

Ball End Mill for Hardened Steel

EPDBEH-TH3

Epoch Deep Ball Evolution Hard-TH3



www.moldino.eu

Applies newly developed next-generation hard coating "TH3"
Excellent wear resistance when machining hardened steel

Line-up: 220 items
DC: 0.1 – 12.0mm
LN: up to 20xDC

Features of EPDBEH-TH3



01

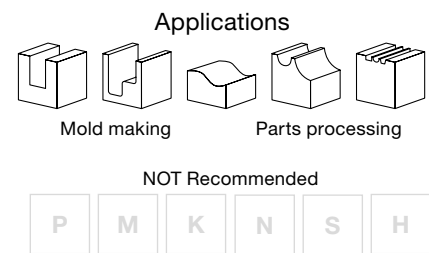
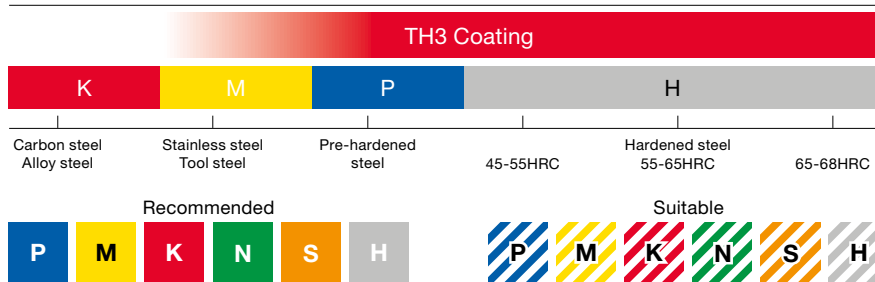
Newly developed coating TH3 for hardened steel machining

02

Double Flank Face cutting edge geometry for hardened steel machining.

03

Tool design to pursue high-accuracy machining



Features

01

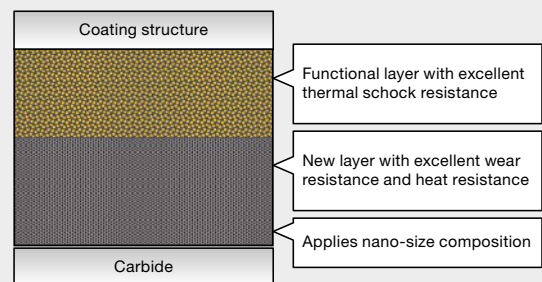
Newly developed coating TH3 for hardened steel machining

Features and performance

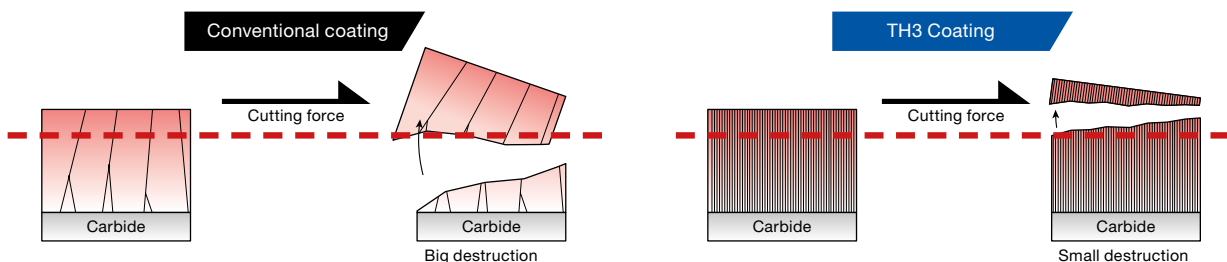
- High hardness coating with excellent wear resistance and heat resistance
- Excellent thermal shock resistance enables to suppress sudden chipping
- Long tool life when cutting high-hardness materials (50HRC or higher) such as hardened steel

Target steel grade

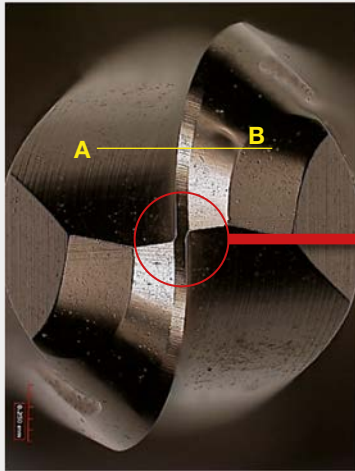
- Hardened steel (especially 50HRC or higher), high-speed steel



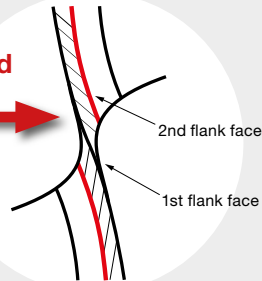
! TH3 Coating TH3 Coating achieves to reduce destruction unit of layer by applying nano-size composition.



Features

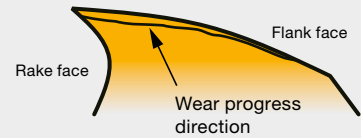
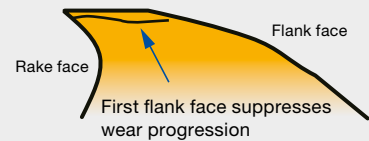
02
Double Flank Face cutting edge geometry for hardened steel machining.


Double Flank Face geometry

Flank of ball area has double face (two-stage flank)
Magnified view

Double Flank Face prevents shape from deteriorating

Double Flank Face geometry is not applied to DC 4 or larger

A-B cross section view

Conventional geometry

Double Flank Face geometry


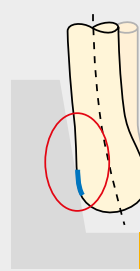
Features

03
Tool design to pursue high-precision machining
Neck design


In case of DC 1 - LN 10 mm (under neck length):

10% of deflection is suppressed compared to conventional neck shape.

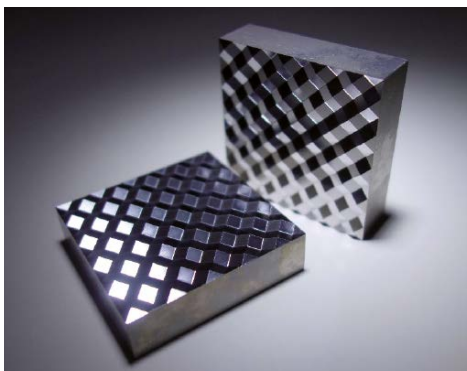
(Theoretical value by our calculation)

Backdraft


The backdraft effect enables the achievement of high-quality machined surfaces.

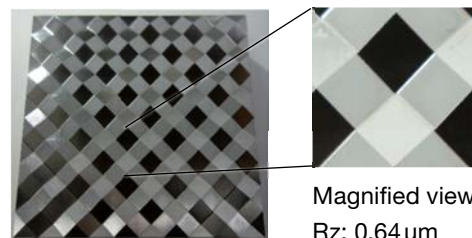
The reliable backdraft shape enables reduced chatter by shortening the cutting length. For DC up to 3.5 mm.

Example

01
Reflector


Work size: 50x50x50 mm

Material: X105CrMo17


 Magnified view
 Rz: 0.64 μm

Surface roughness of 20° incline

ID Code	Item Code	DC	LN	Revolution	Vc	Vf	fz	a _p	a _e	Cutting time
				(min ⁻¹)	(mm)	(mm/min)	(mm)	(mm)	(mm)	
Roughing	EPDBEH-2030-8-TH3	3.0	8	10610	100	1061	0.05	0.30	0.30	60 min
Semi-finishing	EPDBEH-2030-8-TH3	3.0	8	15915	150	1592	0.05	0.10	0.10	28 min
Finishing	EPDBEH-2010-2-TH3	1.0	2	31831	100	1910	0.03	0.03	0.03	56 min

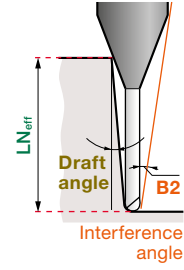
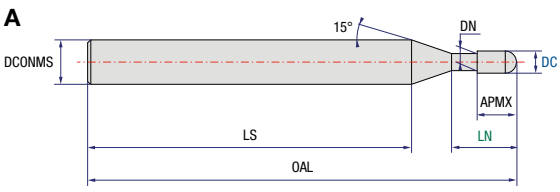
Total 2hr 24 min

EPDBEH-TH3 Epoch Deep Ball Evolution Hard-TH3

Rake Angle negative
2 flutes
Carbide
TH3 coated
68 HRC
Helix 30°
h5

DC (mm)	Radius tolerance (mm)
0.1-0.5	±0.003
0.6-12	±0.005

P M K
N S H



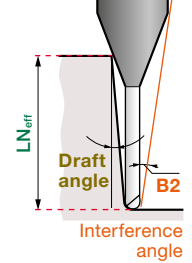
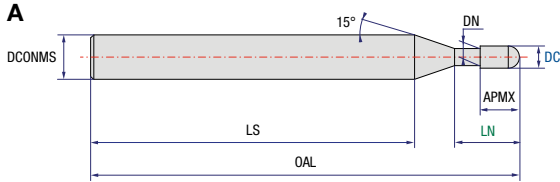
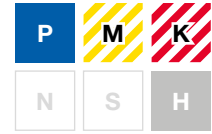
ID Code	Item Code	Stock	Size (mm)								Interference Angle	LN _{eff} (mm) for various draft angles					
			DC	APMX	LN	DN	LS	OAL	DCONMS	TYPE		B2	0.5°	1.0°	1.5°	2.0°	3.0°
EP1876	EPDBEH-2001-0.2-TH3	○	0.10	0.08	0.20	0.08	37.50	45	4	A	14.64°	0.24	0.25	0.25	0.26	0.28	
EP1877	EPDBEH-2001-0.3-TH3	●			0.30		37.40				14.46°	0.34	0.35	0.36	0.38	0.40	
EP1878	EPDBEH-2001-0.5-TH3	○			0.50		37.20				14.10°	0.55	0.57	0.59	0.61	0.65	
EP1879	EPDBEH-20015-0.3-TH3	○	0.15	0.12	0.30	0.13	37.50	45	4	A	14.50°	0.34	0.35	0.36	0.37	0.40	
EP1880	EPDBEH-20015-0.5-TH3	○			0.50		37.30				14.14°	0.55	0.56	0.58	0.60	0.65	
EP1881	EPDBEH-20015-0.75-TH3	○			0.75		37.10				13.71°	0.81	0.83	0.86	0.89	0.96	
EP1882	EPDBEH-20015-1-TH3	○	0.20	0.15	1.00	0.18	36.80	50	4	A	13.30°	1.06	1.10	1.14	1.18	1.27	
EP1883	EPDBEH-2002-0.3-TH3	○			0.30		42.60				14.54°	0.34	0.35	0.36	0.37	0.39	
EP1884	EPDBEH-2002-0.5-TH3	●			0.50		42.40				14.17°	0.55	0.56	0.58	0.60	0.64	
EP1885	EPDBEH-2002-0.75-TH3	●	0.30	0.25	0.75	0.27	42.20	50	4	A	13.73°	0.81	0.83	0.86	0.89	0.95	
EP1886	EPDBEH-2002-1-TH3	○			1.00		41.90				13.32°	1.06	1.10	1.13	1.17	1.26	
EP1887	EPDBEH-2002-1.25-TH3	○			1.25		41.70				12.93°	1.32	1.37	1.41	1.46	1.57	
EP1888	EPDBEH-2002-1.5-TH3	○	0.40	0.30	1.50	0.37	41.40	50	4	A	12.56°	1.58	1.63	1.69	1.75	1.88	
EP1889	EPDBEH-2002-2-TH3	○			2.00		40.90				11.89°	2.10	2.17	2.24	2.32	2.50	
EP1890	EPDBEH-2002-2.5-TH3	○			2.50		40.40				11.28°	2.61	2.70	2.80	2.90	3.13	
EP1891	EPDBEH-2002-3-TH3	○	0.50	0.35	3.00	0.47	39.90	50	4	A	10.73°	3.13	3.24	3.35	3.47	3.75	
EP1892	EPDBEH-2003-0.5-TH3	●			0.50		42.60				14.21°	0.56	0.58	0.60	0.61	0.65	
EP1893	EPDBEH-2003-0.75-TH3	●			0.75		42.30				13.76°	0.82	0.85	0.87	0.90	0.96	
EP1894	EPDBEH-2003-1-TH3	●	0.40	0.30	1.00	0.37	42.10	50	4	A	13.33°	1.08	1.11	1.15	1.19	1.27	
EP1895	EPDBEH-2003-1.25-TH3	○			1.25		41.80				12.93°	1.34	1.38	1.43	1.47	1.58	
EP1896	EPDBEH-2003-1.5-TH3	●			1.50		41.60				12.56°	1.60	1.65	1.70	1.76	1.89	
EP1897	EPDBEH-2003-2-TH3	●	0.50	0.35	2.00	0.47	41.10	50	4	A	11.86°	2.12	2.18	2.26	2.34	2.52	
EP1898	EPDBEH-2003-2.5-TH3	○			2.50		40.60				11.24°	2.63	2.72	2.81	2.91	3.14	
EP1899	EPDBEH-2003-3-TH3	○			3.00		40.10				10.68°	3.15	3.25	3.37	3.49	3.76	
EP1900	EPDBEH-2003-3.5-TH3	○	0.40	0.30	3.50	0.37	39.60	50	4	A	10.18°	3.67	3.79	3.92	4.06	4.38	
EP1901	EPDBEH-2003-4-TH3	○			4.00		39.10				9.72°	4.18	4.32	4.47	4.64	5.00	
EP1902	EPDBEH-2004-0.5-TH3	○			0.50		42.80				14.28°	0.56	0.58	0.59	0.60	0.64	
EP1903	EPDBEH-2004-0.75-TH3	●	0.50	0.35	0.75	0.47	42.50	50	4	A	13.81°	0.82	0.84	0.87	0.89	0.95	
EP1904	EPDBEH-2004-1-TH3	●			1.00		42.30				13.37°	1.08	1.11	1.14	1.18	1.26	
EP1905	EPDBEH-2004-1.5-TH3	●			1.50		41.80				12.57°	1.60	1.65	1.70	1.75	1.88	
EP1906	EPDBEH-2004-2-TH3	●	0.40	0.30	2.00	0.37	41.30	50	4	A	11.86°	2.11	2.18	2.25	2.33	2.50	
EP1907	EPDBEH-2004-2.5-TH3	●			2.50		40.80				11.23°	2.63	2.72	2.81	2.90	3.13	
EP1908	EPDBEH-2004-3-TH3	●			3.00		40.30				10.65°	3.15	3.25	3.36	3.48	3.75	
EP1909	EPDBEH-2004-3.5-TH3	○	0.50	0.35	3.50	0.47	39.80	50	4	A	10.14°	3.66	3.78	3.91	4.05	4.37	
EP1910	EPDBEH-2004-4-TH3	●			4.00		39.30				9.67°	4.18	4.32	4.47	4.63	4.99	
EP1911	EPDBEH-2004-4.5-TH3	○			4.50		38.80				9.24°	4.70	4.85	5.02	5.20	5.61	
EP1912	EPDBEH-2004-5-TH3	○	0.40	0.30	5.00	0.37	38.30	50	4	A	8.85°	5.21	5.39	5.58	5.78	6.23	
EP1913	EPDBEH-2005-0.75-TH3	○			0.75		43.20				13.88°	0.82	0.84	0.86	0.88	0.94	
EP1914	EPDBEH-2005-1-TH3	●			1.00		42.50				13.42°	1.08	1.11	1.14	1.17	1.25	
EP1915	EPDBEH-2005-1.5-TH3	●	0.50	0.35	1.50	0.47	42.00	50	4	A	12.59°	1.59	1.64	1.69	1.75	1.87	
EP1916	EPDBEH-2005-2-TH3	●			2.00		41.50				11.86°	2.11	2.18	2.25	2.32	2.49	
EP1917	EPDBEH-2005-2.5-TH3	●			2.50		41.00				11.21°	2.63	2.71	2.80	2.90	3.11	
EP1918	EPDBEH-2005-3-TH3	●	0.40	0.30	3.00	0.37	40.50	50	4	A	10.62°	3.15	3.25	3.36	3.47	3.73	
EP1919	EPDBEH-2005-4-TH3	●			4.00		39.50				9.61°	4.18	4.32	4.46	4.62	4.98	
EP1920	EPDBEH-2005-5-TH3	●			5.00		38.50				8.78°	5.21	5.39	5.57	5.77	6.22	
EP1921	EPDBEH-2005-5.5-TH3	○	0.50	0.35	5.50	0.47	38.00	50	4	A	8.41°	5.73	5.92	6.13	6.35	6.84	
EP1922	EPDBEH-2005-6-TH3	○			6.00		37.50				8.08°	6.25	6.46	6.68	6.92	7.46	
EP1923	EPDBEH-2005-7-TH3	○			7.00		36.50				7.48°	7.28	7.53	7.79	8.07	8.71	
EP1924	EPDBEH-2005-8-TH3	○	0.40	0.30	8.00	0.37	35.50	50	4	A	6.96°	8.31	8.60	8.90	9.22	9.95	

● Stock Item ○ Non-Stock Item (Min. Orderqty. 5 pcs.)

EPDBEH-TH3 Epoch Deep Ball Evolution Hard-TH3



DC (mm)	Radius tolerance (mm)
0.1-0.5	±0.003
0.6-12	±0.005



ID Code	Item Code	Stock	Size (mm)							Interference Angle	LN _{eff} (mm) for various draft angles						
			DC	APMX	LN	DN	LS	OAL	DCONMS		TYPE	B2	0.5°	1.0°	1.5°	2.0°	3.0°
EP1925	EPDBEH-2006-0.75-TH3	○	0.6	0.40	0.75	0.57	42.90	50	4	A	13.94°	0.82	0.84	0.86	0.88	0.93	
EP1926	EPDBEH-2006-1-TH3	●			1.00						42.60	13.47°	1.08	1.10	1.13	1.17	1.24
EP1927	EPDBEH-2006-1.5-TH3	○			1.50						42.10	12.61°	1.59	1.64	1.69	1.74	1.86
EP1928	EPDBEH-2006-2-TH3	●			2.00						41.60	11.86°	2.11	2.17	2.24	2.31	2.48
EP1929	EPDBEH-2006-2.5-TH3	●			2.50						41.10	11.19°	2.63	2.71	2.80	2.89	3.10
EP1930	EPDBEH-2006-3-TH3	●			3.00						40.60	10.59°	3.14	3.24	3.35	3.46	3.72
EP1931	EPDBEH-2006-3.5-TH3	○			3.50						40.10	10.05°	3.66	3.78	3.90	4.04	4.34
EP1932	EPDBEH-2006-4-TH3	●			4.00						39.60	9.56°	4.18	4.31	4.46	4.61	4.97
EP1933	EPDBEH-2006-4.5-TH3	○			4.50						39.10	9.12°	4.69	4.85	5.01	5.19	5.59
EP1934	EPDBEH-2006-5-TH3	●			5.00						38.60	8.71°	5.21	5.38	5.57	5.76	6.21
EP1935	EPDBEH-2006-5.5-TH3	○			5.50						38.10	8.34°	5.73	5.92	6.12	6.34	6.83
EP1936	EPDBEH-2006-6-TH3	●			6.00						37.60	8.00°	6.24	6.45	6.67	6.91	7.45
EP1937	EPDBEH-2006-7-TH3	○	7.00	36.60	7.40°	7.28	7.52	7.78	8.06	8.70							
EP1938	EPDBEH-2006-8-TH3	●	8.00	35.60	6.88°	8.31	8.59	8.89	9.21	9.94							
EP1939	EPDBEH-2006-9-TH3	○	9.00	34.60	6.43°	9.35	9.66	10.00	10.36	11.18							
EP1940	EPDBEH-2006-10-TH3	○	10.00	33.60	6.03°	10.38	10.73	11.11	11.51	12.43							
EP1941	EPDBEH-2006-12-TH3	○	12.00	31.60	5.37°	12.45	12.87	13.32	13.81	14.91							
EP1942	EPDBEH-2007-2-TH3	●	0.7	0.45	2.00	0.67	41.80	50	4	A	11.85°	2.11	2.17	2.24	2.31	2.47	
EP1943	EPDBEH-2007-4-TH3	●			4.00						39.80	9.50°	4.18	4.31	4.45	4.61	4.95
EP1944	EPDBEH-2007-6-TH3	○			6.00						37.80	7.92°	6.24	6.45	6.67	6.91	7.44
EP1945	EPDBEH-2007-8-TH3	○			8.00						35.80	6.79°	8.31	8.59	8.89	9.21	9.93
EP1946	EPDBEH-2008-1-TH3	○	0.8	0.50	1.00	0.77	43.00	50	4	A	13.58°	1.07	1.10	1.12	1.15	1.21	
EP1947	EPDBEH-2008-1.5-TH3	○			1.50						42.50	12.66°	1.59	1.63	1.68	1.73	1.83
EP1948	EPDBEH-2008-2-TH3	●			2.00						42.00	11.85°	2.11	2.17	2.23	2.30	2.46
EP1949	EPDBEH-2008-2.5-TH3	○			2.50						41.50	11.14°	2.62	2.70	2.79	2.88	3.08
EP1950	EPDBEH-2008-3-TH3	○			3.00						41.00	10.51°	3.14	3.24	3.34	3.45	3.70
EP1951	EPDBEH-2008-4-TH3	●			4.00						40.00	9.44°	4.17	4.31	4.45	4.60	4.94
EP1952	EPDBEH-2008-5-TH3	●			5.00						39.00	8.57°	5.21	5.38	5.56	5.75	6.19
EP1953	EPDBEH-2008-6-TH3	●			6.00						38.00	7.84°	6.24	6.45	6.66	6.90	7.43
EP1954	EPDBEH-2008-8-TH3	●	8.00	36.00	6.70°	8.31	8.58	8.88	9.20	9.92							
EP1955	EPDBEH-2008-10-TH3	○	10.00	34.00	5.85°	10.38	10.72	11.10	11.50	12.40							
EP1956	EPDBEH-2008-12-TH3	○	12.00	32.00	5.19°	12.44	12.86	13.31	13.80	14.89							
EP1957	EPDBEH-2009-2-TH3	○	0.9	0.60	2.00	0.87	42.20	50	4	A	11.85°	2.11	2.16	2.23	2.29	2.44	
EP1958	EPDBEH-2009-4-TH3	○			4.00						40.20	9.38°	4.17	4.30	4.44	4.59	4.93
EP1959	EPDBEH-2009-6-TH3	○			6.00						38.20	7.75°	6.24	6.44	6.66	6.89	7.42
EP1960	EPDBEH-2009-8-TH3	○			8.00						36.20	6.61°	8.31	8.58	8.88	9.19	9.90
EP1961	EPDBEH-2010-1.5-TH3	○	1.0	0.80	1.50	0.96	42.90	50	4	A	12.67°	1.61	1.64	1.69	1.73	1.83	
EP1963	EPDBEH-2010-2-TH3	●			2.00						42.40	11.82°	2.12	2.18	2.24	2.31	2.46
EP1962	EPDBEH-2010-2-S6-TH3	○			2.00						38.60	12.92°	2.12	2.18	2.24	2.31	2.46
EP1964	EPDBEH-2010-2.5-TH3	○			2.50						41.90	11.07°	2.64	2.71	2.80	2.88	3.08
EP1966	EPDBEH-2010-3-TH3	●			3.00						41.40	10.41°	3.16	3.25	3.35	3.46	3.70
EP1965	EPDBEH-2010-3-S6-TH3	○			3.00						37.60	11.86°	3.16	3.25	3.35	3.46	3.70
EP1967	EPDBEH-2010-4-TH3	●			4.00						40.40	9.29°	4.19	4.32	4.46	4.61	4.94
EP1968	EPDBEH-2010-5-TH3	●			5.00						39.40	8.39°	5.22	5.39	5.57	5.76	6.19
EP1970	EPDBEH-2010-6-TH3	●			6.00						38.40	7.65°	6.26	6.46	6.67	6.91	7.43
EP1969	EPDBEH-2010-6-S6-TH3	○			6.00						34.60	9.53°	6.26	6.46	6.67	6.91	7.43
EP1971	EPDBEH-2010-7-TH3	●			7.00						37.40	7.03°	7.29	7.53	7.78	8.06	8.67

NOTE: Although basically dry (air blow) cutting is recommended, please use appropriate coolant according to the work material and machining shape.

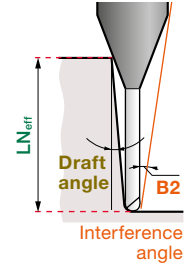
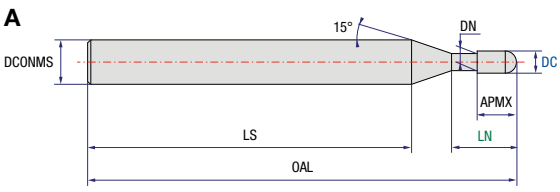
● Stock Item ○ Non-Stock Item (Min. Orderqty. 5 pcs.)

EPDBEH-TH3 Epoch Deep Ball Evolution Hard-TH3

Rake Angle negative
2 flutes
Carbide
TH3 coated
68 HRC
Helix 30°
h5

DC (mm)	Radius tolerance (mm)
0.1-0.5	±0.003
0.6-12	±0.005

P M K
N S H



ID Code	Item Code	Stock	Size (mm)							Interference Angle	LN _{eff} (mm) for various draft angles													
			DC	APMX	LN	DN	LS	OAL	DCONMS		TYPE	B2	0.5°	1.0°	1.5°	2.0°	3.0°							
EP1973	EPDBEH-2010-8-TH3	●	1.0	0.80	8.0	0.96	36.40	50	4	A	6.50°	8.32	8.60	8.89	9.21	9.91								
EP1972	EPDBEH-2010-8-S6-TH3	○			8.0		32.60				6	8.42°	8.32	8.60	8.89	9.21	9.91							
EP1974	EPDBEH-2010-9-TH3	○			9.0		35.40				4	6.05°	9.36	9.67	10.00	10.36	11.16							
EP1976	EPDBEH-2010-10-TH3	●			10.0		34.40				6	5.65°	10.39	10.74	11.11	11.51	12.40							
EP1975	EPDBEH-2010-10-S6-TH3	○			10.0		30.60				4	7.54°	10.39	10.74	11.11	11.51	12.40							
EP1977	EPDBEH-2010-12-TH3	●			12.0		37.40				55	4	A	5.00°	12.46	12.88	13.32	13.81	14.89					
EP1978	EPDBEH-2010-13-TH3	○			13.0		36.40							4.72°	13.49	13.95	14.43	14.96	16.13					
EP1979	EPDBEH-2010-14-TH3	○			14.0		35.40							4.48°	14.53	15.02	15.54	16.11	17.37					
EP1980	EPDBEH-2010-16-TH3	○			16.0		33.40							4.06°	16.59	17.16	17.76	18.40	19.86					
EP1981	EPDBEH-2010-18-TH3	○			18.0		36.40							3.71°	18.66	19.29	19.97	20.70	22.35					
EP1982	EPDBEH-2010-20-TH3	○	20.0	34.40	3.42°	20.73	21.43	22.19	23.00	24.83														
EP1983	EPDBEH-2011-2-TH3	○	1.1	1.00	2.0	1.05	42.50	50	4	A				11.78°	2.14	2.20	2.26	2.32	2.47					
EP1984	EPDBEH-2011-4-TH3	○			4.0									40.50	9.20°	4.21	4.34	4.47	4.62	4.95				
EP1985	EPDBEH-2011-6-TH3	○			6.0									38.50	7.54°	6.28	6.47	6.69	6.92	7.44				
EP1986	EPDBEH-2011-8-TH3	○			8.0									36.50	6.39°	8.34	8.61	8.91	9.22	9.93				
EP1987	EPDBEH-2011-10-TH3	○			10.0						34.50	5.54°	10.41	10.75	11.12	11.52	12.41							
EP1988	EPDBEH-2012-2-TH3	○			1.2						1.10	2.0	1.15	42.70	50	4	A	11.78°	2.14	2.19	2.25	2.31	2.46	
EP1989	EPDBEH-2012-2-S6-TH3	○										2.0						39.00	12.94°	2.14	2.19	2.25	2.31	2.46
EP1990	EPDBEH-2012-3-TH3	○										3.0						41.70	10.29°	3.17	3.26	3.36	3.46	3.70
EP1992	EPDBEH-2012-4-TH3	○										4.0						40.70	9.13°	4.21	4.33	4.47	4.61	4.94
EP1991	EPDBEH-2012-4-S6-TH3	○										4.0						37.00	10.92°	4.21	4.33	4.47	4.61	4.94
EP1993	EPDBEH-2012-6-TH3	○	6.0	38.70		7.45°	6.27	6.47	6.68	6.91		7.43												
EP1994	EPDBEH-2012-8-TH3	●	8.0	36.70		6.29°	8.34	8.61	8.90	9.21		9.91												
EP1995	EPDBEH-2012-10-TH3	○	10.0	34.70		5.44°	10.41	10.75	11.12	11.51		12.40												
EP1996	EPDBEH-2012-12-TH3	○	12.0	37.70		4.79°	12.48	12.89	13.33	13.81		14.89												
EP1997	EPDBEH-2014-3-TH3	○	1.4	1.30		3.0	1.34	42.10	50	4		A						10.15°	3.19	3.28	3.37	3.47	3.70	
EP1998	EPDBEH-2014-8-TH3	○			8.0	37.10					6.06°		8.36	8.62	8.91	9.22	9.91							
EP1999	EPDBEH-2014-12-TH3	○			12.0	38.10					4.58°		12.49	12.90	13.34	13.82	14.89							
EP2000	EPDBEH-2014-16-TH3	○			16.0	34.10					3.68°		16.63	17.18	17.78	18.42	19.86							
EP2001	EPDBEH-2015-2-TH3	○			1.5	1.35					2.0		1.45	43.30	50	4	A	11.76°	2.13	2.18	2.23	2.29	2.42	
EP2002	EPDBEH-2015-2.5-TH3	○									2.5							42.80	10.88°	2.65	2.72	2.79	2.87	3.04
EP2003	EPDBEH-2015-3-TH3	○									3.0							42.30	10.12°	3.17	3.25	3.34	3.44	3.66
EP2004	EPDBEH-2015-3-S6-TH3	○									3.0							38.60	11.84°	3.17	3.25	3.34	3.44	3.66
EP2005	EPDBEH-2015-4-TH3	●									4.0							41.30	8.88°	4.20	4.32	4.45	4.59	4.91
EP2006	EPDBEH-2015-5-TH3	○									5.0							40.30	7.90°	5.23	5.39	5.56	5.74	6.15
EP2007	EPDBEH-2015-5-S6-TH3	○	5.0	36.60			10.02°	5.23	5.39	5.56	5.74	6.15												
EP2008	EPDBEH-2015-6-TH3	●	6.0	39.30			7.12°	6.27	6.46	6.67	6.89	7.39												
EP2010	EPDBEH-2015-8-TH3	●	8.0	37.30			5.95°	8.34	8.60	8.88	9.19	9.88												
EP2009	EPDBEH-2015-8-S6-TH3	○	8.0	33.60			8.14°	8.34	8.60	8.88	9.19	9.88												
EP2011	EPDBEH-2015-10-TH3	●	10.0	35.30	5.10°	10.40	10.74	11.10	11.49	12.36														
EP2013	EPDBEH-2015-12-TH3	●	12.0	38.30	4.47°	12.47	12.88	13.32	13.79	14.85														
EP2012	EPDBEH-2015-12-S6-TH3	○	12.0	29.60	6.51°	12.47	12.88	13.32	13.79	14.85														
EP2014	EPDBEH-2015-14-TH3	○	14.0	36.30	3.98°	14.54	15.02	15.53	16.09	17.34														
EP2015	EPDBEH-2015-16-TH3	●	16.0	34.30	3.58°	16.60	17.16	17.75	18.39	19.82														
EP2016	EPDBEH-2015-18-TH3	○	18.0	37.30	3.26°	18.67	19.30	19.97	20.69	22.31														
EP2017	EPDBEH-2015-20-TH3	○	20.0	35.30	2.99°	20.74	21.44	22.18	22.99	-														

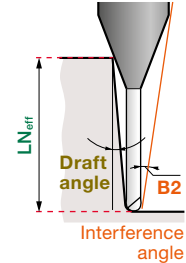
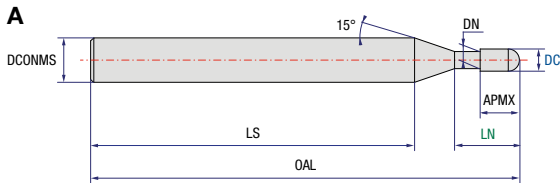
NOTE: Although basically dry (air blow) cutting is recommended, please use appropriate coolant according to the work material and machining shape.
 ● Stock Item ○ Non-Stock Item (Min. Orderqty. 5 pcs.)

EPDBEH-TH3 Epoch Deep Ball Evolution Hard-TH3

Rake Angle negative | 2 flutes | Carbide | TH3 coated | 68 HRC | Helix 30° | h5

DC (mm)	Radius tolerance (mm)
0.1-0.5	±0.003
0.6-12	±0.005

P	M	K
N	S	H



ID Code	Item Code	Stock	Size (mm)							Interference Angle	LN _{eff} (mm) for various draft angles						
			DC	APMX	LN	DN	LS	OAL	DCONMS		TYPE	B2	0.5°	1.0°	1.5°	2.0°	3.0°
EP2018	EPDBEH-2016-4-TH3	○	1.6	1.40	4.0	1.54	15.4	41.50	50	4	A	8.76°	4.22	4.34	4.47	4.61	4.92
EP2019	EPDBEH-2016-8-TH3	○			8.0			37.50				5.82°	8.35	8.62	8.90	9.20	9.89
EP2020	EPDBEH-2016-12-TH3	○			12.0			38.50	4.35°			12.49	12.90	13.33	13.80	14.86	
EP2021	EPDBEH-2016-16-TH3	○			16.0			34.50	3.47°			16.62	17.17	17.77	18.40	19.84	
EP2022	EPDBEH-2016-20-TH3	○			20.0		35.50	60				2.89°	20.76	21.45	22.20	23.00	-
EP2023	EPDBEH-2018-4-TH3	○	1.8	1.60	4.0	1.73	17.3	41.80	50	4	A	8.53°	4.23	4.35	4.48	4.61	4.92
EP2024	EPDBEH-2018-8-TH3	○			8.0			37.80				5.55°	8.37	8.63	8.91	9.21	9.89
EP2025	EPDBEH-2018-12-TH3	●			12.0			38.80	4.11°			12.50	12.91	13.34	13.81	14.86	
EP2026	EPDBEH-2018-16-TH3	○			16.0			34.80	3.26°			16.64	17.19	17.78	18.41	19.83	
EP2027	EPDBEH-2018-20-TH3	○			20.0		35.80	60				2.70°	20.77	21.47	22.21	23.01	-
EP2028	EPDBEH-2020-2.5-TH3	○	2.0	1.70	2.5	1.94	19.4	43.70	4	A	10.60°	2.66	2.72	2.78	2.85	3.01	
EP2030	EPDBEH-2020-3-TH3	●			3.0			43.20			9.72°	3.18	3.25	3.34	3.43	3.63	
EP2029	EPDBEH-2020-3-S6-TH3	○			3.0			39.50	11.80°		3.18	3.25	3.34	3.43	3.63		
EP2031	EPDBEH-2020-4-TH3	●			4.0			42.20	8.32°		4.21	4.32	4.45	4.58	4.87		
EP2032	EPDBEH-2020-5-TH3	○			5.0			41.20	7.27°		5.25	5.39	5.55	5.73	6.11		
EP2034	EPDBEH-2020-6-TH3	●			6.0			40.20	6.46°		6.28	6.46	6.66	6.88	7.36		
EP2033	EPDBEH-2020-6-S6-TH3	○			6.0			36.50	9.04°		6.28	6.46	6.66	6.88	7.36		
EP2036	EPDBEH-2020-8-TH3	●			8.0			38.20	5.27°		8.35	8.60	8.88	9.18	9.84		
EP2035	EPDBEH-2020-8-S6-TH3	○			8.0			34.50	7.82°		8.35	8.60	8.88	9.18	9.84		
EP2037	EPDBEH-2020-10-TH3	●			10.0			36.20	4.46°		10.41	10.74	11.10	11.48	12.33		
EP2039	EPDBEH-2020-12-TH3	●			12.0			39.20	3.86°		12.48	12.88	13.31	13.77	14.82		
EP2038	EPDBEH-2020-12-S6-TH3	○			12.0			30.50	6.15°		12.48	12.88	13.31	13.77	14.82		
EP2040	EPDBEH-2020-13-TH3	○			13.0			38.20	3.62°		13.51	13.95	14.42	14.92	16.06		
EP2041	EPDBEH-2020-14-TH3	●			14.0			37.20	3.40°		14.55	15.02	15.53	16.07	17.30		
EP2043	EPDBEH-2020-16-TH3	●			16.0			35.20	3.04°		16.62	17.16	17.75	18.37	19.79		
EP2042	EPDBEH-2020-16-S6-TH3	○			16.0			26.50	5.07°		16.62	17.16	17.75	18.37	19.79		
EP2044	EPDBEH-2020-18-TH3	○			18.0			38.20	2.75°		18.68	19.30	19.96	20.67	-		
EP2046	EPDBEH-2020-20-TH3	●			20.0			36.20	2.51°		20.75	21.44	22.18	22.97	-		
EP2045	EPDBEH-2020-20-S6-TH3	○			20.0			32.50	4.31°		20.75	21.44	22.18	22.97	24.76		
EP2047	EPDBEH-2020-22-TH3	○			22.0			34.20	2.31°		22.82	23.58	24.40	25.27	-		
EP2048	EPDBEH-2020-25-TH3	●	25.0		2.06°	25.92	26.79	27.72	28.72	-							
EP2049	EPDBEH-2020-30-TH3	●	30.0		1.75°	31.09	32.14	33.26	-	-							
EP2050	EPDBEH-2020-35-TH3	○	35.0		1.52°	36.26	37.48	38.80	-	-							
EP2051	EPDBEH-2020-40-TH3	○	40.0		1.34°	41.42	42.83	-	-	-							

NOTE: Although basically dry (air blow) cutting is recommended, please use appropriate coolant according to the work material and machining shape.

● Stock Item ○ Non-Stock Item (Min. Orderqty. 5 pcs.)

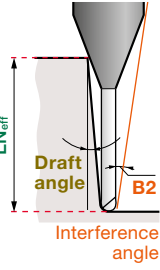
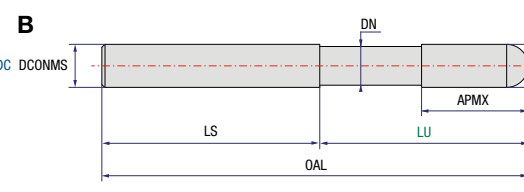
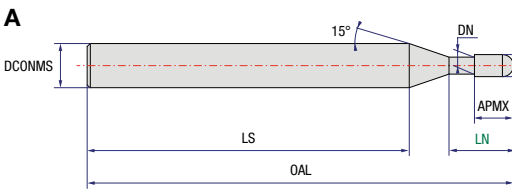
EPDBEH-TH3 Epoch Deep Ball Evolution Hard-TH3



Rake Angle negative
2 flutes
Carbide
TH3 coated
68 HRC
Helix 30°
h5

DC (mm)	Radius tolerance (mm)
0.1-0.5	±0.003
0.6-12	±0.005

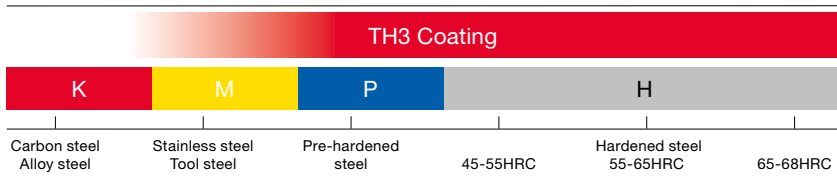
P M K
N S H



ID Code	Item Code	Stock	Size (mm)								Interference Angle	LN _{eff} (mm) for various draft angles					
			DC	APMX	LN/LU	DN	LS	OAL	DCONMS	TYPE		B2	0.5°	1.0°	1.5°	2.0°	3.0°
EP2052	EPDBEH-2025-6-TH3	●	2.5	2.00	6	2.40	37.10	41.10	50	4	A	5.54°	6.35	6.53	6.72	6.92	7.39
EP2053	EPDBEH-2025-10-TH3	○			10			55	3.66°			10.48	10.81	11.15	11.52	12.36	
EP2054	EPDBEH-2025-15-TH3	●			15			60	2.57°			15.65	16.15	16.69	17.27	-	
EP2055	EPDBEH-2025-20-TH3	●			20			65	1.98°			20.82	21.50	22.23	-	-	
EP2056	EPDBEH-2025-25-TH3	○			25			70	1.61°			25.99	26.85	27.78	-	-	
EP2057	EPDBEH-2025-30-TH3	○	30	70	1.36°	31.16	32.20	-	-	-							
EP2058	EPDBEH-2030-6-TH3	●	3.0	2.50	6	2.88	38.20	50	6	A	8.27°	6.38	6.55	6.73	6.93	7.38	
EP2059	EPDBEH-2030-8-TH3	●			8		41.20	55			6.95°	8.45	8.69	8.95	9.23	9.86	
EP2060	EPDBEH-2030-10-TH3	●			10		39.20	55			5.98°	10.51	10.83	11.17	11.53	12.35	
EP2061	EPDBEH-2030-13-TH3	●			13		41.20	60			4.95°	13.61	14.04	14.49	14.98	16.08	
EP2062	EPDBEH-2030-16-TH3	●			16		38.20	60			4.23°	16.71	17.25	17.82	18.43	19.81	
EP2063	EPDBEH-2030-20-TH3	●			20		65	3.53°			20.85	21.52	22.25	23.03	24.78		
EP2064	EPDBEH-2030-25-TH3	●			25		70	2.93°			26.02	26.87	27.79	28.78	-		
EP2065	EPDBEH-2030-30-TH3	●			30		75	2.51°			31.19	32.22	33.33	34.53	-		
EP2066	EPDBEH-2030-35-TH3	●			35		80	2.19°			36.35	37.57	38.87	40.28	-		
EP2067	EPDBEH-2035-10-TH3	○			10		55	5.42°			10.56	10.87	11.20	11.56	12.36		
EP2068	EPDBEH-2035-15-TH3	○	15	60	3.94°	15.73	16.22	16.74	17.31	18.58							
EP2069	EPDBEH-2035-25-TH3	○	25	70	2.54°	26.07	26.92	27.83	28.81	-							
EP2070	EPDBEH-2035-35-TH3	○	35	80	1.88°	36.40	37.61	38.91	-	-							
EP2071	EPDBEH-2035-45-TH3	○	45	90	1.49°	46.74	48.31	-	-	-							
EP2072	EPDBEH-2040-8-TH3	●	4.0	3.00	8	3.85	43.00	55	6	A	5.71°	8.49	8.71	8.96	9.22	9.81	
EP2073	EPDBEH-2040-10-TH3	●			10		41.00	55			4.76°	10.55	10.85	11.17	11.52	12.30	
EP2074	EPDBEH-2040-12-TH3	○			12		44.00	60			4.09°	12.62	12.99	13.39	13.82	14.79	
EP2075	EPDBEH-2040-13-TH3	●			13		43.00	60			3.82°	13.65	14.06	14.50	14.97	16.03	
EP2076	EPDBEH-2040-16-TH3	●			16		40.00	65			3.18°	16.76	17.27	17.82	18.42	19.76	
EP2077	EPDBEH-2040-20-TH3	●			20		70	2.61°			20.89	21.55	22.26	23.02	-		
EP2078	EPDBEH-2040-25-TH3	●			25		75	2.13°			26.06	26.90	27.80	28.77	-		
EP2079	EPDBEH-2040-30-TH3	●			30		80	1.79°			31.23	32.25	33.34	-	-		
EP2080	EPDBEH-2040-35-TH3	●			35		80	1.55°			36.40	37.60	38.88	-	-		
EP2081	EPDBEH-2040-40-TH3	○			40		36.00	90			1.37°	41.56	42.94	-	-		
EP2082	EPDBEH-2040-45-TH3	○			45		41.00	90			1.22°	46.73	48.29	-	-		
EP2083	EPDBEH-2040-50-TH3	○			50		46.00	100			1.11°	51.90	53.64	-	-		
EP2084	EPDBEH-2050-10-TH3	○			10		55	2.97°			10.54	10.82	11.12	11.45	-		
EP2085	EPDBEH-2050-20-TH3	●			20		65	1.46°			20.87	21.52	-	-	-		
EP2086	EPDBEH-2050-25-TH3	○			25		70	1.17°			26.04	26.86	-	-	-		
EP2087	EPDBEH-2050-30-TH3	○	30	75	0.97°	31.21	-	-	-	-							
EP2088	EPDBEH-2050-40-TH3	○	40	37.90	80	0.73°	41.55	-	-	-							
EP2089	EPDBEH-2060-12-TH3	●	12	47.80	60	-	-	-	-	-							
EP2090	EPDBEH-2060-20-TH3	●	20	65	-	-	-	-	-	-							
EP2091	EPDBEH-2060-30-TH3	●	30	75	-	-	-	-	-	-							
EP2092	EPDBEH-2060-50-TH3	○	50	49.80	100	-	-	-	-	-							
EP2093	EPDBEH-2080-24-TH3	●	8.0	12.00	24	7.60	75.30	100	8	B	-	-	-	-	-		
EP2094	EPDBEH-2100-30-TH3	●	10.0	15.00	30	9.50	69.10	100	10	B	-	-	-	-	-		
EP2095	EPDBEH-2120-36-TH3	●	12.0	18.00	36	11.50	73.10	110	12	B	-	-	-	-	-		

NOTE: Although basically dry (air blow) cutting is recommended, please use appropriate coolant according to the work material and machining shape.
 ● Stock Item ○ Non-Stock Item (Min. Orderqty. 5 pcs.)

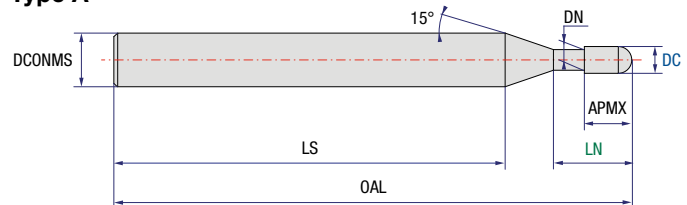
EPDBEH-TH3 General Technical Information



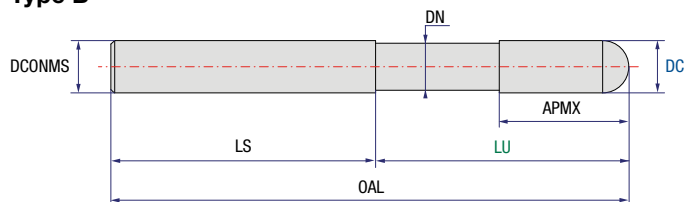
ISO 513 Symbol	Description	Examples
P	Non-alloy steel, low alloy steel, high alloy steel, ferritic/martensitic stainless steel, tool steel	1.2343 / X38CrMoV5-1; 1.2738 / 40CrMnNiMo8; 1.0503 / C45; 1.0570 / ST52-3; 1.1730 / C45W; 1.7131 / 16MnCr5; 1.7225 / 42CrMo4; 1.3343 / HS6-5-2; 1.0511 / C40; 1.2312 / 40CrMnMoS8-6; 1.2311 / 40CrMnMo7; 1.2344 / X40CrMoV5-1; 1.2767 / X45NiCrMo4; 1.2083 / X42Cr13; 1.2085 / X33CrS16; 1.2714 / 55NiCrMoV7; 1.2842 / 90MnCrV8;
M	Austenitic stainless steel	1.4301 / X5CrNi18-9; 1.4401 / X5CrNiMo17-12-2; 1.4404 / X2CrNiMo17-13-2; 1.4828 / X15CrNiSi20 12
K	Grey cast iron (GG), Nodular cast iron (GGG), Malleable cast iron	0.6025 / GG-25; GGG-40.3; 0.8155 / GTS-55-04
N	Aluminum wrought all, Copper alloy, Aluminum-cast, alloyed, Non-metallic	2.0060 / E-Cu57; 2.0321 / CuZn37; 3.0255 / Al99.5; 3.5103 / MgSE3Zn27r1
S	High temperature alloys, Titanium and Ti alloys	1.4864 / X12NiCrSi36 16; 2.4856 / NiCr22Mo9Nb; 1.4977 / X40CoCrNi20 20; 2.4669 / NiCr15Fe7TiAl
H	Hardened steel, Chilled cast iron, Cast iron	

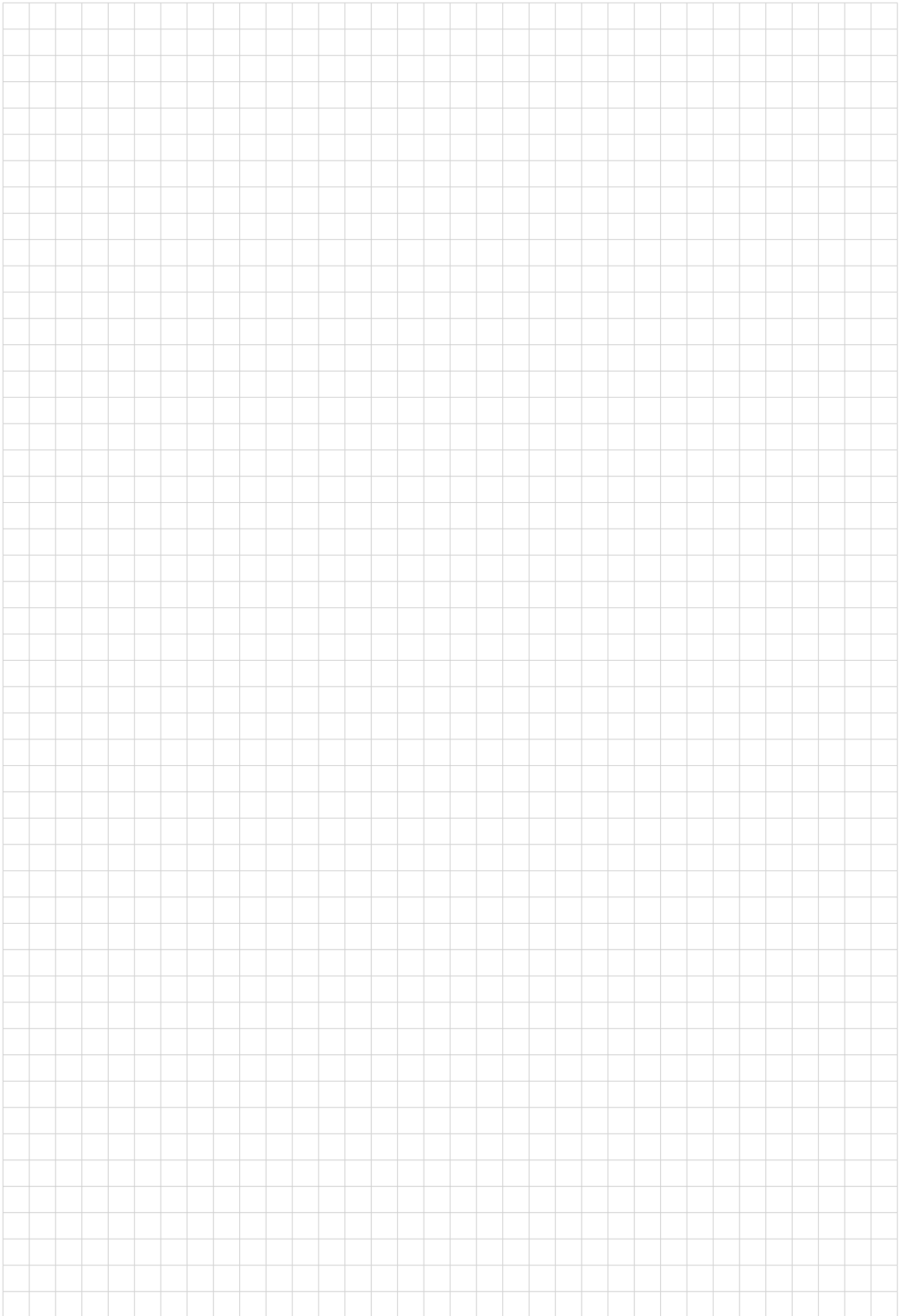
Drawing Nomenclature (mm)	
APMX	Max. Side Cutting Edge Length
DC	Diameter Cutting
DCONMS	Connection Diameter
DN	Neck Diameter
LN	Underneck Length
LS	Shank Length
LU	Usable Length
OAL	Overall Length

Type A



Type B





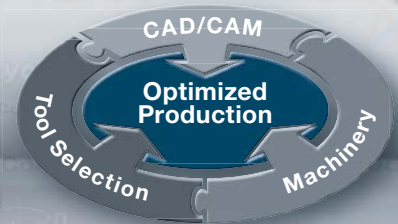


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ID Code	Item code	Z	ØD	ØR	CR	In	e	l	Øda	L	Ød	Grade	Inserts1	Inserts2	Inserts3
EP997	ETMP-4050-40-10	4	4	1	40	1	5	90	6						
EP370	ETM-4050-12	4	5	1.2	15		10	70	6						
EP598	ETMP-4050-30-12	4	5	1.2	30	1	7.5	90	6						
EP599	ETMP-4050-40-12	4	5	1.2	40	1	7.5	100	9						
EP600	ETMP-4050-50-12	4	5	1.2	50	1	7.5	110	8						
EP371	ETM-4050-15	4	6	1.5			12	90	6						
EP378	ETMLN-4050-30-15	4	6	1.5	30		9	5.7	75	6					
EP380	ETMLN-4050-42-15	4	6	1.5	42		9	5.7	90	6					
EP381	ETMLN-4050-54-15	4	6	1.5	54		9	5.7	100	6					
EP601	ETMP-4050-40-15	4	6	1.5	40	1	9	100	8						
EP602	ETMP-4050-50-15	4	6	1.5	50	1	9	110	8						
EP603	ETMP-4050-67-15	4	6	1.5	67	1	9	125	8						
EP372	ETM-4050-20	4	8	2			16	100	0						
EP282	ETMLN-4050-40-20	4	8	2	40		12	7.6	85	8					
EP283	ETMLN-4050-50-20	4	8	2	50		12	7.6	100	8					
EP384	ETMLN-4050-72-20	4	8	2	72		12	7.6	120	8					
EP373	ETM-4100-20	4	10	2			20		110	10					

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 **Attentions on Safety**

1. Cautions regarding handling

- (1) When removing the tool from its case (packaging), be careful that the tool does not pop out or is dropped. Be particularly careful regarding contact with the tool flutes.
- (2) When handling tools with sharp cutting flutes, be careful not to touch the cutting flutes directly with your bare hands.

2. Cautions regarding mounting

- (1) Before use, check the outside appearance of the tool for scratches, cracks, etc. and that it is firmly mounted in the collet chuck, etc.
- (2) When preparing for use, be sure that the inserts are firmly mounted in place and that they are firmly mounted on the arbor, etc.
- (3) If abnormal chattering, etc. occurs during use, stop the machine immediately and remove the cause of the chattering.

3. Cautions during use

- (1) Before use, confirm the dimensions and direction of rotation of the tool and milling work material.
- (2) The numerical values in the standard cutting conditions table should be used as criteria when starting new work. The cutting conditions should be adjusted as appropriate when the cutting depth is large, the rigidity of the machine being used is low, or according to the conditions of the work material.
- (3) Cutting tools are made of a hard material. During use, they may break and fly off. In addition, cutting chips may also fly off. Since there is a danger of injury to workers, fire, or eye damage from such flying pieces, a safety cover should be attached when work is performed and safety equipment such as safety goggles should be worn to create a safe environment for work.
- (4) There is a risk of fire or inflammation due to sparks, heat due to breakage, and cutting chips. Do not use where there is a risk of fire or explosion. Please caution of fire while using oil base coolant, fire prevention is necessary.
- (5) Do not use the tool for any purpose other than that for which it is intended.

4. Cautions regarding regrinding

- (1) If regrinding is not performed at the proper time, there is a risk of the tool breaking. Replace the tool with one in good condition, or perform regrinding.
- (2) Grinding dust will be created when regrinding a tool. When regrinding, be sure to attach a safety cover over the work area and wear safety clothes such as safety goggles, etc.
- (3) This product contains the specified chemical substance cobalt and its inorganic compounds. When performing regrinding or similar processing, be sure to handle the processing in accordance with the local laws and regulations regarding prevention of hazards due to specified chemical substances.

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Specifications for the products listed in this catalog are subject to change without notice due to replacement or modification.

For more details please check our digital tool database



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