

TOLERANCES

d_1	+0.000" -0.001" (+0.000 -0.025mm)
d_2	h6

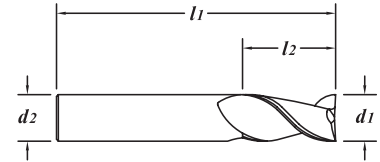
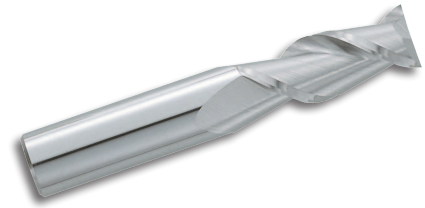


Recommended for aluminum and titanium

Square End

- Solid submicron grain carbide end mill - center cutting
- High performance machining
- Rigid work holding, machine stability and part integrity are critical!
- Excellent choice for slotting
- Polished cylindrical O.D. margin reduces chatter
- Sharp corners (Can be modified with a corner radius)

Designed for spindles between 3,000-8,000 RPM, 1% diameter for chip load



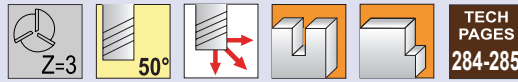
EDP#	d_1 †		d_2	l_1	l_2	1-11	12-24	25-49	50-100	
	Decimal	Diameter								Metric
08910	.1181		3.000	3.0	38	8	12.09	11.56	11.04	10.51
08920	.1181		3.000	3.0	50	12	14.57	13.94	13.30	12.67
85160	.1250	1/8"	3.175	1/8"	1-1/2"	1/4"	11.35	10.86	10.36	9.87
85170	.1250	1/8"	3.175	1/8"	2"	1/2"	13.67	13.08	12.48	11.89
08950	.1575		4.000	6.0	50	8	19.65	18.80	17.94	17.09
08960	.1575		4.000	6.0	50	12	19.65	18.80	17.94	17.09
85180	.1875	3/16"	4.763	3/16"	2"	5/16"	14.17	13.55	12.94	12.32
85190	.1875	3/16"	4.763	3/16"	2"	9/16"	14.17	13.55	12.94	12.32
08990	.1969		5.000	6.0	50	10	18.50	17.70	16.89	16.09
09000	.1969		5.000	6.0	65	15	20.57	19.68	18.78	17.89
09010	.2362		6.000	6.0	50	12	15.76	15.07	14.39	13.70
09020	.2362		6.000	6.0	65	25	16.93	16.19	15.46	14.72
09030	.2362		6.000	6.0	100	50	30.68	29.35	28.01	26.68
85200	.2500	1/4"	6.350	1/4"	2"	1/2"	14.93	14.28	13.63	12.98
85220	.2500	1/4"	6.350	1/4"	2-1/2"	1"	16.13	15.43	14.73	14.03
85240	.2500	1/4"	6.350	1/4"	4"	2"	29.14	27.87	26.61	25.34
85300	.3125	5/16"	7.938	5/16"	3"	1-1/8"	34.06	32.58	31.10	29.62
09240	.3150		8.000	8.0	65	20	23.76	22.73	21.69	20.66
09040	.3150		8.000	8.0	75	30	35.89	34.33	32.77	31.21
09050	.3150		8.000	8.0	100	50	40.03	38.29	36.55	34.81
85400	.3750	3/8"	9.525	3/8"	2"	5/8"	25.22	24.12	23.03	21.93
85420	.3750	3/8"	9.525	3/8"	2-1/2"	1"	28.18	26.95	25.73	24.50
85440	.3750	3/8"	9.525	3/8"	4"	2"	42.10	40.27	38.44	36.61
09060	.3937		10.000	10.0	50	16	29.35	28.07	26.80	25.52
09070	.3937		10.000	10.0	70	25	34.30	32.81	31.32	29.83
09080	.3937		10.000	10.0	100	50	53.65	51.32	48.98	46.65
09090	.4724		12.000	12.0	65	20	43.84	41.93	40.03	38.12
09100	.4724		12.000	12.0	75	32	47.40	45.34	43.28	41.22
09110	.4724		12.000	12.0	100	50	65.30	62.46	59.62	56.78
85500	.5000	1/2"	12.700	1/2"	2-1/2"	3/4"	41.40	39.60	37.80	36.00
85520	.5000	1/2"	12.700	1/2"	3"	1-1/4"	45.14	43.18	41.21	39.25
85540	.5000	1/2"	12.700	1/2"	4"	2"	61.61	58.93	56.25	53.57
85600	.6250	5/8"	15.875	5/8"	3-1/2"	1-5/8"	87.04	83.26	79.47	75.69
85620	.6250	5/8"	15.875	5/8"	6"	3"	126.98	121.46	115.94	110.42
09120	.6299		16.000	16.0	88	40	91.39	87.42	83.44	79.47
09130	.6299		16.000	16.0	150	75	126.98	121.46	115.94	110.42
09140	.7087		18.000	18.0	100	45	134.02	128.19	122.37	116.54
85700	.7500	3/4"	19.050	3/4"	4"	1-3/4"	127.63	122.08	116.53	110.98
85720	.7500	3/4"	19.050	3/4"	6"	3"	202.29	193.49	184.70	175.90
09350	.7874		20.000	20.0	100	38	170.38	162.98	155.57	148.16
09150	.7874		20.000	20.0	150	75	213.10	203.83	194.57	185.30
09160	.9843		25.000	25.0	100	45	197.94	189.33	180.73	172.12
09170	.9843		25.000	25.0	150	75	328.37	314.09	299.82	285.54
85800	1.000	1"	25.400	1"	4"	1-3/4"	190.90	182.60	174.30	166.00
85820	1.000	1"	25.400	1"	6"	3"	343.91	328.96	314.00	299.05

HIGH PERFORMANCE
END MILLS

MATERIAL HARDNESS (RC) 70 35 0

Series 253MA, 853MA

.1181" - .5512"
(3.000mm - 14.000mm)

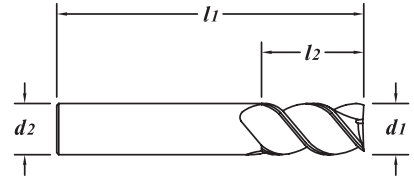


TOLERANCES	
d_1	+0.000" - .002" (+0.000 - .050mm)
d_2	h6

Recommended for stainless steel

Square End
AlTiN Coating

- Solid submicron grain carbide end mill - center cutting
- High performance machining
- Rigid work holding, machine stability and part integrity are critical!
- Dry or semi-dry machining
- Slots stainless steel at an axial depth of 25% of diameter
- Sharp corners (Can be modified with a corner radius)
- Uncoated - page 180
- TiCN Coated - page 182



MATERIAL HARDNESS (Rc)

70

35

0

EDP#	d_1 † Diameter		d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	1-11	12-24	25-49	50-100	
	Decimal	Metric								
10347	.1181	3.000	3.0	38	8	14.81	14.17	13.52	12.88	
10357	.1181	3.000	3.0	50	12	17.85	17.07	16.30	15.52	
86137	.1250	1/8"	3.175	1/8"	1-1/2"	1/4"	14.06	13.45	12.84	12.23
86147	.1250	1/8"	3.175	1/8"	2"	1/2"	16.96	16.23	15.49	14.75
10387	.1575	4.000	6.0	50	8	23.93	22.89	21.85	20.81	
10397	.1575	4.000	6.0	50	12	23.93	22.89	21.85	20.81	
86157	.1875	3/16"	4.763	3/16"	2"	5/16"	16.08	15.38	14.68	13.98
86167	.1875	3/16"	4.763	3/16"	2"	9/16"	16.08	15.38	14.68	13.98
86187	.1875	3/16"	4.763	3/16"	3"	1"	28.04	26.82	25.60	24.38
10407	.1969	5.000	5.0	50	8	19.06	18.23	17.40	16.57	
10417	.1969	5.000	5.0	50	14	19.06	18.23	17.40	16.57	
10507	.1969	5.000	6.0	50	8	23.44	22.42	21.40	20.38	
10517	.1969	5.000	6.0	65	16	25.60	24.49	23.37	22.26	
10017	.2362	6.000	6.0	50	12	19.93	19.06	18.20	17.33	
10027	.2362	6.000	6.0	65	19	22.46	21.48	20.51	19.53	
10037	.2362	6.000	6.0	75	32	34.63	33.12	31.62	30.11	
86207	.2500	1/4"	6.350	1/4"	2"	1/2"	19.12	18.29	17.46	16.63
86227	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	21.69	20.75	19.80	18.86
86247	.2500	1/4"	6.350	1/4"	3"	1-1/4"	33.15	31.71	30.27	28.83
86267	.3125	5/16"	7.938	5/16"	2"	7/16"	26.43	25.28	24.13	22.98
86277	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	30.92	29.58	28.23	26.89
86287	.3125	5/16"	7.938	5/16"	4"	1-1/4"	48.58	46.46	44.35	42.24
10427	.3150	8.000	8.0	50	11	27.52	26.32	25.13	23.93	
10047	.3150	8.000	8.0	65	20	32.05	30.66	29.26	27.87	
10057	.3150	8.000	8.0	75	32	44.18	42.26	40.34	38.42	
86307	.3750	3/8"	9.525	3/8"	2"	1/2"	31.22	29.87	28.51	27.15
86327	.3750	3/8"	9.525	3/8"	2-1/2"	1"	36.49	34.90	33.32	31.73
86347	.3750	3/8"	9.525	3/8"	3-1/2"	1-1/2"	52.66	50.37	48.08	45.79
10067	.3937	10.000	10.0	50	12	36.14	34.57	33.00	31.43	
10077	.3937	10.000	10.0	75	25	51.05	48.83	46.61	44.39	
10087	.3937	10.000	10.0	88	38	64.63	61.82	59.01	56.20	
86367	.4375	7/16"	11.113	7/16"	2-1/2"	9/16"	43.87	41.97	40.06	38.15
86377	.4375	7/16"	11.113	7/16"	2-3/4"	1"	43.87	41.97	40.06	38.15
86387	.4375	7/16"	11.113	7/16"	4"	2"	70.15	67.10	64.05	61.00
10097	.4724	12.000	12.0	65	16	53.27	50.95	48.64	46.32	
10107	.4724	12.000	12.0	75	26	56.83	54.36	51.89	49.42	
10117	.4724	12.000	12.0	100	50	77.57	74.20	70.82	67.45	
86407	.5000	1/2"	12.700	1/2"	2-1/2"	5/8"	51.08	48.86	46.64	44.42
86427	.5000	1/2"	12.700	1/2"	3"	1"	54.58	52.21	49.83	47.46
86447	.5000	1/2"	12.700	1/2"	4"	2"	73.85	70.64	67.43	64.22
10437	.5512	14.000	14.0	65	16	79.55	76.09	72.63	69.17	
10447	.5512	14.000	14.0	75	25	85.17	81.47	77.76	74.06	
10457	.5512	14.000	14.0	100	50	103.37	98.88	94.38	89.89	

EDP#	$d1$ † Diameter		$d2$ Shank Diameter	$l1$ Overall Length	$l2$ Flute Length	1-11	12-24	25-49	50-100	
	Decimal	Metric								
86467	.5625	9/16"	14.288	9/16"	3"	7/8"	85.41	81.70	77.98	74.27
86477	.5625	9/16"	14.288	9/16"	3-1/2"	1-1/4"	90.76	86.81	82.87	78.92
86507	.6250	5/8"	15.875	5/8"	3"	7/8"	90.56	86.63	82.69	78.75
86527	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	100.71	96.33	91.95	87.57
86547	.6250	5/8"	15.875	5/8"	6"	2-1/2"	147.28	140.88	134.47	128.07
10137	.6299		16.000	16.0	88	32	60.81	58.17	55.52	52.88
10147	.6299		16.000	16.0	150	65	147.28	140.88	134.47	128.07
10167	.7087		18.000	18.0	100	38	150.12	143.59	137.07	130.54
86607	.7500	3/4"	19.050	3/4"	3-1/2"	1"	143.75	137.50	131.25	125.00
86627	.7500	3/4"	19.050	3/4"	4"	1-1/2"	143.75	137.50	131.25	125.00
86647	.7500	3/4"	19.050	3/4"	6"	3"	225.79	215.97	206.16	196.34
10187	.7874		20.000	20.0	100	38	194.21	185.77	177.32	168.88
10197	.7874		20.000	20.0	150	75	243.62	233.02	222.43	211.84
86697	1.000	1"	25.400	1"	4"	1-1/8"	214.75	205.41	196.08	186.74
86727	1.000	1"	25.400	1"	4"	2"	214.75	205.41	196.08	186.74
86747	1.000	1"	25.400	1"	6"	3-1/4"	374.44	358.16	341.88	325.60

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MATERIAL HARDNESS (Rc)

0

Series 253M, 853M

.1181" - .5512"
(3.000mm - 14.000mm)

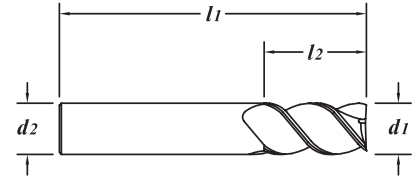


TOLERANCES	
d_1	+0.000" - .002" (+.000 - .050mm)
d_2	h6

Recommended for aluminum and stainless steel

Square End

- Solid submicron grain carbide end mill - center cutting
- High performance machining
- Rigid work holding, machine stability and part integrity are critical!
- Slots aluminum at an axial depth of 25% of diameter
- Sharp corners (Can be modified with a corner radius)
- AlTiN Coating - page 178
- TiCN Coated - page 182



70
35
0
MATERIAL HARDNESS (Rc)

EDP#	d_1 † Diameter		d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	1-11	12-24	25-49	50-100	
	Decimal	Metric								
10340	.1181	3.000	3.0	38	8	12.09	11.56	11.04	10.51	
10350	.1181	3.000	3.0	50	12	14.57	13.94	13.30	12.67	
86130	.1250	1/8"	3.175	1/8"	1-1/2"	1/4"	11.35	10.86	10.36	9.87
86140	.1250	1/8"	3.175	1/8"	2"	1/2"	13.67	13.08	12.48	11.89
10380	.1575	4.000	6.0	50	8	19.65	18.80	17.94	17.09	
10390	.1575	4.000	6.0	50	12	19.65	18.80	17.94	17.09	
86150	.1875	3/16"	4.763	3/16"	2"	5/16"	13.37	12.79	12.21	11.63
86160	.1875	3/16"	4.763	3/16"	2"	9/16"	13.37	12.79	12.21	11.63
86180	.1875	3/16"	4.763	3/16"	3"	1"	23.84	22.80	21.77	20.73
10400	.1969	5.000	5.0	50	8	14.86	14.21	13.57	12.92	
10410	.1969	5.000	5.0	50	14	14.86	14.21	13.57	12.92	
10010	.2362	6.000	6.0	50	12	15.76	15.07	14.39	13.70	
10020	.2362	6.000	6.0	65	19	16.93	16.19	15.46	14.72	
10030	.2362	6.000	6.0	75	32	29.06	27.80	26.53	25.27	
86200	.2500	1/4"	6.350	1/4"	2"	1/2"	14.93	14.28	13.63	12.98
86220	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	16.13	15.43	14.73	14.03
86240	.2500	1/4"	6.350	1/4"	3"	1-1/4"	27.62	26.42	25.22	24.02
86260	.3125	5/16"	7.938	5/16"	2"	7/16"	20.41	19.53	18.64	17.75
86270	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	22.63	21.65	20.66	19.68
86280	.3125	5/16"	7.938	5/16"	4"	1-1/4"	38.01	36.36	34.70	33.05
10420	.3150	8.000	8.0	50	11	21.53	20.59	19.66	18.72	
10040	.3150	8.000	8.0	65	20	23.76	22.73	21.69	20.66	
10050	.3150	8.000	8.0	75	32	35.89	34.33	32.77	31.21	
86300	.3750	3/8"	9.525	3/8"	2"	1/2"	25.22	24.12	23.03	21.93
86320	.3750	3/8"	9.525	3/8"	2-1/2"	1"	28.18	26.95	25.73	24.50
86340	.3750	3/8"	9.525	3/8"	3-1/2"	1-1/2"	42.10	40.27	38.44	36.61
10060	.3937	10.000	10.0	50	12	29.35	28.07	26.80	25.52	
10070	.3937	10.000	10.0	75	25	41.61	39.80	37.99	36.18	
10080	.3937	10.000	10.0	88	38	52.41	50.13	47.85	45.57	
86360	.4375	7/16"	11.113	7/16"	2-1/2"	9/16"	34.40	32.90	31.41	29.91
86370	.4375	7/16"	11.113	7/16"	2-3/4"	1"	34.40	32.90	31.41	29.91
86380	.4375	7/16"	11.113	7/16"	4"	2"	57.93	55.41	52.89	50.37
10090	.4724	12.000	12.0	65	16	43.84	41.93	40.03	38.12	
10100	.4724	12.000	12.0	75	26	47.40	45.34	43.28	41.22	
10110	.4724	12.000	12.0	100	50	65.30	62.46	59.62	56.78	
86400	.5000	1/2"	12.700	1/2"	2-1/2"	5/8"	41.63	39.82	38.01	36.20
86420	.5000	1/2"	12.700	1/2"	3"	1"	45.14	43.18	41.21	39.25
86440	.5000	1/2"	12.700	1/2"	4"	2"	61.61	58.93	56.25	53.57
10430	.5512	14.000	14.0	65	16	68.57	65.59	62.61	59.63	
10440	.5512	14.000	14.0	75	25	74.19	70.96	67.74	64.51	
10450	.5512	14.000	14.0	100	50	89.70	85.80	81.90	78.00	

EDP#	$d1$ † Diameter		$d2$ Shank Diameter	$l1$ Overall Length	$l2$ Flute Length	1-11	12-24	25-49	50-100	
	Decimal	Metric								
86460	.5625	9/16"	14.288	9/16"	3"	7/8"	74.45	71.21	67.98	64.74
86470	.5625	9/16"	14.288	9/16"	3-1/2"	1-1/4"	77.08	73.73	70.38	67.03
86480	.5625	9/16"	14.288	9/16"	6"	2-1/2"	116.96	111.87	106.79	101.70
86500	.6250	5/8"	15.875	5/8"	3"	7/8"	79.60	76.14	72.68	69.22
86520	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	87.04	83.26	79.47	75.69
86540	.6250	5/8"	15.875	5/8"	6"	2-1/2"	126.98	121.46	115.94	110.42
10120	.6299		16.000	16.0	75	20	83.78	80.14	76.49	72.85
10130	.6299		16.000	16.0	88	32	91.39	87.42	83.44	79.47
10140	.6299		16.000	16.0	150	65	126.98	121.46	115.94	110.42
10160	.7087		18.000	18.0	100	38	134.00	128.17	122.35	116.52
10170	.7087		18.000	18.0	150	75	190.90	182.60	174.30	166.00
86600	.7500	3/4"	19.050	3/4"	3-1/2"	1"	127.63	122.08	116.53	110.98
86620	.7500	3/4"	19.050	3/4"	4"	1-1/2"	127.63	122.08	116.53	110.98
86640	.7500	3/4"	19.050	3/4"	6"	3"	202.29	193.49	184.70	175.90
10460	.7874		20.000	20.0	75	22	155.25	148.50	141.75	135.00
10180	.7874		20.000	20.0	100	38	170.38	162.98	155.57	148.16
10190	.7874		20.000	20.0	150	75	213.10	203.83	194.57	185.30
10480	.9843		25.000	25.0	100	50	197.94	189.33	180.73	172.12
10490	.9843		25.000	25.0	150	82	328.37	314.09	299.82	285.54
86690	1.000	1"	25.400	1"	4"	1-1/8"	190.90	182.60	174.30	166.00
86720	1.000	1"	25.400	1"	4"	2"	190.90	182.60	174.30	166.00
86740	1.000	1"	25.400	1"	6"	3-1/4"	343.91	328.96	314.00	299.05

70
35
0
MATERIAL HARDNESS (Rc)



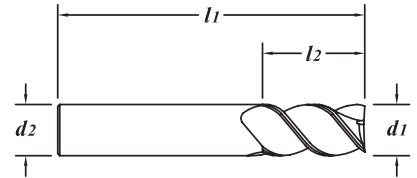
$d1$	+0.000" - .002" (+.000 - .050mm)
$d2$	h6



Recommended for aluminum and 303 stainless steel

**Square End
TiCN Coated**

- Solid submicron grain carbide end mill - center cutting
- High performance machining
- Rigid work holding, machine stability and part integrity are critical!
- Improved abrasion resistance and lubricity
- Slots aluminum and stainless steel at an axial depth of 25% of diameter
- Sharp corners (Can be modified with a corner radius)
- AlTiN Coating - page 178
- Uncoated - page 180



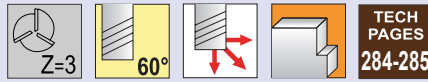
MATERIAL HARDNESS (Rc) 70 35 0

EDP#	$d1$ † Diameter		$d2$ Shank Diameter	$l1$ Overall Length	$l2$ Flute Length	1-11	12-24	25-49	50-100	
	Decimal	Metric								
86154	.1875	3/16"	4.763	3/16"	2"	5/16"	15.76	15.07	14.39	13.70
86164	.1875	3/16"	4.763	3/16"	2"	9/16"	15.76	15.07	14.39	13.70
86184	.1875	3/16"	4.763	3/16"	3"	1"	27.16	25.98	24.80	23.62
86204	.2500	1/4"	6.350	1/4"	2"	1/2"	18.27	17.48	16.68	15.89
86224	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	20.95	20.04	19.13	18.22
86244	.2500	1/4"	6.350	1/4"	3"	1-1/4"	32.42	31.01	29.60	28.19
86264	.3125	5/16"	7.938	5/16"	2"	7/16"	25.63	24.52	23.40	22.29
86274	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	29.06	27.80	26.53	25.27
86284	.3125	5/16"	7.938	5/16"	4"	1-1/4"	46.02	44.02	42.02	40.02
86304	.3750	3/8"	9.525	3/8"	2"	1/2"	30.44	29.12	27.79	26.47
86324	.3750	3/8"	9.525	3/8"	2-1/2"	1"	33.40	31.94	30.49	29.04
86344	.3750	3/8"	9.525	3/8"	3-1/2"	1-1/2"	50.07	47.89	45.72	43.54
86364	.4375	7/16"	11.113	7/16"	2-1/2"	9/16"	42.14	40.30	38.47	36.64
86374	.4375	7/16"	11.113	7/16"	2-3/4"	1"	42.14	40.30	38.47	36.64
86384	.4375	7/16"	11.113	7/16"	4"	2"	67.56	64.63	61.69	58.75
86404	.5000	1/2"	12.700	1/2"	2-1/2"	5/8"	49.36	47.21	45.07	42.92
86424	.5000	1/2"	12.700	1/2"	3"	1"	52.85	50.56	48.26	45.96
86444	.5000	1/2"	12.700	1/2"	4"	2"	71.27	68.17	65.07	61.97
86464	.5625	9/16"	14.288	9/16"	3"	7/8"	84.84	81.15	77.46	73.77
86474	.5625	9/16"	14.288	9/16"	3-1/2"	1-1/4"	89.13	85.25	81.38	77.50
86484	.5625	9/16"	14.288	9/16"	6"	2-1/2"	133.83	128.01	122.19	116.37
86504	.6250	5/8"	15.875	5/8"	3"	7/8"	89.98	86.06	82.15	78.24
86524	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	99.06	94.75	90.45	86.14
86544	.6250	5/8"	15.875	5/8"	6"	2-1/2"	143.85	137.60	131.34	125.09
86604	.7500	3/4"	19.050	3/4"	3-1/2"	1"	141.40	135.26	129.11	122.96
86624	.7500	3/4"	19.050	3/4"	4"	1-1/2"	141.40	135.26	129.11	122.96
86644	.7500	3/4"	19.050	3/4"	6"	3"	221.55	211.92	202.28	192.65
86694	1.000	1"	25.400	1"	4"	1-1/8"	211.62	202.42	193.22	184.02
86724	1.000	1"	25.400	1"	4"	2"	211.62	202.42	193.22	184.02
86744	1.000	1"	25.400	1"	6"	3-1/4"	371.15	355.01	338.88	322.74

TOLERANCES

d_1	+0.000° -0.002° (+.000 -.050mm)
d_2	h6

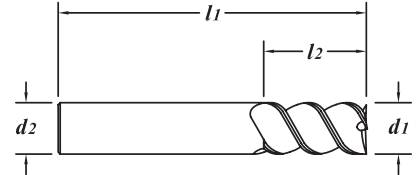
Series 263M, 263MC, 263MA, 863MA



Recommended for steels, stainless steel, high-temperature alloys

Square End

- Solid submicron grain carbide end mill - center cutting
- High performance profiling
- Rigid work holding, machine stability and part integrity are critical!
- Modified end gash - will not cut square corner
- Can be modified with a corner radius



(263M) UNCOATED EDP#	(263MC) TiCN EDP#	(263MA/863MA) AlTiN 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								
23010	-	-	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	16.13	15.43	14.73	14.03
23020	-	-	.3125	5/16"	7.938	5/16"	2-1/2"	7/8"	22.63	21.65	20.66	19.68
23030	-	-	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	28.18	26.95	25.73	24.50
23040	-	-	.4375	7/16"	11.113	7/16"	2-3/4"	1"	34.40	32.90	31.41	29.91
23050	-	-	.5000	1/2"	12.700	1/2"	3"	1"	45.14	43.18	41.21	39.25
23060	-	-	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	87.04	83.26	79.47	75.69
23070	-	-	.7500	3/4"	19.050	3/4"	4"	1-1/2"	127.63	122.08	116.53	110.98
23080	-	-	1.000	1"	25.400	1"	4"	1-1/2"	190.90	182.60	174.30	166.00
-	23014	-	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	20.95	20.04	19.13	18.22
-	23024	-	.3125	5/16"	7.938	5/16"	2-1/2"	7/8"	29.06	27.80	26.53	25.27
-	23034	-	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	34.63	33.12	31.62	30.11
-	23044	-	.4375	7/16"	11.113	7/16"	2-3/4"	1"	42.14	40.30	38.47	36.64
-	23054	-	.5000	1/2"	12.700	1/2"	3"	1"	52.85	50.56	48.26	45.96
-	23064	-	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	99.06	94.75	90.45	86.14
-	23074	-	.7500	3/4"	19.050	3/4"	4"	1-1/2"	141.40	135.26	129.11	122.96
-	23084	-	1.000	1"	25.400	1"	4"	1-1/2"	211.62	202.42	193.22	184.02
-	-	23517	.2362		6.000	6.0	65	13	22.46	21.48	20.51	19.53
-	-	23017	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	21.69	20.75	19.80	18.86
-	-	23027	.3125	5/16"	7.938	5/16"	2-1/2"	7/8"	30.92	29.58	28.23	26.89
-	-	23527	.3150		8.000	8.0	65	19	32.05	30.66	29.26	27.87
-	-	23037	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	36.49	34.90	33.32	31.73
-	-	23537	.3937		10.000	10.0	70	22	43.76	41.86	39.95	38.05
-	-	23047	.4375	7/16"	11.113	7/16"	2-3/4"	1"	43.87	41.97	40.06	38.15
-	-	23547	.4724		12.000	12.0	75	26	56.83	54.36	51.89	49.42
-	-	23057	.5000	1/2"	12.700	1/2"	3"	1"	54.58	52.21	49.83	47.46
-	-	23067	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	100.71	96.33	91.95	87.57
-	-	23557	.6299		16.000	16.0	88	32	105.05	100.49	95.92	91.35
-	-	23077	.7500	3/4"	19.050	3/4"	4"	1-1/2"	143.75	137.50	131.25	125.00
-	-	23087	1.000	1"	25.400	1"	4"	1-1/2"	214.75	205.41	196.08	186.74

70
35
0
MATERIAL HARDNESS (Rc)

HIGH PERFORMANCE
END MILLS

Series 255MA, 855MA

.1181" - .4724"
(3.000mm - 12.000mm)

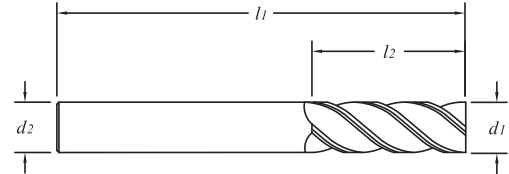


TOLERANCES	
d_1	+0.000" - .002" (+.000 - .050mm)
d_2	h6

Recommended for steels, stainless steel, and exotics

Square End
AlTiN Coating

- Solid submicron grain carbide end mill - center cutting
- High performance milling
- Rigid work holding, machine stability and part integrity are critical!
- Dry or semi-dry machining
- Improved finishes in titanium
- Heavy core, Sharp corners
- Uncoated - page 186
- TiCN Coated - page 188



70
35
0
MATERIAL HARDNESS (Rc)

EDP#	d_1 † Diameter		d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	1-11	12-24	25-49	50-100	
	Decimal	Metric								
40047	.1181	3.000	3.0	38	8	14.81	14.17	13.52	12.88	
40057	.1181	3.000	3.0	50	12	17.85	17.07	16.30	15.52	
52087	.1250	1/8"	3.175	1/8"	1-1/2"	1/4"	14.06	13.45	12.84	12.23
52097	.1250	1/8"	3.175	1/8"	2"	1/2"	16.96	16.23	15.49	14.75
40087	.1575	4.000	6.0	50	8	23.93	22.89	21.85	20.81	
40097	.1575	4.000	6.0	50	12	23.93	22.89	21.85	20.81	
52107	.1875	3/16"	4.763	3/16"	2"	5/16"	16.08	15.38	14.68	13.98
52127	.1875	3/16"	4.763	3/16"	2"	9/16"	16.08	15.38	14.68	13.98
40107	.1969	5.000	5.0	50	8	19.06	18.23	17.40	16.57	
40127	.1969	5.000	5.0	50	14	19.06	18.23	17.40	16.57	
40117	.1969	5.000	6.0	50	8	23.44	22.42	21.40	20.38	
40137	.1969	5.000	6.0	65	16	25.60	24.49	23.37	22.26	
40207	.2362	6.000	6.0	50	10	19.93	19.06	18.20	17.33	
40227	.2362	6.000	6.0	65	20	22.46	21.48	20.51	19.53	
40247	.2362	6.000	6.0	100	32	37.18	35.56	33.95	32.33	
52207	.2500	1/4"	6.350	1/4"	2"	3/8"	19.12	18.29	17.46	16.63
52227	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	21.69	20.75	19.80	18.86
52237	.2500	1/4"	6.350	1/4"	3"	1-1/8"	33.15	31.71	30.27	28.83
52247	.2500	1/4"	6.350	1/4"	4"	1-1/4"	35.65	34.10	32.55	31.00
52307	.3125	5/16"	7.938	5/16"	2"	7/16"	26.43	25.28	24.13	22.98
52327	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	30.92	29.58	28.23	26.89
52347	.3125	5/16"	7.938	5/16"	4"	1-1/4"	48.58	46.46	44.35	42.24
40307	.3150	8.000	8.0	50	11	27.52	26.32	25.13	23.93	
40327	.3150	8.000	8.0	65	21	32.05	30.66	29.26	27.87	
40347	.3150	8.000	8.0	100	32	50.58	48.38	46.18	43.98	
40367	.3543	9.000	10.0	65	22	49.50	47.34	45.19	43.04	
52407	.3750	3/8"	9.525	3/8"	2"	1/2"	31.22	29.87	28.51	27.15
52427	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	36.49	34.90	33.32	31.73
52437	.3750	3/8"	9.525	3/8"	3"	1-1/4"	46.58	44.55	42.53	40.50
52447	.3750	3/8"	9.525	3/8"	3-1/2"	1-1/2"	52.66	50.37	48.08	45.79
40407	.3937	10.000	10.0	50	12	36.14	34.57	33.00	31.43	
40427	.3937	10.000	10.0	70	22	43.76	41.86	39.95	38.05	
40447	.3937	10.000	10.0	88	38	64.63	61.82	59.01	56.20	
52507	.4375	7/16"	11.113	7/16"	2-1/2"	9/16"	43.87	41.97	40.06	38.15
52527	.4375	7/16"	11.113	7/16"	2-3/4"	1"	43.87	41.97	40.06	38.15
52547	.4375	7/16"	11.113	7/16"	4"	2"	70.15	67.10	64.05	61.00
40507	.4724	12.000	12.0	65	16	53.27	50.95	48.64	46.32	
40527	.4724	12.000	12.0	75	32	56.83	54.36	51.89	49.42	
40547	.4724	12.000	12.0	100	50	77.57	74.20	70.82	67.45	

EDP#	$d1$ † Diameter		$d2$ Shank Diameter	$l1$ Overall Length	$l2$ Flute Length	1-11	12-24	25-49	50-100	
	Decimal	Metric								
52607	.5000	1/2"	12.700	1/2"	2-1/2"	5/8"	51.08	48.86	46.64	44.42
52627	.5000	1/2"	12.700	1/2"	3"	1-1/4"	54.58	52.21	49.83	47.46
52647	.5000	1/2"	12.700	1/2"	4"	2"	73.85	70.64	67.43	64.22
52707	.6250	5/8"	15.875	5/8"	3"	3/4"	90.56	86.63	82.69	78.75
52727	.6250	5/8"	15.875	5/8"	3-1/2"	1-5/8"	100.71	96.33	91.95	87.57
52747	.6250	5/8"	15.875	5/8"	6"	2-1/2"	147.28	140.88	134.47	128.07
40607	.6299		16.000	16.0	75	20	94.73	90.61	86.49	82.37
40627	.6299		16.000	16.0	88	41	105.05	100.49	95.92	91.35
40647	.6299		16.000	16.0	150	63	147.28	140.88	134.47	128.07
52807	.7500	3/4"	19.050	3/4"	3"	7/8"	127.59	122.05	116.50	110.95
52827	.7500	3/4"	19.050	3/4"	4"	1-5/8"	143.75	137.50	131.25	125.00
52837	.7500	3/4"	19.050	3/4"	5"	2"	192.94	184.55	176.16	167.77
52847	.7500	3/4"	19.050	3/4"	6"	3-1/4"	225.79	215.97	206.16	196.34
40727	.7874		20.000	20.0	100	41	194.21	185.77	177.32	168.88
40747	.7874		20.000	20.0	150	82	243.62	233.02	222.43	211.84
40787	.9843		25.000	25.0	100	28	221.79	212.15	202.50	192.86
40827	.9843		25.000	25.0	100	50	221.79	212.15	202.50	192.86
40847	.9843		25.000	25.0	150	82	358.89	343.29	327.68	312.08
52897	1.000	1"	25.400	1"	4"	1-1/8"	214.75	205.41	196.08	186.74
52927	1.000	1"	25.400	1"	4"	2"	214.75	205.41	196.08	186.74
52947	1.000	1"	25.400	1"	6"	3-1/4"	374.44	358.16	341.88	325.60

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MATERIAL HARDNESS (Rc)

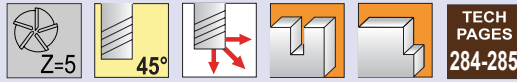
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End Mill Manufacturing

Series 255M, 855M

.1181" - .5000"
(3.000mm - 12.700mm)

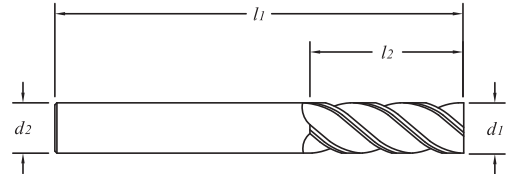


TOLERANCES	
d_1	+0.000" - .002" (+.000 - .050mm)
d_2	h6

Recommended for steels, stainless steel, and exotics

Square End

- Solid submicron grain carbide end mill - center cutting
- High performance milling
- Rigid work holding, machine stability and part integrity are critical!
- Improved finishes in titanium
- Heavy core
- Sharp corners
- AlTiN Coating - page 184
- TiCN Coated - page 188



MATERIAL HARDNESS (Rc)

70

35

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EDP#	d_1 † Diameter		d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	1-11	12-24	25-49	50-100	
	Decimal	Metric								
40040	.1181	3.000	3.0	38	8	12.09	11.56	11.04	10.51	
40050	.1181	3.000	3.0	50	12	14.57	13.94	13.30	12.67	
52080	.1250	1/8"	3.175	1/8"	1-1/2"	1/4"	11.35	10.86	10.36	9.87
52090	.1250	1/8"	3.175	1/8"	2"	1/2"	13.67	13.08	12.48	11.89
40080	.1575	4.000	6.0	50	8	19.65	18.80	17.94	17.09	
40090	.1575	4.000	6.0	50	12	19.65	18.80	17.94	17.09	
52100	.1875	3/16"	4.763	3/16"	2"	5/16"	13.37	12.79	12.21	11.63
52120	.1875	3/16"	4.763	3/16"	2"	9/16"	13.37	12.79	12.21	11.63
40100	.1969	5.000	5.0	50	8	14.86	14.21	13.57	12.92	
40120	.1969	5.000	5.0	50	14	14.86	14.21	13.57	12.92	
40200	.2362	6.000	6.0	50	10	15.76	15.07	14.39	13.70	
40220	.2362	6.000	6.0	65	20	16.93	16.19	15.46	14.72	
40240	.2362	6.000	6.0	100	32	30.68	29.35	28.01	26.68	
52200	.2500	1/4"	6.350	1/4"	2"	3/8"	14.93	14.28	13.63	12.98
52220	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	16.13	15.43	14.73	14.03
52240	.2500	1/4"	6.350	1/4"	4"	1-1/4"	29.14	27.87	26.61	25.34
52300	.3125	5/16"	7.938	5/16"	2"	7/16"	20.41	19.53	18.64	17.75
52320	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	22.63	21.65	20.66	19.68
52340	.3125	5/16"	7.938	5/16"	4"	1-1/4"	38.01	36.36	34.70	33.05
40320	.3150	8.000	8.0	65	21	23.76	22.73	21.69	20.66	
40340	.3150	8.000	8.0	100	32	40.03	38.29	36.55	34.81	
52400	.3750	3/8"	9.525	3/8"	2"	1/2"	25.22	24.12	23.03	21.93
52420	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	28.18	26.95	25.73	24.50
52440	.3750	3/8"	9.525	3/8"	3-1/2"	1-1/2"	42.10	40.27	38.44	36.61
40420	.3937	10.000	10.0	70	22	34.30	32.81	31.32	29.83	
40440	.3937	10.000	10.0	88	38	52.41	50.13	47.85	45.57	
52500	.4375	7/16"	11.113	7/16"	2-1/2"	9/16"	34.40	32.90	31.41	29.91
52520	.4375	7/16"	11.113	7/16"	2-3/4"	1"	34.40	32.90	31.41	29.91
52540	.4375	7/16"	11.113	7/16"	4"	2"	57.93	55.41	52.89	50.37
40520	.4724	12.000	12.0	75	32	47.40	45.34	43.28	41.22	
40540	.4724	12.000	12.0	100	50	65.30	62.46	59.62	56.78	
52600	.5000	1/2"	12.700	1/2"	2-1/2"	5/8"	41.63	39.82	38.01	36.20
52620	.5000	1/2"	12.700	1/2"	3"	1-1/4"	45.14	43.18	41.21	39.25
52640	.5000	1/2"	12.700	1/2"	4"	2"	61.61	58.93	56.25	53.57

EDP#	d_1 † Diameter		d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	1-11	12-24	25-49	50-100	
	Decimal	Metric								
52700	.6250	5/8"	15.875	5/8"	3"	3/4"	79.60	76.14	72.68	69.22
52720	.6250	5/8"	15.875	5/8"	3-1/2"	1-5/8"	87.04	83.26	79.47	75.69
52740	.6250	5/8"	15.875	5/8"	6"	2-1/2"	126.98	121.46	115.94	110.42
40600	.6299		16.000	16.0	75	20	83.78	80.14	76.49	72.85
40620	.6299		16.000	16.0	88	41	91.39	87.42	83.44	79.47
40640	.6299		16.000	16.0	150	63	126.98	121.46	115.94	110.42
52800	.7500	3/4"	19.050	3/4"	3"	7/8"	114.47	109.49	104.52	99.54
52820	.7500	3/4"	19.050	3/4"	4"	1-5/8"	127.63	122.08	116.53	110.98
52830	.7500	3/4"	19.050	3/4"	5"	2"	172.76	165.25	157.74	150.23
52840	.7500	3/4"	19.050	3/4"	6"	3-1/4"	202.29	193.49	184.70	175.90
40700	.7874		20.000	20.0	75	22	155.25	148.50	141.75	135.00
40720	.7874		20.000	20.0	100	41	170.38	162.98	155.57	148.16
40740	.7874		20.000	20.0	150	82	213.10	203.83	194.57	185.30
40780	.9843		25.000	25.0	100	28	197.94	189.33	180.73	172.12
40820	.9843		25.000	25.0	100	50	197.94	189.33	180.73	172.12
40840	.9843		25.000	25.0	150	82	328.37	314.09	299.82	285.54
52890	1.000	1"	25.400	1"	4"	1-1/8"	190.90	182.60	174.30	166.00
52920	1.000	1"	25.400	1"	4"	2"	190.90	182.60	174.30	166.00
52940	1.000	1"	25.400	1"	6"	3-1/4"	343.91	328.96	314.00	299.05



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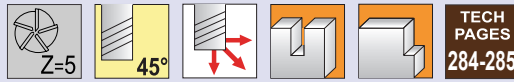
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MATERIAL HARDNESS (Rc)

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Series 255MC

.1875" - 1.000"
(4.763mm - 25.400mm)

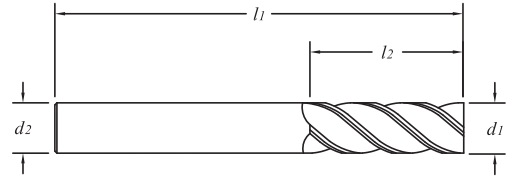


TOLERANCES	
d_1	+0.000" - .002" (+.000 - .050mm)
d_2	h6

Recommended for steels, stainless steel, and exotics

Square End
TiCN Coated

- Solid submicron grain carbide end mill - center cutting
- High performance milling
- Rigid work holding, machine stability and part integrity are critical!
- Improved abrasion resistance and lubricity
- Improved finishes in titanium
- Heavy core
- Sharp corners
- AlTiN Coating - page 184
- Uncoated - page 186



MATERIAL HARDNESS (Rc)

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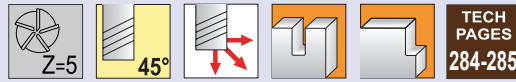
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EDP#	d_1 † Diameter		d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	1-11	12-24	25-49	50-100	
	Decimal	Metric								
52104	.1875	3/16"	4.763	3/16"	2"	5/16"	15.76	15.07	14.39	13.70
52124	.1875	3/16"	4.763	3/16"	2"	9/16"	15.76	15.07	14.39	13.70
52204	.2500	1/4"	6.350	1/4"	2"	3/8"	18.27	17.48	16.68	15.89
52224	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	20.95	20.04	19.13	18.22
52244	.2500	1/4"	6.350	1/4"	4"	1-1/4"	34.35	32.86	31.36	29.87
52304	.3125	5/16"	7.938	5/16"	2"	7/16"	25.63	24.52	23.40	22.29
52324	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	29.06	27.80	26.53	25.27
52344	.3125	5/16"	7.938	5/16"	4"	1-1/4"	46.02	44.02	42.02	40.02
52404	.3750	3/8"	9.525	3/8"	2"	1/2"	30.44	29.12	27.79	26.47
52424	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	34.63	33.12	31.62	30.11
52444	.3750	3/8"	9.525	3/8"	3-1/2"	1-1/2"	50.07	47.89	45.72	43.54
52504	.4375	7/16"	11.113	7/16"	2-1/2"	9/16"	42.14	40.30	38.47	36.64
52524	.4375	7/16"	11.113	7/16"	2-3/4"	1"	42.14	40.30	38.47	36.64
52544	.4375	7/16"	11.113	7/16"	4"	2"	67.56	64.63	61.69	58.75
52604	.5000	1/2"	12.700	1/2"	2-1/2"	5/8"	49.36	47.21	45.07	42.92
52624	.5000	1/2"	12.700	1/2"	3"	1-1/4"	52.85	50.56	48.26	45.96
52644	.5000	1/2"	12.700	1/2"	4"	2"	71.27	68.17	65.07	61.97
52704	.6250	5/8"	15.875	5/8"	3"	3/4"	89.98	86.06	82.15	78.24
52724	.6250	5/8"	15.875	5/8"	3-1/2"	1-5/8"	99.06	94.75	90.45	86.14
52744	.6250	5/8"	15.875	5/8"	6"	2-1/2"	143.85	137.60	131.34	125.09
52804	.7500	3/4"	19.050	3/4"	3"	7/8"	127.25	121.72	116.18	110.65
52824	.7500	3/4"	19.050	3/4"	4"	1-5/8"	141.40	135.26	129.11	122.96
52844	.7500	3/4"	19.050	3/4"	6"	3-1/4"	221.55	211.92	202.28	192.65
52894	1.000	1"	25.400	1"	4"	1-1/8"	211.62	202.42	193.22	184.02
52924	1.000	1"	25.400	1"	4"	2"	211.62	202.42	193.22	184.02
52944	1.000	1"	25.400	1"	6"	3-1/4"	371.15	355.01	338.88	322.74

TOLERANCES

<i>d1</i>	+0.000" - .002" (+0.000 - .050mm)
<i>d2</i>	h6
<i>r</i>	+0.001" - .001" (+0.025 - .025mm)



Series 255RA, 855RA

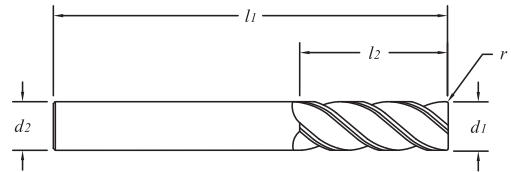
.1181" - .3125"
(3.000mm - 7.938mm)

Recommended for steels, stainless steel, and exotics

Corner Radius

AlTiN Coating

- Solid submicron grain carbide end mill - center cutting
- High performance milling
- Rigid work holding, machine stability and part integrity are critical!
- Dry or semi-dry machining
- Improved finishes in titanium
- Heavy core



EDP#	<i>d1</i> † Diameter		<i>d2</i> Shank Diameter	<i>l1</i> Overall Length	<i>l2</i> Flute Length	<i>r</i> Corner Radius	1-11	12-24	25-49	50-100	
	Decimal	Metric									
83527	.1181	3.000	3.0	38	8	0.20	16.17	15.47	14.76	14.06	
83537	.1181	3.000	3.0	38	8	0.50	16.17	15.47	14.76	14.06	
83547	.1181	3.000	3.0	50	12	0.20	19.38	18.54	17.69	16.85	
83550	.1181	3.000	3.0	50	12	0.30	19.38	18.54	17.69	16.85	
83557	.1181	3.000	3.0	50	12	0.50	19.38	18.54	17.69	16.85	
83567	.1250	1/8"	3.175	1/8"	1-1/2"	1/4"	.010"	15.36	14.70	14.03	13.36
83577	.1250	1/8"	3.175	1/8"	1-1/2"	1/4"	.020"	15.36	14.70	14.03	13.36
83587	.1250	1/8"	3.175	1/8"	2"	1/2"	.010"	18.88	18.06	17.24	16.42
83597	.1250	1/8"	3.175	1/8"	2"	1/2"	.020"	18.88	18.06	17.24	16.42
83600	.1250	1/8"	3.175	1/8"	2"	1/2"	.030"	18.88	18.06	17.24	16.42
83607	.1575	4.000	6.0	50	8	0.30	26.07	24.94	23.80	22.67	
83617	.1575	4.000	6.0	50	8	0.50	26.07	24.94	23.80	22.67	
83627	.1575	4.000	6.0	50	12	0.30	26.07	24.94	23.80	22.67	
83637	.1575	4.000	6.0	50	12	0.50	26.07	24.94	23.80	22.67	
83647	.1875	3/16"	4.763	3/16"	2"	5/16"	.010"	19.32	18.48	17.64	16.80
83657	.1875	3/16"	4.763	3/16"	2"	5/16"	.020"	19.32	18.48	17.64	16.80
83667	.1875	3/16"	4.763	3/16"	2"	9/16"	.010"	19.32	18.48	17.64	16.80
83677	.1875	3/16"	4.763	3/16"	2"	9/16"	.020"	19.32	18.48	17.64	16.80
83680	.1875	3/16"	4.763	3/16"	2"	9/16"	.030"	19.32	18.48	17.64	16.80
83707	.1969	5.000	6.0	65	15	0.30	28.43	27.19	25.96	24.72	
83717	.1969	5.000	6.0	65	15	0.50	28.43	27.19	25.96	24.72	
83767	.2362	6.000	6.0	50	12	0.30	24.53	23.46	22.40	21.33	
83777	.2362	6.000	6.0	50	12	0.50	24.53	23.46	22.40	21.33	
83780	.2362	6.000	6.0	65	19	0.20	27.54	26.35	25.15	23.95	
83787	.2362	6.000	6.0	65	19	0.30	27.54	26.35	25.15	23.95	
83797	.2362	6.000	6.0	65	19	0.50	27.54	26.35	25.15	23.95	
83807	.2362	6.000	6.0	65	19	1.00	27.54	26.35	25.15	23.95	
83827	.2500	1/4"	6.350	1/4"	2"	3/8"	.015"	23.61	22.58	21.56	20.53
83837	.2500	1/4"	6.350	1/4"	2"	3/8"	.030"	23.61	22.58	21.56	20.53
83845	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.010"	26.54	25.39	24.23	23.08
83847	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.015"	26.54	25.39	24.23	23.08
83857	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.030"	26.54	25.39	24.23	23.08
83877	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.060"	26.54	25.39	24.23	23.08
83907	.2500	1/4"	6.350	1/4"	3"	1-1/8"	.030"	38.11	36.45	34.80	33.14
83927	.3125	5/16"	7.938	5/16"	2"	7/16"	.020"	32.23	30.83	29.43	28.03
83937	.3125	5/16"	7.938	5/16"	2"	7/16"	.030"	32.23	30.83	29.43	28.03
83940	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	.010"	35.93	34.36	32.80	31.24
83947	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	.020"	35.93	34.36	32.80	31.24
83957	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	.030"	35.93	34.36	32.80	31.24
83977	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	.060"	35.93	34.36	32.80	31.24

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MATERIAL HARDNESS (Rc)

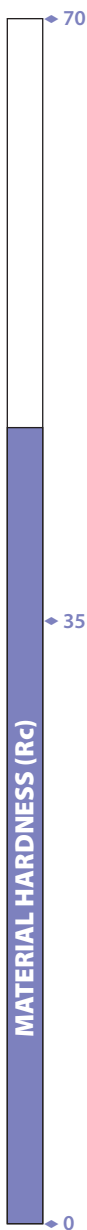
continued →

HIGH PERFORMANCE
END MILLS

Series 255RA, 855RA (continued)

.3150" - 1.000"
(8.000mm - 25.400mm)

EDP#	$d1$ † Diameter		$d2$ Shank Diameter	$l1$ Overall Length	$l2$ Flute Length	r Corner Radius	1-11	12-24	25-49	50-100	
	Decimal	Metric									
83987	.3150	8.000	8.0	50	12	0.50	33.42	31.97	30.51	29.06	
83997	.3150	8.000	8.0	50	12	1.00	33.42	31.97	30.51	29.06	
84000	.3150	8.000	8.0	65	22	0.30	37.27	35.65	34.03	32.41	
84007	.3150	8.000	8.0	65	22	0.50	37.27	35.65	34.03	32.41	
84017	.3150	8.000	8.0	65	22	1.00	37.27	35.65	34.03	32.41	
84027	.3150	8.000	8.0	65	22	1.50	37.27	35.65	34.03	32.41	
84087	.3750	3/8"	9.525	3/8"	2"	1/2"	.020"	38.00	36.34	34.69	33.04
84097	.3750	3/8"	9.525	3/8"	2"	1/2"	.030"	38.00	36.34	34.69	33.04
84100	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.010"	41.79	39.97	38.16	36.34
84107	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.020"	41.79	39.97	38.16	36.34
84117	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.030"	41.79	39.97	38.16	36.34
84137	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.060"	41.79	39.97	38.16	36.34
84147	.3750	3/8"	9.525	3/8"	3"	1-1/4"	.030"	54.99	52.60	50.21	47.82
84167	.3937	10.000	10.0	70	22	0.50	50.52	48.32	46.13	43.93	
84177	.3937	10.000	10.0	70	22	1.00	50.52	48.32	46.13	43.93	
84257	.4724	12.000	12.0	75	32	0.30	73.88	70.66	67.45	64.24	
84267	.4724	12.000	12.0	75	32	0.50	73.88	70.66	67.45	64.24	
84277	.4724	12.000	12.0	75	32	1.00	73.88	70.66	67.45	64.24	
84287	.4724	12.000	12.0	75	32	1.50	73.88	70.66	67.45	64.24	
84307	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.010"	70.89	67.80	64.72	61.64
84317	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.020"	70.89	67.80	64.72	61.64
84327	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.030"	70.89	67.80	64.72	61.64
84337	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.060"	70.89	67.80	64.72	61.64
84357	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.120"	70.89	67.80	64.72	61.64
84367	.5000	1/2"	12.700	1/2"	4"	2"	.030"	83.97	80.32	76.67	73.02
84377	.5000	1/2"	12.700	1/2"	4"	2"	.060"	83.97	80.32	76.67	73.02
84397	.5000	1/2"	12.700	1/2"	4"	2"	.120"	83.97	80.32	76.67	73.02
84467	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.015"	112.73	107.83	102.93	98.03
84487	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.030"	112.73	107.83	102.93	98.03
84497	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.060"	112.73	107.83	102.93	98.03
84507	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.120"	112.73	107.83	102.93	98.03
84567	.6299	16.000	16.0	88	32	1.00	117.55	112.44	107.33	102.22	
84577	.6299	16.000	16.0	88	32	2.00	117.55	112.44	107.33	102.22	
84587	.6299	16.000	16.0	150	65	1.00	175.55	167.92	160.28	152.65	
84597	.6299	16.000	16.0	150	65	2.00	175.55	167.92	160.28	152.65	
84667	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.015"	161.33	154.32	147.30	140.29
84687	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.030"	161.33	154.32	147.30	140.29
84697	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.060"	161.33	154.32	147.30	140.29
84700	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.120"	161.33	154.32	147.30	140.29
84707	.7500	3/4"	19.050	3/4"	5"	2"	.030"	223.38	213.66	203.95	194.24
84717	.7500	3/4"	19.050	3/4"	5"	2"	.060"	223.38	213.66	203.95	194.24
84747	.7500	3/4"	19.050	3/4"	5"	2"	.120"	223.38	213.66	203.95	194.24
84757	.7500	3/4"	19.050	3/4"	5"	2"	.190"	223.38	213.66	203.95	194.24
84767	.7874	20.000	20.0	100	38	1.00	228.31	218.38	208.46	198.53	
84777	.7874	20.000	20.0	100	38	3.00	228.31	218.38	208.46	198.53	
84887	.9843	25.000	25.0	100	38	1.00	261.27	249.91	238.55	227.19	
84897	.9843	25.000	25.0	100	38	3.00	261.27	249.91	238.55	227.19	
84957	1.000	1"	25.400	1"	4"	1-1/2"	.015"	274.83	262.88	250.93	238.98
84967	1.000	1"	25.400	1"	4"	1-1/2"	.030"	274.83	262.88	250.93	238.98
84970	1.000	1"	25.400	1"	4"	1-1/2"	.060"	274.83	262.88	250.93	238.98
84977	1.000	1"	25.400	1"	4"	1-1/2"	.120"	274.83	262.88	250.93	238.98
84987	1.000	1"	25.400	1"	5"	2"	.030"	337.97	323.28	308.58	293.89
84990	1.000	1"	25.400	1"	5"	2"	.060"	337.97	323.28	308.58	293.89
84997	1.000	1"	25.400	1"	5"	2"	.120"	337.97	323.28	308.58	293.89
85007	1.000	1"	25.400	1"	5"	2"	.190"	337.97	323.28	308.58	293.89



TOLERANCES

$d1$	+0.000" - .002" (+0.000 - .050mm)
$d2$	h6

NEW ITEM

Series 246M, 246MC, 246MA, 846M, 846MA

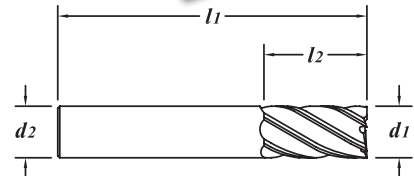


TECH PAGES 284-285

Recommended for steels

Square End

Solid submicron grain carbide end mill - center cutting
 High performance finishing in a variety of steels
 Rigid work holding, machine stability and part integrity are critical!
 Excellent durability



(246M/846M) UNCOATED EDP#	(246MC) TiCN EDP#	(246MA/846MA) AlTiN EDP#	$d1$ † Diameter		$d2$ Shank Diameter	$l1$ Overall Length	$l2$ Flute Length	1-11	12-24	25-49	50-100	
			Decimal	Metric								
51110	-	-	.1875	3/16"	4.763	3/16"	2"	5/8"	13.37	12.79	12.21	11.63
51510	-	-	.1969		5.000	5.0	50	16	14.86	14.21	13.57	12.92
51520	-	-	.2362		6.000	6.0	65	20	16.93	16.19	15.46	14.72
51150	-	-	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	16.13	15.43	14.73	14.03
51190	-	-	.3125	5/16"	7.938	5/16"	2-1/2"	7/8"	22.63	21.65	20.66	19.68
51530	-	-	.3150		8.000	8.0	65	22	23.76	22.73	21.69	20.66
51230	-	-	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	28.18	26.95	25.73	24.50
51540	-	-	.3937		10.000	10.0	70	25	34.30	32.81	31.32	29.83
51270	-	-	.4375	7/16"	11.113	7/16"	2-3/4"	1"	34.40	32.90	31.41	29.91
51310	-	-	.5000	1/2"	12.700	1/2"	3"	1"	45.14	43.18	41.21	39.25
51330	-	-	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	87.04	83.26	79.47	75.69
51560	-	-	.6299		16.000	16.0	88	32	91.39	87.42	83.44	79.47
51350	-	-	.7500	3/4"	19.050	3/4"	4"	1-1/2"	127.63	122.08	116.53	110.98
51370	-	-	1.000	1"	25.400	1"	4"	1-1/2"	190.90	182.60	174.30	166.00
51400	-	-	1.250	1-1/4"	31.750	1-1/4"	4-1/2"	2"	557.35	533.12	508.88	484.65
51430	-	-	1.250	1-1/4"	31.750	1-1/4"	6"	3"	729.58	697.86	666.14	634.42
-	51114	-	.1875	3/16"	4.763	3/16"	2"	5/8"	15.76	15.07	14.39	13.70
-	51154	-	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	20.95	20.04	19.13	18.22
-	51194	-	.3125	5/16"	7.938	5/16"	2-1/2"	7/8"	29.06	27.80	26.53	25.27
-	51234	-	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	34.63	33.12	31.62	30.11
-	51274	-	.4375	7/16"	11.113	7/16"	2-3/4"	1"	42.14	40.30	38.47	36.64
-	51314	-	.5000	1/2"	12.700	1/2"	3"	1"	52.85	50.56	48.26	45.96
-	51334	-	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	99.06	94.75	90.45	86.14
-	51354	-	.7500	3/4"	19.050	3/4"	4"	1-1/2"	141.40	135.26	129.11	122.96
-	51374	-	1.000	1"	25.400	1"	4"	1-1/2"	211.58	202.38	193.18	183.98
-	51404	-	1.250	1-1/4"	31.750	1-1/4"	4-1/2"	2"	590.76	565.07	539.39	513.70
-	51434	-	1.250	1-1/4"	31.750	1-1/4"	6"	3"	767.36	734.00	700.63	667.27
-	-	51117	.1875	3/16"	4.763	3/16"	2"	5/8"	16.08	15.38	14.68	13.98
-	-	51517	.1969		5.000	5.0	50	16	19.06	18.23	17.40	16.57
NEW	-	51597	.1969		5.000	6.0	65	16	25.60	24.49	23.37	22.26
-	-	51527	.2362		6.000	6.0	65	20	22.46	21.48	20.51	19.53
-	-	51157	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	21.69	20.75	19.80	18.86
-	-	51197	.3125	5/16"	7.938	5/16"	2-1/2"	7/8"	30.92	29.58	28.23	26.89
-	-	51537	.3150		8.000	8.0	65	22	32.05	30.66	29.26	27.87
-	-	51237	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	36.49	34.90	33.32	31.73
-	-	51547	.3937		10.000	10.0	70	25	43.76	41.86	39.95	38.05
-	-	51277	.4375	7/16"	11.113	7/16"	2-3/4"	1"	43.87	41.97	40.06	38.15
-	-	51557	.4724		12.000	12.0	75	26	56.83	54.36	51.89	49.42
-	-	51317	.5000	1/2"	12.700	1/2"	3"	1"	54.58	52.21	49.83	47.46
-	-	51337	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	100.71	96.33	91.95	87.57
-	-	51567	.6299		16.000	16.0	88	32	105.05	100.49	95.92	91.35
-	-	51357	.7500	3/4"	19.050	3/4"	4"	1-1/2"	143.75	137.50	131.25	125.00
-	-	51577	.7874		20.000	20.0	100	38	194.21	185.77	177.32	168.88
-	-	51587	.9843		25.000	25.0	100	38	221.79	212.15	202.50	192.86
-	-	51377	1.000	1"	25.400	1"	4"	1-1/2"	214.75	205.41	196.08	186.74
-	-	51407	1.250	1-1/4"	31.750	1-1/4"	4-1/2"	2"	596.45	570.52	544.58	518.65
-	-	51437	1.250	1-1/4"	31.750	1-1/4"	6"	3"	768.68	735.26	701.84	668.42

HIGH PERFORMANCE END MILLS

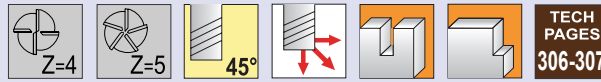
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MATERIAL HARDNESS (Rc)

0

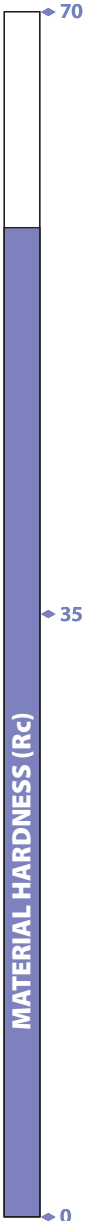
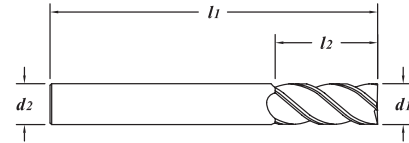
$d1$	+0.000" -0.002" (+0.000 -0.050mm)
$d2$	h6



Recommended for inconel, tool steels, hardened die mold >40Rc

**Square End
AlTiN Coating**

Solid submicron grain carbide end mill - center cutting
High performance tool for use in high Rockwell and difficult to machine materials
Corner Radius - page 193
Ball End - page 194



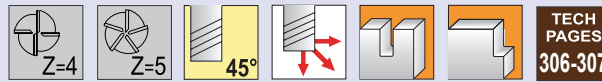
EDP#	$d1$ † Diameter		$d2$ Shank Diameter	$l1$ Overall Length	$l2$ Flute Length	Number of Flutes	1-11	12-24	25-49	50-100	
	Decimal	Metric									
21200	.1181	3.000	3.0	38	12	4	15.63	14.95	14.27	13.59	
21230	.1250	1/8"	3.175	1/8"	1-1/2"	4	14.86	14.21	13.57	12.92	
21260	.1575	4.000	6.0	50	12	4	25.25	24.16	23.06	21.96	
21290	.1875	3/16"	4.763	3/16"	2"	9/16"	4	18.66	17.85	17.04	16.23
21320	.1969	5.000	6.0	65	15	4	27.67	26.47	25.26	24.06	
21350	.2362	6.000	6.0	65	19	4	26.83	25.66	24.50	23.33	
21380	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	4	25.85	24.73	23.60	22.48
21410	.2756	7.000	8.0	65	22	5	40.50	38.74	36.98	35.22	
21440	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	5	35.10	33.57	32.05	30.52
21470	.3150	8.000	8.0	65	22	5	36.89	35.29	33.68	32.08	
21500	.3543	9.000	10.0	65	22	5	54.20	51.84	49.49	47.13	
21530	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	5	40.69	38.92	37.15	35.38
21560	.3937	10.000	10.0	70	22	5	49.11	46.97	44.84	42.70	
21620	.4724	12.000	12.0	75	32	5	72.00	68.87	65.74	62.61	
21660	.5000	1/2"	12.700	1/2"	3"	1-1/4"	5	68.46	65.48	62.51	59.53
21710	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	5	108.70	103.97	99.25	94.52
21740	.6299	16.000	16.0	88	32	5	114.31	109.34	104.37	99.40	
21800	.7500	3/4"	19.050	3/4"	4"	1-1/2"	5	155.69	148.92	142.15	135.38
21830	.7874	20.000	20.0	100	38	5	220.09	210.52	200.95	191.38	
21890	.9843	25.000	25.0	100	38	5	275.17	263.21	251.24	239.28	
21920	1.000	1"	25.400	1"	4"	1-1/2"	5	266.05	254.49	242.92	231.35

TOLERANCES

d_1	+0.000" - .002" (+.000mm - .050mm)
d_2	h6
r	+0.01" - .001" (+.025 - .025mm)

HIGH ROCKWELL END MILLS

Series 545RA



Recommended for inconel, tool steels, hardened die mold >40Rc

Corner Radius

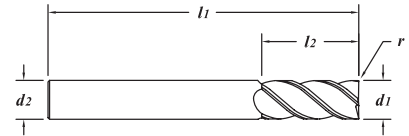
AlTiN Coating

Solid submicron grain carbide end mill - center cutting

High performance tool for use in high Rockwell and difficult to machine materials

Square End - page 192

Ball End - page 194



HIGH PERFORMANCE END MILLS

70

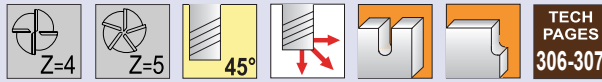
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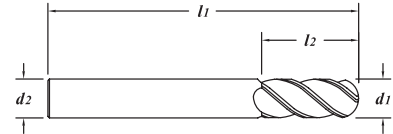
MATERIAL HARDNESS (Rc)

EDP#	d_1 † Diameter		d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius	Number of Flutes	1-11	12-24	25-49	50-100	
	Decimal	Metric										
21202	.1181	3.000	3.0	38	12	0.20	4	17.07	16.32	15.58	14.84	
21212	.1181	3.000	3.0	38	12	0.50	4	17.07	16.32	15.58	14.84	
21232	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"	.010"	4	16.22	15.51	14.81	14.10
21242	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"	.020"	4	16.22	15.51	14.81	14.10
21262	.1575	4.000	6.0	50	12	0.30	4	27.52	26.32	25.13	23.93	
21292	.1875	3/16"	4.763	3/16"	2"	9/16"	.010"	4	20.38	19.49	18.61	17.72
21302	.1875	3/16"	4.763	3/16"	2"	9/16"	.020"	4	20.38	19.49	18.61	17.72
21322	.1969	5.000	6.0	65	15	0.30	4	30.02	28.71	27.41	26.10	
21342	.2362	6.000	6.0	65	19	0.20	4	29.07	27.81	26.54	25.28	
21352	.2362	6.000	6.0	65	19	0.50	4	29.07	27.81	26.54	25.28	
21372	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.010"	4	28.01	26.80	25.58	24.36
21382	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.015"	4	28.01	26.80	25.58	24.36
21392	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.030"	4	28.01	26.80	25.58	24.36
21412	.2756	7.000	8.0	65	22	0.50	5	43.93	42.02	40.11	38.20	
21432	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	.010"	5	37.93	36.28	34.63	32.98
21442	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	.015"	5	37.93	36.28	34.63	32.98
21452	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	.030"	5	37.93	36.28	34.63	32.98
21462	.3150	8.000	8.0	65	22	0.20	5	39.93	38.19	36.46	34.72	
21472	.3150	8.000	8.0	65	22	0.50	5	39.93	38.19	36.46	34.72	
21502	.3543	9.000	10.0	65	22	0.50	5	59.00	56.43	53.87	51.30	
21522	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.010"	5	44.14	42.22	40.30	38.38
21532	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.015"	5	44.14	42.22	40.30	38.38
21542	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.030"	5	44.14	42.22	40.30	38.38
21552	.3937	10.000	10.0	70	22	0.20	5	53.31	51.00	48.68	46.36	
21562	.3937	10.000	10.0	70	22	0.50	5	53.31	51.00	48.68	46.36	
21612	.4724	12.000	12.0	75	32	0.50	5	78.76	75.34	71.91	68.49	
21622	.4724	12.000	12.0	75	32	1.00	5	78.76	75.34	71.91	68.49	
21642	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.010"	5	74.82	71.57	68.31	65.06
21652	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.015"	5	74.82	71.57	68.31	65.06
21662	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.030"	5	74.82	71.57	68.31	65.06
21672	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.060"	5	74.82	71.57	68.31	65.06
21692	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.010"	5	119.00	113.83	108.65	103.48
21702	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.015"	5	119.00	113.83	108.65	103.48
21712	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.030"	5	119.00	113.83	108.65	103.48
21722	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.060"	5	119.00	113.83	108.65	103.48
21732	.6299	16.000	16.0	88	32	0.50	5	125.27	119.82	114.38	108.93	
21742	.6299	16.000	16.0	88	32	1.00	5	125.27	119.82	114.38	108.93	
21772	.7087	18.000	18.0	100	38	0.50	5	178.78	171.01	163.23	155.46	
21802	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.015"	5	171.07	163.64	156.20	148.76
21812	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.030"	5	171.07	163.64	156.20	148.76
21822	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.060"	5	171.07	163.64	156.20	148.76
21832	.7874	20.000	20.0	100	38	0.50	5	241.86	231.34	220.83	210.31	
21922	1.000	1"	25.400	1"	4"	1-1/2"	.015"	5	292.38	279.66	266.95	254.24
21932	1.000	1"	25.400	1"	4"	1-1/2"	.030"	5	292.38	279.66	266.95	254.24
21942	1.000	1"	25.400	1"	4"	1-1/2"	.060"	5	292.38	279.66	266.95	254.24

d_1	+0.000" - .002" (+.000 - .050mm)
d_2	h6
ball radius	+0.000" - .001" (+.000 - .025mm)

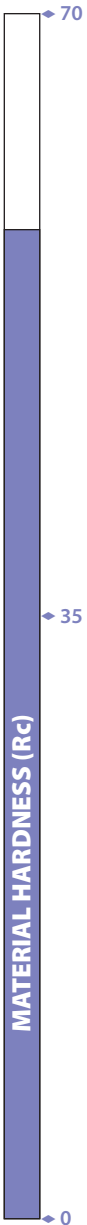


Recommended for inconel, tool steels, hardened die mold >40Rc



Ball End
AlTiN Coating

Solid submicron grain carbide end mill - center cutting
High performance tool for use in high Rockwell and difficult to machine materials
Square End - page 192
Corner Radius - page 193



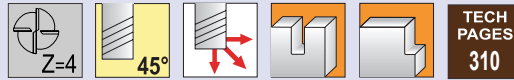
EDP#	d_1 † Diameter		d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	Number of Flutes	1-11	12-24	25-49	50-100	
	Decimal	Metric									
21204	.1181	3.000	3.0	38	12	4	17.07	16.32	15.58	14.84	
21234	.1250	1/8"	3.175	1/8"	1-1/2"	4	16.22	15.51	14.81	14.10	
21264	.1575		4.000	6.0	50	12	4	27.52	26.32	25.13	23.93
21294	.1875	3/16"	4.763	3/16"	2"	9/16"	4	20.38	19.49	18.61	17.72
21324	.1969		5.000	6.0	65	15	4	30.02	28.71	27.41	26.10
21354	.2362		6.000	6.0	65	19	4	29.07	27.81	26.54	25.28
21384	.2500	1/4"	6.353	1/4"	2-1/2"	3/4"	4	28.01	26.80	25.58	24.36
21414	.2756		7.000	8.0	65	22	5	43.93	42.02	40.11	38.20
21444	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	5	37.93	36.28	34.63	32.98
21474	.3150		8.000	8.0	65	22	5	39.93	38.19	36.46	34.72
21504	.3543		9.000	10.0	65	22	5	59.00	56.43	53.87	51.30
21534	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	5	44.14	42.22	40.30	38.38
21564	.3937		10.000	10.0	70	22	5	53.31	51.00	48.68	46.36
21624	.4724		12.000	12.0	75	32	5	78.76	75.34	71.91	68.49
21664	.5000	1/2"	12.700	1/2"	3"	1-1/4"	5	74.82	71.57	68.31	65.06
21714	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	5	119.00	113.83	108.65	103.48
21744	.6299		16.000	16.0	88	32	5	125.27	119.82	114.38	108.93
21774	.7087		18.000	18.0	100	38	5	178.78	171.01	163.23	155.46
21804	.7500	3/4"	19.050	3/4"	4"	1-1/2"	5	171.07	163.64	156.20	148.76
21924	1.000	1"	25.400	1"	4"	1-1/2"	5	292.38	279.66	266.95	254.24

TOLERANCES

d1	+ .000" - .002" (+.000mm -.050mm)
d2	h6
r	+ .001" - .001" (+.025 -.025mm)

HIGH FEED END MILLS

Series H-45



Recommended for die mold applications

Corner Radius

AlTiN Coating

Solid submicron grain carbide end mill - center cutting

For light axial / radial depths of cut

Rigid work holding, machine stability and part integrity are critical!

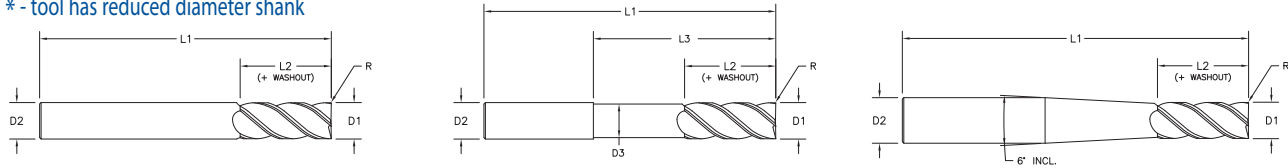
Recommended for high Rockwell materials

Modified reach lengths available within 48 hours



* - tool has 3° per side blend angle to shank

* - tool has reduced diameter shank



HIGH PERFORMANCE END MILLS

MATERIAL HARDNESS (Rc)

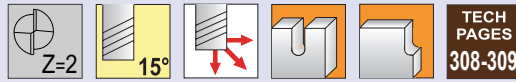
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EDP#	d1 † Diameter		d2 Shank Diameter	l1 Overall Length	l2 Flute Length	r Corner Radius	l3 Reach Length	d3 Neck Diameter	1-11	12-24	25-49	50-100
	Decimal	Metric										
48300	.1181	3.000	6.0	65	3	0.75	15.0	2.80	38.63	36.95	35.27	33.59
48305	.1250	3.175	1/8"	3"	1/8"	.015"	-	-	29.19	27.92	26.65	25.38
48310	.1250	3.175	1/8"	3"	1/8"	.030"	-	-	29.19	27.92	26.65	25.38
48315	.1250	3.175	3/16"	2-1/2"	1/8"	.010"	3/4"	.115"	34.29	32.80	31.31	29.82
48320	.1250	3.175	3/16"	2-1/2"	1/8"	.015"	3/4"	.115"	34.29	32.80	31.31	29.82
48325	.1250	3.175	3/16"	2-1/2"	1/8"	.020"	3/4"	.115"	34.29	32.80	31.31	29.82
* 48330	.1250	3.175	3/16"	3"	1/8"	.030"	*	-	31.29	29.93	28.57	27.21
48335	.1575	4.000	6.0	65	4	1.00	20.0	3.70	37.09	35.48	33.86	32.25
48340	.1875	4.763	3/16"	3"	3/16"	.015"	-	-	33.66	32.20	30.73	29.27
48345	.1875	4.763	3/16"	3"	3/16"	.030"	-	-	33.66	32.20	30.73	29.27
48350	.1875	4.763	3/16"	3"	3/16"	.060"	-	-	33.66	32.20	30.73	29.27
48355	.1875	4.763	1/4"	2-1/2"	3/16"	.020"	7/8"	.175"	36.02	34.45	32.89	31.32
48360	.1875	4.763	1/4"	2-1/2"	3/16"	.030"	7/8"	.175"	36.02	34.45	32.89	31.32
48365	.1875	4.763	1/4"	2-1/2"	3/16"	.060"	7/8"	.175"	36.02	34.45	32.89	31.32
48370	.1875	4.763	1/4"	4"	3/16"	.020"	1-1/2"	.175"	52.07	49.81	47.54	45.28
48375	.1875	4.763	1/4"	4"	3/16"	.030"	1-1/2"	.175"	52.07	49.81	47.54	45.28
* 48380	.1875	4.763	1/4"	4"	3/16"	.030"	*	-	52.07	49.81	47.54	45.28
* 48385	.1969	5.000	6.0	100	5	1.20	* 10.0	5.00	53.98	51.63	49.29	46.94
48390	.2362	6.000	6.0	100	6	1.50	30.0	5.70	51.20	48.97	46.75	44.52
48395	.2500	6.350	1/4"	3"	1/4"	.015"	-	-	38.89	37.20	35.51	33.82
48400	.2500	6.350	1/4"	3"	1/4"	.030"	-	-	38.89	37.20	35.51	33.82
48405	.2500	6.350	1/4"	3"	1/4"	.060"	-	-	38.89	37.20	35.51	33.82
* 48410	.2756	7.000	6.0	100	7	1.50	*	-	81.01	77.48	73.96	70.44
48415	.3125	7.938	5/16"	2-1/2"	5/16"	.020"	-	-	35.93	34.36	32.80	31.24
48420	.3125	7.938	5/16"	3"	5/16"	.078"	1-5/8"	.300"	57.34	54.85	52.35	49.86
48425	.3125	7.938	5/16"	3"	5/16"	.094"	1-5/8"	.300"	57.34	54.85	52.35	49.86
48430	.3150	8.000	8.0	75	8	2.00	-	-	51.62	49.38	47.13	44.89
48435	.3150	8.000	8.0	100	8	2.00	40.0	7.70	66.95	64.04	61.13	58.22
48440	.3750	9.525	3/8"	3"	3/8"	.015"	-	-	54.53	52.16	49.79	47.42
48445	.3750	9.525	3/8"	3"	3/8"	.030"	-	-	54.53	52.16	49.79	47.42
48450	.3750	9.525	3/8"	3"	3/8"	.060"	-	-	54.53	52.16	49.79	47.42
48455	.3750	9.525	3/8"	3"	3/8"	.094"	2.00"	.365"	62.32	59.61	56.90	54.19
48460	.3750	9.525	3/8"	4"	3/8"	.030"	2-1/2"	.365"	69.37	66.35	63.34	60.32
48465	.3750	9.525	3/8"	4"	3/8"	.094"	2-1/2"	.365"	69.37	66.35	63.34	60.32
48470	.3937	10.000	10.0	100	10	2.00	50.0	9.70	85.64	81.92	78.19	74.47
48475	.4724	12.000	12.0	100	12	3.00	60.0	11.70	95.12	90.98	86.85	82.71
48480	.5000	12.700	1/2"	3"	1/2"	.015"	-	-	70.89	67.80	64.72	61.64
48485	.5000	12.700	1/2"	3"	1/2"	.030"	-	-	70.89	67.80	64.72	61.64
48490	.5000	12.700	1/2"	3"	1/2"	.060"	-	-	70.89	67.80	64.72	61.64
48495	.5000	12.700	1/2"	3"	1/2"	.125"	-	-	70.89	67.80	64.72	61.64
48500	.5000	12.700	1/2"	4"	1/2"	.125"	-	-	83.97	80.32	76.67	73.02

d_1	+0.000" -0.011" (+0.000 -0.25mm)
d_2	h6
ball radius	+0.0000" -0.0005" (+0.0000 -0.127mm)

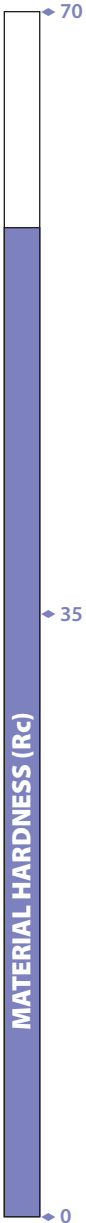
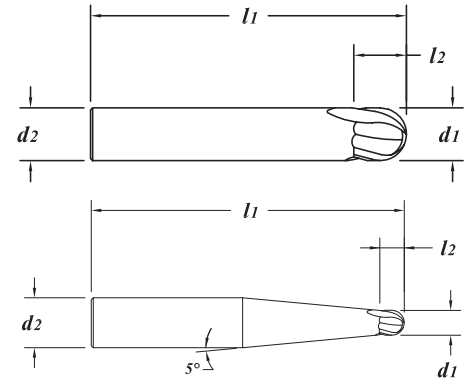


Recommended for die mold applications

Die Mold Cutter - Ball End

AlTiN Coating

Solid submicron grain carbide end mill - center cutting
 High performance machining in the die mold industry
 Rigid work holding, machine stability and part integrity are critical!
 <5mm (.1969") diameter have 5° per side taper to shank
 Recommended for high Rockwell materials
 Can be modified with a neck in 48 hours



EDP#	d_1 † Diameter		d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	1-11	12-24	25-49	50-100	
	Decimal	Metric								
14210	.0312	1/32"	0.792	1/4"	3"	1/32"	60.36	57.74	55.11	52.49
15210	.0394		1.000	6.0	75	1	60.36	57.74	55.11	52.49
15220	.0591		1.500	6.0	75	1.5	60.36	57.74	55.11	52.49
14220	.0625	1/16"	1.588	1/4"	3"	1/16"	60.36	57.74	55.11	52.49
15230	.0787		2.000	6.0	75	2	60.36	57.74	55.11	52.49
14230	.0938	3/32"	2.383	1/4"	3"	3/32"	60.36	57.74	55.11	52.49
15240	.1181		3.000	6.0	75	3	58.98	56.42	53.85	51.29
14240	.1250	1/8"	3.175	1/4"	3"	1/8"	58.98	56.42	53.85	51.29
15250	.1575		4.000	6.0	75	4	58.12	55.59	53.07	50.54
14250	.1875	3/16"	4.763	1/4"	3"	3/16"	58.12	55.59	53.07	50.54
15260	.1969		5.000	6.0	75	5	58.12	55.59	53.07	50.54
15270	.2362		6.000	6.0	75	6	56.91	54.44	51.96	49.49
14260	.2500	1/4"	6.350	1/4"	3"	1/4"	56.91	54.44	51.96	49.49
14270	.3125	5/16"	7.938	5/16"	4"	5/16"	69.70	66.67	63.64	60.61
15280	.3150		8.000	8.0	100	8	69.70	66.67	63.64	60.61
14280	.3750	3/8"	9.525	3/8"	4"	3/8"	77.12	73.77	70.41	67.06
15290	.3937		10.000	10.0	100	10	83.43	79.81	76.18	72.55
15300	.4724		12.000	12.0	100	12	101.05	96.66	92.26	87.87
14290	.5000	1/2"	12.700	1/2"	4"	1/2"	112.53	107.64	102.74	97.85

TOLERANCES

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

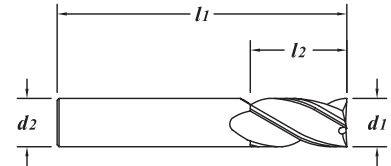
Series 210D



Recommended for graphite, fiber-reinforced plastics, carbon fiber

**Square End
Diamond Coating**

Solid grade C-2 carbide end mill - center cutting
Crystalline diamond coating



EDP#	d_1 † Diameter		d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	1-11	12-24	25-49	50-100	
	Decimal	Metric								
10018	.0312	1/32"	0.792	1/8"	1-1/2"	3/32"	73.26	70.07	66.89	63.70
46018	.0394		1.000	3.0	38	4	77.11	73.76	70.40	67.05
10028	.0469	3/64"	1.191	1/8"	1-1/2"	1/8"	73.26	70.07	66.89	63.70
46028	.0591		1.500	3.0	38	6	77.11	73.76	70.40	67.05
10038	.0625	1/16"	1.588	1/8"	1-1/2"	1/4"	70.92	67.84	64.75	61.67
46038	.0787		2.000	3.0	38	8	74.67	71.42	68.18	64.93
10058	.0938	3/32"	2.383	1/8"	1-1/2"	3/8"	69.67	66.64	63.61	60.58
46058	.1181		3.000	3.0	38	12	69.30	66.29	63.27	60.26
10078	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"	65.81	62.95	60.09	57.23
46078	.1575		4.000	4.0	50	14	110.73	105.92	101.10	96.29
10118	.1875	3/16"	4.763	3/16"	2"	5/8"	105.20	100.63	96.05	91.48
46098	.1969		5.000	5.0	50	16	127.64	122.09	116.54	110.99
46108	.2362		6.000	6.0	65	20	130.17	124.51	118.85	113.19
10158	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	123.66	118.28	112.91	107.53
10198	.3125	5/16"	7.938	5/16"	2-1/2"	7/8"	147.95	141.52	135.08	128.65
46128	.3150		8.000	8.0	65	20	174.64	167.05	159.45	151.86
10238	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	165.78	158.58	151.37	144.16
46148	.3937		10.000	10.0	70	25	193.42	185.01	176.60	168.19
46168	.4724		12.000	12.0	75	25	212.04	202.82	193.60	184.38
10318	.5000	1/2"	12.700	1/2"	3"	1"	201.43	192.68	183.92	175.16
13338	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	291.12	278.47	265.81	253.15
46188	.6299		16.000	16.0	88	32	354.48	339.06	323.65	308.24
13358	.7500	3/4"	19.050	3/4"	4"	1-1/2"	550.79	526.85	502.90	478.95
13378	1.000	1"	25.400	1"	4"	1-1/2"	865.35	827.73	790.10	752.48

MATERIAL HARDNESS (RC) 70 35 0

HIGH PERFORMANCE END MILLS

Series 210RD



TOLERANCES

d_1	+0.00" -0.002" (+0.000 -0.050mm)
d_2	h6
r	+0.001" -0.001" (+0.025 -0.025mm)

Recommended for graphite, fiber-reinforced plastics, carbon fiber

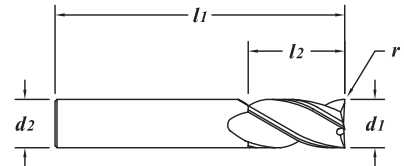
Corner Radius

Diamond Coating

Solid grade C-2 carbide end mill - center cutting

Crystalline diamond coating

For stronger corners and part radius



MATERIAL HARDNESS (Rc) 70 35 0

EDP#	d_1 † Diameter		d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius	1-11	12-24	25-49	50-100	
	Decimal	Metric									
24118	.1181	3.000	3.0	38	12	0.50	96.00	91.83	87.65	83.48	
80018	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"	.015"	91.20	87.23	83.27	79.30
80028	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"	.020"	91.20	87.23	83.27	79.30
24148	.1575	4.000	4.0	50	14	0.30	138.72	132.69	126.66	120.63	
24158	.1575	4.000	4.0	50	14	0.50	138.72	132.69	126.66	120.63	
80058	.1875	3/16"	4.763	3/16"	2"	5/8"	.015"	131.80	126.07	120.34	114.61
80068	.1875	3/16"	4.763	3/16"	2"	5/8"	.020"	131.80	126.07	120.34	114.61
24178	.2362	6.000	6.0	65	20	0.50	148.03	141.59	135.16	128.72	
24208	.2362	6.000	6.0	65	20	1.50	148.03	141.59	135.16	128.72	
80108	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.015"	140.63	134.52	128.40	122.29
80118	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.020"	140.63	134.52	128.40	122.29
80128	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.030"	140.63	134.52	128.40	122.29
24248	.3150	8.000	8.0	65	20	1.00	185.64	177.57	169.50	161.43	
80248	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.020"	176.88	169.19	161.50	153.81
80258	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.030"	176.88	169.19	161.50	153.81
24318	.3937	10.000	10.0	70	25	1.00	206.21	197.24	188.28	179.31	
24378	.4724	12.000	12.0	75	25	0.50	226.75	216.89	207.03	197.17	
24398	.4724	12.000	12.0	75	25	1.00	226.75	216.89	207.03	197.17	
80328	.5000	1/2"	12.700	1/2"	3"	1"	.030"	215.41	206.04	196.68	187.31
80348	.5000	1/2"	12.700	1/2"	3"	1"	.060"	215.41	206.04	196.68	187.31

TOLERANCES

<i>d1</i>	+0.000" -0.002" (+0.000 -0.050mm)
<i>d2</i>	h6
<i>ball radius</i>	+0.000" -0.001" (+0.000 -0.025mm)



TECH
PAGES
284, 285,
311

Series 310D

HIGH PERFORMANCE
END MILLS

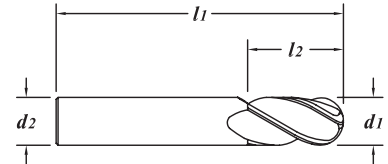
Recommended for graphite, fiber-reinforced plastics, carbon fiber

Ball End

Diamond Coating

Solid grade C-2 carbide end mill - center cutting

Crystalline diamond coating



EDP#	<i>d1</i> † Diameter		<i>d2</i> Shank Diameter	<i>l1</i> Overall Length	<i>l2</i> Flute Length	1-11	12-24	25-49	50-100	
	Decimal	Metric								
15018	.0312	1/32"	0.792	1/8"	1-1/2"	3/32"	99.04	94.73	90.43	86.12
48018	.0394		1.000	3.0	38	4	104.26	99.73	95.19	90.66
15028	.0469	3/64"	1.191	1/8"	1-1/2"	1/8"	99.04	94.73	90.43	86.12
48028	.0591		1.500	3.0	38	6	104.26	99.73	95.19	90.66
15038	.0625	1/16"	1.588	1/8"	1-1/2"	1/4"	96.72	92.51	88.31	84.10
48038	.0787		2.000	3.0	38	8	101.79	97.36	92.94	88.51
15058	.0938	3/32"	2.383	1/8"	1-1/2"	3/8"	95.04	90.90	86.77	82.64
48058	.1181		3.000	3.0	38	12	96.00	91.83	87.65	83.48
15078	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"	91.20	87.23	83.27	79.30
48078	.1575		4.000	4.0	50	14	138.72	132.69	126.66	120.63
15118	.1875	3/16"	4.763	3/16"	2"	5/8"	131.80	126.07	120.34	114.61
48098	.1969		5.000	5.0	50	16	144.96	138.66	132.35	126.05
48108	.2362		6.000	6.0	65	20	148.03	141.59	135.16	128.72
15158	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	140.63	134.52	128.40	122.29
15198	.3125	5/16"	7.938	5/16"	2-1/2"	7/8"	158.40	151.51	144.63	137.74
48128	.3150		8.000	8.0	65	20	185.64	177.57	169.50	161.43
15238	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	176.88	169.19	161.50	153.81
48168	.4724		12.000	12.0	75	25	226.75	216.89	207.03	197.17
15318	.5000	1/2"	12.700	1/2"	3"	1"	215.41	206.04	196.68	187.31

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MATERIAL HARDNESS (RC)

35

0

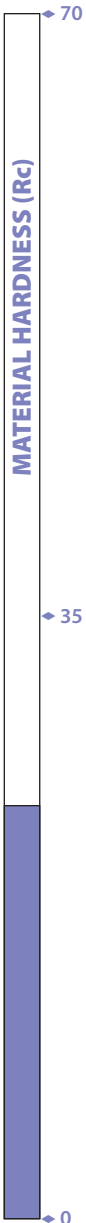
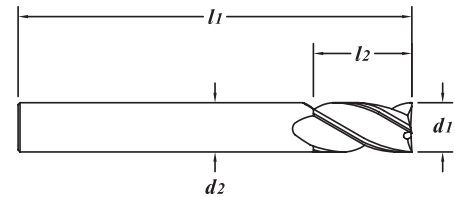
d_1	+0.00" -0.002" (+.000 -.050mm)
d_2	h6



Recommended for graphite, fiber-reinforced plastics, carbon fiber

**Extra Length - Square End
Diamond Coating**

Solid grade C-2 carbide end mill - center cutting
Crystalline diamond coating
Can be modified with a neck in 48 hours



EDP#	d_1 † Diameter		d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	1-11	12-24	25-49	50-100
	Decimal	Metric							
94028	.1181	3.000	3.0	75	20	106.18	101.56	96.95	92.33
38038	.1250	1/8"	3.175	1/8"	3"	100.88	96.49	92.11	87.72
94068	.1575	4.000	4.0	75	25	142.07	135.89	129.72	123.54
38048	.1875	3/16"	4.763	3/16"	4"	134.95	129.09	123.22	117.35
38058	.2500	1/4"	6.350	1/4"	3"	144.60	138.31	132.03	125.74
38068	.2500	1/4"	6.350	1/4"	4"	150.17	143.64	137.11	130.58
38078	.2500	1/4"	6.350	1/4"	6"	171.87	164.40	156.92	149.45
38098	.3125	5/16"	7.938	5/16"	4"	176.05	168.40	160.74	153.09
94168	.3150	8.000	8.0	100	25	210.58	201.42	192.27	183.11
38128	.3750	3/8"	9.525	3/8"	4"	196.05	187.53	179.00	170.48
38138	.3750	3/8"	9.525	3/8"	6"	216.67	207.25	197.83	188.41
94208	.3937	10.000	10.0	100	25	235.09	224.87	214.65	204.43
94248	.4724	12.000	12.0	100	25	259.60	248.31	237.03	225.74
38168	.5000	1/2"	12.700	1/2"	4"	246.64	235.92	225.19	214.47
38178	.5000	1/2"	12.700	1/2"	4"	246.64	235.92	225.19	214.47

TOLERANCES

d_1	+0.000" -0.002" (+0.000 -0.050mm)
d_2	h6
ball radius	+0.000" -0.001" (+0.000 -0.025mm)



TECH
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Series 710D

HIGH PERFORMANCE
END MILLS

Recommended for graphite, fiber-reinforced plastics, carbon fiber

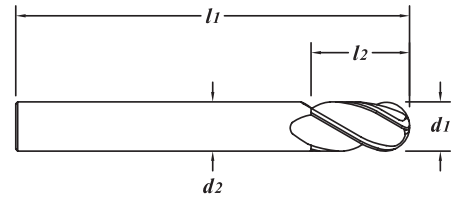
Extra Length - Ball End

Diamond Coating

Solid grade C-2 carbide end mill - center cutting

Crystalline diamond coating

Can be modified with a neck in 48 hours



EDP#	d_1 † Diameter		d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	1-11	12-24	25-49	50-100
	Decimal	Metric							
99028	.1181	3.000	3.0	75	20	129.69	124.05	118.41	112.77
40038	.1250	1/8"	3.175	1/8"	3"	123.21	117.85	112.50	107.14
99068	.1575	4.000	4.0	75	25	161.36	154.34	147.33	140.31
40048	.1875	3/16"	4.763	3/16"	4"	153.28	146.62	139.95	133.29
99108	.2362	6.000	6.0	100	25	177.34	169.63	161.92	154.21
99128	.2362	6.000	6.0	150	38	196.91	188.35	179.79	171.23
40058	.2500	1/4"	6.350	1/4"	3"	162.92	155.84	148.75	141.67
40068	.2500	1/4"	6.350	1/4"	4"	168.50	161.17	153.85	146.52
40078	.2500	1/4"	6.350	1/4"	6"	187.07	178.94	170.80	162.67
40098	.3125	5/16"	7.938	5/16"	4"	194.37	185.92	177.47	169.02
99168	.3150	8.000	8.0	100	25	226.55	216.70	206.85	197.00
40128	.3750	3/8"	9.525	3/8"	4"	214.38	205.06	195.74	186.42
40138	.3750	3/8"	9.525	3/8"	6"	226.83	216.96	207.10	197.24
99208	.3937	10.000	10.0	100	25	251.08	240.16	229.25	218.33
40168	.5000	1/2"	12.700	1/2"	4"	261.84	250.46	239.07	227.69
40178	.5000	1/2"	12.700	1/2"	4"	261.84	250.46	239.07	227.69

MATERIAL HARDNESS (RC)
70
35
0