

# Series 220MA, 223MA, 230MA, 820MA, 823MA, 830MA

**TOLERANCES**

$d_1$	+0.000" - .002" (+.000 - .050mm)
$d_2$	h6

.0312" - .3594"  
(0.792mm - 9.129mm)



TECH  
PAGES  
282-283

## Standard Length - Square End

### TiAlN Coating

Solid submicron grain carbide end mill - center cutting

Dry or semi-dry machining

Extremely versatile

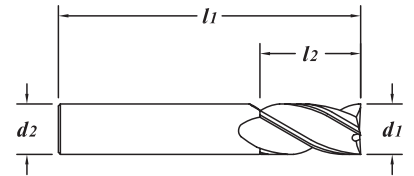
Uncoated - page 216

TiN Coating - page 218

TiCN Coating - page 219

Stub Length - page 209

Extended Length - page 239



70

35

MATERIAL HARDNESS (Rc)

0

(220MA/820MA) 2 Flute EDP#	(223MA/823MA) 3 Flute EDP#	(230MA/830MA) 4 Flute EDP#	$d_1$ † Diameter		$d_2$ Shank Diameter	$l_1$ Overall Length	$l_2$ Flute Length	
			Decimal	Metric				
11017	12017	13017	.0312	1/32"	0.792	1/8"	1-1/2"	3/32"
45017	37017	46017	.0394		1.000	3.0	38	4
11027	12027	13027	.0469	3/64"	1.191	1/8"	1-1/2"	1/8"
45027	37027	46027	.0591		1.500	3.0	38	6
11037	12037	13037	.0625	1/16"	1.588	1/8"	1-1/2"	1/4"
11047	12047	13047	.0781	5/64"	1.984	1/8"	1-1/2"	1/4"
45037	37037	46037	.0787		2.000	3.0	38	8
11057	12057	13057	.0938	3/32"	2.383	1/8"	1-1/2"	3/8"
45047	37047	46047	.0984		2.500	3.0	38	12
11067	12067	13067	.1094	7/64"	2.779	1/8"	1-1/2"	3/8"
45057	37057	46057	.1181		3.000	3.0	38	12
11077	12077	13077	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"
45067	37067	46067	.1378		3.500	4.0	50	12
11087	12087	13087	.1406	9/64"	3.571	3/16"	2"	9/16"
11097	12097	13097	.1562	5/32"	3.967	3/16"	2"	9/16"
45077	37077	46077	.1575		4.000	4.0	50	14
11107	12107	13107	.1719	11/64"	4.366	3/16"	2"	9/16"
45087	37087	46087	.1772		4.500	5.0	50	14
11117	12117	13117	.1875	3/16"	4.763	3/16"	2"	5/8"
92077	93077	94077	.1969		5.000	5.0	50	16
45097	37097	46097	.1969		5.000	5.0	65	16
11127	12127	13127	.2031	13/64"	5.159	1/4"	2-1/2"	5/8"
11137	12137	13137	.2188	7/32"	5.558	1/4"	2-1/2"	5/8"
11147	12147	13147	.2344	15/64"	5.954	1/4"	2-1/2"	3/4"
45107	37107	46107	.2362		6.000	6.0	65	19
11157	12157	13157	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"
11167	12167	13167	.2656	17/64"	6.746	5/16"	2-1/2"	7/8"
45117	37117	46117	.2756		7.000	7.0	65	22
11177	12177	13177	.2812	9/32"	7.142	5/16"	2-1/2"	7/8"
11187	12187	13187	.2969	19/64"	7.541	5/16"	2-1/2"	7/8"
11197	12197	13197	.3125	5/16"	7.938	5/16"	2-1/2"	7/8"
45127	37127	46127	.3150		8.000	8.0	65	22
11207	12207	13207	.3281	21/64"	8.334	3/8"	2-1/2"	7/8"
11217	12217	13217	.3438	11/32"	8.733	3/8"	2-1/2"	7/8"
45137	37137	46137	.3543		9.000	9.0	65	22
11227	12227	13227	.3594	23/64"	9.129	3/8"	2-1/2"	7/8"

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

.3750" - 1.250"  
(9.525mm - 31.750mm)

GENERAL PURPOSE  
END MILLS

(220MA/820MA) 2 Flute EDP#	(223MA/823MA) 3 Flute EDP#	(230MA/830MA) 4 Flute EDP#	$d1$ †		$d2$ Shank Diameter	$l1$ Overall Length	$l2$ Flute Length	
			Decimal	Diameter Metric				
11237	12237	13237	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"
11247	12247	13247	.3906	25/64"	9.921	7/16"	2-3/4"	7/8"
45147	37147	46147	.3937		10.000	10.0	70	25
11257	12257	13257	.4062	13/32"	10.317	7/16"	2-3/4"	7/8"
11267	12267	13267	.4219	27/64"	10.716	7/16"	2-3/4"	7/8"
45157	37157	46157	.4331		11.000	11.0	75	25
11277	12277	13277	.4375	7/16"	11.113	7/16"	2-3/4"	1"
11287	12287	13287	.4531	29/64"	11.509	1/2"	3"	1"
11297	12297	13297	.4688	15/32"	11.908	1/2"	3"	1"
45167	37167	46167	.4724		12.000	12.0	75	25
11307	12307	13307	.4844	31/64"	12.304	1/2"	3"	1"
11317	12317	13317	.5000	1/2"	12.700	1/2"	3"	1"
45177	37177	46177	.5512		14.000	14.0	88	32
11327	12327	13327	.5625	9/16"	14.288	9/16"	3-1/2"	1-1/4"
11337	12337	13337	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"
45187	37187	46187	.6299		16.000	16.0	88	38
11347	12347	13347	.6875	11/16"	17.463	3/4"	4"	1-1/2"
45197	37197	46197	.7087		18.000	18.0	100	38
11357	12357	13357	.7500	3/4"	19.050	3/4"	4"	1-1/2"
45207	37207	46207	.7874		20.000	20.0	100	38
45217	37217	46217	.8661		22.000	22.0	100	38
11367	12367	13367	.8750	7/8"	22.225	7/8"	4"	1-1/2"
45227	37227	46227	.9843		25.000	25.0	100	38
11377	12377	13377	1.000	1"	25.400	1"	4"	1-1/2"
-	-	13397	1.250	1-1/4"	31.750	1-1/4"	4-1/2"	2"

70

35

MATERIAL HARDNESS (Rc)

0



End Mill Manufacturing