EPSBE

Super-Hard Ball Nose End Mills for Maximum Tool Life

FEATURES

Double face (two-stage flank) prevents radius from deteriorating while machining

Extremely accurate radius tolerance: +0.003mm to -0.007mm

Wide variety of neck length variations

Long tool life is possible even when machining materials with a hardness
of greater than 60 HRC

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INTRODUCTION

MOLDINO's new EPSBE Super Hard Ball Nose End Mills feature our newly developed ATH Coating to enable high-efficient machining of high-hardness materials. This new coating, coupled with the highly rigid tool geometry, provide exceptionally long tool life and excellent cost performance.

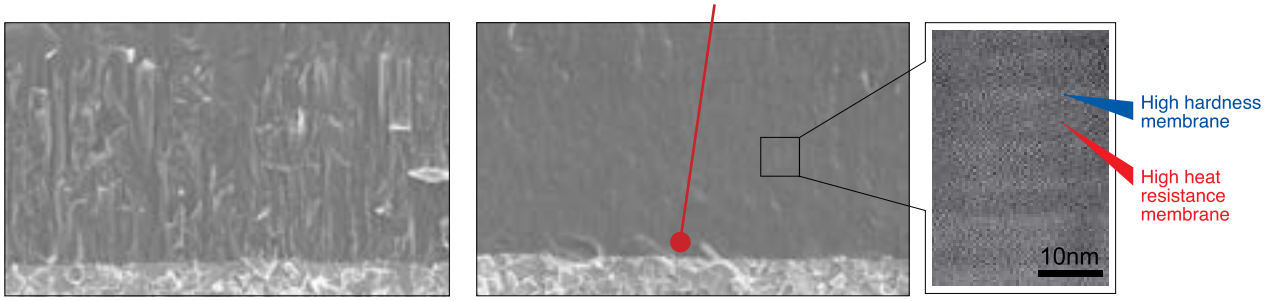
FEATURES

1. Advanced TH (ATH) Coating

With a hardness of 3800Hv and oxidation temperature of 1200°, our new ATH Coating enables longer life and higher efficiency when cutting high-hardness materials (55HRC or higher). Compared with our previous generation coating, double the tool life and more than double the machining efficiency can be achieved. The ATH Coating is ideal for both dry cutting and wet cutting in a variety of materials including cold-worked die steel, HSS, tool steel, composite materials, carbide alloys and more.

Cross-section electron microscope photograph

Adhesion is markedly improved to provide more stable machining.

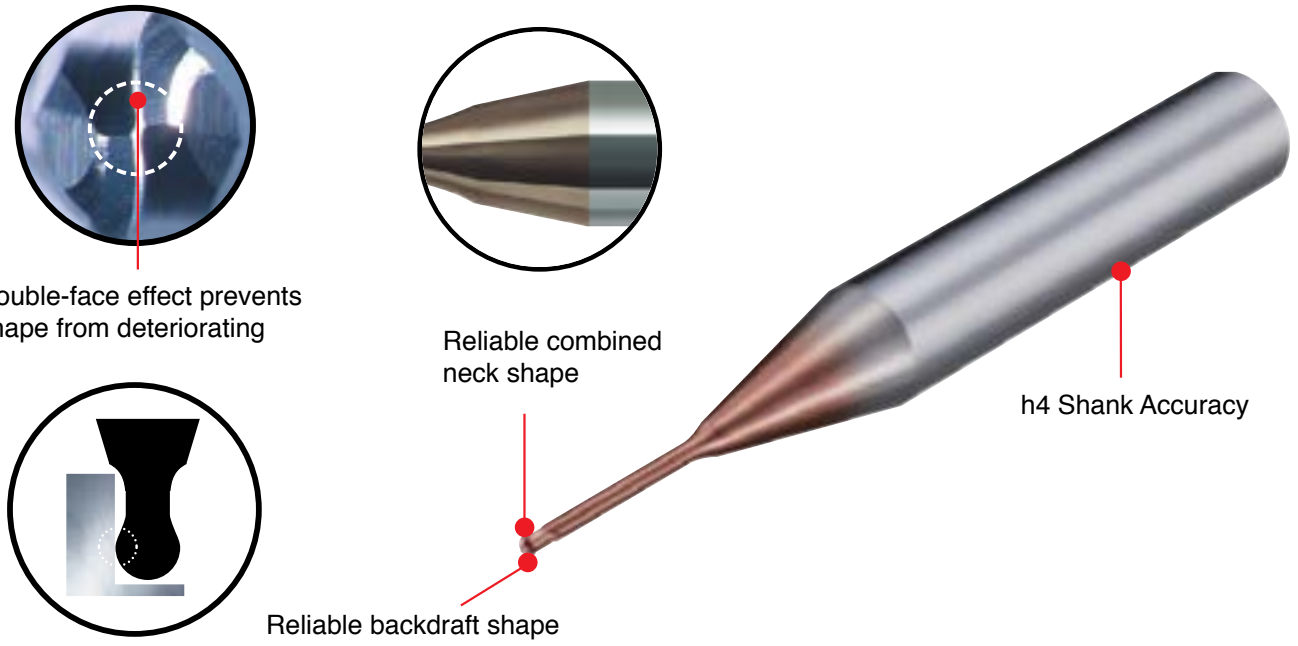


Conventional TH Coating

New TH Coaring for hard material

Even finer particle size is nano order. Provides high heat resistance and high hardness.

2. Unique Tool Geometry for Maximum Performance



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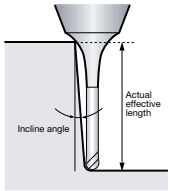

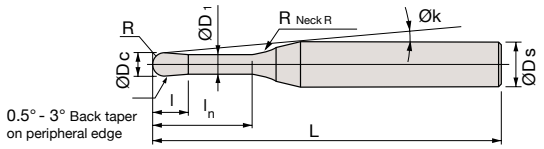

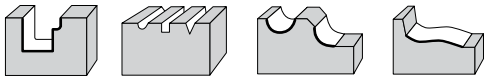

Helix Angle	30°	d	h4
R	+0.003, -0.007		

Part No.	Size (mm) R	D_c	l	D_1	l_2	L	D_s	Neck R	θk	Actual Effective Length in Incline Angles 0.5°	1°	1.5°	2°	3°
EPSBE2001-0.15-TH	0.05	0.1	0.08	0.08	0.15	45	4	1	11.82	0.30	0.32	0.33	0.35	0.38
EPSBE2001-0.3-TH	0.05	0.1	0.08	0.08	0.30	45	4	1	11.64	0.46	0.48	0.50	0.52	0.57
EPSBE2002-0.3-TH	0.10	0.2	0.15	0.17	0.30	45	4	1	11.66	0.49	0.50	0.52	0.54	0.58
EPSBE2002-0.6-TH	0.10	0.2	0.15	0.17	0.60	45	4	1	11.30	0.80	0.83	0.86	0.88	0.93
EPSBE2003-0.45-TH	0.15	0.3	0.25	0.27	0.45	45	4	2	11.53	0.73	0.77	0.80	0.84	0.91
EPSBE2003-0.9-TH	0.15	0.3	0.25	0.27	0.90	45	4	2	11.00	1.21	1.27	1.32	1.37	1.47
EPSBE2003-1.5-TH	0.15	0.3	0.25	0.27	1.50	45	4	2	10.36	1.84	1.92	1.99	2.06	2.18
EPSBE2003-2-TH	0.15	0.3	0.25	0.27	2.00	45	4	2	9.88	2.36	2.46	2.55	2.62	2.76
EPSBE2004-0.6-TH	0.20	0.4	0.30	0.37	0.60	45	4	2	11.39	0.88	0.93	0.97	1.01	1.09
EPSBE2004-1.2-TH	0.20	0.4	0.30	0.37	1.20	45	4	2	10.69	1.52	1.59	1.65	1.71	1.82
EPSBE2004-2-TH	0.20	0.4	0.30	0.37	2.00	45	4	2	9.88	2.36	2.46	2.54	2.62	2.75
EPSBE2004-3-TH	0.20	0.4	0.30	0.37	3.00	45	4	2	9.03	3.41	3.53	3.63	3.73	4.01
EPSBE2005-0.75-TH	0.25	0.5	0.35	0.47	0.75	45	4	2	11.25	1.04	1.09	1.13	1.18	1.27
EPSBE2005-1.5-TH	0.25	0.5	0.35	0.47	1.50	45	4	2	10.39	1.83	1.91	1.98	2.05	2.17
EPSBE2005-3-TH	0.25	0.5	0.35	0.47	3.00	45	4	2	9.00	3.41	3.53	3.63	3.72	3.99
EPSBE2005-5-TH	0.25	0.5	0.35	0.47	5.00	45	4	2	7.64	5.48	5.65	5.78	6.01	6.65
EPSBE2006-0.9-TH	0.30	0.6	0.40	0.57	0.90	45	4	4	11.10	1.33	1.42	1.51	1.59	1.75
EPSBE2006-1.8-TH	0.30	0.6	0.40	0.57	1.80	45	4	4	10.08	2.30	2.44	2.56	2.68	2.88
EPSBE2006-3-TH	0.30	0.6	0.40	0.57	3.00	45	4	4	8.98	3.58	3.77	3.93	4.07	4.32
EPSBE2006-5-TH	0.30	0.6	0.40	0.57	5.00	45	4	4	7.59	5.70	5.94	6.14	6.32	6.63
EPSBE2008-1.2-TH	0.40	0.8	0.50	0.77	1.20	45	4	4	10.79	1.65	1.75	1.84	1.93	2.11
EPSBE2008-2.4-TH	0.40	0.8	0.50	0.77	2.40	45	4	4	9.47	2.94	3.10	3.24	3.36	3.59
EPSBE2010-1.5-TH	0.50	1.0	0.80	0.96	1.50	45	6	4	11.01	2.01	2.12	2.21	2.31	2.49
EPSBE2010-3-TH	0.50	1.0	0.80	0.96	3.00	45	6	4	9.88	3.61	3.78	3.93	4.06	4.30
EPSBE2010-4-TH	0.50	1.0	0.80	0.96	4,00	45	6	4	9.25	4.66	4.87	5.00	5.20	5.47
EPSBE2010-6-TH	0.50	1.0	0.80	0.96	6.00	45	6	4	8.20	6.76	7.02	7.23	7.42	7.92
EPSBE2010-8-TH	0.50	1.0	0.80	0.96	8.00	45	6	4	7.36	8.85	9.15	9.40	9.61	10.58
EPSBE2010-10-TH	0.50	1.0	0.80	0.96	10.00	50	6	4	6.68	10.93	11.27	11.54	11.98	13.23
EPSBE2012-1.8-TH	0.60	1.2	1.10	1.15	1.80	45	6	4	10.78	2.36	2.47	2.58	2.68	2.86
EPSBE2012-3.6-TH	0.60	1.2	1.10	1.15	3.60	45	6	4	9.46	4.27	4.45	4.61	4.75	5.01
EPSBE2015-2.25-TH	0.75	1.5	1.35	1.44	2.25	45	6	4	10.43	2.87	2.99	3.10	3.20	3.40
EPSBE2015-4.5-TH	0.75	1.5	1.35	1.44	4.50	45	6	4	8.84	5.24	5.43	5.61	5.76	6.03
EPSBE2015-8-TH	0.75	1.5	1.35	1.44	8.00	45	6	4	7.14	8.89	9.17	9.41	9.61	10.56
EPSBE2015-12-TH	0.75	1.5	1.35	1.44	12.00	50	6	4	5.85	13.03	13.39	13.74	14.38	15.87
EPSBE2020-3-TH	1.00	2.0	1.70	1.92	3.00	45	6	4	9.79	3.71	3.84	3.96	4.07	4.29
EPSBE2020-4-TH	1.00	2.0	1.70	1.92	4.00	45	6	4	9.03	4.75	4.92	5.07	5.21	5.45
EPSBE2020-6-TH	1.00	2.0	1.70	1.92	6.00	45	6	4	7.81	6.84	7.07	7.26	7.43	7.89
EPSBE2020-8-TH	1.00	2.0	1.70	1.92	8.00	45	6	4	6.88	8.92	9.19	9.42	9.61	10.54
EPSBE2020-12-TH	1.00	2.0	1.70	1.92	12.00	50	6	4	5.55	13.06	13.41	13.76	14.39	15.85
EPSBE2020-16-TH	1.00	2.0	1.70	1.92	16.00	50	6	4	4.65	17.19	17.59	18.32	19.17	21.16
EPSBE2020-20-TH	1.00	2.0	1.70	1.92	20.00	55	6	4	4.01	21.30	21.90	22.88	23.96	26.47

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Cutting Conditions
Semi-finishing
(Metric)

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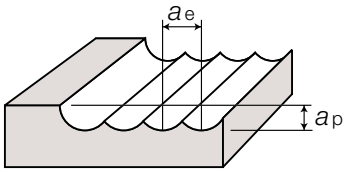

Work Material					Pre-Harden Steels (35 - 45HRC)		Hardened Steels (45 - 55HRC)		Hardened Steels (55 - 65HRC)		Hardened Steels (65 - 68HRC)		Hardened Steels (68 - 72HRC)	
Ratio to standard depth of cut					100%		85%		80%		65%		55%	
R	Mill dia.	Under neck length	Standard Depth of cut a_p	Standard Depth of cut a_e	n (RPM)	vf (mm/min)	n (RPM)	vf (mm/min)	n (RPM)	vf (mm/min)	n (RPM)	vf (mm/min)	n (RPM)	vf (mm/min)
0.05	0.1	0.15	0.006	0.018	59,500	360	54,100	320	51,400	280	46,000	250	43,300	190
0.05	0.1	0.30	0.005	0.015	59,500	360	50,000	320	51,400	280	46,000	250	43,300	190
0.10	0.2	0.30	0.016	0.048	55,400	660	50,400	600	47,900	520	42,800	460	40,300	360
0.10	0.2	0.60	0.014	0.042	55,400	660	50,400	600	47,900	520	42,800	460	40,300	360
0.15	0.3	0.45	0.017	0.051	50,600	910	46,000	830	43,700	710	39,100	630	36,800	500
0.15	0.3	0.90	0.017	0.051	50,600	910	46,000	830	43,700	710	39,100	630	36,800	500
0.15	0.3	1.50	0.013	0.039	37,900	610	34,500	560	32,800	480	29,300	430	27,600	340
0.15	0.3	2.00	0.010	0.030	30,300	470	27,600	430	26,200	370	23,400	330	22,100	260
0.20	0.4	0.60	0.035	0.105	43,800	1,050	39,800	960	37,800	820	33,800	730	31,800	570
0.20	0.4	1.20	0.032	0.096	43,800	1,050	39,800	960	37,800	820	33,800	730	31,800	570
0.20	0.4	2.00	0.022	0.066	35,000	840	31,800	760	30,200	650	27,100	590	25,500	460
0.20	0.4	3.00	0.013	0.039	28,000	630	25,500	570	24,200	490	21,600	440	20,400	340
0.25	0.5	0.75	0.036	0.108	37,300	1,190	34,000	1,090	32,300	930	28,900	830	27,200	650
0.25	0.5	1.50	0.036	0.108	37,300	1,190	34,000	1,090	32,300	930	28,900	830	27,200	650
0.25	0.5	3.00	0.024	0.072	28,000	840	25,500	770	24,200	650	21,600	580	20,400	460
0.30	0.6	0.90	0.040	0.120	35,000	1,430	31,800	1,300	30,200	1,110	27,100	1,000	25,500	780
0.30	0.6	1.80	0.036	0.108	35,000	1,430	31,800	1,300	30,200	1,110	27,100	1,000	25,500	780
0.30	0.6	3.00	0.028	0.084	27,000	1,100	24,500	1,000	23,300	860	20,900	770	19,600	600
0.30	0.6	5.00	0.018	0.054	22,200	910	20,200	820	19,200	710	17,100	630	16,100	490
0.30	0.6	6.00	0.013	0.039	22,200	830	20,200	750	19,200	640	17,100	570	16,100	450
0.40	0.8	1.20	0.065	0.195	29,200	1,680	26,500	1,530	25,200	1,310	22,500	1,170	21,200	920
0.40	0.8	2.40	0.065	0.195	29,200	1,680	26,500	1,530	25,200	1,310	22,500	1,170	21,200	920
0.50	1.0	1.50	0.080	0.240	28,600	2,060	26,000	1,870	24,700	1,600	22,100	1,430	20,800	1,120
0.50	1.0	3.00	0.080	0.240	28,600	2,060	26,000	1,870	24,700	1,600	22,100	1,430	20,800	1,120
0.50	1.0	4.00	0.060	0.180	25,500	1,840	23,200	1,670	22,000	1,430	19,700	1,270	18,500	1,000
0.50	1.0	6.00	0.035	0.105	22,300	1,610	20,300	1,460	19,300	1,250	17,200	1,110	16,200	870
0.50	1.0	8.00	0.035	0.105	19,300	1,350	17,500	1,230	16,600	1,050	14,900	940	14,000	740
0.50	1.0	10.00	0.022	0.066	19,300	1,270	17,500	1,160	16,600	990	14,900	890	14,000	690
0.60	1.2	1.80	0.080	0.240	25,300	2,190	23,000	1,990	21,800	1,700	19,500	1,520	18,400	1,190
0.60	1.2	3.60	0.080	0.240	25,300	2,190	23,000	1,990	21,800	1,700	19,500	1,520	18,400	1,190
0.75	1.5	2.25	0.085	0.255	21,400	2,310	19,500	2,110	18,500	1,800	16,500	1,600	15,600	1,260
0.75	1.5	4.50	0.080	0.240	21,400	2,310	19,500	2,110	18,500	1,800	16,500	1,600	15,600	1,260
0.75	1.5	8.00	0.050	0.150	18,300	1,870	16,700	1,700	15,800	1,450	14,200	1,300	13,300	1,020
0.75	1.5	12.00	0.050	0.150	16,600	1,590	15,100	1,450	14,400	1,240	12,900	1,110	12,100	870
1.00	2.0	3.00	0.160	0.480	18,400	2,650	16,700	2,400	15,900	2,060	14,200	1,840	13,400	1,450
1.00	2.0	4.00	0.160	0.480	18,400	2,650	16,700	2,400	15,900	2,060	14,200	1,840	13,400	1,450
1.00	2.0	6.00	0.160	0.480	18,400	2,650	16,700	2,400	15,900	2,060	14,200	1,840	13,400	1,450
1.00	2.0	8.00	0.130	0.390	18,400	2,650	16,700	2,400	15,900	2,060	14,200	1,840	13,400	1,450
1.00	2.0	12.00	0.070	0.210	15,300	1,960	13,900	1,780	13,200	1,520	11,800	1,360	11,100	1,070
1.00	2.0	16.00	0.070	0.210	14,600	1,750	13,300	1,600	12,600	1,360	11,300	1,220	10,600	950
1.00	2.0	20.00	0.045	0.135	13,500	1,620	12,300	1,480	11,600	1,250	10,400	1,120	9,800	880