0	9085200115100	9085240115100
0.4567			11.60	12.0	102.0	55.0	9085200116000	9085240116000
0.4606			11.70	12.0	102.0	55.0	9085200117000	9085240117000

**Point**

Robust cutting edge with a new point grind geometry

Cutting Edge Prep - gives consistent results

**nano - Si® Coating**

Extreme hardness and heat resistance

**Corner Protection**

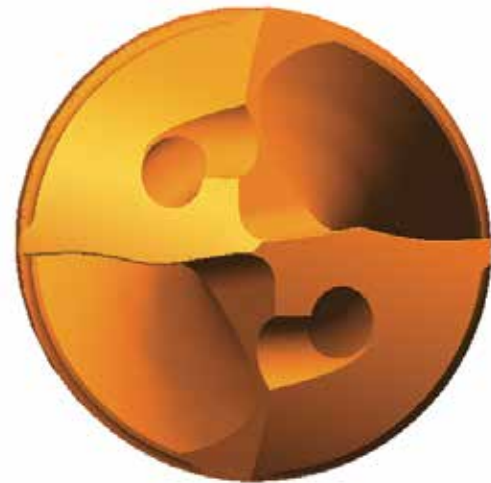
Negative chamfer provides excellent surface quality and longer tool life

**Double Margin**

For increased stability in the cut and improved surface finish



Dec. inch	Diameter (d1)		d2 mm	l1 mm	l2 mm	8520 EDP #	8524 EDP #	
	Fract. inch	Wire / letter						mm
0.4646			11.80	12.0	102.0	55.0	9085200118000	9085240118000
0.4685			11.90	12.0	102.0	55.0	9085200119000	9085240119000
0.4689	15/32		11.91	12.0	102.0	55.0	9085200119100	9085240119100
0.4724			12.00	12.0	102.0	55.0	9085200120000	9085240120000
0.4803			12.20	14.0	107.0	60.0	9085200122000	9085240122000
0.4843	31/64		12.30	14.0	107.0	60.0	9085200123000	9085240123000
0.4921			12.50	14.0	107.0	60.0	9085200125000	9085240125000
0.5000	1/2		12.70	14.0	107.0	60.0	9085200127000	9085240127000
0.5039			12.80	14.0	107.0	60.0	9085200128000	9085240128000
0.5118			13.00	14.0	107.0	60.0	9085200130000	9085240130000
0.5236			13.30	14.0	107.0	60.0	9085200133000	9085240133000
0.5311	17/32		13.49	14.0	107.0	60.0	9085200134900	9085240134900
0.5315			13.50	14.0	107.0	60.0	9085200135000	9085240135000
0.5394			13.70	14.0	107.0	60.0	9085200137000	9085240137000
0.5512			14.00	14.0	107.0	60.0	9085200140000	9085240140000
0.5591			14.20	16.0	115.0	65.0	9085200142000	9085240142000
0.5626	9/16		14.29	16.0	115.0	65.0	9085200142900	9085240142900
0.5630			14.30	16.0	115.0	65.0	9085200143000	9085240143000
0.5709			14.50	16.0	115.0	65.0	9085200145000	9085240145000
0.5787			14.70	16.0	115.0	65.0	9085200147000	9085240147000
0.5906			15.00	16.0	115.0	65.0	9085200150000	9085240150000
0.5984			15.20	16.0	115.0	65.0	9085200152000	9085240152000
0.6024			15.30	16.0	115.0	65.0	9085200153000	9085240153000
0.6102			15.50	16.0	115.0	65.0	9085200155000	9085240155000
0.6181			15.70	16.0	115.0	65.0	9085200157000	9085240157000
0.6248	5/8		15.87	16.0	115.0	65.0	9085200158700	9085240158700
0.6299			16.00	16.0	115.0	65.0	9085200160000	9085240160000
0.6417			16.30	16.0	115.0	65.0	9085200163000	9085240163000
0.6496			16.50	18.0	123.0	73.0	9085200165000	9085240165000
0.6654			16.90	18.0	123.0	73.0	9085200169000	9085240169000
0.6693			17.00	18.0	131.0	79.0	9085200170000	9085240170000
0.6811			17.30	18.0	131.0	79.0	9085200173000	9085240173000
0.6890			17.50	18.0	131.0	79.0	9085200175000	9085240175000
0.7087			18.00	18.0	131.0	79.0	9085200180000	9085240180000
0.7283			18.50	20.0	131.0	79.0	9085200185000	9085240185000
0.7441			18.90	20.0	131.0	79.0	9085200189000	9085240189000
0.7480			19.00	20.0	131.0	79.0	9085200190000	9085240190000
0.7500	3/4		19.05	20.0	131.0	79.0	9085200190500	9085240190500
0.7598			19.30	20.0	131.0	79.0	9085200193000	9085240193000
0.7677			19.50	20.0	131.0	79.0	9085200195000	9085240195000
0.7874			20.00	20.0	131.0	79.0	9085200200000	9085240200000



RT 100 HF Point - CAD Drawing



# Drilling

## RT 100 HF Carbide Drill



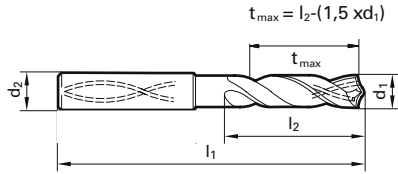
Coolant Fed - Series 8521

# 5xD



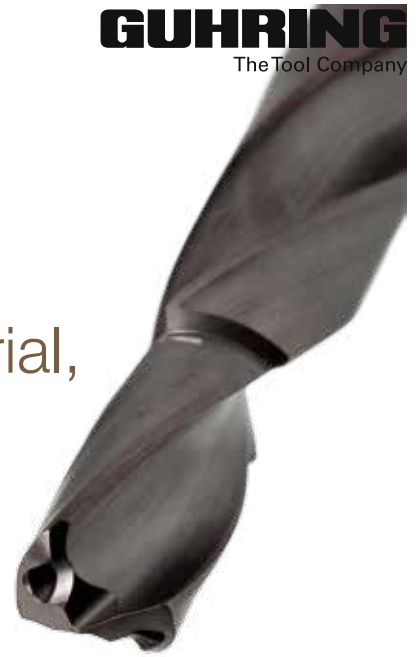
Diameter (d1)			d2 mm	l1 mm	l2 mm	8521 EDP #	
Dec. inch	Fract. inch	Wire / letter					
0.1181			3.00	6.0	66.0	28.0	9085210030000
0.1220			3.10	6.0	66.0	28.0	9085210031000
0.1248	1/8		3.17	6.0	66.0	28.0	9085210031700
0.1260			3.20	6.0	66.0	28.0	9085210032000
0.1280			3.25	6.0	66.0	28.0	9085210032500
0.1299			3.30	6.0	66.0	28.0	9085210033000
0.1339			3.40	6.0	66.0	28.0	9085210034000
0.1378			3.50	6.0	66.0	28.0	9085210035000
0.1406	9/64	28	3.57	6.0	66.0	28.0	9085210035700
0.1417			3.60	6.0	66.0	28.0	9085210036000
0.1457			3.70	6.0	66.0	28.0	9085210037000
0.1496		25	3.80	6.0	74.0	36.0	9085210038000
0.1535			3.90	6.0	74.0	36.0	9085210039000
0.1563	5/32		3.97	6.0	74.0	36.0	9085210039700
0.1575			4.00	6.0	74.0	36.0	9085210040000
0.1614			4.10	6.0	74.0	36.0	9085210041000
0.1654			4.20	6.0	74.0	36.0	9085210042000
0.1693		18	4.30	6.0	74.0	36.0	9085210043000
0.1720	11/64		4.37	6.0	74.0	36.0	9085210043700
0.1732			4.40	6.0	74.0	36.0	9085210044000
0.1772		16	4.50	6.0	74.0	36.0	9085210045000
0.1811			4.60	6.0	74.0	36.0	9085210046000
0.1831			4.65	6.0	74.0	36.0	9085210046500
0.1850		13	4.70	6.0	74.0	36.0	9085210047000
0.1874	3/16		4.76	6.0	82.0	44.0	9085210047600
0.1890		12	4.80	6.0	82.0	44.0	9085210048000
0.1929			4.90	6.0	82.0	44.0	9085210049000
0.1969			5.00	6.0	82.0	44.0	9085210050000
0.2008			5.10	6.0	82.0	44.0	9085210051000
0.2031	13/64		5.16	6.0	82.0	44.0	9085210051600
0.2047			5.20	6.0	82.0	44.0	9085210052000
0.2087			5.30	6.0	82.0	44.0	9085210053000
0.2126			5.40	6.0	82.0	44.0	9085210054000
0.2165			5.50	6.0	82.0	44.0	9085210055000
0.2185			5.55	6.0	82.0	44.0	9085210055500
0.2189	7/32		5.56	6.0	82.0	44.0	9085210055600
0.2205			5.60	6.0	82.0	44.0	9085210056000
0.2244			5.70	6.0	82.0	44.0	9085210057000
0.2283			5.80	6.0	82.0	44.0	9085210058000
0.2323			5.90	6.0	82.0	44.0	9085210059000
0.2343	15/64		5.95	6.0	82.0	44.0	9085210059500
0.2362			6.00	6.0	82.0	44.0	9085210060000
0.2402			6.10	8.0	91.0	53.0	9085210061000
0.2441			6.20	8.0	91.0	53.0	9085210062000
0.2480			6.30	8.0	91.0	53.0	9085210063000
0.2500	1/4	E	6.35	8.0	91.0	53.0	9085210063500
0.2520			6.40	8.0	91.0	53.0	9085210064000
0.2559			6.50	8.0	91.0	53.0	9085210065000
0.2598			6.60	8.0	91.0	53.0	9085210066000
0.2638			6.70	8.0	91.0	53.0	9085210067000
0.2657	17/64	H	6.75	8.0	91.0	53.0	9085210067500
0.2677			6.80	8.0	91.0	53.0	9085210068000
0.2717		I	6.90	8.0	91.0	53.0	9085210069000
0.2756			7.00	8.0	91.0	53.0	9085210070000
0.2795			7.10	8.0	91.0	53.0	9085210071000
0.2811	9/32	K	7.14	8.0	91.0	53.0	9085210071400
0.2835			7.20	8.0	91.0	53.0	9085210072000
0.2874			7.30	8.0	91.0	53.0	9085210073000
0.2913			7.40	8.0	91.0	53.0	9085210074000
0.2953			7.50	8.0	91.0	53.0	9085210075000
0.2969	19/64		7.54	8.0	91.0	53.0	9085210075400
0.2992			7.60	8.0	91.0	53.0	9085210076000
0.3031			7.70	8.0	91.0	53.0	9085210077000
0.3071			7.80	8.0	91.0	53.0	9085210078000
0.3110			7.90	8.0	91.0	53.0	9085210079000
0.3126	5/16		7.94	8.0	91.0	53.0	9085210079400
0.3150			8.00	8.0	91.0	53.0	9085210080000
0.3189			8.10	10.0	103.0	61.0	9085210081000
0.3228		P	8.20	10.0	103.0	61.0	9085210082000
0.3268			8.30	10.0	103.0	61.0	9085210083000
0.3280	21/64		8.33	10.0	103.0	61.0	9085210083300

Diameter (d1)			d2 mm	l1 mm	l2 mm	8521 EDP #	
Dec. inch	Fract. inch	Wire / letter					
0.3307			8.40	10.0	103.0	61.0	9085210084000
0.3346			8.50	10.0	103.0	61.0	9085210085000
0.3386			8.60	10.0	103.0	61.0	9085210086000
0.3425			8.70	10.0	103.0	61.0	9085210087000
0.3437	11/32		8.73	10.0	103.0	61.0	9085210087300
0.3465			8.80	10.0	103.0	61.0	9085210088000
0.3543			9.00	10.0	103.0	61.0	9085210090000
0.3583			9.10	10.0	103.0	61.0	9085210091000
0.3594	23/64		9.13	10.0	103.0	61.0	9085210091300
0.3622			9.20	10.0	103.0	61.0	9085210092000
0.3642			9.25	10.0	103.0	61.0	9085210092500
0.3661			9.30	10.0	103.0	61.0	9085210093000
0.3701			9.40	10.0	103.0	61.0	9085210094000
0.3740			9.50	10.0	103.0	61.0	9085210095000
0.3748	3/8		9.52	10.0	103.0	61.0	9085210095200
0.3780			9.60	10.0	103.0	61.0	9085210096000
0.3819			9.70	10.0	103.0	61.0	9085210097000
0.3858		W	9.80	10.0	103.0	61.0	9085210098000
0.3898			9.90	10.0	103.0	61.0	9085210099000
0.3906	25/64		9.92	10.0	103.0	61.0	9085210099200
0.3937			10.00	10.0	103.0	61.0	9085210100000
0.3976			10.10	12.0	118.0	71.0	9085210101000
0.4016			10.20	12.0	118.0	71.0	9085210102000
0.4055			10.30	12.0	118.0	71.0	9085210103000
0.4063	13/32		10.32	12.0	118.0	71.0	9085210103200
0.4094			10.40	12.0	118.0	71.0	9085210104000
0.4134			10.50	12.0	118.0	71.0	9085210105000
0.4173			10.60	12.0	118.0	71.0	9085210106000
0.4213			10.70	12.0	118.0	71.0	9085210107000
0.4220	27/64		10.72	12.0	118.0	71.0	9085210107200
0.4252			10.80	12.0	118.0	71.0	9085210108000
0.4291			10.90	12.0	118.0	71.0	9085210109000
0.4331			11.00	12.0	118.0	71.0	9085210110000
0.4370			11.10	12.0	118.0	71.0	9085210111000
0.4374	7/16		11.11	12.0	118.0	71.0	9085210111100
0.4409			11.20	12.0	118.0	71.0	9085210112000
0.4449			11.30	12.0	118.0	71.0	9085210113000
0.4488			11.40	12.0	118.0	71.0	9085210114000
0.4528			11.50	12.0	118.0	71.0	9085210115000
0.4531	29/64		11.51	12.0	118.0	71.0	9085210115100
0.4567			11.60	12.0	118.0	71.0	9085210116000
0.4606			11.70	12.0	118.0	71.0	9085210117000
0.4646			11.80	12.0	118.0	71.0	9085210118000
0.4685			11.90	12.0	118.0	71.0	9085210119000
0.4689	15/32		11.91	12.0	118.0	71.0	9085210119100
0.4724			12.00	12.0	118.0	71.0	9085210120000
0.4803			12.20	14.0	124.0	77.0	9085210122000
0.4843	31/64		12.30	14.0	124.0	77.0	9085210123000
0.4921			12.50	14.0	124.0	77.0	9085210125000
0.5000	1/2		12.70	14.0	124.0	77.0	9085210127000
0.5039			12.80	14.0	124.0	77.0	9085210128000
0.5118			13.00	14.0	124.0	77.0	9085210130000
0.5236			13.30	14.0	124.0	77.0	9085210133000
0.5311	17/32		13.49	14.0	124.0	77.0	9085210134900
0.5315			13.50	14.0	124.0	77.0	9085210135000
0.5394			13.70	14.0	124.0	77.0	9085210137000
0.5512			14.00	14.0	124.0	77.0	9085210140000
0.5591			14.20	16.0	133.0	83.0	9085210142000
0.5626	9/16		14.29	16.0	133.0	83.0	9085210142900
0.5630			14.30	16.0	133.0	83.0	9085210143000
0.5709			14.50	16.0	133.0	83.0	9085210145000
0.5787			14.70	16.0	133.0	83.0	9085210147000
0.5906			15.00	16.0	133.0	83.0	9085210150000
0.5984			15.20	16.0	133.0	83.0	9085210152000
0.6024			15.30	16.0	133.0	83.0	9085210153000
0.6102			15.50	16.0	133.0	83.0	9085210155000
0.6181			15.70	16.0	133.0	83.0	9085210157000
0.6248	5/8		15.87	16.0	133.0	83.0	9085210158700
0.6299			16.00	16.0	133.0	83.0	9085210160000
0.6417			16.30	16.0	133.0	83.0	9085210163000

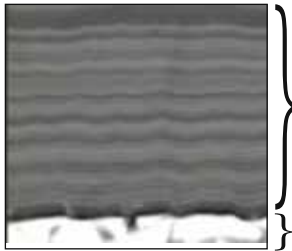


Diameter (d1)		Wire / letter	d2 mm	l1 mm	l2 mm	8521 EDP #	
Dec. inch	Fract. inch						
0.6496			16.50	18.0	143.0	93.0	9085210165000
0.6654			16.90	18.0	143.0	93.0	9085210169000
0.6693			17.00	18.0	143.0	93.0	9085210170000
0.6811			17.30	18.0	143.0	93.0	9085210173000
0.6890			17.50	18.0	143.0	93.0	9085210175000
0.7087			18.00	18.0	143.0	93.0	9085210180000
0.7283			18.50	18.0	143.0	93.0	9085210185000
0.7441			18.90	20.0	153.0	101.0	9085210189000
0.7480			19.00	20.0	153.0	101.0	9085210190000
0.7500	3/4		19.05	20.0	153.0	101.0	9085210190500
0.7598			19.30	20.0	153.0	101.0	9085210193000
0.7677			19.50	20.0	153.0	101.0	9085210195000
0.7874			20.00	20.0	153.0	101.0	9085210200000

Tool Material,  
Geometry,  
Coating . . .



**NEW!** nano-Si<sup>®</sup>



nano-Si<sup>®</sup>

Carbide Substrate

**ULTRA-HARD COATING!**

Guhring's coatings research department has developed a new nano multi-layer coating for nickel base materials and hardened materials that require high surface hardness coatings. Called nano-Si<sup>®</sup>, this TiAlSiN (titanium aluminum silicon nitride) based coating is designed to yield similar performance to diamond-like coatings without the restrictions on the host base material substrate. With a hardness value of 5,500 (HV 0.05), nano-Si<sup>®</sup> stands up to the most abrasive applications. The oxidation, or maximum useful operating temperature, is over 1,470° F, which is similar to high temperature coatings such as FIREX<sup>®</sup> or TiAlN.

Test results in drilling inconel have shown a 35% increase in tool life compared to a comparable TiAlN based multi-layer coating using the same operating parameters. Similar results were found when machining cast iron and hardened steels over 52HRc.

No other coating can provide this high hardness property while still retaining the toughness required in drilling and milling applications.



perfectly matched.





# Drilling

## RT 100 HF Carbide Drill

# 7xD



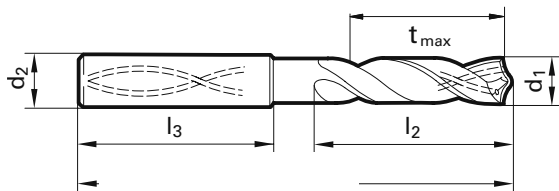
### Coolant Fed - Series 8522



Diameter (d1)		Wire / letter	d2 mm	l1 mm	l2 mm	EDP #	
Dec. inch	Fract. inch						
0.1181			3.00	6.000	70.00	30.00	9085220030000
0.1248	1/8		3.17	6.000	70.00	30.00	9085220031700
0.1280			3.25	6.000	70.00	30.00	9085220032500
0.1299			3.30	6.000	70.00	30.00	9085220033000
0.1339			3.40	6.000	75.00	37.50	9085220034000
0.1378			3.50	6.000	75.00	37.50	9085220035000
0.1406	9/64	28	3.57	6.000	75.00	37.50	9085220035700
0.1457			3.70	6.000	75.00	37.50	9085220037000
0.1563	5/32		3.97	6.000	75.00	37.50	9085220039700
0.1575			4.00	6.000	75.00	37.50	9085220040000
0.1654			4.20	6.000	75.00	37.50	9085220042000
0.1693		18	4.30	6.000	85.00	45.00	9085220043000
0.1720	11/64		4.37	6.000	85.00	45.00	9085220043700
0.1772			4.50	6.000	85.00	45.00	9085220045000
0.1831			4.65	6.000	85.00	45.00	9085220046500
0.1874	3/16		4.76	6.000	90.00	50.00	9085220047600
0.1969			5.00	6.000	90.00	50.00	9085220050000
0.2008			5.10	6.000	90.00	50.00	9085220051000
0.2031	13/64		5.16	6.000	90.00	50.00	9085220051600
0.2047			5.20	6.000	90.00	50.00	9085220052000
0.2165			5.50	6.000	97.00	57.00	9085220055000
0.2185			5.55	6.000	97.00	57.00	9085220055500
0.2189	7/32		5.56	6.000	97.00	57.00	9085220055600
0.2343	15/64		5.95	6.000	97.00	57.00	9085220059500
0.2362			6.00	6.000	97.00	57.00	9085220060000
0.2500	1/4	E	6.35	8.000	106.00	66.00	9085220063500
0.2559			6.50	8.000	106.00	66.00	9085220065000
0.2571		F	6.53	8.000	106.00	66.00	9085220065300
0.2657	17/64	H	6.75	8.000	106.00	66.00	9085220067500
0.2677			6.80	8.000	106.00	66.00	9085220068000
0.2717		I	6.90	8.000	116.00	76.00	9085220069000
0.2756			7.00	8.000	116.00	76.00	9085220070000
0.2811	9/32	K	7.14	8.000	116.00	76.00	9085220071400
0.2913			7.40	8.000	116.00	76.00	9085220074000
0.2953			7.50	8.000	116.00	76.00	9085220075000
0.2969	19/64		7.54	8.000	116.00	76.00	9085220075400
0.3071			7.80	8.000	116.00	76.00	9085220078000
0.3126	5/16		7.94	8.000	116.00	76.00	9085220079400
0.3150			8.00	8.000	116.00	76.00	9085220080000
0.3280	21/64		8.33	10.000	131.00	87.00	9085220083300
0.3346			8.50	10.000	131.00	87.00	9085220085000

Diameter (d1)		Wire / letter	d2 mm	l1 mm	l2 mm	EDP #	
Dec. inch	Fract. inch						
0.3386			8.60	10.000	131.00	87.00	9085220086000
0.3437	11/32		8.73	10.000	131.00	87.00	9085220087300
0.3465			8.80	10.000	131.00	87.00	9085220088000
0.3543			9.00	10.000	131.00	87.00	9085220090000
0.3594	23/64		9.13	10.000	139.00	95.00	9085220091300
0.3642			9.25	10.000	139.00	95.00	9085220092500
0.3677		U	9.340	10.000	139.00	95.00	9085220093400
0.3701			9.40	10.000	139.00	95.00	9085220094000
0.3740			9.50	10.000	139.00	95.00	9085220095000
0.3748	3/8		9.52	10.000	139.00	95.00	9085220095200
0.3906	25/64		9.92	10.000	139.00	95.00	9085220099200
0.3937			10.00	10.000	139.00	95.00	9085220100000
0.4015			10.20	12.000	155.00	106.00	9085220102000
0.4063	13/32		10.32	12.000	155.00	106.00	9085220103200
0.4094			10.40	12.000	155.00	106.00	9085220104000
0.4134			10.50	12.000	155.00	106.00	9085220105000
0.4252			10.80	12.000	155.00	106.00	9085220108000
0.4331			11.00	12.000	155.00	106.00	9085220110000
0.4374	7/16		11.11	12.000	163.00	114.00	9085220111100
0.4449			11.30	12.000	155.00	106.00	9085220113000
0.4488			11.40	12.000	155.00	106.00	9085220114000
0.4528			11.50	12.000	163.00	114.00	9085220115000
0.4531			11.51	12.000	155.00	106.00	9085220115100
0.4689	15/32		11.91	12.000	163.00	114.00	9085220119100
0.4724			12.00	12.000	163.00	114.00	9085220120000
0.4843	31/64		12.30	14.000	182.00	133.00	9085220123000
0.4921			12.50	14.000	182.00	133.00	9085220125000
0.5000	1/2		12.70	14.000	182.00	133.00	9085220127000
0.5118			13.00	14.000	182.00	133.00	9085220130000
0.5157			13.10	14.000	182.00	133.00	9085220131000
0.5311			13.49	14.000	182.00	133.00	9085220134900
0.5315			13.50	14.000	182.00	133.00	9085220135000
0.5512			14.00	14.000	182.00	133.00	9085220140000
0.5626	9/16		14.29	16.000	204.00	152.00	9085220142900
0.5709			14.50	16.000	204.00	152.00	9085220145000
0.5906			15.00	16.000	204.00	152.00	9085220150000
0.5945			15.10	16.000	204.00	152.00	9085220151000
0.6102			15.50	16.000	204.00	152.00	9085220155000
0.6248	5/8		15.87	16.000	204.00	152.00	9085220158700
0.6299			16.00	16.000	204.00	152.00	9085220160000

$$t_{max} = l_2 - (1,5 \times d_1)$$

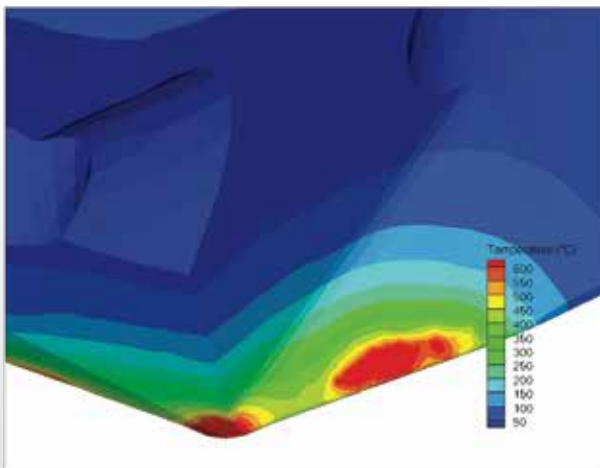




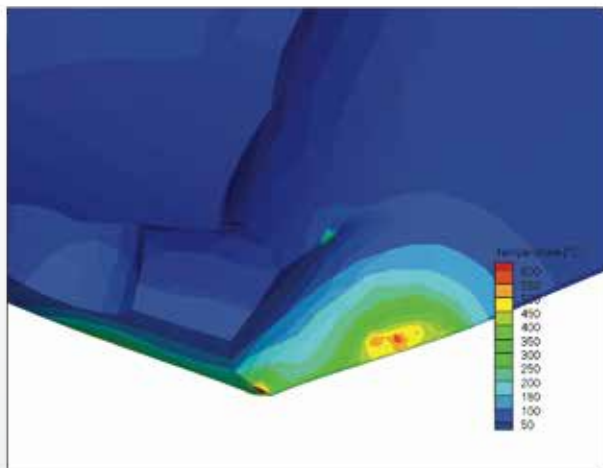
. . . heat resistant

*The RT 100 HF has a newly developed, web and point geometry that considerably reduces heat occurring during the machining of hardened materials, and high strength alloys.*

**Conventional Point Geometry**



**RT100 HF Point Geometry**



Thermal Imaging

**Reduced Heat Generation**

# Speeds & Feeds

Using These Tables. The Speeds & Feeds listed below are conservative recommendations for initial setup. In actual use, depending on the machining environment and workpiece material, significantly higher speeds and feeds may be achievable. Using the below as a starting point, cutting speed/feed can be gradually adjusted upwards until the optimum settings per application are found. Questions? Contact us by telephone at (800) 776-6170.

## Series #8520

Material group	Hardness	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. 24.400 mm	1 1/4 in. 31.750 mm	1 1/2 in. 38.100 mm
Common structural steels	≤100 Bhn 260 Bhn	475 395	0.0028 0.0016	0.0050 0.0039	0.0080 0.0063	0.0120 0.0098	0.0120 0.0098	0.0160 0.0124	0.0200 0.0157	0.0250 0.0197	•	•
Free-cutting steels	≤24 Rc >24-30 Rc	560 475	0.0011 0.0011	0.0063 0.0063	0.0098 0.0098	0.0150 0.0150	0.0157 0.0157	0.0197 0.0197	0.0248 0.0248	0.0315 0.0315	•	•
Unalloyed heat-treatable steels	≤16 Rc 16-24 Rc 24-30 Rc	425 410 395	0.0011 0.0028 0.0028	0.0063 0.0049 0.0049	0.0098 0.0079 0.0079	0.0150 0.0124 0.0124	0.0157 0.0124 0.0124	0.0197 0.0157 0.0157	0.0248 0.0197 0.0197	0.0315 0.0248 0.0248	•	•
Alloyed heat-treatable steels	24-30 Rc >30-38 Rc	395 345	0.0028 0.0028	0.0049 0.0049	0.0079 0.0079	0.0124 0.0124	0.0124 0.0124	0.0157 0.0157	0.0197 0.0197	0.0248 0.0248	•	•
Unalloyed case hardened steels	≤230 Bhn	475	0.0011	0.0063	0.0098	0.0150	0.0157	0.0197	0.0248	0.0315	•	•
Alloyed case hardened steels	24-30 Rc >30-38 Rc	395 280	0.0028 0.0007	0.0049 0.0031	0.0079 0.0049	0.0124 0.0075	0.0124 0.0079	0.0157 0.0098	0.0197 0.0124	0.0248 0.0157	•	•
Nitriding steels	≥24-30 Rc >30-38 Rc	360 345	0.0028 0.0007	0.0049 0.0031	0.0079 0.0049	0.0124 0.0075	0.0124 0.0079	0.0157 0.0098	0.0197 0.0124	0.0248 0.0157	•	•
Tool steels	≤24 Rc >24-30 Rc	260 215	0.0016 0.0007	0.0039 0.0031	0.0063 0.0049	0.0098 0.0075	0.0098 0.0079	0.0124 0.0098	0.0157 0.0124	0.0197 0.0157	•	•
High speed steels	≥14-30 Rc	195	0.0007	0.0025	0.0039	0.0059	0.0063	0.0079	0.0098	0.0124	•	•
Spring steels	≤330 Bhn	195	0.0008	0.0020	0.0031	0.0049	0.0049	0.0063	0.0079	0.0098	•	•
Stainless steels, sulphured austenitic martensitic	≤24 Rc ≤24 Rc ≤24 Rc	• • •	• • •	• • •	• • •	• • •	• • •	• • •	• • •	• • •	•	•
Hardened steels	≤40-48 Rc >48-60 Rc	180 115	0.0008 0.0004	0.0020 0.0016	0.0031 0.0025	0.0049 0.0039	•	0.0063 0.0049	0.0079 0.0063	0.0098 0.0079	•	•
Special alloys	≤38 Rc	115	0.0007	0.0025	0.0039	0.0059	•	0.0079	0.0098	0.0124	•	•
Cast iron	≤240 Bhn <300 Bhn	• •	• •	• •	• •	• •	• •	• •	• •	• •	•	•
Spheroidal graphite iron and malleable cast iron	≤240 Bhn <300 Bhn	• •	• •	• •	• •	• •	• •	• •	• •	• •	•	•
Chilled cast iron	≤350 Bhn	•	•	•	•	•	•	•	•	•	•	•
Ti and Ti-alloys	≤24 Rc >24-38 Rc	150 130	0.0007 0.0008	0.0025 0.0020	0.0039 0.0031	0.0059 0.0049	•	0.0049 0.0063	0.0098 0.0079	0.0124 0.0098	•	•
Aluminium and Al-alloys	≤120 Bhn	•	•	•	•	•	•	•	•	•	•	•
Al wrought alloys	≤150 Bhn	•	•	•	•	•	•	•	•	•	•	•
Al cast alloys ≤ 10 % Si > 10 % Si	≤200 Bhn ≤200 Bhn	• •	• •	• •	• •	• •	• •	• •	• •	• •	•	•
Magnesium alloys	≤150 Bhn	•	•	•	•	•	•	•	•	•	•	•
Copper, low-alloyed	≤120 Bhn	•	•	•	•	•	•	•	•	•	•	•
Brass, short-chipping long-chipping	≤200 Bhn ≤200 Bhn	• •	• •	• •	• •	• •	• •	• •	• •	• •	•	•
Bronze, short-chipping	≤200 Bhn	•	•	•	•	•	•	•	•	•	•	•
Bronze, long-chipping	>200 Bhn	•	•	•	•	•	•	•	•	•	•	•
Duroplastics	-	•	•	•	•	•	•	•	•	•	•	•
Thermoplastics	-	•	•	•	•	•	•	•	•	•	•	•
Reinforced plastics - Kevlar	-	•	•	•	•	•	•	•	•	•	•	•
Reinforced plastics - GFK / CFK	-	•	•	•	•	•	•	•	•	•	•	•

## Series # 8521

Material group	Hardness	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. 24.400 mm	1 1/4 in. 31.750 mm	1 1/2 in. 38.100 mm
Common structural steels	≤100 Bhn 260 Bhn	475 395	0.0028 0.0016	0.0050 0.0039	0.0080 0.0063	0.0120 0.0098	0.0120 0.0098	0.0160 0.0124	0.0200 0.0157	0.0250 0.0197	•	•
Free-cutting steels	≤24 Rc >24-30 Rc	560 475	0.0011 0.0011	0.0063 0.0063	0.0098 0.0098	0.0150 0.0150	0.0157 0.0157	0.0197 0.0197	0.0248 0.0248	0.0315 0.0315	•	•
Unalloyed heat-treatable steels	≤16 Rc 16-24 Rc 24-30 Rc	425 410 395	0.0011 0.0028 0.0028	0.0063 0.0049 0.0049	0.0098 0.0079 0.0079	0.0150 0.0124 0.0124	0.0157 0.0124 0.0124	0.0197 0.0157 0.0157	0.0248 0.0197 0.0197	0.0315 0.0248 0.0248	•	•
Alloyed heat-treatable steels	24-30 Rc >30-38 Rc	395 345	0.0028 0.0028	0.0049 0.0049	0.0079 0.0079	0.0124 0.0124	0.0124 0.0124	0.0157 0.0157	0.0197 0.0197	0.0248 0.0248	•	•
Unalloyed case hardened steels	≤230 Bhn	475	0.0011	0.0063	0.0098	0.0150	0.0157	0.0197	0.0248	0.0315	•	•
Alloyed case hardened steels	24-30 Rc >30-38 Rc	395 280	0.0028 0.0007	0.0049 0.0031	0.0079 0.0049	0.0124 0.0075	0.0124 0.0079	0.0157 0.0098	0.0197 0.0124	0.0248 0.0157	•	•
Nitriding steels	≥24-30 Rc >30-38 Rc	360 345	0.0028 0.0007	0.0049 0.0031	0.0079 0.0049	0.0124 0.0075	0.0124 0.0079	0.0157 0.0098	0.0197 0.0124	0.0248 0.0157	•	•
Tool steels	≤24 Rc >24-30 Rc	260 215	0.0016 0.0007	0.0039 0.0031	0.0063 0.0049	0.0098 0.0075	0.0098 0.0079	0.0124 0.0098	0.0157 0.0124	0.0197 0.0157	•	•
High speed steels	≥14-30 Rc	195	0.0007	0.0025	0.0039	0.0059	0.0063	0.0079	0.0098	0.0124	•	•
Spring steels	≤330 Bhn	195	0.0008	0.0020	0.0031	0.0049	0.0049	0.0063	0.0079	0.0098	•	•
Stainless steels, sulphured austenitic martensitic	≤24 Rc ≤24 Rc ≤24 Rc	• • •	• • •	• • •	• • •	• • •	• • •	• • •	• • •	• • •	•	•
Hardened steels	≤40-48 Rc >48-60 Rc	180 115	0.0008 0.0004	0.0020 0.0016	0.0031 0.0025	0.0049 0.0039	•	0.0063 0.0049	0.0079 0.0063	0.0098 0.0079	•	•
Special alloys	≤38 Rc	115	0.0007	0.0025	0.0039	0.0059	•	0.0079	0.0098	0.0124	•	•
Cast iron	≤240 Bhn <300 Bhn	• •	• •	• •	• •	• •	• •	• •	• •	• •	•	•
Spheroidal graphite iron and malleable cast iron	≤240 Bhn <300 Bhn	• •	• •	• •	• •	• •	• •	• •	• •	• •	•	•
Chilled cast iron	≤350 Bhn	•	•	•	•	•	•	•	•	•	•	•
Ti and Ti-alloys	≤24 Rc >24-38 Rc	150 130	0.0007 0.0008	0.0025 0.0020	0.0039 0.0031	0.0059 0.0049	•	0.0049 0.0063	0.0098 0.0079	0.0124 0.0098	•	•
Aluminium and Al-alloys	≤120 Bhn	•	•	•	•	•	•	•	•	•	•	•
Al wrought alloys	≤150 Bhn	•	•	•	•	•	•	•	•	•	•	•
Al cast alloys ≤ 10 % Si > 10 % Si	≤200 Bhn ≤200 Bhn	• •	• •	• •	• •	• •	• •	• •	• •	• •	•	•
Magnesium alloys	≤150 Bhn	•	•	•	•	•	•	•	•	•	•	•
Copper, low-alloyed	≤120 Bhn	•	•	•	•	•	•	•	•	•	•	•
Brass, short-chipping long-chipping	≤200 Bhn ≤200 Bhn	• •	• •	• •	• •	• •	• •	• •	• •	• •	•	•
Bronze, short-chipping	≤200 Bhn	•	•	•	•	•	•	•	•	•	•	•
Bronze, long-chipping	>200 Bhn	•	•	•	•	•	•	•	•	•	•	•
Duroplastics	-	•	•	•	•	•	•	•	•	•	•	•
Thermoplastics	-	•	•	•	•	•	•	•	•	•	•	•
Reinforced plastics - Kevlar	-	•	•	•	•	•	•	•	•	•	•	•
Reinforced plastics - GFK / CFK	-	•	•	•	•	•	•	•	•	•	•	•



# Speeds & Feeds

## Series #8522

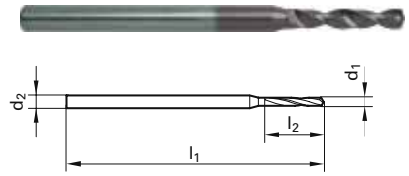
Material group	Hardness	SFM	Feed Rate - IPR									
			1/16 in. 1.590 mm	1/8 in. 3.170 mm	1/4 in. 6.350 mm	3/8 in. 9.520 mm	1/2 in. 12.700 mm	5/8 in. 15.870 mm	3/4 in. 19.050 mm	1 in. 24.400 mm	1 1/4 in. 31.750 mm	1 1/2 in. 38.100 mm
Common structural steels	≤100 Bhn	475	0.0160	0.0040	0.0060	0.0100	0.0100	0.0120	0.0160	0.0200	•	•
	260 Bhn	395	0.0077	0.0031	0.0049	0.0075	0.0079	0.0098	0.0124	0.0157	•	•
Free-cutting steels	≤24 Rc	560	0.0028	0.0049	0.0079	0.0124	0.0124	0.0157	0.0197	0.0248	•	•
	>24-30 Rc	475	0.0028	0.0049	0.0079	0.0124	0.0124	0.0157	0.0197	0.0248	•	•
Unalloyed heat-treatable steels	≤16 Rc	425	0.0028	0.0049	0.0079	0.0124	0.0124	0.0157	0.0197	0.0248	•	•
	16-24 Rc	410	0.0016	0.0039	0.0063	0.0098	0.0098	0.0124	0.0157	0.0197	•	•
	24-30 Rc	395	0.0016	0.0039	0.0063	0.0098	0.0098	0.0124	0.0157	0.0197	•	•
Alloyed heat-treatable steels	24-30 Rc	395	0.0016	0.0039	0.0063	0.0098	0.0098	0.0124	0.0157	0.0197	•	•
	>30-38 Rc	345	0.0016	0.0039	0.0063	0.0098	0.0098	0.0124	0.0157	0.0197	•	•
Unalloyed case hardened steels	≤230 Bhn	475	0.0028	0.0049	0.0079	0.0124	0.0124	0.0157	0.0197	0.0248	•	•
Alloyed case hardened steels	24-30 Rc	395	0.0016	0.0039	0.0063	0.0098	0.0098	0.0124	0.0157	0.0197	•	•
	>30-38 Rc	280	0.0007	0.0025	0.0039	0.0059	0.0063	0.0079	0.0098	0.0124	•	•
Nitriding steels	≥24-30 Rc	360	0.0016	0.0039	0.0063	0.0098	0.0098	0.0124	0.0157	0.0197	•	•
	>30-38 Rc	345	0.0007	0.0025	0.0039	0.0059	0.0063	0.0079	0.0098	0.0124	•	•
Tool steels	≤24 Rc	260	0.0007	0.0031	0.0049	0.0075	0.0079	0.0098	0.0124	0.0157	•	•
	>24-30 Rc	215	0.0007	0.0025	0.0039	0.0059	0.0063	0.0079	0.0098	0.0124	•	•
High speed steels	≥14-30 Rc	195	0.0008	0.0020	0.0031	0.0049	0.0049	0.0063	0.0079	0.0098	•	•
Spring steels	≤330 Bhn	195	0.0004	0.0016	0.0025	0.0039	0.0039	0.0049	0.0063	0.0079	•	•
Stainless steels, sulphured	≤24 Rc	•	•	•	•	•	•	•	•	•	•	•
austenitic	≤24 Rc	•	•	•	•	•	•	•	•	•	•	•
martensitic	≤24 Rc	•	•	•	•	•	•	•	•	•	•	•
Hardened steels	≤40-48 Rc	180	0.0004	0.0016	0.0025	0.0039	0.0039	0.0049	0.0063	0.0079	•	•
	>48-60 Rc	115	0.0007	0.0013	0.0020	0.0031	0.0031	0.0039	0.0049	0.0063	•	•
Special alloys	≤38 Rc	115	0.0008	0.0020	0.0031	0.0049	0.0049	0.0063	0.0079	0.0098	•	•
Cast iron	≤240 Bhn	•	•	•	•	•	•	•	•	•	•	•
	<300 Bhn	•	•	•	•	•	•	•	•	•	•	•
Spheroidal graphite iron and malleable cast iron	≤240 Bhn	•	•	•	•	•	•	•	•	•	•	•
	<300 Bhn	•	•	•	•	•	•	•	•	•	•	•
Chilled cast iron	≤350 Bhn	•	•	•	•	•	•	•	•	•	•	•
Ti and Ti-alloys	≤24 Rc	150	0.0008	0.0020	0.0031	0.0049	0.0049	0.0063	0.0079	0.0098	•	•
	>24-38 Rc	130	0.0008	0.0020	0.0031	0.0049	0.0049	0.0063	0.0079	0.0098	•	•
Aluminium and Al-alloys	≤120 Bhn	•	•	•	•	•	•	•	•	•	•	•
Al wrought alloys	≤150 Bhn	•	•	•	•	•	•	•	•	•	•	•
Al cast alloys ≤ 10 % Si	≤200 Bhn	•	•	•	•	•	•	•	•	•	•	•
> 10 % Si	≤200 Bhn	•	•	•	•	•	•	•	•	•	•	•
Magnesium alloys	≤150 Bhn	•	•	•	•	•	•	•	•	•	•	•
Copper, low-alloyed	≤120 Bhn	•	•	•	•	•	•	•	•	•	•	•
Brass, short-chipping	≤200 Bhn	•	•	•	•	•	•	•	•	•	•	•
long-chipping	≤200 Bhn	•	•	•	•	•	•	•	•	•	•	•
Bronze, short-chipping	≤200 Bhn	•	•	•	•	•	•	•	•	•	•	•
long-chipping	>200 Bhn	•	•	•	•	•	•	•	•	•	•	•
Duroplastics	-	•	•	•	•	•	•	•	•	•	•	•
Thermoplastics	-	•	•	•	•	•	•	•	•	•	•	•
Reinforced plastics - Kevlar	-	•	•	•	•	•	•	•	•	•	•	•
Reinforced plastics - GFK / CFK	-	•	•	•	•	•	•	•	•	•	•	•

## Series #8524

Material group	Hardness	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. 24.400 mm	1 1/4 in. 31.750 mm	1 1/2 in. 38.100 mm
Common structural steels	≤100 Bhn	425	0.0028	0.0050	0.0080	0.0120	0.0120	0.0160	0.0200	0.0250	•	•
	260 Bhn	360	0.0016	0.0039	0.0063	0.0098	0.0098	0.0124	0.0157	0.0197	•	•
Free-cutting steels	≤24 Rc	475	0.0011	0.0063	0.0098	0.0150	0.0157	0.0197	0.0248	0.0315	•	•
	>24-30 Rc	360	0.0031	0.0049	0.0079	0.0124	0.0124	0.0157	0.0197	0.0248	•	•
Unalloyed heat-treatable steels	≤16 Rc	395	0.0031	0.0049	0.0079	0.0124	0.0124	0.0157	0.0197	0.0248	•	•
	16-24 Rc	360	0.0028	0.0049	0.0079	0.0124	0.0124	0.0157	0.0197	0.0248	•	•
	24-30 Rc	345	0.0028	0.0049	0.0079	0.0124	0.0124	0.0157	0.0197	0.0248	•	•
Alloyed heat-treatable steels	24-30 Rc	345	0.0028	0.0049	0.0079	0.0124	0.0124	0.0157	0.0197	0.0248	•	•
	>30-38 Rc	330	0.0025	0.0039	0.0063	0.0098	0.0098	0.0124	0.0157	0.0197	•	•
Unalloyed case hardened steels	≤230 Bhn	425	0.0011	0.0063	0.0098	0.0150	0.0157	0.0124	0.0248	0.0315	•	•
Alloyed case hardened steels	24-30 Rc	395	0.0028	0.0049	0.0079	0.0124	0.0124	0.0157	0.0197	0.0248	•	•
	>30-38 Rc	280	0.0007	0.0031	0.0049	0.0075	0.0079	0.0098	0.0124	0.0157	•	•
Nitriding steels	≥24-30 Rc	330	0.0025	0.0039	0.0063	0.0098	0.0098	0.0124	0.0157	0.0197	•	•
	>30-38 Rc	295	0.0007	0.0031	0.0049	0.0075	0.0079	0.0098	0.0124	0.0157	•	•
Tool steels	≤24 Rc	215	0.0016	0.0039	0.0063	0.0098	0.0098	0.0124	0.0157	0.0197	•	•
	>24-30 Rc	180	0.0007	0.0031	0.0049	0.0075	0.0079	0.0098	0.0124	0.0157	•	•
High speed steels	≥14-30 Rc	180	0.0007	0.0025	0.0039	0.0059	0.0063	0.0079	0.0098	0.0124	•	•
Spring steels	≤330 Bhn	150	0.0008	0.0020	0.0031	0.0049	0.0049	0.0063	0.0079	0.0098	•	•
Stainless steels, sulphured	≤24 Rc	•	•	•	•	•	•	•	•	•	•	•
austenitic	≤24 Rc	•	•	•	•	•	•	•	•	•	•	•
martensitic	≤24 Rc	•	•	•	•	•	•	•	•	•	•	•
Hardened steels	≤40-48 Rc	150	0.0008	0.0020	0.0031	0.0049	0.0049	0.0063	0.0079	0.0098	•	•
	>48-60 Rc	80	0.0004	0.0016	0.0025	0.0039	0.0039	0.0049	0.0063	0.0079	•	•
Special alloys	≤38 Rc	80	0.0007	0.0025	0.0039	0.0059	0.0063	0.0079	0.0098	0.0124	•	•
Cast iron	≤240 Bhn	•	•	•	•	•	•	•	•	•	•	•
	<300 Bhn	•	•	•	•	•	•	•	•	•	•	•
Spheroidal graphite iron and malleable cast iron	≤240 Bhn	•	•	•	•	•	•	•	•	•	•	•
	<300 Bhn	•	•	•	•	•	•	•	•	•	•	•
Chilled cast iron	≤350 Bhn	•	•	•	•	•	•	•	•	•	•	•
Ti and Ti-alloys	≤24 Rc	130	0.0013	0.0020	0.0031	0.0049	0.0049	0.0063	0.0079	0.0098	•	•
	>24-38 Rc	115	0.0008	0.0020	0.0031	0.0049	0.0049	0.0063	0.0079	0.0098	•	•
Aluminium and Al-alloys	≤120 Bhn	•	•	•	•	•	•	•	•	•	•	•
Al wrought alloys	≤150 Bhn	•	•	•	•	•	•	•	•	•	•	•
Al cast alloys ≤ 10 % Si	≤200 Bhn	•	•	•	•	•	•	•	•	•	•	•
> 10 % Si	≤200 Bhn	•	•	•	•	•	•	•	•	•	•	•
Magnesium alloys	≤150 Bhn	•	•	•	•	•	•	•	•	•	•	•
Copper, low-alloyed	≤120 Bhn	•	•	•	•	•	•	•	•	•	•	•
Brass, short-chipping	≤200 Bhn	•	•	•	•	•	•	•	•	•	•	•
long-chipping	≤200 Bhn	•	•	•	•	•	•	•	•	•	•	•
Bronze, short-chipping	≤200 Bhn	•	•	•	•	•	•	•	•	•	•	•
long-chipping	>200 Bhn	•	•	•	•	•	•	•	•	•	•	•
Duroplastics	-	•	•	•	•	•	•	•	•	•	•	•
Thermoplastics	-	•	•	•	•	•	•	•	•	•	•	•
Reinforced plastics - Kevlar	-	•	•	•	•	•	•	•	•	•	•	•
Reinforced plastics - GFK / CFK	-	•	•	•	•	•	•	•	•	•	•	•

# Micro Drilling

- Precision ground hone point
- Reinforced straight-shank
- Double margin design (improves surface finish)
- Ultra-fine grain carbide
- 140° 4-facet point
- m7 cut diameter tolerance
- Super-A™ coated for heat and wear resistance



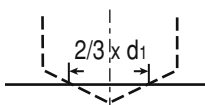
## Series 6400 (4xD)

Diameter (d1)			d2	l1	l2	EDP #
Dec. inch	Fract. inch	Wire / letter	mm	mm	mm	
0.0315			0.80	3.0	4.8	9064000008000
0.0335			0.85	3.0	4.7.0	9064000008500
0.0354			0.90	3.0	47.0	9064000009000
0.0374			0.95	3.0	47.0	9064000009500
0.0394			1.00	3.0	47.0	9064000010000
0.0413			1.05	3.0	47.0	9064000010500
0.0433			1.10	3.0	47.0	9064000011000
0.0453			1.15	3.0	47.0	9064000011500
0.0472			1.20	3.0	47.0	9064000012000
0.0492			1.25	3.0	47.0	9064000012500
0.0512			1.30	3.0	47.0	9064000013000
0.0531			1.35	3.0	47.0	9064000013500
0.0551		54	1.40	3.0	47.0	9064000014000
0.0571			1.45	3.0	47.0	9064000014500
0.0591			1.50	3.0	47.0	9064000015000
0.0610			1.55	3.0	47.0	9064000015500
0.0626	1/16		1.59	3.0	47.0	9064000015900
0.0630			1.60	3.0	47.0	9064000016000
0.0650			1.65	3.0	47.0	9064000016500
0.0669		51	1.70	3.0	47.0	9064000017000
0.0689			1.75	3.0	47.0	9064000017500
0.0709			1.80	3.0	52.0	9064000018000
0.0728		49	1.85	3.0	52.0	9064000018500
0.0748			1.90	3.0	52.0	9064000019000
0.0768			1.95	3.0	52.0	9064000019500
0.0780	5/64		1.98	4.0	59.0	9064000019800
0.0787			2.00	4.0	59.0	9064000020000
0.0807			2.05	4.0	59.0	9064000020500
0.0827			2.10	4.0	59.0	9064000021000
0.0846			2.15	4.0	59.0	9064000021500
0.0866			2.20	4.0	59.0	9064000022000
0.0886			2.25	4.0	59.0	9064000022500
0.0906			2.30	4.0	59.0	9064000023000
0.0925			2.35	4.0	59.0	9064000023500
0.0937	3/32		2.38	4.0	59.0	9064000023800
0.0945			2.40	4.0	59.0	9064000024000
0.0965			2.45	4.0	59.0	9064000024500
0.0984			2.50	4.0	59.0	9064000025000
0.1004			2.55	4.0	59.0	9064000025500
0.1024			2.60	4.0	59.0	9064000026000
0.1043			2.65	4.0	59.0	9064000026500
0.1063			2.70	4.0	59.0	9064000027000
0.1083			2.75	4.0	59.0	9064000027500
0.1094	7/64		2.78	4.0	59.0	9064000027800
0.1102			2.80	4.0	59.0	9064000028000
0.1122			2.85	4.0	59.0	9064000028500
0.1142			2.90	4.0	59.0	9064000029000
0.1161		32	2.95	4.0	59.0	9064000029500
0.1181			3.00	4.0	59.0	9064000030000

## Series 6401 (7xD)

Diameter (d1)			d2	l1	l2	EDP #
Dec. inch	Fract. inch	Wire / letter	mm	mm	mm	
0.0315			0.80	3.0	47.0	9064010008000
0.0335			0.85	3.0	47.0	9064010008500
0.0354			0.90	3.0	47.0	9064010009000
0.0374			0.95	3.0	47.0	9064010009500
0.0394			1.00	3.0	47.0	9064010010000
0.0413			1.05	3.0	47.0	9064010010500
0.0433			1.10	3.0	47.0	9064010011000
0.0453			1.15	3.0	47.0	9064010011500
0.0472			1.20	3.0	52.0	9064010012000
0.0492			1.25	3.0	52.0	9064010012500
0.0512			1.30	3.0	52.0	9064010013000
0.0531			1.35	3.0	52.0	9064010013500
0.0551		54	1.40	3.0	52.0	9064010014000
0.0571			1.45	3.0	52.0	9064010014500
0.0591			1.50	3.0	52.0	9064010015000
0.0610			1.55	3.0	52.0	9064010015500
0.0626	1/16		1.59	3.0	52.0	9064010015900
0.0630			1.60	3.0	52.0	9064010016000
0.0650			1.65	3.0	52.0	9064010016500
0.0669		51	1.70	3.0	52.0	9064010017000
0.0689			1.75	3.0	52.0	9064010017500
0.0709			1.80	3.0	52.0	9064010018000
0.0728		49	1.85	3.0	52.0	9064010018500
0.0748			1.90	3.0	52.0	9064010019000
0.0768			1.95	3.0	52.0	9064010019500
0.0780	5/64		1.98	4.0	63.0	9064010019800
0.0787			2.00	4.0	63.0	9064010020000
0.0807			2.05	4.0	63.0	9064010020500
0.0827			2.10	4.0	63.0	9064010021000
0.0846			2.15	4.0	63.0	9064010021500
0.0866			2.20	4.0	63.0	9064010022000
0.0886			2.25	4.0	63.0	9064010022500
0.0906			2.30	4.0	63.0	9064010023000
0.0925			2.35	4.0	63.0	9064010023500
0.0937	3/32		2.38	4.0	63.0	9064010023800
0.0945			2.40	4.0	63.0	9064010024000
0.0965			2.45	4.0	63.0	9064010024500
0.0984			2.50	4.0	63.0	9064010025000
0.1004			2.55	4.0	63.0	9064010025500
0.1024			2.60	4.0	67.0	9064010026000
0.1043			2.65	4.0	67.0	9064010026500
0.1063			2.70	4.0	67.0	9064010027000
0.1083			2.75	4.0	67.0	9064010027500
0.1094	7/64		2.78	4.0	67.0	9064010027800
0.1102			2.80	4.0	67.0	9064010028000
0.1122			2.85	4.0	67.0	9064010028500
0.1142			2.90	4.0	67.0	9064010029000
0.1161		32	2.95	4.0	67.0	9064010029500
0.1181			3.00	4.0	67.0	9064010030000

### Spot Drilling



In order to achieve full performance with Series 6408 carbide micro-precision drills at 8xD drilling depth, we recommend spot drilling.

The Exclusive Line Series 6400 solid carbide micro-precision drill (up to 4xD) can be applied for this purpose. The spot drill diameter should be approximately  $\frac{2}{3} \times d$ .

- 135° 4-facet point
- h7 cut diameter tolerance
- TiAlN coated



**\*\*Coolant Fed**

## \*Series 6408 (8xD)

Diameter (d1)			d2 mm	l1 mm	l2 mm	6408 EDP #	
Dec. inch	Fract. inch	Wire / letter					
0.0551		54	1.40	4.0	52.0	15.0	9064080014000
0.0571			1.45	4.0	52.0	16.0	9064080014500
0.0591			1.50	4.0	52.0	17.0	9064080015000
0.0610			1.55	4.0	52.0	17.0	9064080015500
0.0626	1/16		1.59	4.0	52.0	18.0	9064080015900
0.0630			1.60	4.0	52.0	18.0	9064080016000
0.0650			1.65	4.0	52.0	18.0	9064080016500
0.0669		51	1.70	4.0	56.0	19.0	9064080017000
0.0689			1.75	4.0	56.0	19.0	9064080017500
0.0709			1.80	4.0	56.0	20.0	9064080018000
0.0728		49	1.85	4.0	56.0	20.0	9064080018500
0.0748			1.90	4.0	56.0	21.0	9064080019000
0.0768			1.95	4.0	56.0	21.0	9064080019500
0.0780	5/64		1.98	4.0	56.0	22.0	9064080019800
0.0787			2.00	4.0	56.0	22.0	9064080020000
0.0807			2.05	4.0	56.0	23.0	9064080020500
0.0827			2.10	4.0	62.0	23.0	9064080021000
0.0846			2.15	4.0	62.0	24.0	9064080021500
0.0866			2.20	4.0	62.0	24.0	9064080022000
0.0886			2.25	4.0	62.0	25.0	9064080022500
0.0906			2.30	4.0	62.0	25.0	9064080023000
0.0913			2.32	4.0	62.0	25.0	9064080023200
0.0925			2.35	4.0	62.0	26.0	9064080023500
0.0937	3/32		2.38	4.0	62.0	26.0	9064080023800
0.0945			2.40	4.0	62.0	26.0	9064080024000
0.0965			2.45	4.0	62.0	27.0	9064080024500
0.0984			2.50	4.0	62.0	28.0	9064080025000
0.1004			2.55	4.0	62.0	28.0	9064080025500
0.1024			2.60	4.0	66.0	29.0	9064080026000
0.1043			2.65	4.0	66.0	29.0	9064080026500
0.1063			2.70	4.0	66.0	30.0	9064080027000
0.1083			2.75	4.0	66.0	30.0	9064080027500
0.1094	7/64		2.78	4.0	66.0	31.0	9064080027800
0.1102			2.80	4.0	66.0	31.0	9064080028000
0.1122			2.85	4.0	66.0	31.0	9064080028500
0.1142			2.90	4.0	66.0	32.0	9064080029000
0.1161		32	2.95	4.0	66.0	32.0	9064080029500
0.1181			3.00	4.0	66.0	33.0	9064080030000

## \*Series 6412 (15xD)

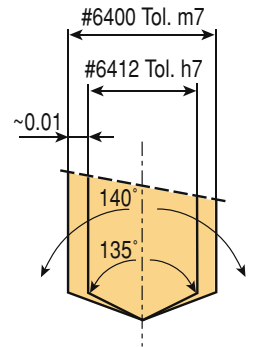
Diameter (d1)			d2 mm	l1 mm	l2 mm	6412 EDP #	
Dec. inch	Fract. inch	Wire / letter					
0.0551			1.40	4.0	62.0	25.0	9064120014000
0.0591			1.50	4.0	62.0	27.0	9064120015000
0.0626	1/16		1.59	4.0	62.0	29.0	9064120015900
0.0630			1.60	4.0	62.0	29.0	9064120016000
0.0669			1.70	4.0	70.0	31.0	9064120017000
0.0709			1.80	4.0	70.0	32.0	9064120018000
0.0748			1.90	4.0	70.0	34.0	9064120019000
0.0780	5/64		1.98	4.0	70.0	36.0	9064120019800
0.0787			2.00	4.0	70.0	36.0	9064120020000
0.0827			2.10	4.0	78.0	38.0	9064120021000
0.0866			2.20	4.0	78.0	40.0	9064120022000
0.0906			2.30	4.0	78.0	42.0	9064120023000
0.0937	3/32		2.38	4.0	78.0	44.0	9064120023800
0.0945			2.40	4.0	78.0	44.0	9064120024000
0.0984			2.50	4.0	78.0	45.0	9064120025000
0.1024			2.60	4.0	87.0	47.0	9064120026000
0.1063			2.70	4.0	87.0	48.0	9064120027000
0.1094	7/64		2.78	4.0	87.0	50.0	9064120027800
0.1102			2.80	4.0	87.0	50.0	9064120028000
0.1142			2.90	4.0	87.0	52.0	9064120029000
0.1181			3.00	4.0	87.0	54.0	9064120030000

**\*\*Series 6408 and 6412 are coolant fed.**  
Minimum recommended coolant pressure is 250 - 400 psi.

### Pilot drilling

For applications using Series 6412 carbide micro-precision drills to drilling depths of 15xD we recommend a pilot hole 1xD up to 2xD depth.

For this pilot hole, the Series 6400 solid carbide micro-precision drill (4xD) is optimally suited. Its 140° point angle and its m7 diameter tolerance are perfectly adapted.



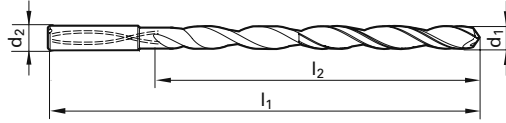
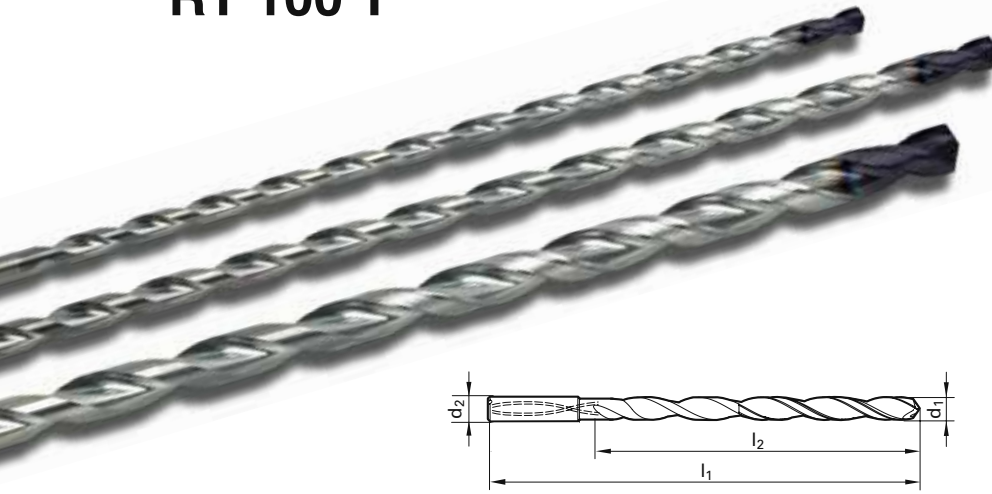
## OPERATING PARAMETERS

Drill Series	Material group	Hardness	SFM	Feed Rate - IPR					
				0.0315 in 0.800 mm	0.0394 in. 1.000 mm	0.0591 in. 1.500 mm	0.0787 in. 2.000 mm	0.0984 in. 2.500 mm	0.1181 in. 3.000 mm
6400/6401	Ti and Ti-alloys	≤24 Rc	50	0.0003	0.0005	0.0008	0.0013	0.0018	0.0024
		>24-38 Rc	50	0.0003	0.0005	0.0008	0.0013	0.0018	0.0024
	Nickel Alloys	38 Rc	35	0.0003	0.0005	0.0008	0.0013	0.0018	0.0024
6408/6412	Ti and Ti-alloys	≤24 Rc	115	0.0003	0.0005	0.0008	0.0013	0.0018	0.0024
		>24-38 Rc	115	0.0003	0.0005	0.0008	0.0013	0.0018	0.0024
	Nickel Alloys	38 Rc	80	0.0003	0.0005	0.0008	0.0013	0.0018	0.0024



# Deep Hole Drills

## RT 100 T



- Coolant fed / Carbide
- 3-5 times the penetration rate of gun drills or cobalt deep hole drills
- Eliminates peck cycles
- Unique double margin design
- Specialized flute form
- High polished flute
- TiAlN coated tip
- 135° point angle
- h7 cut diameter tolerance

### Series 6509 (15xD)

Diameter (d1)			d2 mm	l1 mm	l2 mm	EDP #
Dec. inch	Fract. inch	Wire / letter				
0.1181			6.0	95.0	55.0	9065090030000
0.1250	1/8		6.0	106.0	67.0	9065090031700
0.1378			6.0	116.0	76.0	9065090035000
0.1406	9/64		6.0	116.0	76.0	9065090035700
0.1563	5/32		6.0	116.0	76.0	9065090039700
0.1575			6.0	116.0	76.0	9065090040000
0.1719	11/64		6.0	133.0	93.0	9065090043700
0.1772			6.0	133.0	93.0	9065090045000
0.1874	3/16		6.0	133.0	93.0	9065090047600
0.1969			6.0	133.0	93.0	9065090050000
0.2008			6.0	150.0	110.0	9065090051000
0.2030	13/64		6.0	150.0	110.0	9065090051600
0.2130			6.0	150.0	110.0	9065090054100
0.2165			6.0	150.0	110.0	9065090055000
0.2189	7/32		6.0	150.0	110.0	9065090055600
0.2344	15/64		6.0	150.0	110.0	9065090059500
0.2362			6.0	150.0	110.0	9065090060000
0.2500	1/4		8.0	167.0	127.0	9065090063500
0.2559			8.0	167.0	127.0	9065090065000
0.2656	17/64		8.0	167.0	127.0	9065090067500
0.2756			8.0	167.0	127.0	9065090070000
0.2811	9/32	K	8.0	183.0	143.0	9065090071400
0.2953			8.0	183.0	143.0	9065090075000
0.2969			8.0	183.0	143.0	9065090075400
0.3120	19/64		8.0	183.0	143.0	9065090079400
0.3150			8.0	183.0	143.0	9065090080000
0.3281	21/64		10.0	204.0	160.0	9065090083300
0.3346			10.0	204.0	160.0	9065090085000
0.3438	11/32		10.0	204.0	160.0	9065090087300
0.3543			10.0	204.0	160.0	9065090090000
0.3594	23/64		10.0	221.0	177.0	9065090091300
0.3750	3/8		10.0	221.0	177.0	9065090095200
0.3906	25/64		10.0	221.0	177.0	9065090099200
0.3937			10.0	221.0	177.0	9065090100000
0.4063	13/32		12.0	247.0	198.0	9065090103200
0.4219	27/64		12.0	247.0	198.0	9065090107200
0.4330			12.0	247.0	198.0	9065090110000
0.4370	7/16		12.0	263.0	214.0	9065090111100
0.4531	29/64		12.0	263.0	214.0	9065090115100
0.4688	15/32		12.0	263.0	214.0	9065090119100
0.4724			12.0	263.0	214.0	9065090120000
0.4843	31/64		14.0	297.0	248.0	9065090123000
0.5000	1/2		14.0	297.0	248.0	9065090127000
0.5157	33/64		14.0	297.0	248.0	9065090131000
0.5311	17/32		14.0	297.0	248.0	9065090134900
0.5469	35/64		14.0	297.0	248.0	9065090138900
0.5512			14.0	297.0	248.0	9065090140000

### Series 6511 (20xD)

Diameter (d1)			d2 mm	l1 mm	l2 mm	EDP #
Dec. inch	Fract. inch	Wire / letter				
0.1181			6.0	110.0	70.0	9065110030000
0.1250	1/8		6.0	123.0	83.0	9065110031700
0.1378			6.0	136.0	96.0	9065110035000
0.1406	9/64		6.0	136.0	96.0	9065110035700
0.1563	5/32		6.0	136.0	96.0	9065110039700
0.1575			6.0	136.0	96.0	9065110040000
0.1719	11/64		6.0	158.0	118.0	9065110043700
0.1772			6.0	158.0	118.0	9065110045000
0.1874	3/16		6.0	158.0	118.0	9065110047600
0.1969			6.0	158.0	118.0	9065110050000
0.2008			6.0	158.0	118.0	9065110051000
0.2030	13/64		6.0	158.0	118.0	9065110051600
0.2130		3	6.0	180.0	140.0	9065110054100
0.2165			6.0	180.0	140.0	9065110055000
0.2189	7/32		6.0	180.0	140.0	9065110055600
0.2344	15/64		6.0	180.0	140.0	9065110059500
0.2362			6.0	180.0	140.0	9065110060000
0.2500	1/4		8.0	202.0	162.0	9065110063500
0.2559			8.0	202.0	162.0	9065110065000
0.2656	17/64		8.0	202.0	162.0	9065110067500
0.2756			8.0	202.0	162.0	9065110070000
0.2811	9/32	K	8.0	223.0	183.0	9065110071400
0.2953			8.0	223.0	183.0	9065110075000
0.2969	19/64		8.0	223.0	183.0	9065110075400
0.3120	5/16		8.0	223.0	183.0	9065110079400
0.3150			8.0	223.0	183.0	9065110080000
0.3281	21/64		10.0	249.0	205.0	9065110083300
0.3346			10.0	249.0	205.0	9065110085000
0.3438	11/32		10.0	249.0	205.0	9065110087300
0.3543			10.0	249.0	205.0	9065110090000
0.3594	23/64		10.0	249.0	205.0	9065110091300
0.3750	3/8		10.0	271.0	227.0	9065110095200
0.3906	25/64		10.0	271.0	227.0	9065110099200
0.3937			10.0	271.0	227.0	9065110100000
0.4063	13/32		12.0	302.0	242.0	9065110103200
0.4219	27/64		12.0	302.0	242.0	9065110107200
0.4330			12.0	302.0	253.0	9065110110000
0.4370	7/16		12.0	323.0	274.0	9065110111100
0.4531	29/64		12.0	323.0	274.0	9065110115100
0.4688	15/32		12.0	323.0	274.0	9065110119100
0.4724			12.0	323.0	274.0	9065110120000
0.4843	31/64		14.0	367.0	318.0	9065110123000
0.5000	1/2		14.0	367.0	318.0	9065110127000
0.5157	33/64		14.0	367.0	318.0	9065110131000
0.5311	17/32		14.0	367.0	318.0	9065110134900
0.5469	35/64		14.0	367.0	318.0	9065110138900
0.5512			14.0	367.0	318.0	9065110140000

# Series 6512 (25xD)

Diameter (d1)			d2 mm	l1 mm	l2 mm	EDP #	
Dec. inch	Fract. inch	Wire / letter					
0.1181			3.000	6.0	125.0	85.0	9065120030000
0.1250	1/8		3.170	6.0	141.0	101.0	9065120031700
0.1378			3.500	6.0	156.0	116.0	9065120035000
0.1406	9/64		3.570	6.0	156.0	116.0	9065120035700
0.1563	5/32		3.970	6.0	156.0	116.0	9065120039700
0.1575			4.000	6.0	156.0	116.0	9065120040000
0.1719	11/64		4.370	6.0	183.0	143.0	9065120043700
0.1772			4.500	6.0	183.0	143.0	9065120045000
0.1874	3/16		4.760	6.0	183.0	143.0	9065120047600
0.1969			5.000	6.0	183.0	143.0	9065120050000
0.2008			5.100	6.0	183.0	143.0	9065120051000
0.2030	13/64		5.160	6.0	183.0	143.0	9065120051600
0.2130		3	5.410	6.0	210.0	170.0	9065120054100
0.2165			5.500	6.0	210.0	170.0	9065120055000
0.2189	7/32		5.560	6.0	210.0	170.0	9065120055600
0.2344	15/64		5.950	6.0	210.0	170.0	9065120059500
0.2362			6.000	6.0	210.0	170.0	9065120060000
0.2500	1/4		6.350	8.0	237.0	197.0	9065120063500
0.2559			6.500	8.0	237.0	197.0	9065120065000
0.2656	17/64		6.750	8.0	237.0	197.0	9065120067500
0.2756			7.000	8.0	237.0	197.0	9065120070000
0.2811	9/32	K	7.140	8.0	263.0	223.0	9065120071400
0.2953			7.500	8.0	263.0	223.0	9065120075000
0.2969	19/64		7.540	8.0	263.0	223.0	9065120075400
0.3120	5/16		7.940	8.0	263.0	223.0	9065120079400
0.3150			8.000	8.0	263.0	223.0	9065120080000
0.3281	21/64		8.330	10.0	294.0	250.0	9065120083300
0.3346			8.500	10.0	294.0	250.0	9065120085000
0.3438	11/32		8.730	10.0	294.0	250.0	9065120087300
0.3543			9.000	10.0	294.0	250.0	9065120090000
0.3594	23/64		9.130	10.0	294.0	250.0	9065120091300
0.3750	3/8		9.520	10.0	321.0	277.0	9065120095200
0.3906	25/64		9.920	10.0	321.0	277.0	9065120099200
0.3937			10.000	10.0	321.0	277.0	9065120100000
0.4063	13/32		10.320	12.0	359.0	310.0	9065120103200
0.4219	27/64		10.720	12.0	359.0	310.0	9065120107200
0.4330			11.000	12.0	359.0	310.0	9065120110000
0.4370	7/16		11.110	12.0	386.0	337.0	9065120111100
0.4531	29/64		11.510	12.0	386.0	337.0	9065120115100
0.4689	15/32		11.910	12.0	386.0	337.0	9065120119100
0.4724			12.000	12.0	386.0	337.0	9065120120000

- Minimum of 250 PSI coolant pressure recommended -



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 series 5514 RT 100 drill 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
- Start high coolant pressure and increase RPM.
- Continuous drilling to complete hole depth without peck cycle.
- 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 RPM and withdraw.

## OPERATING PARAMETERS

Drill Series	Material group	Hardness	SFM	Feed Rate - IPR					
				0.0315 in 0.800 mm	0.0394 in. 1.000 mm	0.0591 in. 1.500 mm	0.0787 in. 2.000 mm	0.0984 in. 2.500 mm	0.1181 in. 3.000 mm
6509/6512	Nickel alloys	≤38 Rc	80-100	0.004	0.002	0.002	0.004	0.004	0.005
6513/6514	Nickel alloys	≤38 Rc	80-100	0.001	0.002	0.002	0.004	0.004	0.005

# Series 6513 (30xD)

Diameter (d1)			d2 mm	l1 mm	l2 mm	EDP #	
Dec. inch	Fract. inch	Wire / letter					
0.1181			3.00	6.0	140.0	100.0	9065130030000
0.1250	1/8		3.17	6.0	158.0	118.0	9065130031700
0.1378			3.50	6.0	176.0	136.0	9065130035000
0.1406	9/64		3.57	6.0	176.0	136.0	9065130035700
0.1563	5/32		3.97	6.0	176.0	136.0	9065130039700
0.1575			4.00	6.0	176.0	136.0	9065130040000
0.1719	11/64		4.37	6.0	208.0	168.0	9065130043700
0.1772			4.50	6.0	208.0	168.0	9065130045000
0.1874	3/16		4.76	6.0	208.0	168.0	9065130047600
0.1969			5.00	6.0	208.0	168.0	9065130050000
0.2008			5.10	6.0	208.0	168.0	9065130051000
0.2030	13/64		5.16	6.0	208.0	168.0	9065130051600
0.2130		3	5.41	6.0	240.0	200.0	9065130054100
0.2165			5.50	6.0	240.0	200.0	9065130055000
0.2189	7/32		5.56	6.0	240.0	200.0	9065130055600
0.2344	15/64		5.95	6.0	240.0	200.0	9065130059500
0.2362			6.00	6.0	240.0	200.0	9065130060000
0.2500	1/4		6.35	8.0	272.0	232.0	9065130063500
0.2559			6.50	8.0	272.0	232.0	9065130065000
0.2656	17/64		6.75	8.0	272.0	232.0	9065130067500
0.2756			7.00	8.0	272.0	232.0	9065130070000
0.2811	9/32	K	7.14	8.0	303.0	263.0	9065130071400
0.2953			7.50	8.0	303.0	263.0	9065130075000
0.2969	19/64		7.54	8.0	303.0	263.0	9065130075400
0.3120	5/16		7.94	8.0	303.0	263.0	9065130079400
0.3150			8.00	8.0	303.0	263.0	9065130080000
0.3281	21/64		8.33	10.0	339.0	295.0	9065130083300
0.3346			8.50	10.0	339.0	295.0	9065130085000
0.3438	11/32		8.73	10.0	339.0	295.0	9065130087300
0.3543			9.00	10.0	339.0	295.0	9065130090000
0.3594	23/64		9.13	10.0	339.0	295.0	9065130091300
0.3750	3/8		9.52	10.0	371.0	327.0	9065130095200
0.3906	25/64		9.92	10.0	371.0	327.0	9065130099200
0.3937			10.00	10.0	371.0	327.0	9065130100000

# Series 6514 (40xD)

Diameter (d1)			d2 mm	l1 mm	l2 mm	EDP #	
Dec. inch	Fract. inch	Wire / letter					
0.1181			3.00	6.0	170.0	130.0	9065140030000
0.1248	1/8		3.17	6.0	193.0	153.0	9065140031700
0.1378			3.50	6.0	193.0	153.0	9065140035000
0.1406	9/64		3.57	6.0	216.0	176.0	9065140035700
0.1563	5/32		3.97	6.0	216.0	176.0	9065140039700
0.1575			4.00	6.0	216.0	176.0	9065140040000
0.1720	11/64		4.37	6.0	238.0	198.0	9065140043700
0.1772			4.50	6.0	238.0	198.0	9065140045000
0.1874	3/16		4.76	6.0	258.0	218.0	9065140047600
0.1969			5.00	6.0	258.0	218.0	9065140050000
0.2008			5.10	6.0	280.0	240.0	9065140051000
0.2031	13/64		5.16	6.0	280.0	240.0	9065140051600
0.2129		3	5.41	6.0	280.0	240.0	9065140054100
0.2165			5.50	6.0	280.0	240.0	9065140055000
0.2189	7/32		5.56	6.0	300.0	260.0	9065140055600
0.2343	15/64		5.95	6.0	300.0	260.0	9065140059500
0.2362			6.00	6.0	300.0	260.0	9065140060000
0.2500	1/4		6.35	8.0	322.0	282.0	9065140063500
0.2559			6.50	8.0	322.0	282.0	9065140065000
0.2657	17/64		6.75	8.0	342.0	302.0	9065140067500
0.2756			7.00	8.0	342.0	302.0	9065140070000
0.2811	9/32	K	7.14	8.0	363.0	323.0	9065140071400
0.2953			7.50	8.0	363.0	323.0	9065140075000
0.2969	19/64		7.54	8.0	383.0	343.0	9065140075400
0.3120	5/16		7.94	8.0	383.0	343.0	9065140079400
0.3150			8.00	8.0	383.0	343.0	9065140080000





# Threading Nickel Alloys

- Powdered Metal Cobalt (PM) substrate for wear resistance
- Precision ground thread forms
- Class of Fit UNC/UNF = 2BX or 3BX, Metric = 6HX
- DIN standard dimensions
- TiAlN coated for heat and additional wear resistance



**Form B 3.5 - 5 chamfer  
Spiral Point - Plug Style**

Class of Fit 2BX	Size UNC	No. Flutes	Approx. Limits	EDP #
<b>UNC 2918</b>	6-32	3	H3/H4	9029180035050
	8-32	3	H3/H4	9029180041660
	10-24	3	H3/H4	9029180048260
	12-24	3	H3/H4	9029180054860
	1/4-20	3	H4/H5	9029180063500
	5/16-18	4	H4/H5	9029180079380
<b>UNF 2919</b>	3/8-16	4	H5/H6	9029180095250
	6-40	3	H2/H3	9029190035050
	8-36	3	H2/H3	9029190041660
	10-32	3	H3/H4	9029190048260
	12-28	3	H3/H4	9029190054860
	1/4-28	3	H3/H4	9029190063500
	5/16-28	4	H3/H4	9029190079380
	3/8-24	4	H3/H4	9029190095250

Class of Fit 6HX	Size UNC	No. Flutes	Approx. Limits	EDP #
<b>METRIC 2916</b>	M3 X 0.50	3	D2/D3	9029160030000
	M4 X 0.70	3	D3/D4	9029160040000
	M5 X 0.80	3	D3/D4	9029160050000
	M6 X 1.00	3	D4/D5	9029160060000
	M8 X 1.25	3	D4/D5	9029160080000
	M10 X 1.50	3	D4/D5	9029160100000
	M12 X 1.75*	4	D5/D6	9029160120000
<b>METRIC FINE 2917</b>	M16 X 2.0*	4	D6/D7	9029160160000
	M3 X 0.35	3	D2/D3	9029170030020
	M4 X 0.50	3	D3/D4	9029170040030
	M5 X 0.50	3	D3/D4	9029170050030
	M6 X 0.50	3	D3/D4	9029170060030
	M6 X 0.75	3	D3/D4	9029170060040
	M8 X 0.50	3	D3/D4	9029170080030
	M8 X 0.75	3	D3/D4	9029170080040
M8 X 1.00	3	D4/D5	9029170080050	
M10 X 1.00	3	D4/D5	9029170100050	
M10 X 1.25	3	D4/D5	9029170100060	



**Form C 2 - 3 chamfer  
Semi-bottoming Style**

	Size UNC	No. Flutes	2BX	3BX
			2922 EDP #	1067 EDP #
<b>UNC 2922 &amp; 1067</b>	4-40	3	9029220028450	9010670028450
	5-40	3	9029220031750	9010670031750
	6-32	3	9029220035050	9010670035050
	8-32	3	9029220041660	9010670041660
	10-24	3	9029220048260	9010670048260
	12-24	3	9029220054860	9010670054860
	1/4-20	3	9029220063500	9010670063500
	5/16-18	3	9029220079380	9010670079380
	3/8-16	4	9029220095250	9010670095250
	7/16-14*	4	9029220111130	9010670111130
	1/2-13*	4	9029220127000	9010670127000
<b>UNF 2923 &amp; 1068</b>	5/8-11*	4	9029220158750	9010670158750
	Size UNC	No. Flutes	2BX 2923 EDP #	3BX 1068 EDP #
	4-48	3	9029230028450	9010680028450
	5-44	3	9029230031750	9010680031750
	6-40	3	9029230035050	9010680035050
	8-36	3	9029230041660	9010680041660
	10-32	3	9029230048260	9010680048260
	12-28	3	9029230054860	9010680054860
	1/4-28	3	9029230063500	9010680063500
	5/16-24	3	9029230079380	9010680079380
	3/8-24	4	9029230095250	9010680095250
7/16-20*	4	9029230111130	9010680111130	
1/2-20*	4	9029230127000	9010680127000	
5/8-18*	4	9029230158750	9010680158750	

Class of Fit 6HX	Size UNC	No. Flutes	Approx. Limits	EDP #
<b>METRIC 2920</b>	M3 X 0.50	3	D2/D3	9029440030000
	M4 X 0.70	3	D3/D4	9029440040000
	M5 X 0.80	3	D3/D4	9029440050000
	M6 X 1.00	3	D4/D5	9029440060000
	M8 X 1.25	3	D4/D5	9029440080000
	M10 X 1.50	3	D4/D5	9029440100000
	M12 X 1.75*	3	D5/D6	9029440120000
<b>METRIC FINE 2921</b>	M16 X 2.0*	3	D6/D7	9029440160000
	M3 X 0.35	3	D2/D3	9029210030020
	M4 X 0.50	3	D3/D4	9029210040030
	M5 X 0.50	3	D3/D4	9029210050030
	M6 X 0.50	3	D3/D4	9029210060030
	M6 X 0.75	3	D3/D4	9029210060040
	M8 X 0.50	3	D3/D4	9029210080030
	M8 X 0.75	3	D3/D4	9029210080040
M8 X 1.00	3	D4/D5	9029210080050	
M10 X 1.00	3	D4/D5	9029210100050	
M10 X 1.25	3	D4/D5	9029210100060	

\* Denotes sizes manufactured to DIN 376 standards.

## Tap Operating Parameters

Recommended Tapping Speeds - Nickel and Ni Alloys		
Material Hardness (Approximate HB)	SFM (HSS-E-PM)	
	Bright Finish	Hard Coated
200 - 300	6 - 12	10 - 18
> 300	3 - 6	6 - 12

# Titanium Alloys

TiCN coated for lubricity and additional wear resistance



**Form B 3.5 - 5 chamfer  
Spiral Point - Plug Style**

	Size	No. Flutes	2BX	3BX
	UNC		2905 EDP #	1059 EDP #
<b>UNC 2905 &amp; 1059</b>	6-32	3	9029050035050	9010590035050
	8-32	3	9029050041660	9010590041660
	10-24	3	9029050048260	9010590048260
	12-24	3	9029050054860	9010590054860
	1/4-20	3	9029050063500	9010590063500
	5/16-18	4	9029050079380	9010590079380
	3/8-16	4	9029050095250	9010590095250
	7/16-14	4		9010590111130
	1/2-13	4		9010590127000
	5/8-11	4		9010590158750
	Size	No. Flutes	2BX	3BX
	UNC		2907 EDP #	1060 EDP #
<b>UNF 2907 &amp; 1060</b>	6-40	3	9029070035050	9010600035050
	8-36	3	9029070041660	9010600041660
	10-32	3	9029070048260	9010600048260
	12-28	3	9029070054860	9010600054860
	1/4-28	3	9029070063500	9010600063500
	5/16-24	4	9029070079380	9010600079380
	3/8-24	4	9029070095250	9010600095250
	7/16-20	4		9010600111130
	1/2-20	4		9010600127000
	5/8-18	4		9010600158750



**Form C 2 - 3 chamfer  
Semi-bottoming Style**

	Size	No. Flutes	2BX	3BX
	UNC		2912 EDP #	1063 EDP #
<b>UNC 2912 &amp; 1063</b>	4-40	3	9029120028450	9010630028450
	5-40	3	9029120031750	9010630031750
	6-32	3	9029120035050	9010630035050
	8-32	3	9029120041660	9010630041660
	10-24	3	9029120048260	9010630048260
	12-24	3	9029120054860	9010630054860
	1/4-20	3	9029120063500	9010630063500
	5/16-18	3	9029120079380	9010630079380
	3/8-16	4	9029120095250	9010630095250
	7/16-14*	4	9029120111130	9010630111130
	1/2-13*	4	9029120127000	9010630127000
	5/8-11*	4	9029120158750	9010630158750
		Size	No. Flutes	2BX
UNC		2914 EDP #		1064 EDP #
<b>UNF 2914 &amp; 1064</b>	4-48	3	9029140028450	9010640028450
	5-44	3	9029140031750	9010640031750
	6-40	3	9029140035050	9010640035050
	8-36	3	9029140041660	9010640041660
	10-32	3	9029140048260	9010640048260
	12-28	3	9029140054860	9010640054860
	1/4-28	3	9029140063500	9010640063500
	5/16-24	3	9029140079380	9010640079380
	3/8-24	4	9029140095250	9010640095250
	7/16-20*	4	9029140111130	9010640111130
	1/2-20*	4	9029140127000	9010640127000
	5/8-18*	4	9029140158750	9010640158750

Class of Fit	Size	No. Flutes	Approx. Limits	EDP #
6HX	UNC			
<b>METRIC 2901</b>	M3 X 0.50	3	D2/D3	9029010030000
	M4 X 0.70	3	D3/D4	9029010040000
	M5 X 0.80	3	D3/D4	9029010050000
	M6 X 1.00	3	D4/D5	9029010060000
	M8 X 1.25	3	D4/D5	9029010080000
	M10 X 1.50	3	D4/D5	9029010100000
	M12 X 1.75*	4	D5/D6	9029210080040
M16 X 2.0*	4	D6/D7	9029210080050	
<b>METRIC FINE 2903</b>	M3 X 0.35	3	D2/D3	9029030030020
	M4 X 0.50	3	D3/D4	9029030040030
	M5 X 0.50	3	D3/D4	9029030050030
	M6 X 0.50	3	D3/D4	9029030060030
	M6 X 0.75	3	D3/D4	9029030060040
	M8 X 0.75	3	D3/D4	9029030080040
	M8 X 1.00	3	D4/D5	9029030080050
M10 X 1.00	3	D4/D5	9029030100050	

Class of Fit	Size	No. Flutes	Approx. Limits	EDP #
6HX	UNC			
<b>METRIC 2909</b>	M3 X 0.50	3	D2/D3	9029090030000
	M4 X 0.70	3	D3/D4	9029090040000
	M5 X 0.80	3	D3/D4	9029090050000
	M6 X 1.00	3	D4/D5	9029090060000
	M8 X 1.25	3	D4/D5	9029090080000
	M10 X 1.50	3	D4/D5	9029090100000
	M12 X 1.75*	4	D5/D6	9029090120000
	M16 X 2.00*	4	D6/D7	9029090160000
<b>METRIC FINE 2910</b>	M3 X 0.35	3	D2/D3	9029100030020
	M4 X 0.50	3	D3/D4	9029100040030
	M5 X 0.50	3	D3/D4	9029100050030
	M6 X 0.50	3	D3/D4	9029100060030
	M6 X 0.75	3	D3/D4	9029100060040
	M8 X 0.75	3	D3/D4	9029100080040
	M8 X 1.00	3	D4/D5	9029100080050
M10 X 1.00	3	D4/D5	9029100100050	

\* Denotes sizes manufactured to DIN 376 standards.

## Tap Operating Parameters

Recommended Tapping Speeds - Titanium and Ti Alloys		
Material Hardness (Approximate HB)	SFM (HSS-E-PM)	
	Bright Finish	Hard Coated
140 - 275	12 - 25	20 - 30
300 - 380	6 - 12	10 - 18



Detailed information and additional tap options can be found in our full-line tap catalog, or by contacting Guhring Tech Support at (800) 776-6170. Product information is also available on our website [www.guhring.com](http://www.guhring.com) on the Products & Services tab.

EDP numbers in RED are new and will be available in Fall of 2012.



# Milling

## RF 100 Variable Helix End Mills

**Solid carbide, RF 100 style designed for nickel alloys and titanium**  
**Variable helix dampens vibration, provides improved surface finish quality**



### Series 3876 - RF 100 TI

Cut Diameter	Shank Diameter	Length of Cut	OAL	Corner Radius	No. Flutes	EDP #
1/4	1/4	3/4	2 1/2	0.015	4	9038760063520
1/4	1/4	3/4	2 1/2	0.031	4	9038760063540
5/16	5/16	13/16	2 1/2	0.031	4	9038760079440
3/8	3/8	1	2 1/2	0.031	4	9038760095240
7/16	7/16	1 1/4	2 3/4	0.031	4	9038760111140
1/2	1/2	1 1/4	3 1/2	0.031	4	9038760127040
1/2	1/2	1 1/4	3 1/2	0.040	4	9038760127050
1/2	1/2	1 1/4	3 1/2	0.062	4	9038760127060
1/2	1/2	1 1/4	3 1/2	0.090	4	9038760127070
5/8	5/8	1 1/4	3 1/2	0.031	4	9038760158740
5/8	5/8	1 1/4	3 1/2	0.062	4	9038760158760
3/4	3/4	1 1/2	4	0.062	4	9038760190560
3/4	3/4	1 1/2	4	0.090	4	9038760190570
3/4	3/4	1 1/2	4	0.125	4	9038760190590
1	1	1 1/2	4	0.062	4	9038760254060
1	1	1 1/2	4	0.090	4	9038760254070
1	1	1 1/2	4	0.125	4	9038760254090

### RF 100 Ti end mill features:

- Super-A™ coating - outstanding heat and wear resistance
- Ultra fine grain carbide
- 35°/38° variable helix design
- Shank flats on diameters from 1/2" to 1.0"
- Corner radius to NAS Standard



### Series 3080 - RF 100 VA

Cut Diameter	Shank Diameter	Length of Cut	OAL	No. Flutes	EDP #
3/16	3/16	5/8	2	4	9030800047600
1/4	1/4	3/4	2 1/2	4	9030800063500
5/16	5/16	13/16	2 1/2	4	9030800079400
3/8	3/8	1	2 1/2	4	9030800095200
1/2	1/2	1 1/4	3 1/2	4	9030800127000
5/8	5/8	1 1/4	3 1/2	4	9030800158700
3/4	3/4	1 1/2	4	4	9030800190500
1	1	1 1/2	4	4	9030800254000

### 4-flute multi-purpose end mill features:

- Designed for higher feed rates
- Suitable for roughing and finishing, slot or periphery milling
- Chamfer edge protection for longer tool life
- nano-A™ coating - outstanding heat and wear resistance
- Shank flats on diameters from 1/2" to 1.0"
- 36°/38° variable helix design
- Ultra fine grain carbide



### Series 3115 - RF 100 SF

Cut Diameter	Shank Diameter	Length of Cut	OAL	No. Flutes	EDP #
5/16	5/16	13/16	2 1/2	6	9031150079400
3/8	3/8	1	2 1/2	6	9031150095200
1/2	1/2	1	3	6	9031150127000
5/8	5/8	1 1/4	3 1/2	6	9031150158700
3/4	3/4	1 1/2	4	6	9031150190500
1	1	1 1/2	4	6	9031150254000

### Super-finishing end mill features:

- 6-flute design with a larger, more rigid core than competitors
- Optimized flute profile for superior chip flow and feed rates
- Vibration-free; allows for exceptional surface finish
- FIREX® coating - extremely heat and wear resistant
- 44°/45°/46° variable helix design
- Ultra fine grain carbide
- Metric sizes available in series 3631

## End Mill Alternatives:

### Roughing end mills:

\* **Series 3082\***- RF 100 U/HF variable helix roughing/finishing end mill, FIREX® coated, standard length, cut diameters from 1/4" to 1.0".

**Series 3097** - Aero-Rough 48 carbide 4-5 flute end mill. FIREX® coated, roughing cutter for materials < 48 HRC, cut diameters from 1/4" to 1.0".

### Finishing end mills:

\* **Series 3179\***- Finish-Tech carbide 6-10 flute finishing end mill. FIREX® coated, suitable for high speed machining, cut diameters from 1/4" to 1.0".

**Series 3182**- Finish-Tech carbide 6-10 flute finishing end mill. FIREX® coated, best suited for nickel alloy above 40 HRC, cut diameters from 1/4" to 1.0".

### Ballnose end mills:

\* **Series 3165\***- Uni Pro ballnose end mill. Carbide 4-flute end mill with FIREX® coating, cut diameters from 1/16 to 3/4". Long length version also available.

**Series 3861** - Uni Pro ballnose end mill. Carbide 4-flute end mill with Super-A™ coating, cut diameters from 1/16" to 3/4". Long length version also available.

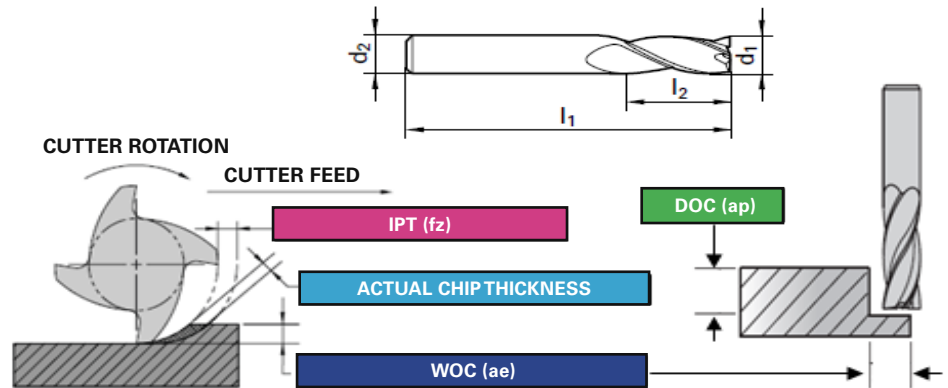


Detailed information and additional end mill options can be found in our RF 100 or full-line end mill catalogs, or by contacting Guhring Tech Support at (800) 776-6170. Product information is also available on our website [www.guhring.com](http://www.guhring.com) on the Products & Services tab.

## OPERATING PARAMETERS

$$\text{RPM} = \frac{\text{SFM}}{d_1} \times 3.82$$

$$\text{IPM} = \text{No. of Teeth} \times \text{IPT} \times \text{RPM}$$



If surface finish is the priority use IPT from table with no adjustment for chip thinning. Use SFM for 10% radial width of cut.

			Surface Feet per Minute - SFM				
			Radial Width of Cut WOC (ae)				
Material	Hardness	RF100-	5%	10%	30%	50%	100% Slotting
			2.3	1.8	1.1	1	1
High-Temperature Alloys Nimonic, Inconel, Monel, Hastelloy	up to 42 Hrc	Ti/F	150	140	120	100	100
		VA					
Titanium Alloys 6Al-4V, 5Al-2.5 Sn, 6Al- 2Sn-4Zr-6Mo, 3Ai-8V- 6Cr4Mo-4Zr, 10V-2Fe- 3Ai, 13V-11Cr-3Ai	up to 240 HB 30	SF	450	325	225	175	175
		Ti/U					

Feed Rate Inch per Tooth - IPT							
d1 End Mill Diameter							
1/8	1/4	5/16	3/8	1/2	5/8	3/4	1
Multiply IPT x this factor based on WOC							
.0003	.0007	.0010	.0012	.0015	.0020	.0024	.0030
.0005	.0012	.0015	.0018	.0022	.0028	.0035	.0040



# Coating

Oftentimes, there is a need for a thin film coating on cutting tools due to the heat generated from the machining operation, as well as the wear caused by abrasion, and the potential for chip adhesion. The proper coating (applied correctly) increases surface hardness while lowering the friction coefficient and thermal conductivity. It also provides a chemically inert surface. Fortunately, Guhring's Coating Division has more than enough knowledge and experience to create coatings that will maximize tool and wear part productivity, which in turn provides cost effectiveness to our customers. Over the years, we have seen significant increases in tool life and part quality. We've also seen reduced friction and heat buildup, high resistance to edge buildup, as well as galling and fissure propagation - all thanks to our coating development and application processes. Not convinced? Contact your Guhring representative today and learn about our free coating trial policy!

## Extending You

	Type	Identifying Color	Coating Process	Coating Temperature	Layer Structure	Thickness (µm)	Nano-hardness (HV 0.05)	Friction Coefficient (fetting)	Thermal Stability
<b>TiN</b> Titanium Nitride	Hard • Wear-resistant	Gold	PVD Physical Vapor Deposition	930° F 500° C	Monolayer	1.5 - 4.0	2400	0.50	1100° F 595° C
<b>TiCN</b> Titanium Carbonitride	Hard • Wear-resistant	Gray Violet	PVD Physical Vapor Deposition	930° F 500° C	Gradient	1.5 - 5.0	3000	0.25	840° F 450° C
<b>TiAlN</b> Titanium Aluminum Nitride	Hard • Wear-resistant	Black Violet	PVD Physical Vapor Deposition	930° F 500° C	Monolayer	1.5 - 4.0	3300	0.50	1470° F 800° C
<b>FIREX®</b> Special TiN-TiAlN	Hard • Wear-resistant	Red Violet	PVD Physical Vapor Deposition	930° F 500° C	Multilayer	1.5 - 5.0	3000-3300	0.50	1470° F 800° C
<b>nano-FIREX®</b> Special TiN-TiAlN	Hard • Wear-resistant	Red Violet	PVD Physical Vapor Deposition	930° F 500° C	Multilayer	1.5 - 4.0	3000-3300	0.50	1470° F 800° C
<b>Super-A™</b> Aluminum Titanium Nitride	Hard • Wear-resistant	Dark Gray	PVD Physical Vapor Deposition	930° F 500° C	Monolayer	1.5 - 4.0	3800	0.60	1650° F 900° C
<b>nano-A™</b> Aluminum Titanium Nitride	Hard • Wear-resistant	Dark Gray	PVD Physical Vapor Deposition	930° F 500° C	Monolayer	1.5 - 4.0	3800	0.60	1650° F 900° C
<b>Moly-Glide®</b> MoS <sub>2</sub> -Based	Soft • Lubricating	Silver	PVD Physical Vapor Deposition	305° F 150° C	Monolayer	1.0	n.a.	0.10	1470° F 800° C
<b>nano-Si®</b>	Hard • Wear-resistant	Bronze	PVD Physical Vapor Deposition	930° F 500° C	Multilayer	1.5 - 5.0	5500	0.55	1470° F 800° C



# Reconditioning

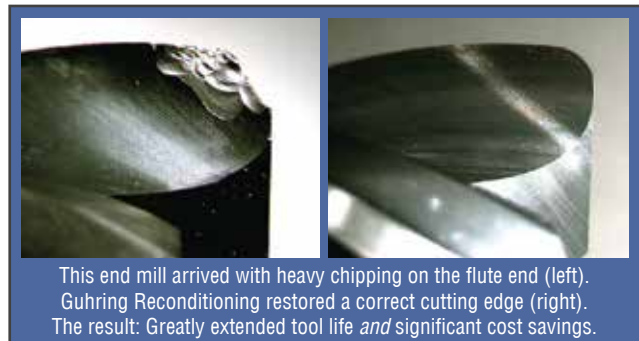
# r Investment



Guhring can restore worn standard, special carbide and PCD drills, step drills, reamers, and end mills to their original factory quality, condition and performance. We also recoat in the same facility that we recondition, allowing for quicker turn-around and excellent quality control. High precision remanufacturing delivers longer reground tool life and often more regrinds per tool, resulting in significant cost savings in terms of both tooling and machining expenses.

Utilizing the same high-precision CNC grinding machines that are used in Guhring's manufacturing plants, our Reconditioning Division is well-equipped to restore standard and special carbide and PCD tooling to its original factory condition.

Guhring is able to provide factory reconditioning for our own drills, step drills, end mills, and reamers – and we can provide the same high-quality service for other manufacturers' tooling as well. We even offer van pickup and delivery service in select areas.



## Guhring Coating and Reconditioning Facilities:

Brookfield, WI

Huntington Beach, CA

New Hudson, MI

Bloomfield, CT



Visit <http://www.guhring.com/PS/Reconditioning.htm> for more information!

DRILLING

TAPPING/THREAD-  
MILLING/FLUTELESS  
TAPPING

MILLING

REAMING

PCD/PCBN



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SYSTEMS

TOOL RESTORATION SERVICE

Don't forget to visit us at [www.guhring.com](http://www.guhring.com)

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