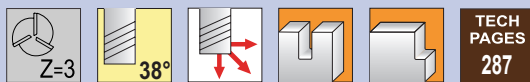


TOLERANCES	
$d1$	+0.000" -0.001" (+0.000 -0.025mm)
$d2$	h6
r	+0.0005" -0.0005" (+0.0127 -0.0127mm)

.1181" - .2362"
(3.000mm - 6.000mm)

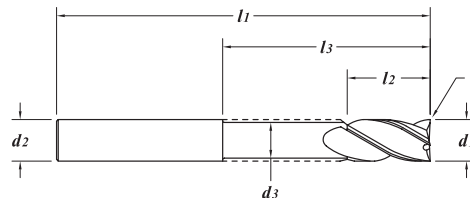


Recommended for aluminum

HSAL End Mill - Corner Radius

ALUMASTAR Coating

- Solid submicron grain carbide end mill - center cutting
- Engineered for High Efficiency Milling
- Specific coating engineered to repel aluminum
- Engineered to run at 750-2500 SFM (225-750 M/Min.)
- For high speed machining of aluminum
- High velocity - high metal removal rate (for 5,000-20,000 RPM spindles)
- Need to use properly balanced holders
- Holds perpendicularity
- Flats can be added within 48 hours



MATERIAL HARDNESS (Rc) 70
35
0

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										
39113	.1181	3.000	3.0	38	6	0.20	-	-	23.38	22.36	21.35	20.33
39123	.1181	3.000	3.0	38	6	0.50	-	-	23.38	22.36	21.35	20.33
39133	.1181	3.000	3.0	38	12	0.20	-	-	23.38	22.36	21.35	20.33
39143	.1181	3.000	3.0	38	12	0.50	-	-	23.38	22.36	21.35	20.33
39153	.1250	1/8"	3.175	1/8"	1-1/2"	1/4"	.010"	-	22.69	21.70	20.72	19.73
39163	.1250	1/8"	3.175	1/8"	1-1/2"	1/4"	.020"	-	22.69	21.70	20.72	19.73
39173	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"	.010"	-	22.69	21.70	20.72	19.73
39183	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"	.020"	-	22.69	21.70	20.72	19.73
39193	.1575	4.000	6.0	50	8	0.20	-	-	31.57	30.20	28.82	27.45
39203	.1575	4.000	6.0	50	8	0.50	-	-	31.57	30.20	28.82	27.45
39213	.1575	4.000	6.0	50	12	0.20	-	-	31.57	30.20	28.82	27.45
39223	.1575	4.000	6.0	50	12	0.30	-	-	31.57	30.20	28.82	27.45
39225	.1575	4.000	6.0	50	12	0.50	-	-	31.57	30.20	28.82	27.45
39243	.1575	4.000	6.0	65	6	0.30	20	3.7	38.59	36.92	35.24	33.56
39253	.1575	4.000	6.0	65	6	0.50	20	3.7	38.59	36.92	35.24	33.56
39263	.1575	4.000	6.0	65	6	1.00	20	3.7	38.59	36.92	35.24	33.56
39265	.1875	3/16"	4.763	3/16"	2"	5/16"	.010"	-	23.40	22.39	21.37	20.35
39275	.1875	3/16"	4.763	3/16"	2"	5/16"	.020"	-	23.40	22.39	21.37	20.35
39280	.1875	3/16"	4.763	3/16"	2"	5/16"	.030"	-	23.40	22.39	21.37	20.35
39283	.1875	3/16"	4.763	3/16"	2"	9/16"	.010"	-	23.40	22.39	21.37	20.35
39285	.1875	3/16"	4.763	3/16"	2"	9/16"	.020"	-	23.40	22.39	21.37	20.35
39293	.1875	3/16"	4.763	3/16"	2"	9/16"	.030"	-	23.40	22.39	21.37	20.35
39303	.1875	3/16"	4.763	3/16"	3"	7/32"	.010"	3/4"	42.85	40.99	39.12	37.26
39313	.1875	3/16"	4.763	3/16"	3"	7/32"	.030"	3/4"	42.85	40.99	39.12	37.26
39343	.1969	5.000	6.0	65	16	0.30	-	-	32.57	31.15	29.74	28.32
39363	.1969	5.000	6.0	75	8	0.30	20	4.7	53.21	50.90	48.58	46.27
39373	.1969	5.000	6.0	75	8	0.50	20	4.7	53.21	50.90	48.58	46.27
39383	.1969	5.000	6.0	75	8	1.00	20	4.7	53.21	50.90	48.58	46.27
39403	.2362	6.000	6.0	65	19	0.30	-	-	31.52	30.15	28.78	27.41
39423	.2362	6.000	6.0	75	10	0.30	25	5.7	51.50	49.26	47.02	44.78
39433	.2362	6.000	6.0	75	10	0.50	25	5.7	51.50	49.26	47.02	44.78
39436	.2362	6.000	6.0	75	10	1.00	25	5.7	51.50	49.26	47.02	44.78
39439	.2362	6.000	6.0	75	10	1.50	25	5.7	51.50	49.26	47.02	44.78
39443	.2362	6.000	6.0	75	10	2.00	25	5.7	51.50	49.26	47.02	44.78

EDP#	$d1^{\dagger}$ 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											
39314	.2500	1/4"	6.350	1/4"	2"	1/2"	.010"	-	-	28.42	27.18	25.95	24.71
39316	.2500	1/4"	6.350	1/4"	2"	1/2"	.015"	-	-	28.42	27.18	25.95	24.71
39318	.2500	1/4"	6.350	1/4"	2"	1/2"	.020"	-	-	28.42	27.18	25.95	24.71
39453	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.010"	-	-	29.95	28.64	27.34	26.04
39463	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.015"	-	-	29.95	28.64	27.34	26.04
39320	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.020"	-	-	29.95	28.64	27.34	26.04
39473	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.030"	-	-	29.95	28.64	27.34	26.04
39483	.2500	1/4"	6.350	1/4"	3"	1-1/8"	.030"	-	-	45.41	43.44	41.46	39.49
39493	.2500	1/4"	6.350	1/4"	4"	3/8"	.015"	1-1/8"	.235"	51.89	49.63	47.38	45.12
40403	.2500	1/4"	6.350	1/4"	4"	3/8"	.030"	1-1/8"	.235"	51.89	49.63	47.38	45.12
39503	.2500	1/4"	6.350	1/4"	4"	3/8"	.015"	2-1/8"	.235"	57.22	54.74	52.25	49.76
39543	.2756		7.000	8.0	65	19	0.30	-	-	45.84	43.85	41.85	39.86
39563	.2756		7.000	8.0	75	12	0.30	25	6.4	69.84	66.80	63.77	60.73
39322	.3125	5/16"	7.938	5/16"	2"	1/2"	.010"	-	-	36.26	34.68	33.11	31.53
39324	.3125	5/16"	7.938	5/16"	2"	1/2"	.020"	-	-	36.26	34.68	33.11	31.53
39593	.3125	5/16"	7.938	5/16"	2-1/2"	3/4"	.010"	-	-	39.64	37.92	36.19	34.47
39603	.3125	5/16"	7.938	5/16"	2-1/2"	3/4"	.015"	-	-	39.64	37.92	36.19	34.47
39326	.3125	5/16"	7.938	5/16"	2-1/2"	3/4"	.020"	-	-	39.64	37.92	36.19	34.47
39613	.3125	5/16"	7.938	5/16"	2-1/2"	3/4"	.030"	-	-	39.64	37.92	36.19	34.47
39623	.3125	5/16"	7.938	5/16"	4"	7/16"	.015"	1-1/8"	.297"	68.21	65.24	62.28	59.31
39633	.3125	5/16"	7.938	5/16"	4"	7/16"	.030"	1-1/8"	.297"	68.21	65.24	62.28	59.31
39328	.3150		8.000	8.0	50	12	0.50	-	-	37.95	36.30	34.65	33.00
39663	.3150		8.000	8.0	65	19	0.50	-	-	41.70	39.89	38.07	36.26
39683	.3150		8.000	8.0	75	12	0.50	25	7.4	63.55	60.79	58.02	55.26
39688	.3150		8.000	8.0	75	12	1.00	25	7.4	63.55	60.79	58.02	55.26
39693	.3150		8.000	8.0	75	12	2.00	25	7.4	63.55	60.79	58.02	55.26
39698	.3150		8.000	8.0	75	12	3.00	25	7.4	63.55	60.79	58.02	55.26
39330	.3750	3/8"	9.525	3/8"	2"	1/2"	.010"	-	-	42.68	40.82	38.97	37.11
39332	.3750	3/8"	9.525	3/8"	2"	1/2"	.020"	-	-	42.68	40.82	38.97	37.11
39703	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.010"	-	-	46.18	44.18	42.17	40.16
39713	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.015"	-	-	46.18	44.18	42.17	40.16
39334	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.020"	-	-	46.18	44.18	42.17	40.16
39723	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.030"	-	-	46.18	44.18	42.17	40.16
39733	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.060"	-	-	46.18	44.18	42.17	40.16
39734	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.120"	-	-	46.18	44.18	42.17	40.16
39738	.3750	3/8"	9.525	3/8"	3"	1-1/4"	.030"	-	-	59.55	56.96	54.37	51.78
39763	.3750	3/8"	9.525	3/8"	4"	1/2"	.030"	2-1/8"	.355"	78.88	75.45	72.02	68.59
39773	.3750	3/8"	9.525	3/8"	4"	1/2"	.060"	2-1/8"	.355"	78.88	75.45	72.02	68.59
39783	.3750	3/8"	9.525	3/8"	6"	1/2"	.030"	4"	.355"	115.17	110.17	105.16	100.15
39336	.3937		10.000	10.0	50	14	0.50	-	-	64.17	61.38	58.59	55.80
39803	.3937		10.000	10.0	70	24	0.50	-	-	70.84	67.76	64.68	61.60
39843	.3937		10.000	10.0	100	12	0.50	35	9.4	95.22	91.08	86.94	82.80
39848	.3937		10.000	10.0	100	12	1.00	35	9.4	95.22	91.08	86.94	82.80
39853	.3937		10.000	10.0	100	12	1.50	35	9.4	95.22	91.08	86.94	82.80
39863	.3937		10.000	10.0	100	12	2.00	35	9.4	95.22	91.08	86.94	82.80
39873	.3937		10.000	10.0	100	12	3.00	35	9.4	95.22	91.08	86.94	82.80
39344	.4724		12.000	12.0	65	16	0.50	-	-	76.88	73.54	70.19	66.85
39883	.4724		12.000	12.0	75	32	0.50	-	-	87.62	83.81	80.00	76.19
39346	.4724		12.000	12.0	75	32	0.75	-	-	87.62	83.81	80.00	76.19
39348	.4724		12.000	12.0	75	32	1.00	-	-	87.62	83.81	80.00	76.19
39903	.4724		12.000	12.0	100	16	0.50	40	11.4	112.62	107.72	102.83	97.93
39907	.4724		12.000	12.0	100	16	1.00	40	11.4	112.62	107.72	102.83	97.93
39911	.4724		12.000	12.0	100	16	1.50	40	11.4	112.62	107.72	102.83	97.93
39915	.4724		12.000	12.0	100	16	2.00	40	11.4	112.62	107.72	102.83	97.93
39919	.4724		12.000	12.0	100	16	3.00	40	11.4	112.62	107.72	102.83	97.93

70

35

0

MATERIAL HARDNESS (RC)

continued →

Series 143R (continued)

.5000" - 1.000"
(12.700mm - 25.400mm)

MATERIAL HARDNESS (Rc)
70
35
0

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											
39353	.5000	1/2"	12.700	1/2"	2-1/2"	5/8"	.010"	-	-	73.04	69.86	66.69	63.51
39355	.5000	1/2"	12.700	1/2"	2-1/2"	5/8"	.020"	-	-	73.04	69.86	66.69	63.51
39923	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.010"	-	-	83.24	79.62	76.00	72.38
39933	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.015"	-	-	83.24	79.62	76.00	72.38
39356	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.020"	-	-	83.24	79.62	76.00	72.38
39943	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.030"	-	-	83.24	79.62	76.00	72.38
39953	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.060"	-	-	83.24	79.62	76.00	72.38
39963	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.120"	-	-	83.24	79.62	76.00	72.38
39965	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.125"	-	-	83.24	79.62	76.00	72.38
39967	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.190"	-	-	83.24	79.62	76.00	72.38
39972	.5000	1/2"	12.700	1/2"	4"	1-5/8"	.015"	-	-	96.26	92.07	87.89	83.70
39973	.5000	1/2"	12.700	1/2"	4"	2"	.010"	-	-	96.26	92.07	87.89	83.70
40413	.5000	1/2"	12.700	1/2"	4"	2"	.030"	-	-	96.26	92.07	87.89	83.70
40423	.5000	1/2"	12.700	1/2"	4"	2"	.060"	-	-	96.26	92.07	87.89	83.70
40433	.5000	1/2"	12.700	1/2"	4"	5/8"	.010"	2-1/8"	.475"	106.98	102.33	97.68	93.03
39983	.5000	1/2"	12.700	1/2"	4"	5/8"	.030"	2-1/8"	.475"	106.98	102.33	97.68	93.03
40443	.5000	1/2"	12.700	1/2"	4"	5/8"	.060"	2-1/8"	.475"	106.98	102.33	97.68	93.03
40453	.5000	1/2"	12.700	1/2"	4"	5/8"	.120"	2-1/8"	.475"	106.98	102.33	97.68	93.03
39993	.5000	1/2"	12.700	1/2"	6"	5/8"	.030"	4-1/8"	.475"	160.55	153.57	146.59	139.61
39366	.6250	5/8"	15.875	5/8"	3"	3/4"	.010"	-	-	134.31	128.47	122.63	116.79
39368	.6250	5/8"	15.875	5/8"	3"	3/4"	.020"	-	-	134.31	128.47	122.63	116.79
39369	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.015"	-	-	138.18	132.18	126.17	120.16
39370	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.020"	-	-	138.18	132.18	126.17	120.16
40463	.6250	5/8"	15.875	5/8"	4"	1-5/8"	.015"	-	-	143.99	137.73	131.47	125.21
39372	.6250	5/8"	15.875	5/8"	4"	1-5/8"	.020"	-	-	143.99	137.73	131.47	125.21
40023	.6250	5/8"	15.875	5/8"	4"	1-5/8"	.030"	-	-	143.99	137.73	131.47	125.21
40473	.6250	5/8"	15.875	5/8"	4"	1-5/8"	.060"	-	-	143.99	137.73	131.47	125.21
40483	.6250	5/8"	15.875	5/8"	4"	1-5/8"	.120"	-	-	143.99	137.73	131.47	125.21
40485	.6250	5/8"	15.875	5/8"	4"	1-5/8"	.190"	-	-	143.99	137.73	131.47	125.21
40033	.6250	5/8"	15.875	5/8"	6"	3/4"	.030"	2-3/8"	.590"	205.88	196.93	187.98	179.03
40043	.6250	5/8"	15.875	5/8"	6"	3/4"	.030"	4-3/8"	.590"	216.64	207.22	197.80	188.38
40083	.6299		16.000	16.0	100	40	1.00	-	-	151.58	144.99	138.40	131.81
40103	.6299		16.000	16.0	100	20	1.00	40	15.4	156.94	150.12	143.29	136.47
40113	.6299		16.000	16.0	125	20	2.00	60	15.4	205.98	197.02	188.07	179.11
40118	.6299		16.000	16.0	125	20	3.00	60	15.4	205.98	197.02	188.07	179.11
40123	.6299		16.000	16.0	125	20	4.00	60	15.4	205.98	197.02	188.07	179.11
39374	.7500	3/4"	19.050	3/4"	4"	1-1/4"	.020"	-	-	186.88	178.75	170.63	162.50
40133	.7500	3/4"	19.050	3/4"	4"	1-5/8"	.015"	-	-	186.88	178.75	170.63	162.50
39376	.7500	3/4"	19.050	3/4"	4"	1-5/8"	.020"	-	-	186.88	178.75	170.63	162.50
40143	.7500	3/4"	19.050	3/4"	4"	1-5/8"	.030"	-	-	186.88	178.75	170.63	162.50
40153	.7500	3/4"	19.050	3/4"	4"	1-5/8"	.060"	-	-	186.88	178.75	170.63	162.50
40493	.7500	3/4"	19.050	3/4"	4"	1-5/8"	.120"	-	-	186.88	178.75	170.63	162.50
40495	.7500	3/4"	19.050	3/4"	4"	1-5/8"	.190"	-	-	186.88	178.75	170.63	162.50
40497	.7500	3/4"	19.050	3/4"	4"	1-5/8"	.250"	-	-	186.88	178.75	170.63	162.50
40503	.7500	3/4"	19.050	3/4"	6"	1"	.015"	2-1/2"	.715"	278.50	266.39	254.28	242.17
40163	.7500	3/4"	19.050	3/4"	6"	1"	.030"	2-1/2"	.715"	278.50	266.39	254.28	242.17
40513	.7500	3/4"	19.050	3/4"	6"	1"	.060"	2-1/2"	.715"	278.50	266.39	254.28	242.17
40523	.7500	3/4"	19.050	3/4"	6"	1"	.120"	2-1/2"	.715"	278.50	266.39	254.28	242.17
40171	.7500	3/4"	19.050	3/4"	6"	1"	.015"	4"	.715"	286.06	273.63	261.19	248.75
40173	.7500	3/4"	19.050	3/4"	6"	1"	.030"	4-3/8"	.715"	286.06	273.63	261.19	248.75
40183	.7874		20.000	20.0	100	32	1.00	-	-	262.32	250.91	239.51	228.10
40223	.7874		20.000	20.0	100	20	1.00	40	19.0	267.67	256.04	244.40	232.76
40225	.7874		20.000	20.0	150	20	1.00	65	19.0	359.21	343.60	327.98	312.36
40226	.7874		20.000	20.0	150	20	2.00	65	19.0	359.21	343.60	327.98	312.36
40229	.7874		20.000	20.0	150	20	3.00	65	19.0	359.21	343.60	327.98	312.36
40231	.7874		20.000	20.0	150	20	4.00	65	19.0	359.21	343.60	327.98	312.36
40243	.9843		25.000	25.0	100	38	1.00	-	-	303.53	290.33	277.14	263.94
40293	1.000	1"	25.400	1"	4"	1-5/8"	.030"	-	-	318.70	304.84	290.99	277.13
40303	1.000	1"	25.400	1"	4"	1-5/8"	.060"	-	-	318.70	304.84	290.99	277.13
40313	1.000	1"	25.400	1"	4"	1-5/8"	.120"	-	-	318.70	304.84	290.99	277.13
40343	1.000	1"	25.400	1"	6"	1-1/4"	.030"	3-3/8"	.960"	467.05	446.74	426.44	406.13
40353	1.000	1"	25.400	1"	6"	1-1/4"	.060"	3-3/8"	.960"	467.05	446.74	426.44	406.13
40363	1.000	1"	25.400	1"	6"	1-1/4"	.120"	3-3/8"	.960"	467.05	446.74	426.44	406.13
NEW 40366	1.000	1"	25.400	1"	6"	1-1/4"	.030"	4"	.960"	467.05	446.74	426.44	406.13