

TOLERANCES

d_1	$\leq .030"$	$+0.000" - .001" (+.000 - .025mm)$
	$\geq 1/32"$	$+0.000" - .002" (+.000 - .050mm)$
d_2	h6	
ball radius	$+0.000" - .001" (+.000 - .025mm)$	

Series 320M, 323M, 330M, 920M, 923M, 930M



.0100" - .2656"
(0.254mm - 6.746mm)

END MILLS

Standard Length - Ball End

Solid submicron grain carbide end mill - center cutting

Extremely versatile

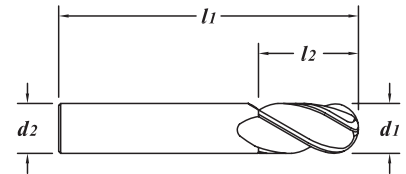
TiN Coating - page 207

TiCN Coating - page 208

TiAlN Coating - page 209

Stub Length - page 188

Extended length - page 231



(320M/920M) 2 Flute EDP#	(323M/923M) 3 Flute EDP#	(330M/930M) 4 Flute EDP#	d_1 †		d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	1-11	12-24	25-49	50-100	
			Decimal	Metric								
16550	-	-	.0100	.0100"	0.254	1/8"	1-1/2"	.030"	21.71	20.77	19.82	18.88
16600	-	-	.0150	.0150"	0.381	1/8"	1-1/2"	.045"	21.62	20.68	19.74	18.80
16650	-	-	.0200	.0200"	0.508	1/8"	1-1/2"	.060"	21.05	20.13	19.22	18.30
16700	-	-	.0250	.0250"	0.635	1/8"	1-1/2"	.075"	20.34	19.46	18.57	17.69
16750	-	-	.0300	.0300"	0.762	1/8"	1-1/2"	.090"	17.53	16.76	16.00	15.24
16010	17010	18010	.0312	1/32"	0.792	1/8"	1-1/2"	3/32"	13.00	12.43	11.87	11.30
47010	38010	48010	.0394		1.000	3.0	38	4	13.65	13.06	12.46	11.87
16020	17020	18020	.0469	3/64"	1.191	1/8"	1-1/2"	1/8"	13.00	12.43	11.87	11.30
47020	38020	48020	.0591		1.500	3.0	38	6	13.65	13.06	12.46	11.87
16030	17030	18030	.0625	1/16"	1.588	1/8"	1-1/2"	1/4"	12.27	11.74	11.20	10.67
16040	17040	18040	.0781	5/64"	1.984	1/8"	1-1/2"	1/4"	12.27	11.74	11.20	10.67
47030	38030	48030	.0787		2.000	3.0	38	8	12.87	12.31	11.75	11.19
16050	17050	18050	.0938	3/32"	2.383	1/8"	1-1/2"	3/8"	11.73	11.22	10.71	10.20
47040	38040	48040	.0984		2.500	3.0	38	12	12.33	11.79	11.26	10.72
16060	17060	18060	.1094	7/64"	2.779	1/8"	1-1/2"	3/8"	11.73	11.22	10.71	10.20
47050	38050	48050	.1181		3.000	3.0	38	12	11.19	10.70	10.22	9.73
16070	17070	18070	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"	10.65	10.19	9.72	9.26
47060	38060	48060	.1378		3.500	4.0	50	12	16.43	15.72	15.00	14.29
16080	17080	18080	.1406	9/64"	3.571	3/16"	2"	9/16"	15.62	14.94	14.26	13.58
16090	17090	18090	.1562	5/32"	3.967	3/16"	2"	9/16"	15.62	14.94	14.26	13.58
47070	38070	48070	.1575		4.000	4.0	50	14	14.73	14.09	13.45	12.81
16100	17100	18100	.1719	11/64"	4.366	3/16"	2"	9/16"	15.62	14.94	14.26	13.58
47080	38080	48080	.1772		4.500	5.0	50	14	18.54	17.73	16.93	16.12
16110	17110	18110	.1875	3/16"	4.763	3/16"	2"	5/8"	14.03	13.42	12.81	12.20
47090	38090	48090	.1969		5.000	5.0	65	16	17.86	17.08	16.31	15.53
16120	17120	18120	.2031	13/64"	5.159	1/4"	2-1/2"	5/8"	18.17	17.38	16.59	15.80
16130	17130	18130	.2188	7/32"	5.558	1/4"	2-1/2"	5/8"	18.17	17.38	16.59	15.80
16140	17140	18140	.2344	15/64"	5.954	1/4"	2-1/2"	3/4"	18.17	17.38	16.59	15.80
47100	38100	48100	.2362		6.000	6.0	65	19	18.31	17.51	16.72	15.92
16150	17150	18150	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	17.42	16.67	15.91	15.15
16160	17160	18160	.2656	17/64"	6.746	5/16"	2-1/2"	7/8"	27.27	26.08	24.90	23.71

continued →

MATERIAL HARDNESS (Rc)

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Series 320M, 323M, 330M, 920M, 923M, 930M (continued)

.2756" - 1.000"
(7.00mm - 25.40mm)

END MILLS

(320M/920M) 2 Flute EDP#	(323M/923M) 3 Flute EDP#	(330M/930M) 4 Flute EDP#	d_1 †		d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	1-11	12-24	25-49	50-100	
			Decimal	Diameter								Metric
47110	38110	48110	.2756		7.000	7.0	65	22	23.51	22.48	21.46	20.44
16170	17170	18170	.2812	9/32"	7.142	5/16"	2-1/2"	7/8"	27.27	26.08	24.90	23.71
16180	-	18180	.2969	19/64"	7.541	5/16"	2-1/2"	7/8"	27.27	26.08	24.90	23.71
16190	17190	18190	.3125	5/16"	7.938	5/16"	2-1/2"	7/8"	22.85	21.86	20.86	19.87
47120	38120	48120	.3150		8.000	8.0	65	22	24.04	22.99	21.95	20.90
16200	17200	18200	.3281	21/64"	8.334	3/8"	2-1/2"	7/8"	32.65	31.23	29.81	28.39
16210	17210	18210	.3438	11/32"	8.733	3/8"	2-1/2"	7/8"	32.65	31.23	29.81	28.39
47130	38130	48130	.3543		9.000	9.0	65	22	29.37	28.09	26.82	25.54
16220	-	18220	.3594	23/64"	9.129	3/8"	2-1/2"	7/8"	32.65	31.23	29.81	28.39
16230	17230	18230	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	27.96	26.74	25.53	24.31
16240	17240	18240	.3906	25/64"	9.921	7/16"	2-3/4"	7/8"	40.17	38.42	36.68	34.93
47140	38140	48140	.3937		10.000	10.0	70	25	34.33	32.84	31.34	29.85
16250	17250	18250	.4062	13/32"	10.317	7/16"	2-3/4"	7/8"	40.17	38.42	36.68	34.93
16260	17260	18260	.4219	27/64"	10.716	7/16"	2-3/4"	7/8"	40.17	38.42	36.68	34.93
47150	38150	48150	.4331		11.000	11.0	75	25	36.13	34.56	32.99	31.42
16270	17270	18270	.4375	7/16"	11.113	7/16"	2-3/4"	1"	34.41	32.91	31.42	29.92
16280	17280	18280	.4531	29/64"	11.509	1/2"	3"	1"	57.55	55.04	52.54	50.04
16290	17290	18290	.4688	15/32"	11.908	1/2"	3"	1"	57.55	55.04	52.54	50.04
47160	38160	48160	.4724		12.000	12.0	75	25	54.66	52.28	49.91	47.53
16300	17300	18300	.4844	31/64"	12.304	1/2"	3"	1"	57.55	55.04	52.54	50.04
16310	17310	18310	.5000	1/2"	12.700	1/2"	3"	1"	52.05	49.79	47.52	45.26
47170	38170	48170	.5512		14.000	14.0	88	32	79.58	76.12	72.66	69.20
16320	17320	18320	.5625	9/16"	14.288	9/16"	3-1/2"	1-1/4"	75.80	72.50	69.21	65.91
16330	17330	18330	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	84.18	80.52	76.86	73.20
47180	38180	48180	.6299		16.000	16.0	88	38	88.37	84.52	80.68	76.84
16340	17340	18340	.6875	11/16"	17.463	3/4"	4"	1-1/2"	140.13	134.04	127.94	121.85
47190	38190	48190	.7087		18.000	18.0	100	38	130.05	124.40	118.74	113.09
16350	17350	18350	.7500	3/4"	19.050	3/4"	4"	1-1/2"	123.88	118.49	113.11	107.72
47200	38200	48200	.7874		20.000	20.0	100	38	174.40	166.82	159.23	151.65
47210	38210	48210	.8661		22.000	22.0	100	38	193.73	185.31	176.88	168.46
16360	17360	18360	.8750	7/8"	22.225	7/8"	4"	1-1/2"	198.46	189.83	181.20	172.57
47220	38220	48220	.9843		25.000	25.0	100	38	203.08	194.25	185.42	176.59
16370	17370	18370	1.000	1"	25.400	1"	4"	1-1/2"	214.88	205.54	196.19	186.85

MATERIAL HARDNESS (Rc)

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