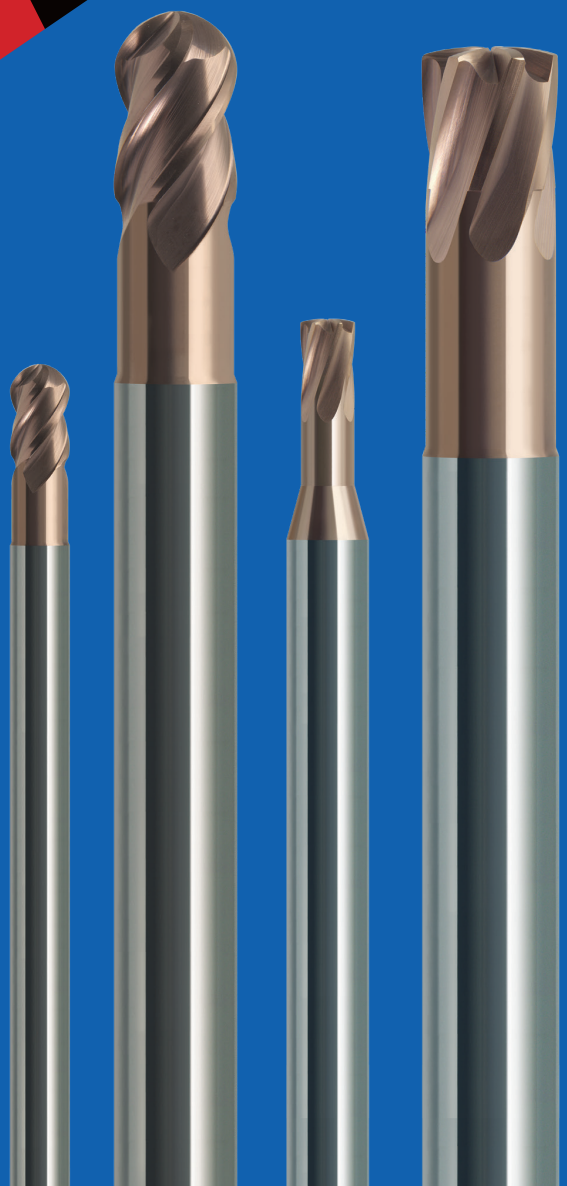
MOLDINO
The Edge To Innovation

Multi-purpose Ball Type / Corner Radius End Mill

EHHBE-TH3
EHHRE-TH3

Epoch High Hard Ball / Radius Evolution



MOLDINO Tool Engineering Europe GmbH

EHHxE-TH3 | 2024-03 | Version 1.1 | Print

TH3 coated 4-flute ball end mill for high hardened steel processing.

Features of EHHBE-TH3

01 Special tip shape

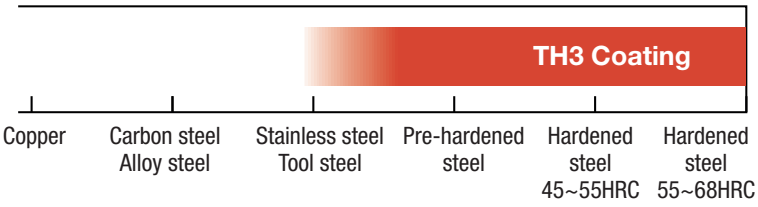
02 Variable pitch geometry

03 New TH3-coating for hardened steel machining

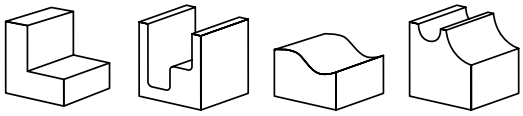
Line-up: 43 items

DC: 1-12 mm

Recommended usage



Applications



Customer need and product benefit

High efficiency and long tool life in high hardened steels.

Challenge

Short tool life and lack of process safety with multi flute end mills in high-hardened materials.

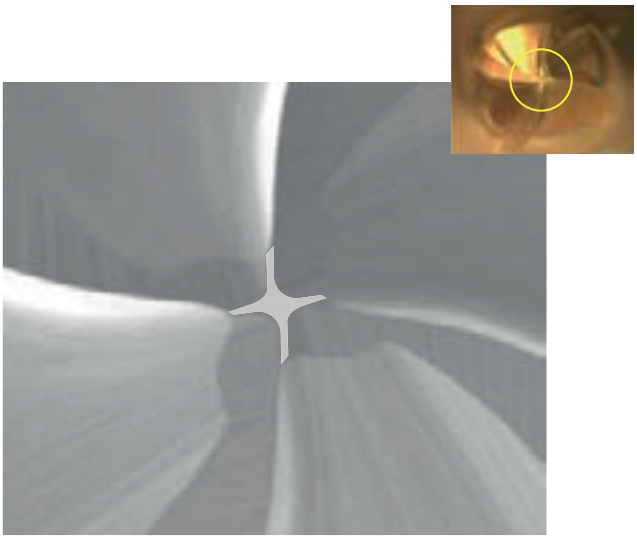
Solution

TH3 coated 4-flute end mill EHHBE for high hardened steels up to and above 68 HRC.

EHHBE-TH3	2024-03	Version 1.1	Print

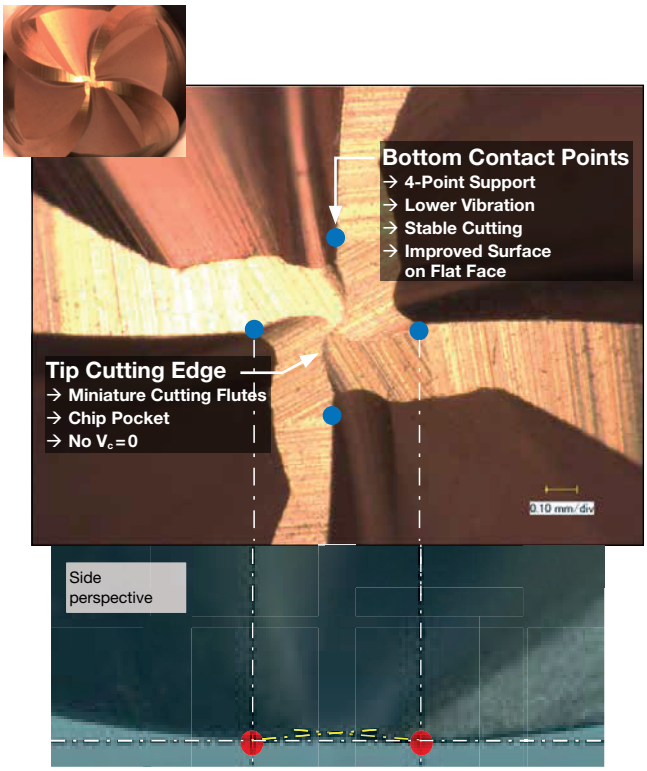
Feature 01 Special tip shape

Features and performance



By creating a special flank face with a tiny relief angle at the very tip section, R accuracy is improved even with 4 flutes.

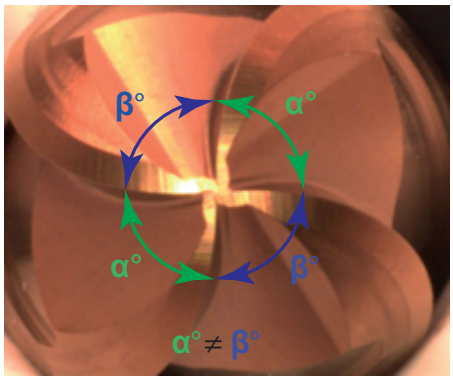
Tool dia. 4-12mm



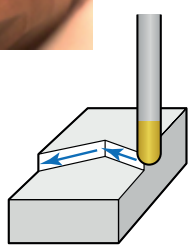
Features: Zero cutting point at the center is isolated from the cutting point.

Effects: Chipping due to jamming of cutting chips at center area is suppressed.

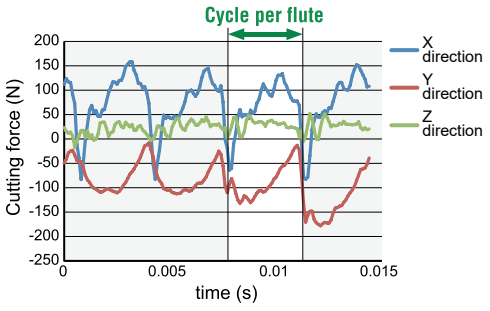
Feature 02 Variable pitch geometry



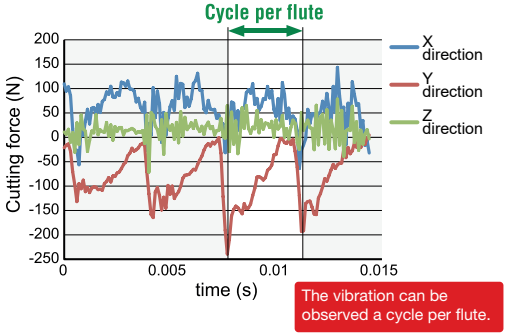
Work material: YXR3 (58HRC)
Tool: DC 8 (RE4) x 4 flutes
n = 4.000 min^{-1} (V_c = 100 m/min)
V_f = 1.920 mm/min (f_z = 0.12 mm/t)
a_p = 0.3 mm a_e = 0.1 mm
Dry Air-blow



EHHBE-TH3
4 flutes
Variable Pitch



Conventional
4 flutes
Equal Pitch

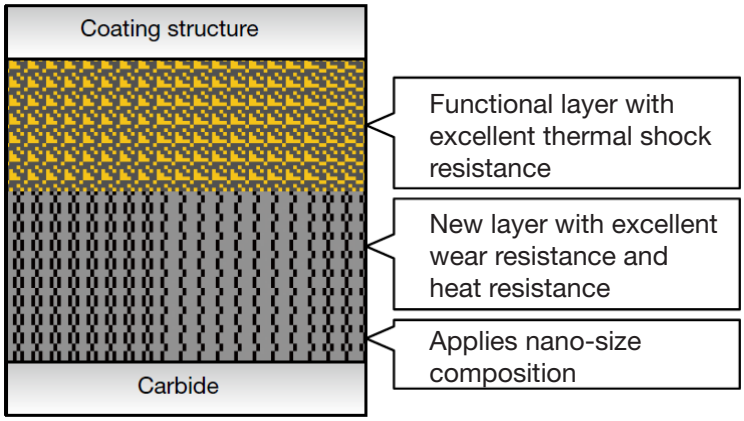


The vibration can be observed a cycle per flute.

Feature 03 New TH3-coating for hardened steel machining

Features and performance

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

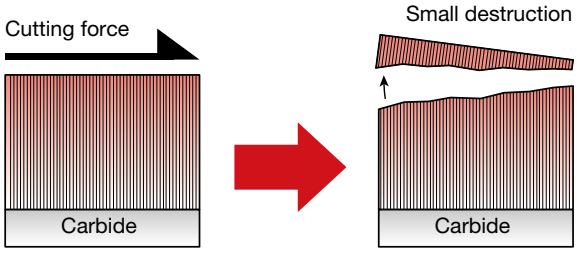


Target steel grade

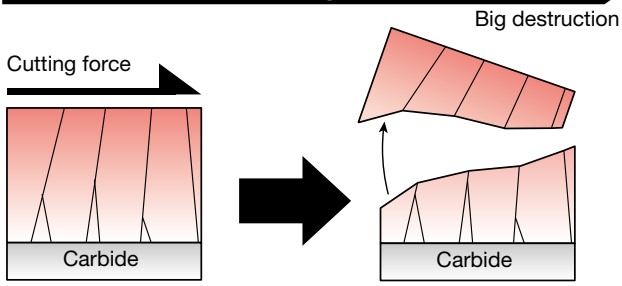
- Hardened steel (especially 50HRC or higher)
- High-speed steel

New coating achieves to reduce destruction unit of layer by applying "nano-size composition".

New TH3 coating



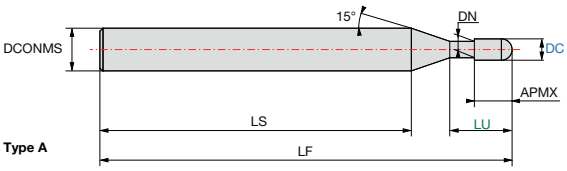
Conventional coating

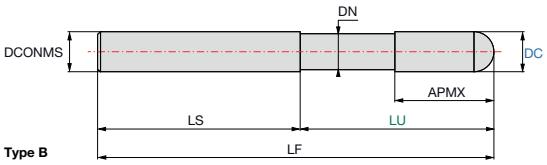


EHHBE-TH3	2024-03	Version 1.1	Print

EHHBE-TH3 Line-up & dimensions

NOF 4 | Rake angle negative | Helix 40° | h5 | Carbide | TH3 coated | 68 HRC



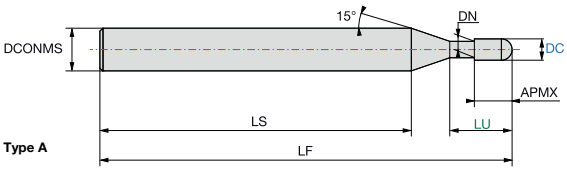


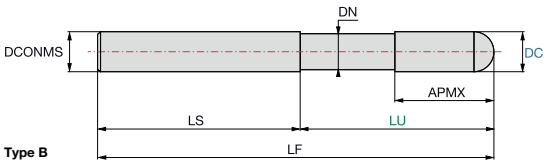
Helix Angle	R Tol. (mm)	D Tol. (mm)	DCONMS Tol.
40°	DC 1 - 3: +/-0.005 DC 4 - 6: +/-0.007 DC 8 - 12: +/-0.01	DC 1 - 3: 0/-0.01 DC 4 - 6: 0/-0.014 DC 8 - 12: 0/-0.02	h5

ID Code	Item Code	NOF	Size (mm)									
			DC	LU	APMX	DN	LF	LS	DCONMS	b	h	Type
EP1846	EHHBE-4010-S4-TH3	4	1.00	3.00	1.50	0.95	50.00	41.30	4.00	0.00	0.00	A
EP1847	EHHBE-4010-S6-TH3	4	1.00	3.00	1.50	0.95	50.00	37.57	6.00	0.00	0.00	A
EP2625	EHHBE4010-5-S4-TH3	4	1.00	5.00	1.50	0.95	50.00	39.30	4.00	0.00	0.00	A
EP2626	EHHBE4010-5-S6-TH3	4	1.00	5.00	1.50	0.95	55.00	40.57	6.00	0.00	0.00	A
EP1848	EHHBE-4015-S4-TH3	4	1.50	4.50	2.50	1.43	50.00	40.70	4.00	0.00	0.00	A
EP1849	EHHBE-4015-S6-TH3	4	1.50	4.50	2.50	1.43	50.00	36.97	6.00	0.00	0.00	A
EP2627	EHHBE4015-7.5-S4-TH3	4	1.50	7.50	2.50	1.43	50.00	37.70	4.00	0.00	0.00	A
EP2628	EHHBE4015-7.5-S6-TH3	4	1.50	7.50	2.50	1.43	55.00	38.97	6.00	0.00	0.00	A
EP1850	EHHBE-4020-S4-TH3	4	2.00	6.00	3.00	1.90	50.00	40.08	4.00	0.00	0.00	A
EP1851	EHHBE-4020-S6-TH3	4	2.00	6.00	3.00	1.90	50.00	36.34	6.00	0.00	0.00	A
EP2629	EHHBE4020-10-S4-TH3	4	2.00	10.00	3.00	1.90	50.00	36.08	4.00	0.00	0.00	A
EP2630	EHHBE4020-10-S6-TH3	4	2.00	10.00	3.00	1.90	55.00	37.34	6.00	0.00	0.00	A
EP1852	EHHBE-4025-S4-TH3	4	2.50	7.50	4.00	2.38	50.00	39.47	4.00	0.00	0.00	A
EP1853	EHHBE-4025-S6-TH3	4	2.50	7.50	4.00	2.38	50.00	35.74	6.00	0.00	0.00	A
EP2631	EHHBE4025-12.5-S4-TH3	4	2.50	12.50	4.00	2.38	50.00	34.47	4.00	0.00	0.00	A
EP2632	EHHBE4025-12.5-S6-TH3	4	2.50	12.50	4.00	2.38	60.00	40.74	6.00	0.00	0.00	A
EP1854	EHHBE-4030-S4-TH3	4	3.00	9.00	4.50	2.90	70.00	58.94	4.00	0.00	0.00	A
EP2601	EHHBE4030-9-50-S4-TH3	4	3.00	9.00	4.50	2.90	50.00	38.94	4.00	0.00	0.00	A
EP1855	EHHBE-4030-S6-TH3	4	3.00	9.00	4.50	2.90	70.00	55.21	6.00	0.00	0.00	A
EP2602	EHHBE4030-9-55-S6-TH3	4	3.00	9.00	4.50	2.90	55.00	40.21	6.00	0.00	0.00	A
EP2633	EHHBE4030-15-S4-TH3	4	3.00	15.00	4.50	2.90	60.00	42.94	4.00	0.00	0.00	A
EP2634	EHHBE4030-15-S6-TH3	4	3.00	15.00	4.50	2.90	60.00	39.21	6.00	0.00	0.00	A
EP1856	EHHBE-4040-S4-TH3	4	4.00	12.00	6.00	3.90	70.00	58.00	4.00	0.26	0.007	B
EP2603	EHHBE4040-12-60-S4-TH3	4	4.00	12.00	6.00	3.90	60.00	48.00	4.00	0.26	0.007	B
EP1857	EHHBE-4040-S6-TH3	4	4.00	12.00	6.00	3.90	70.00	54.08	6.00	0.26	0.007	A
EP2604	EHHBE4040-12-60-S6-TH3	4	4.00	12.00	6.00	3.90	60.00	44.08	6.00	0.26	0.007	A
EP2635	EHHBE4040-20-S4-TH3	4	4.00	20.00	6.00	3.90	60.00	40.00	4.00	0.26	0.007	B
EP2636	EHHBE4040-20-S6-TH3	4	4.00	20.00	6.00	3.90	60.00	36.08	6.00	0.26	0.007	A

EHHBE-TH3 Line-up & dimensions

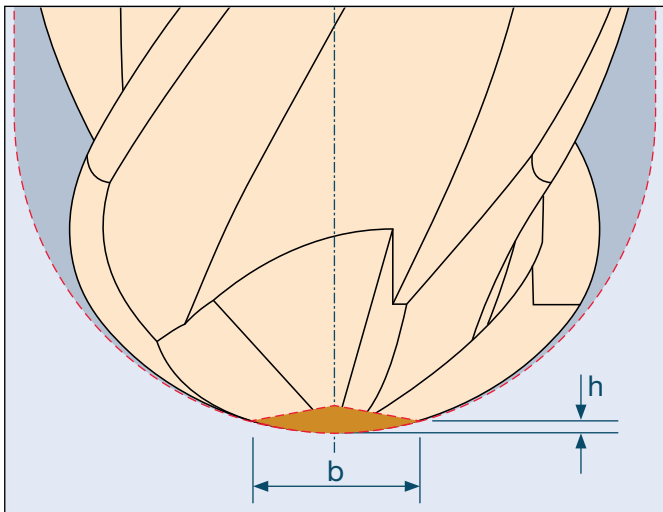
NOF 4 | Rake angle negative | Helix 40° | h5 | Carbide | TH3 coated | 68 HRC



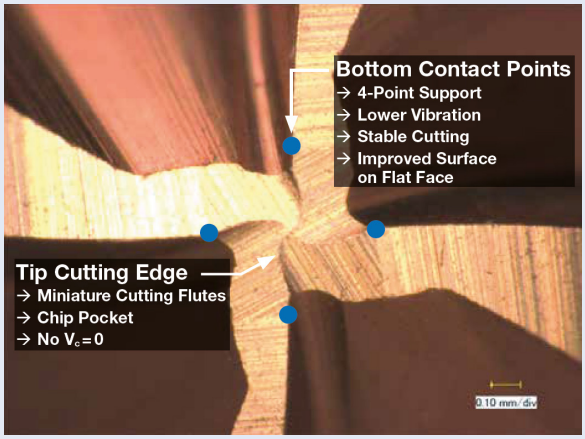


Helix Angle	R Tol. (mm)	D Tol. (mm)	DCONMS Tol.
40°	DC 1 - 3: +/-0.005 DC 4 - 6: +/-0.007 DC 8 - 12: +/-0.01	DC 1 - 3: 0/-0.01 DC 4 - 6: 0/-0.014 DC 8 - 12: 0/-0.02	h5

ID Code	Item Code	NOF	Size (mm)									
			DC	LU	APMX	DN	LF	LS	DCONMS	b	h	Type
EP1858	EHHBE-4050-TH3	4	5.00	15.00	7.50	4.70	80.00	62.57	6.00	0.28	0.007	A
EP2605	EHHBE4050-15-60-TH3	4	5.00	15.00	7.50	4.70	60.00	42.57	6.00	0.28	0.007	A
EP2637	EHHBE4050-25-TH3	4	5.00	25.00	7.50	4.70	60.00	32.57	6.00	0.28	0.007	A
EP1859	EHHBE-4060-TH3	4	6.00	18.00	9.00	5.70	90.00	72.00	6.00	0.33	0.007	B
EP2606	EHHBE4060-18-60-TH3	4	6.00	18.00	9.00	5.70	60.00	42.00	6.00	0.33	0.007	B
EP2638	EHHBE4060-30-TH3	4	6.00	30.00	9.00	5.70	70.00	40.00	6.00	0.33	0.007	B
EP1860	EHHBE-4080-TH3	4	8.00	24.00	12.00	7.60	100.00	76.00	8.00	0.45	0.010	B
EP2607	EHHBE4080-24-63-TH3	4	8.00	24.00	12.00	7.60	63.00	39.00	8.00	0.45	0.010	B
EP2639	EHHBE4080-40-TH3	4	8.00	40.00	12.00	7.60	80.00	40.00	8.00	0.45	0.010	B
EP1861	EHHBE-4100-TH3	4	10.00	30.00	15.00	9.50	100.00	70.00	10.00	0.55	0.010	B
EP2608	EHHBE4100-30-74-TH3	4	10.00	30.00	15.00	9.50	74.00	44.00	10.00	0.55	0.010	B
EP2640	EHHBE4100-50-TH3	4	10.00	50.00	15.00	9.50	90.00	40.00	10.00	0.55	0.010	B
EP1862	EHHBE-4120-TH3	4	12.00	36.00	18.00	11.50	110.00	74.00	12.00	0.55	0.010	B
EP2609	EHHBE4120-36-86-TH3	4	12.00	36.00	18.00	11.50	86.00	50.00	12.00	0.55	0.010	B
EP2641	EHHBE4120-60-TH3	4	12.00	60.00	18.00	11.50	110.00	50.00	12.00	0.55	0.010	B



Diameter 4 –12 mm Contour



Diameter 4 –12 mm Tip

For precise tool definition for the CAM system please download DXF data (QuickFinder) or contact your local MOLDINO Tool staff for more details. Specifications for the products listed in this catalog are subject to change without notice due to replacement or modification. For diameter 1-3 mm, EHHBE has standard ball end mill cutting edge. For diameter 4-12 mm, EHHBE cutting edge geometry is as shown above.

EHHBE-TH3 General technical information

Application range

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	

Recommended

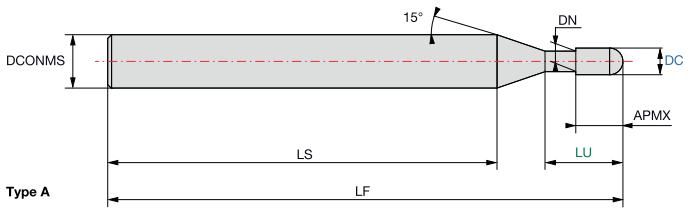
P M K N S H

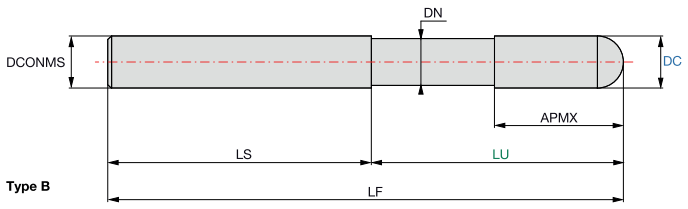
Suitable

P M K N S H

NOT recommended

P M K N S H

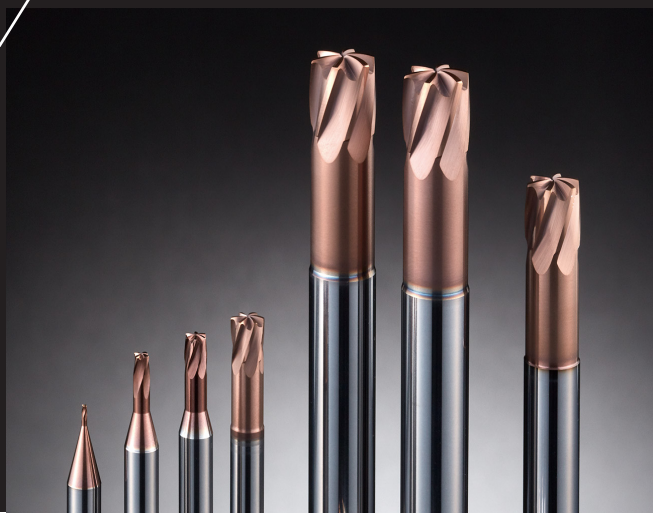




Drawing nomenclatur	
APMX	Cutting edge length
DC	Cutting diameter maximum
DCONMS	Connection diameter machine side
DN	Neck diameter
LF	Functional length
LU	Length usage
LS	Length shank

TH3 coated high feed multi flute end mill for high hardened steel processing.

Features of EHHRE-TH3



01 Low cutting force radius edge geometry

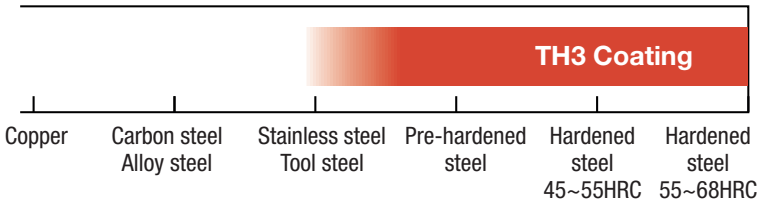
02 Peripheral clearance geometry to reduce vibration

03 New TH3-coating for hardened steel machining

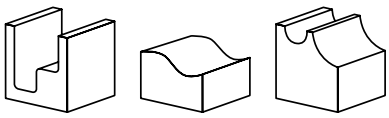
Line-up: 51 items

DC: 0.5-12 mm

Recommended usage

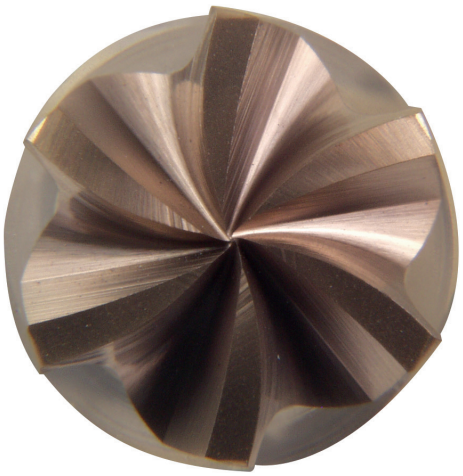


Applications



Customer need and product benefit

High efficiency and long tool life in high hardened steels. The multi flute end mill enables high efficiency machining even in small precision molds, like bipolar plates.



Challenge

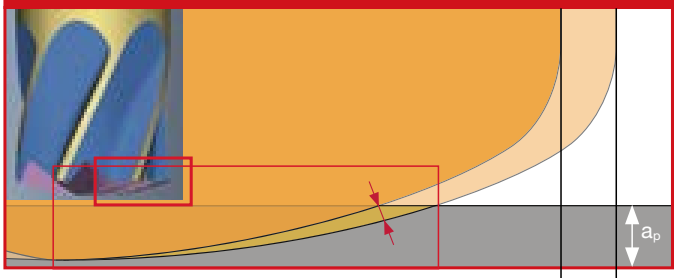
Short tool life and lack of process safety with multi flute end mills in high-hardened materials.

Solution

TH3 coated 4 and 6 flute end mill EHHRE for high hardened steels up to and above 68 HRC.

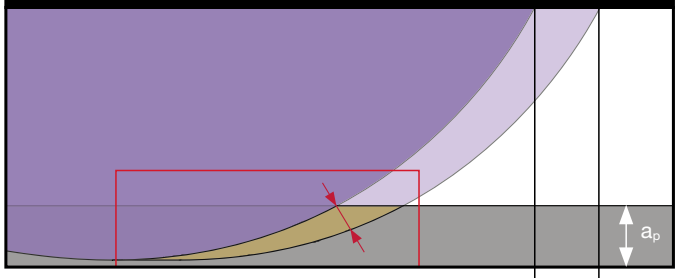
Feature 01 Low cutting force radius edge geometry

EHHRE-TH3

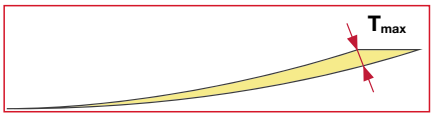


Maximum chip thickness: Tmax

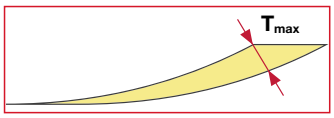
Conventional Radius



Maximum chip thickness: Tmax



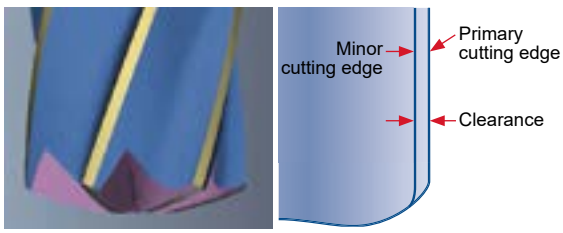
Thinner removed chip

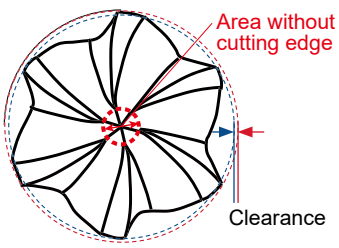


Composite R geometry on bottom cutting edge could create thinner chips than conventional radius geometry (real R), and it enables to reduce cutting force. Furthermore, by making the bottom edge a high helix shape, it improves the chip flow. And achieves excellent chip discharging performance.

Feature 02 Peripheral clearance geometry to reduce vibration

Peripheral clearance geometry to reduce vibration

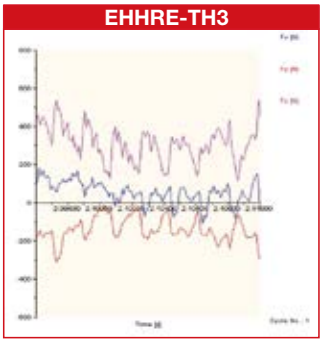




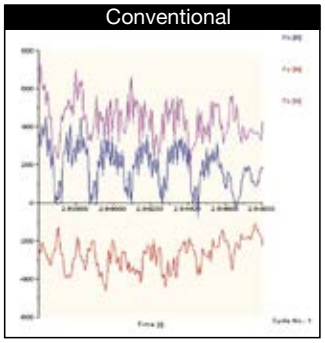
Effect to suppress vibration at corner milling

Work material: DAC (H) 49HRC | Machine: Vertical MC (HSK-A63) | Tool: EHHRE-6100-TH3
Cutting conditions: n = 6.000min^{-1} (V_c = 188 m/min) V_f = 1.800 mm/min (f_z = 0.05mm/t)
Cutting amount: 0.3mm, Dry with air blow

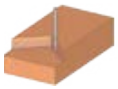
EHHRE-TH3



Conventional



It is possible to minimize chatter vibrations at high speed machining and at corners, that can suppress unexpected chipping due to chatter vibration and efficiency reduction at corners.

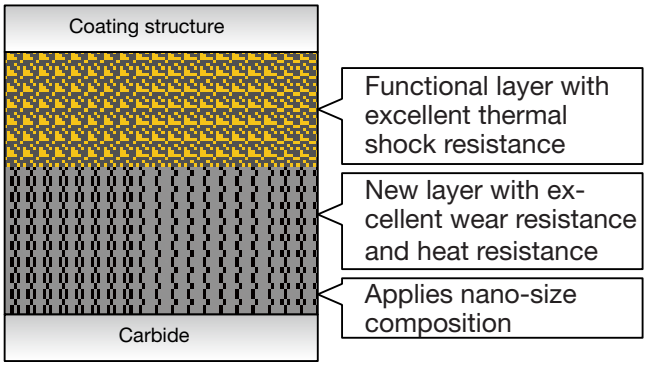


90 degree corner milling

Feature 03 New TH3-coating for hardened steel machining

Features and performance

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

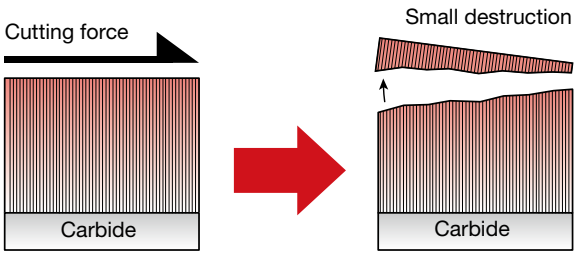


Target steel grade

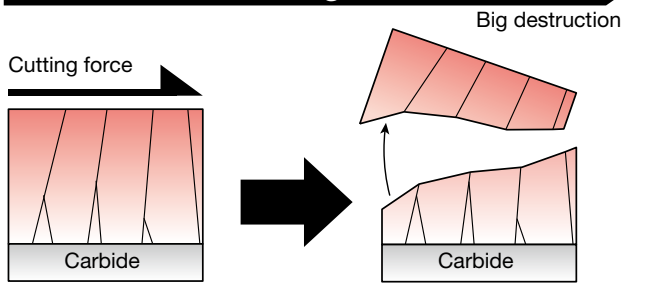
- Hardened steel (especially 50HRC or higher)
- High-speed steel

New coating achieves to reduce destruction unit of layer by applying "nano-size composition".

New TH3 coating



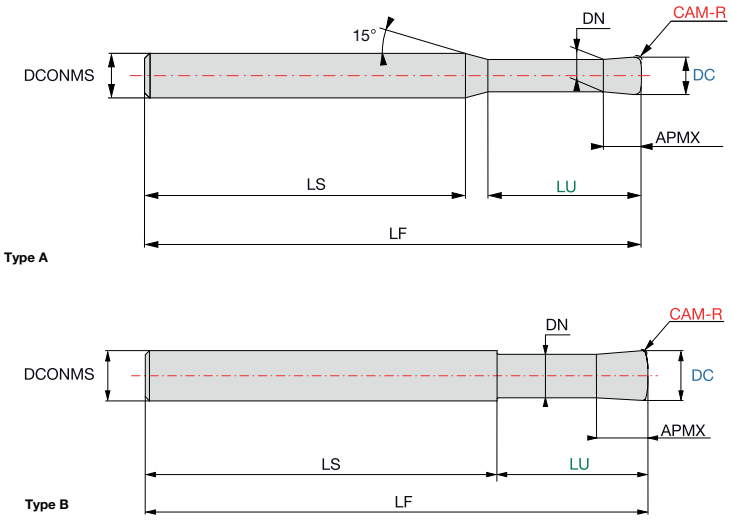
Conventional coating

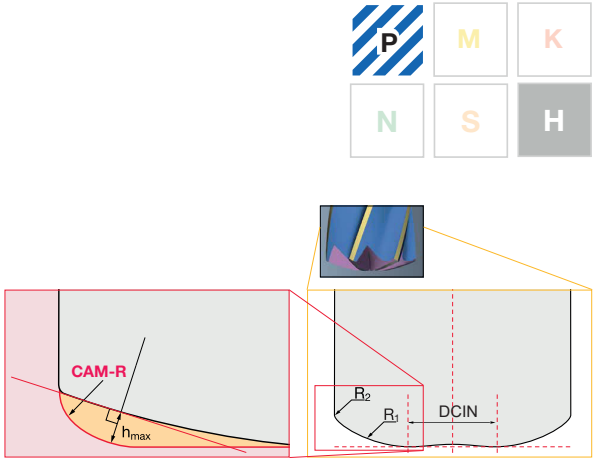


EHHRE-TH3	2024-03	Version 1.1	Print

EHHRE-TH3 Line-up & dimensions

NOF 4 | Rake angle negative | h5 | Carbide | TH3 coated | 68 HRC





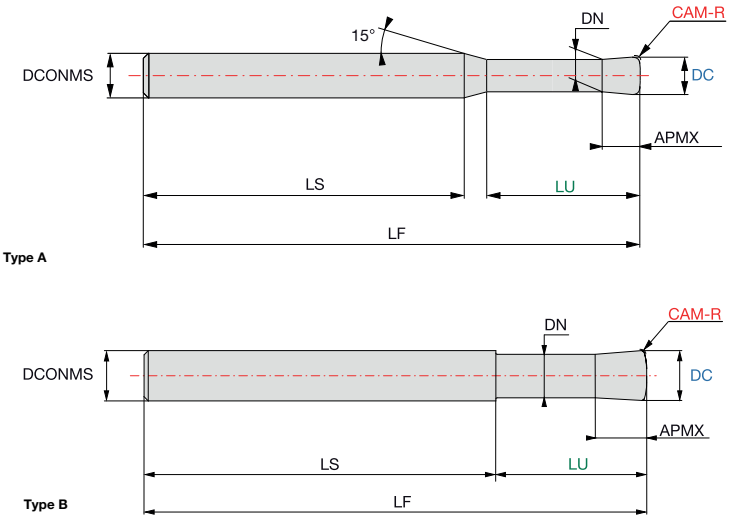
Helix Angle	D Tol. (mm)	DCONMS Tol.
30°	DC 0.5 - 0.8: 0/-0.02	h5
20°	DC 1 - 12: 0/-0.02	

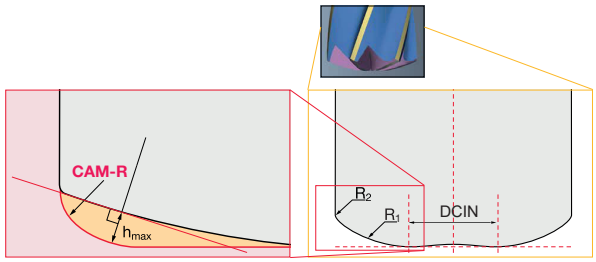
ID Code	Item Code	NOF	Size (mm)												
			DC	CAM-R	LU	APMX	DN	LF	LS	DCONMS	R1	R2	DCIN	h / h_{max}	Type
EP2667	EHHRE4005-0.75-S4-TH3	4	0.5	0.067	0.75	0.30	0.48	40.00	32.68	4.00	0.55	0.05	0.14	0.013	A
EP2668	EHHRE4005-0.75-S6-TH3	4	0.5	0.067	0.75	0.30	0.48	50.00	38.94	6.00	0.55	0.05	0.14	0.013	A
EP2669	EHHRE4005-1.5-S4-TH3	4	0.5	0.067	1.50	0.30	0.48	40.00	31.93	4.00	0.55	0.05	0.14	0.013	A
EP2670	EHHRE4005-1.5-S6-TH3	4	0.5	0.067	1.50	0.30	0.48	50.00	38.19	6.00	0.55	0.05	0.14	0.013	A
EP2671	EHHRE4005-2.5-S4-TH3	4	0.5	0.067	2.50	0.30	0.48	40.00	30.93	4.00	0.55	0.05	0.14	0.013	A
EP2672	EHHRE4005-2.5-S6-TH3	4	0.5	0.067	2.50	0.30	0.48	50.00	37.19	6.00	0.55	0.05	0.14	0.013	A
EP2673	EHHRE4006-0.9-S4-TH3	4	0.6	0.072	0.90	0.36	0.57	40.00	32.69	4.00	0.66	0.05	0.17	0.017	A
EP2674	EHHRE4006-0.9-S6-TH3	4	0.6	0.072	0.90	0.36	0.57	50.00	38.96	6.00	0.66	0.05	0.17	0.017	A
EP2675	EHHRE4006-1.8-S4-TH3	4	0.6	0.072	1.80	0.36	0.57	40.00	31.79	4.00	0.66	0.05	0.17	0.017	A
EP2676	EHHRE4006-1.8-S6-TH3	4	0.6	0.072	1.80	0.36	0.57	50.00	38.06	6.00	0.66	0.05	0.17	0.017	A
EP2677	EHHRE4006-3-S4-TH3	4	0.6	0.072	3.00	0.36	0.57	40.00	30.59	4.00	0.66	0.05	0.17	0.017	A
EP2678	EHHRE4006-3-S6-TH3	4	0.6	0.072	3.00	0.36	0.57	50.00	36.86	6.00	0.66	0.05	0.17	0.017	A
EP2679	EHHRE4008-1.2-S4-TH3	4	0.8	0.085	1.20	0.48	0.76	40.00	32.75	4.00	0.88	0.05	0.22	0.025	A
EP2680	EHHRE4008-1.2-S6-TH3	4	0.8	0.085	1.20	0.48	0.76	50.00	39.02	6.00	0.88	0.05	0.22	0.025	A
EP2681	EHHRE4008-2.4-S4-TH3	4	0.8	0.085	2.40	0.48	0.76	40.00	31.55	4.00	0.88	0.05	0.22	0.025	A
EP2682	EHHRE4008-2.4-S6-TH3	4	0.8	0.085	2.40	0.48	0.76	50.00	37.82	6.00	0.88	0.05	0.22	0.025	A
EP2683	EHHRE4008-4-S4-TH3	4	0.8	0.085	4.00	0.48	0.76	40.00	29.95	4.00	0.88	0.05	0.22	0.025	A
EP2684	EHHRE4008-4-S6-TH3	4	0.8	0.085	4.00	0.48	0.76	50.00	36.22	6.00	0.88	0.05	0.22	0.025	A
EP1863	EHHRE-4010-S4-TH3	4	1.0	0.134	3.00	1.00	0.95	50.00	41.30	4.00	1.10	0.10	0.28	0.026	A
EP1864	EHHRE-4010-S6-TH3	4	1.0	0.134	3.00	1.00	0.95	50.00	37.57	6.00	1.10	0.10	0.28	0.026	A
EP2642	EHHRE4010-5-S4-TH3	4	1.0	0.134	5.00	1.00	0.95	50.00	39.30	4.00	1.10	0.10	0.28	0.026	A
EP2643	EHHRE4010-5-S6-TH3	4	1.0	0.134	5.00	1.00	0.95	55.00	40.57	6.00	1.10	0.10	0.28	0.026	A
EP2685	EHHRE4015-S4-TH3	4	1.5	0.164	4.50	1.50	1.43	50.00	40.70	4.00	1.65	0.10	0.42	0.047	A
EP2686	EHHRE4015-S6-TH3	4	1.5	0.164	4.50	1.50	1.43	50.00	36.97	6.00	1.65	0.10	0.42	0.047	A
EP2687	EHHRE4015-7.5-S4-TH3	4	1.5	0.164	7.50	1.50	1.43	50.00	37.70	4.00	1.65	0.10	0.42	0.047	A
EP2688	EHHRE4015-7.5-S6-TH3	4	1.5	0.164	7.50	1.50	1.43	55.00	38.97	6.00	1.65	0.10	0.42	0.047	A
EP1865	EHHRE-4020-S4-TH3	4	2.0	0.194	6.00	2.00	1.90	50.00	40.08	4.00	2.20	0.10	0.56	0.068	A
EP1866	EHHRE-4020-S6-TH3	4	2.0	0.194	6.00	2.00	1.90	50.00	36.34	6.00	2.20	0.10	0.56	0.068	A

All items on EU-stock

EHHRE-TH3 Line-up & dimensions

NOF 4+6 | Rake angle negative | h5 | Carbide | TH3 coated | 68 HRC





Helix Angle	D Tol. (mm)	DCONMS Tol.
20°	DC 1 - 12: 0/-0.02	h5

ID Code	Item Code	NOF	Size (mm)												
			DC	CAM-R	LU	APMX	DN	LF	LS	DCONMS	R1	R2	DCIN	h / h_{max}	Type
EP2644	EHHRE4020-10-S4-TH3	4	2.0	0.194	10.00	2.00	1.90	50.00	36.08	4.00	2.20	0.10	0.56	0.068	A
EP2645	EHHRE4020-10-S6-TH3	4	2.0	0.194	10.00	2.00	1.90	55.00	37.34	6.00	2.20	0.10	0.56	0.068	A
EP1867	EHHRE-4030-S4-TH3	4	3.0	0.328	9.00	3.00	2.90	60.00	48.94	4.00	3.30	0.20	0.84	0.094	A
EP1868	EHHRE-4030-S6-TH3	4	3.0	0.328	9.00	3.00	2.90	60.00	45.21	6.00	3.30	0.20	0.84	0.094	A
EP2646	EHHRE4030-15-S4-TH3	4	3.0	0.328	15.00	3.00	2.90	60.00	42.94	4.00	3.30	0.20	0.84	0.094	A
EP2647	EHHRE4030-15-S6-TH3	4	3.0	0.328	15.00	3.00	2.90	60.00	39.21	6.00	3.30	0.20	0.84	0.094	A
EP1869	EHHRE-6040-S4-TH3	6	4.0	0.387	12.00	4.00	3.90	60.00	48.00	4.00	4.40	0.20	1.12	0.136	B
EP1870	EHHRE-6040-S6-TH3	6	4.0	0.387	12.00	4.00	3.90	60.00	44.08	6.00	4.40	0.20	1.12	0.136	A
EP2648	EHHRE6040-20-S4-TH3	6	4.0	0.387	20.00	4.00	3.90	60.00	40.00	4.00	4.40	0.20	1.12	0.136	B
EP2649	EHHRE6040-20-S6-TH3	6	4.0	0.387	20.00	4.00	3.90	60.00	36.08	6.00	4.40	0.20	1.12	0.136	A
EP1871	EHHRE-6050-TH3	6	5.0	0.521	15.00	5.00	4.70	60.00	42.57	6.00	5.50	0.30	1.40	0.162	A
EP2650	EHHRE6050-25-TH3	6	5.0	0.521	25.00	5.00	4.70	60.00	32.57	6.00	5.50	0.30	1.40	0.162	A
EP1872	EHHRE-6060-TH3	6	6.0	0.581	18.00	6.00	5.70	60.00	42.00	6.00	6.60	0.30	1.68	0.204	B
EP2651	EHHRE6060-30-TH3	6	6.0	0.581	30.00	6.00	5.70	70.00	40.00	6.00	6.60	0.30	1.68	0.204	B
EP2610	EHHRE6080-24-63-TH3	6	8.0	0.849	24.00	8.00	7.60	63.00	39.00	8.00	8.80	0.50	2.24	0.255	B
EP1873	EHHRE-6080-TH3	6	8.0	0.849	24.00	8.00	7.60	75.00	51.00	8.00	8.80	0.50	2.24	0.255	B
EP2652	EHHRE6080-40-TH3	6	8.0	0.849	40.00	8.00	7.60	80.00	40.00	8.00	8.80	0.50	2.24	0.255	B
EP2611	EHHRE6100-30-74-TH3	6	10.0	0.968	30.00	10.00	9.50	74.00	44.00	10.00	11.00	0.50	2.80	0.340	B
EP1874	EHHRE-6100-TH3	6	10.0	0.968	30.00	10.00	9.50	80.00	50.00	10.00	11.00	0.50	2.80	0.340	B
EP2653	EHHRE6100-50-TH3	6	10.0	0.968	50.00	10.00	9.50	90.00	40.00	10.00	11.00	0.50	2.80	0.340	B
EP2612	EHHRE6120-36-86-TH3	6	12.0	1.088	36.00	12.00	11.50	86.00	50.00	12.00	13.20	0.50	3.36	0.424	B
EP1875	EHHRE-6120-TH3	6	12.0	1.088	36.00	12.00	11.50	100.00	64.00	12.00	13.20	0.50	3.36	0.424	B
EP2654	EHHRE6120-60-TH3	6	12.0	1.088	60.00	12.00	11.50	110.00	50.00	12.00	13.20	0.50	3.36	0.424	B

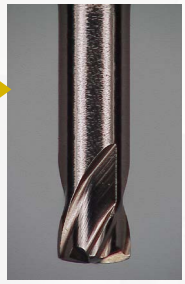
EHHRE-TH3

Achieves high efficiency and long life in roughing of small precision molds made of high hardness steels.

Features of EHHRE-TH3

01 Unique high-rigidity design for small diameter end mills used for roughing

02 Lineuped under neck length 1.5DC, 3DC and 5DC type
Compatible with various machining depths

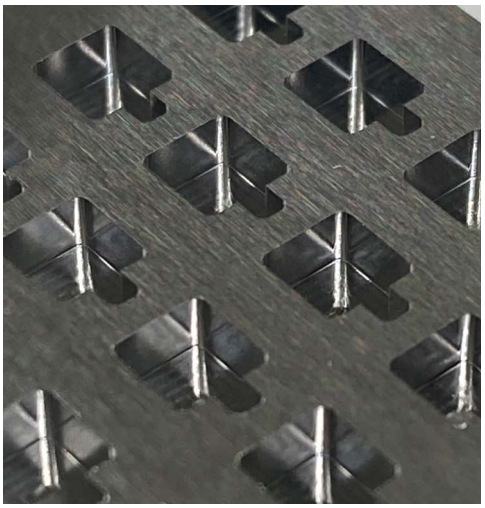


- Short flutes cut upward shape
- High web thickness design
- Tool with neck length of 1.5DC is approximately 8 times more rigid than a tool with neck length of 3DC
  (Based on our deflection calculations using a tool diameter of 0.5mm.)

Improved stability and reliability of miniature roughing of high hardness steels

Example of connector mold machining (work: 1.2379)

Work material: 1.2379 (58HRC)　Machine: Vertical MC (HSK-E32)　Coolant: Mist-blow



Connector molds (image)

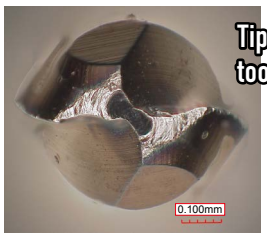
Wear condition after roughing 21pcs of connector molds

EHHRE-TH3

Cutting time : 2 hours 56 min.

【Tool】
EHHRE4006-1.8-S4-TH3
Tool dia.: 0.6mm
n=31,850min^{-1} (v_c=60m/min)
v_f=1,480mm/min (f_z=0.011mm/t)
a_p=0.011mm　a_e=0.33mm

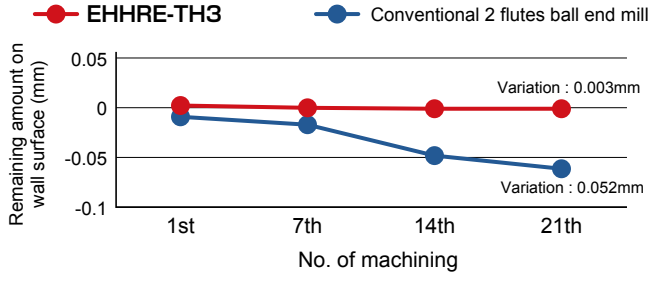
Conventional 2 flutes ball end mill



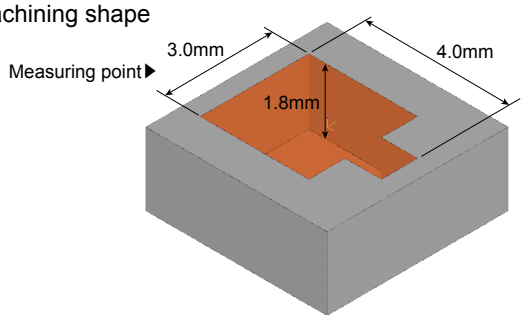
Cutting time : 4 hours 59 min.

【Tool】
Conventioal 2 flutes ball end mill
Tool dia.: 0.6mm
n=28,000min^{-1} (v_c=52m/min)
v_f=560mm/min (f_z=0.01mm/t)
a_p=0.027mm　a_e=0.081mm

Changes of remaining amount on wall surface after roughing



Machining shape



There is almost no dimensional change even after roughing 21 pieces with EHHRE-TH3

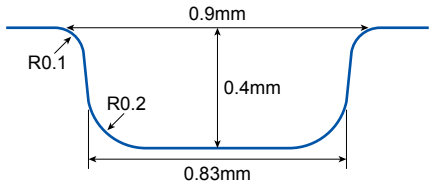
Example of fuel cell separator die machining (Daido DCMX (61HRC))

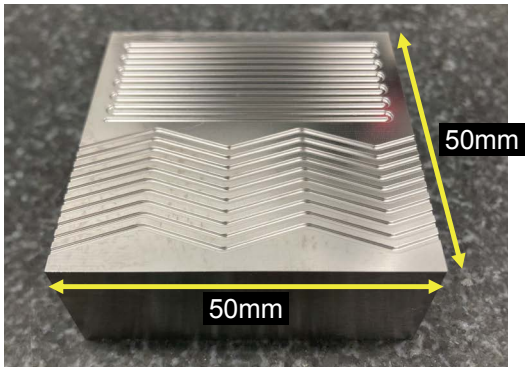
Work material: Daido DCMX (61HRC)
Machine: RXP801
Coolant: Mist-blow
Tool: EHHRE-TH3, EPDREH-TH3

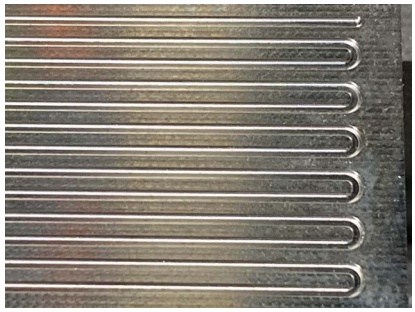
【Roughing condition】
EHHRE4006-1.8-S6-TH3
n = 40,000 min^{-1} (V_c= 75 m/min)
V_f = 3,000 mm/min (f_z = 0.018 mm/t)
a_p = 0.015 mm a_e = 0.6 mm

Tool life: 290 min

Machining shape

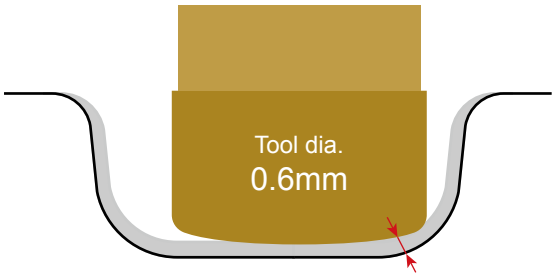






Newly proposed roughing

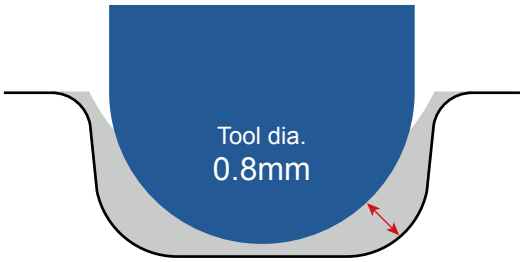
Roughing by EHHRE-TH3



Max. remaining amount: 0.04mm

Conventional roughing

Roughing by ball end mill



Max. remaining amount: 0.12mm

Newly proposed machining process

Roughing	**EHHRE-TH3**	Tool dia. 0.6mm
Semi roughing	Radius end mill	Tool dia. 0.6mm
Semi finishing	Radius end mill	Tool dia. 0.5mm
Finishing	Radius end mill	Tool dia. 0.5mm

Conventional machining process

Roughing 1	Ball end mill	Tool dia. 1.0mm
Roughing 2	Ball end mill	Tool dia. 0.8mm
Rest roughing	Radius end mill	Tool dia. 0.6mm
Semi roughing	Radius end mill	Tool dia. 0.6mm
Semi finishing	Radius end mill	Tool dia. 0.5mm
Finishing	Radius end mill	Tool dia. 0.5mm

Roughing by EHHRE-TH3 allows to consolidate tools and processes!

EHHRE-TH3 General technical information

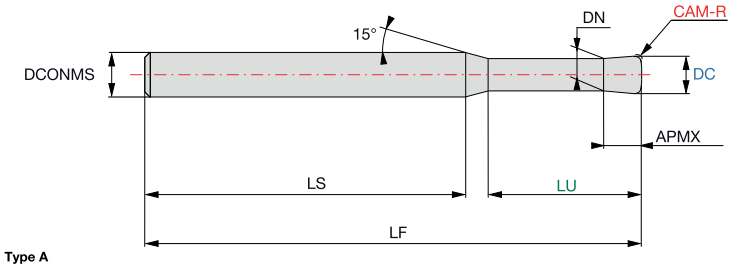
Application range

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	

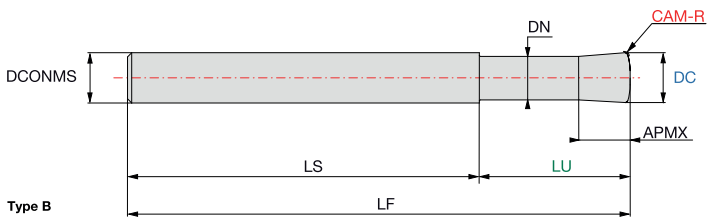
Recommended

Suitable

NOT recommended



Type A



Type B

Drawing nomenclatur	
APMX	Cutting Edge Length
CAM-R	Radius for Programming in CAM
DC	Cutting Diameter Maximum
DCONMS	Connection Diameter Machine Side
DN	Neck Diameter
LF	Functional Length
LU	Length Usage
LS	Length Shank

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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.

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

The diagrams and table data are examples of test results and are not guaranteed values.

For more details please check our digital tool database

P50 QuickFinder

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