

Series 220M, 223M, 230M, 820M, 823M, 830M

.0050" - .0984"
(0.127mm - 2.500mm)



TECH
PAGES
262,264

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

Standard Length - Square End

Solid submicron grain carbide end mill - center cutting

Extremely versatile

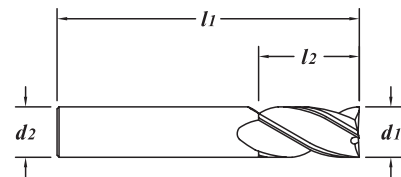
TiN Coating - page 196

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TiAlN Coating - page 198

Stub Length - page 185

Extended length - page 220



(220M/820M) 2 Flute EDP#	(223M/823M) 3 Flute EDP#	(230M/830M) 4 Flute EDP#	Decimal	d_1 † Diameter		d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	1-11	12-24	25-49	50-100
				Metric								
11500	-	-	.0050	.0050"	0.127	1/8"	1-1/2"	.015"	21.28	20.35	19.43	18.50
11510	-	-	.0060	.0060"	0.152	1/8"	1-1/2"	.018"	21.28	20.35	19.43	18.50
11520	-	-	.0070	.0070"	0.178	1/8"	1-1/2"	.021"	20.02	19.15	18.28	17.41
11530	-	-	.0080	.0080"	0.203	1/8"	1-1/2"	.024"	20.02	19.15	18.28	17.41
11540	-	-	.0090	.0090"	0.229	1/8"	1-1/2"	.027"	18.89	18.07	17.25	16.43
11550	-	13550	.0100	.0100"	0.254	1/8"	1-1/2"	.030"	18.89	18.07	17.25	16.43
11560	-	-	.0110	.0110"	0.279	1/8"	1-1/2"	.033"	17.49	16.73	15.97	15.21
11570	-	-	.0120	.0120"	0.305	1/8"	1-1/2"	.036"	17.49	16.73	15.97	15.21
11580	-	-	.0130	.0130"	0.330	1/8"	1-1/2"	.039"	17.40	16.64	15.89	15.13
11590	-	-	.0140	.0140"	0.356	1/8"	1-1/2"	.042"	17.40	16.64	15.89	15.13
11600	-	13600	.0150	.0150"	0.381	1/8"	1-1/2"	.045"	17.40	16.64	15.89	15.13
11610	-	-	.0160	.0160"	0.406	1/8"	1-1/2"	.048"	17.17	16.42	15.68	14.93
11620	-	-	.0170	.0170"	0.432	1/8"	1-1/2"	.051"	17.17	16.42	15.68	14.93
11630	-	-	.0180	.0180"	0.457	1/8"	1-1/2"	.054"	16.85	16.12	15.38	14.65
11640	-	-	.0190	.0190"	0.483	1/8"	1-1/2"	.057"	16.85	16.12	15.38	14.65
11650	-	13650	.0200	.0200"	0.508	1/8"	1-1/2"	.060"	16.85	16.12	15.38	14.65
11660	-	-	.0210	.0210"	0.533	1/8"	1-1/2"	.063"	16.85	16.12	15.38	14.65
11670	-	-	.0220	.0220"	0.559	1/8"	1-1/2"	.066"	16.65	15.93	15.20	14.48
11680	-	-	.0230	.0230"	0.584	1/8"	1-1/2"	.069"	16.65	15.93	15.20	14.48
11690	-	-	.0240	.0240"	0.610	1/8"	1-1/2"	.072"	16.65	15.93	15.20	14.48
11700	-	13700	.0250	.0250"	0.635	1/8"	1-1/2"	.075"	15.71	15.03	14.34	13.66
11710	-	-	.0260	.0260"	0.660	1/8"	1-1/2"	.078"	15.71	15.03	14.34	13.66
11720	-	-	.0270	.0270"	0.686	1/8"	1-1/2"	.081"	14.09	13.48	12.86	12.25
11730	-	-	.0280	.0280"	0.711	1/8"	1-1/2"	.084"	14.09	13.48	12.86	12.25
11740	-	-	.0290	.0290"	0.737	1/8"	1-1/2"	.087"	14.09	13.48	12.86	12.25
11750	-	13750	.0300	.0300"	0.762	1/8"	1-1/2"	.090"	14.09	13.48	12.86	12.25
11010	12010	13010	.0312	1/32"	0.792	1/8"	1-1/2"	3/32"	10.25	9.80	9.36	8.91
45010	37010	46010	.0394		1.000	3.0	38	4	10.76	10.30	9.83	9.36
11020	12020	13020	.0469	3/64"	1.191	1/8"	1-1/2"	1/8"	10.25	9.80	9.36	8.91
45020	37020	46020	.0591		1.500	3.0	38	6	10.76	10.30	9.83	9.36
11030	12030	13030	.0625	1/16"	1.588	1/8"	1-1/2"	1/4"	9.51	9.10	8.68	8.27
11040	12040	13040	.0781	5/64"	1.984	1/8"	1-1/2"	1/4"	9.51	9.10	8.68	8.27
45030	37030	46030	.0787		2.000	3.0	38	8	9.98	9.55	9.11	8.68
11050	12050	13050	.0938	3/32"	2.383	1/8"	1-1/2"	3/8"	8.99	8.60	8.21	7.82
45040	37040	46040	.0984		2.500	3.0	38	12	9.44	9.03	8.62	8.21

MATERIAL HARDNESS (Rc)

Series 220M, 223M, 230M, 820M, 823M, 830M (continued)

.1094" - 1.250"
(2.779mm - 31.750mm)

END MILLS

(220M/820M) 2 Flute EDP#	(223M/823M) 3 Flute EDP#	(230M/830M) 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
11060	12060	13060	.1094	7/64"	2.779	1/8"	1-1/2"	3/8"	8.99	8.60	8.21	7.82
45050	37050	46050	.1181		3.000	3.0	38	12	8.72	8.34	7.96	7.58
11070	12070	13070	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"	8.30	7.94	7.58	7.22
45060	37060	46060	.1378		3.500	4.0	50	12	12.90	12.34	11.78	11.22
11080	12080	13080	.1406	9/64"	3.571	3/16"	2"	9/16"	12.27	11.74	11.20	10.67
11090	12090	13090	.1562	5/32"	3.967	3/16"	2"	9/16"	12.27	11.74	11.20	10.67
45070	37070	46070	.1575		4.000	4.0	50	14	12.24	11.70	11.17	10.64
11100	12100	13100	.1719	11/64"	4.366	3/16"	2"	9/16"	12.27	11.74	11.20	10.67
45080	37080	46080	.1772		4.500	5.0	50	14	14.97	14.32	13.67	13.02
11110	12110	13110	.1875	3/16"	4.763	3/16"	2"	5/8"	11.64	11.13	10.63	10.12
45090	37090	46090	.1969		5.000	5.0	65	16	14.28	13.66	13.04	12.42
11120	12120	13120	.2031	13/64"	5.159	1/4"	2-1/2"	5/8"	15.42	14.75	14.08	13.41
11130	12130	13130	.2188	7/32"	5.558	1/4"	2-1/2"	5/8"	15.42	14.75	14.08	13.41
11140	12140	13140	.2344	15/64"	5.954	1/4"	2-1/2"	3/4"	15.42	14.75	14.08	13.41
45100	37100	46100	.2362		6.000	6.0	65	19	14.73	14.09	13.45	12.81
11150	12150	13150	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	14.03	13.42	12.81	12.20
11160	12160	13160	.2656	17/64"	6.746	5/16"	2-1/2"	7/8"	24.61	23.54	22.47	21.40
45110	37110	46110	.2756		7.000	7.0	65	22	20.24	19.36	18.48	17.60
11170	12170	13170	.2812	9/32"	7.142	5/16"	2-1/2"	7/8"	24.61	23.54	22.47	21.40
11180	12180	13180	.2969	19/64"	7.541	5/16"	2-1/2"	7/8"	24.61	23.54	22.47	21.40
11190	12190	13190	.3125	5/16"	7.938	5/16"	2-1/2"	7/8"	19.68	18.82	17.97	17.11
45120	37120	46120	.3150		8.000	8.0	65	22	20.67	19.77	18.87	17.97
11200	12200	13200	.3281	21/64"	8.334	3/8"	2-1/2"	7/8"	29.15	27.89	26.62	25.35
11210	12210	13210	.3438	11/32"	8.733	3/8"	2-1/2"	7/8"	29.15	27.89	26.62	25.35
45130	37130	46130	.3543		9.000	9.0	65	22	25.74	24.62	23.50	22.38
11220	12220	13220	.3594	23/64"	9.129	3/8"	2-1/2"	7/8"	29.15	27.89	26.62	25.35
11230	12230	13230	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	24.52	23.45	22.39	21.32
11240	12240	13240	.3906	25/64"	9.921	7/16"	2-3/4"	7/8"	34.86	33.34	31.83	30.31
45140	37140	46140	.3937		10.000	10.0	70	25	29.83	28.53	27.24	25.94
11250	12250	13250	.4062	13/32"	10.317	7/16"	2-3/4"	7/8"	34.86	33.34	31.83	30.31
11260	12260	13260	.4219	27/64"	10.716	7/16"	2-3/4"	7/8"	34.86	33.34	31.83	30.31
45150	37150	46150	.4331		11.000	11.0	75	25	31.41	30.04	28.68	27.31
11270	12270	13270	.4375	7/16"	11.113	7/16"	2-3/4"	1"	29.91	28.61	27.31	26.01
11280	12280	13280	.4531	29/64"	11.509	1/2"	3"	1"	46.95	44.91	42.87	40.83
11290	-	13290	.4688	15/32"	11.908	1/2"	3"	1"	46.95	44.91	42.87	40.83
45160	37160	46160	.4724		12.000	12.0	75	25	41.24	39.45	37.65	35.86
11300	12300	13300	.4844	31/64"	12.304	1/2"	3"	1"	46.95	44.91	42.87	40.83
11310	12310	13310	.5000	1/2"	12.700	1/2"	3"	1"	39.26	37.55	35.85	34.14
45170	37170	46170	.5512		14.000	14.0	88	32	70.41	67.35	64.29	61.23
11320	12320	13320	.5625	9/16"	14.288	9/16"	3-1/2"	1-1/4"	67.07	64.15	61.24	58.32
11330	12330	13330	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	75.72	72.42	69.13	65.84
45180	37180	46180	.6299		16.000	16.0	88	38	79.51	76.05	72.60	69.14
11340	12340	13340	.6875	11/16"	17.463	3/4"	4"	1-1/2"	126.10	120.62	115.13	109.65
45190	37190	46190	.7087		18.000	18.0	100	38	116.58	111.51	106.44	101.37
11350	12350	13350	.7500	3/4"	19.050	3/4"	4"	1-1/2"	111.01	106.18	101.36	96.53
45200	37200	46200	.7874		20.000	20.0	100	38	148.22	141.78	135.33	128.89
45210	37210	46210	.8661		22.000	22.0	100	38	164.70	157.54	150.38	143.22
11360	12360	13360	.8750	7/8"	22.225	7/8"	4"	1-1/2"	159.76	152.81	145.87	138.92
45220	37220	46220	.9843		25.000	25.0	100	38	172.20	164.71	157.23	149.74
11370	12370	13370	1.000	1"	25.400	1"	4"	1-1/2"	166.08	158.86	151.64	144.42
-	-	13390	1.250	1-1/4"	31.750	1-1/4"	4-1/2"	2"	484.89	463.80	442.72	421.64

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MATERIAL HARDNESS (Rc)

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