

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

.0200" - .2362"  
(0.508mm - 6.000mm)



TECH  
PAGES  
268,270

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

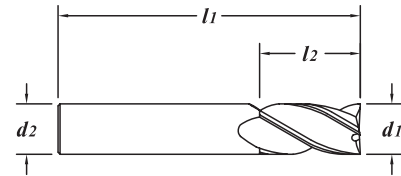
TiN Coating - page 204

TiCN Coating - page 205

TiAlN Coating - page 206

Stub Length - page 189

Extended length - page 230



(220M/820M) 2 Flute EDP#	(223M/823M) 3 Flute EDP#	(230M/830M) 4 Flute EDP#	Decimal	$d_1$ † Diameter	Metric	$d_2$ Shank Diameter	$l_1$ Overall Length	$l_2$ Flute Length	1-11	12-24	25-49	50-100
11650	-	13650	.0200	.0200"	0.508	1/8"	1-1/2"	.060"	17.69	16.92	16.15	15.38
11660	-	-	.0210	.0210"	0.533	1/8"	1-1/2"	.063"	17.69	16.92	16.15	15.38
11670	-	-	.0220	.0220"	0.559	1/8"	1-1/2"	.066"	17.48	16.72	15.96	15.20
11680	-	-	.0230	.0230"	0.584	1/8"	1-1/2"	.069"	17.48	16.72	15.96	15.20
11690	-	-	.0240	.0240"	0.610	1/8"	1-1/2"	.072"	17.48	16.72	15.96	15.20
11700	-	13700	.0250	.0250"	0.635	1/8"	1-1/2"	.075"	16.49	15.77	15.06	14.34
11710	-	-	.0260	.0260"	0.660	1/8"	1-1/2"	.078"	16.49	15.77	15.06	14.34
11720	-	-	.0270	.0270"	0.686	1/8"	1-1/2"	.081"	14.79	14.15	13.50	12.86
11730	-	-	.0280	.0280"	0.711	1/8"	1-1/2"	.084"	14.79	14.15	13.50	12.86
11740	-	-	.0290	.0290"	0.737	1/8"	1-1/2"	.087"	14.79	14.15	13.50	12.86
11750	-	13750	.0300	.0300"	0.762	1/8"	1-1/2"	.090"	14.79	14.15	13.50	12.86
11010	12010	13010	.0312	1/32"	0.792	1/8"	1-1/2"	3/32"	10.76	10.30	9.83	9.36
45010	37010	46010	.0394		1.000	3.0	38	4	11.30	10.81	10.32	9.83
11020	12020	13020	.0469	3/64"	1.191	1/8"	1-1/2"	1/8"	10.76	10.30	9.83	9.36
45020	37020	46020	.0591		1.500	3.0	38	6	11.30	10.81	10.32	9.83
11030	12030	13030	.0625	1/16"	1.588	1/8"	1-1/2"	1/4"	9.98	9.55	9.11	8.68
11040	12040	13040	.0781	5/64"	1.984	1/8"	1-1/2"	1/4"	9.98	9.55	9.11	8.68
45030	37030	46030	.0787		2.000	3.0	38	8	10.48	10.02	9.57	9.11
11050	12050	13050	.0938	3/32"	2.383	1/8"	1-1/2"	3/8"	9.44	9.03	8.62	8.21
45040	37040	46040	.0984		2.500	3.0	38	12	9.91	9.48	9.05	8.62
11060	12060	13060	.1094	7/64"	2.779	1/8"	1-1/2"	3/8"	9.44	9.03	8.62	8.21
45050	37050	46050	.1181		3.000	3.0	38	12	9.15	8.76	8.36	7.96
11070	12070	13070	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"	8.72	8.34	7.96	7.58
45060	37060	46060	.1378		3.500	4.0	50	12	13.55	12.96	12.37	11.78
11080	12080	13080	.1406	9/64"	3.571	3/16"	2"	9/16"	12.88	12.32	11.76	11.20
11090	12090	13090	.1562	5/32"	3.967	3/16"	2"	9/16"	12.88	12.32	11.76	11.20
45070	37070	46070	.1575		4.000	4.0	50	14	12.85	12.29	11.73	11.17
11100	12100	13100	.1719	11/64"	4.366	3/16"	2"	9/16"	12.88	12.32	11.76	11.20
45080	37080	46080	.1772		4.500	5.0	50	14	15.72	15.04	14.35	13.67
11110	12110	13110	.1875	3/16"	4.763	3/16"	2"	5/8"	12.22	11.69	11.16	10.63
NEW 92070	93070	94070	.1969		5.000	5.0	50	16	14.71	14.07	13.43	12.79
45090	37090	46090	.1969		5.000	5.0	65	16	15.00	14.34	13.69	13.04
11120	12120	13120	.2031	13/64"	5.159	1/4"	2-1/2"	5/8"	16.19	15.49	14.78	14.08
11130	12130	13130	.2188	7/32"	5.558	1/4"	2-1/2"	5/8"	16.19	15.49	14.78	14.08
11140	12140	13140	.2344	15/64"	5.954	1/4"	2-1/2"	3/4"	16.19	15.49	14.78	14.08
45100	37100	46100	.2362		6.000	6.0	65	19	15.47	14.80	14.12	13.45

MATERIAL HARDNESS (Rc)

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

.2500" - 1.250"  
(6.350mm - 31.750mm)

END MILLS

(220M/820M) 2 Flute EDP#	(223M/823M) 3 Flute EDP#	(230M/830M) 4 Flute EDP#	$d1$ †		$d2$ Shank Diameter	$l1$ Overall Length	$l2$ Flute Length	1-11	12-24	25-49	50-100	
			Decimal	Diameter								Metric
11150	12150	13150	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	14.73	14.09	13.45	12.81
11160	12160	13160	.2656	17/64"	6.746	5/16"	2-1/2"	7/8"	25.84	24.72	23.59	22.47
45110	37110	46110	.2756		7.000	7.0	65	22	21.25	20.33	19.40	18.48
11170	12170	13170	.2812	9/32"	7.142	5/16"	2-1/2"	7/8"	25.84	24.72	23.59	22.47
11180	12180	13180	.2969	19/64"	7.541	5/16"	2-1/2"	7/8"	25.84	24.72	23.59	22.47
11190	12190	13190	.3125	5/16"	7.938	5/16"	2-1/2"	7/8"	20.67	19.77	18.87	17.97
45120	37120	46120	.3150		8.000	8.0	65	22	21.70	20.76	19.81	18.87
11200	12200	13200	.3281	21/64"	8.334	3/8"	2-1/2"	7/8"	30.61	29.28	27.95	26.62
11210	12210	13210	.3438	11/32"	8.733	3/8"	2-1/2"	7/8"	30.61	29.28	27.95	26.62
45130	37130	46130	.3543		9.000	9.0	65	22	27.03	25.85	24.68	23.50
11220	12220	13220	.3594	23/64"	9.129	3/8"	2-1/2"	7/8"	30.61	29.28	27.95	26.62
11230	12230	13230	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	25.75	24.63	23.51	22.39
11240	12240	13240	.3906	25/64"	9.921	7/16"	2-3/4"	7/8"	36.60	35.01	33.42	31.83
45140	37140	46140	.3937		10.000	10.0	70	25	31.33	29.96	28.60	27.24
11250	12250	13250	.4062	13/32"	10.317	7/16"	2-3/4"	7/8"	36.60	35.01	33.42	31.83
11260	12260	13260	.4219	27/64"	10.716	7/16"	2-3/4"	7/8"	36.60	35.01	33.42	31.83
45150	37150	46150	.4331		11.000	11.0	75	25	32.98	31.55	30.11	28.68
11270	12270	13270	.4375	7/16"	11.113	7/16"	2-3/4"	1"	31.41	30.04	28.68	27.31
11280	12280	13280	.4531	29/64"	11.509	1/2"	3"	1"	49.30	47.16	45.01	42.87
11290	-	13290	.4688	15/32"	11.908	1/2"	3"	1"	49.30	47.16	45.01	42.87
45160	37160	46160	.4724		12.000	12.0	75	25	43.30	41.42	39.53	37.65
11300	12300	13300	.4844	31/64"	12.304	1/2"	3"	1"	49.30	47.16	45.01	42.87
11310	12310	13310	.5000	1/2"	12.700	1/2"	3"	1"	41.23	39.44	37.64	35.85
45170	37170	46170	.5512		14.000	14.0	88	32	73.93	70.72	67.50	64.29
11320	12320	13320	.5625	9/16"	14.288	9/16"	3-1/2"	1-1/4"	70.43	67.36	64.30	61.24
11330	12330	13330	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	79.50	76.04	72.59	69.13
45180	37180	46180	.6299		16.000	16.0	88	38	83.49	79.86	76.23	72.60
11340	12340	13340	.6875	11/16"	17.463	3/4"	4"	1-1/2"	132.40	126.64	120.89	115.13
45190	37190	46190	.7087		18.000	18.0	100	38	122.41	117.08	111.76	106.44
11350	12350	13350	.7500	3/4"	19.050	3/4"	4"	1-1/2"	116.56	111.50	106.43	101.36
45200	37200	46200	.7874		20.000	20.0	100	38	155.63	148.86	142.10	135.33
45210	37210	46210	.8661		22.000	22.0	100	38	172.94	165.42	157.90	150.38
11360	12360	13360	.8750	7/8"	22.225	7/8"	4"	1-1/2"	167.75	160.46	153.16	145.87
45220	37220	46220	.9843		25.000	25.0	100	38	180.81	172.95	165.09	157.23
11370	12370	13370	1.000	1"	25.400	1"	4"	1-1/2"	174.39	166.80	159.22	151.64
-	-	13390	1.250	1-1/4"	31.750	1-1/4"	4-1/2"	2"	509.13	486.99	464.86	442.72

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MATERIAL HARDNESS (Rc)