



Carbide Tap series for High hardened material

# ***EHST-TH*** ***EHT-TH***

Epoch Super Hard Tap, Epoch Hard Tap

**Mitsubishi Hitachi Tool Engineering, Ltd.**

New Product News | No.0820E-3 | 2017-8

# Epoch Super Hard Tap

**Stably machines tempered materials with hardnesses of **50HRC or more!****

**One-shot machining after heat treatment reduces machining process.**

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## **Cross-section shape minimizes torque during cutting.**

Cross-section design minimizes torque during cutting. Chips are broken up finely, so chip clogging is avoided.

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## **TH coating with excellent heat and wear resistance**

TH coating with good results on end mills is fine-tuned specifically for taps.

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## **Employs a 1-rank larger shaft diameter.**

In order to withstand the severe conditions when tapping high-hardness steel, the taps are designed with a larger-diameter shank which is 1 size larger than JIS standards.

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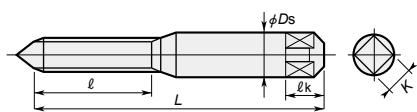
## **Carbide substrate with high durability**

Durable carbide substrate with high resistance to breaking or chipping is used to minimize problems during machining.

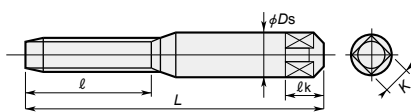
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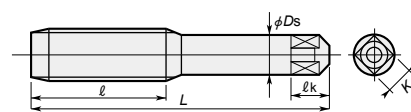
## Dimensions



A Type



B Type



C Type

## ESHT $\phi$ -M $\phi$ - $\phi$ . $\phi$ -TH

Unit : mm

Item Code	Stocks	Size	Pitch $P$	Thread accuracy	No. of Threads	Thread Length $\ell$	Overall Length $L$	Shank Dia. $D_s$	Flutes	Type	$K$	$\ell_k$
				$d_2$ Tolerance zone(+)								
ESHT5-M3-0.5-TH	●	M3	0.5	55~40	5	11	46	5	4	A	4	7
ESHT5-M4-0.7-TH	●	M4	0.7	60~40	5	13	52	5.5	4	A	4.5	7
ESHT5-M5-0.8-TH	●	M5	0.8	60~40	5	16	60	6	4	A	4.5	7
ESHT5-M6-1.0-TH	●	M6	1	60~40	5	19	62	6.2	5	B	5	8
ESHT5-M8-1.25-TH	●	M8	1.25	80~60	5	22	70	7	5	C	5.5	8
ESHT5-M10-1.5-TH	●	M10	1.5	80~60	5	24	75	8.5	5	C	6.5	9
ESHT5-M12-1.75-TH	●	M12	1.75	80~60	5	30	82	10.5	5	C	8	11

$d_2$  tolerance zone : The pitch diameter tolerance to tap is shown from upper tolerance to lower tolerance by  $\mu\text{m}$ .

● : Stocked items.

※ Tap accuracy does not guarantee thread accuracy.

## Recommended cutting conditions

Work material	General criteria for cutting speed
Hardened steel (50~55HRC)	2~5m/min
Hardened steel (55~60HRC)	1~3m/min

## Field data

### Performance comparison with products from conventional ~M8×P1.25~

#### Cutting condition

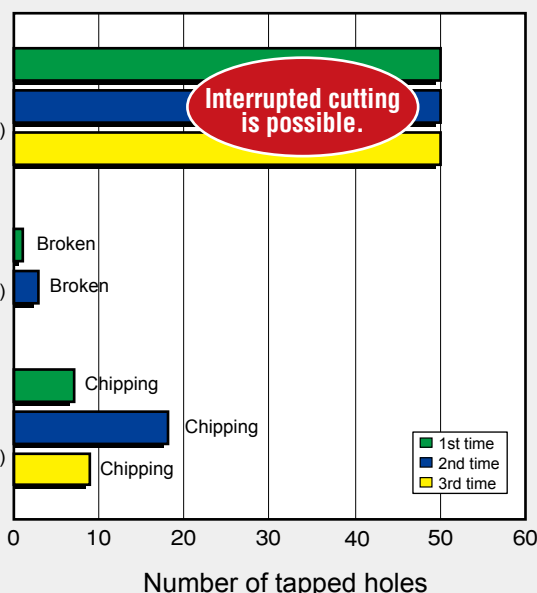
Work material : SKD61(50HRC)  
 Tool : M8x1.25  
 $n=120\text{min}^{-1}$  ( $v_c=3\text{m/min}$ )  
 $v_f=150\text{mm/min}$   
 Tap depth : 16mm  
 Pilot hole diameter : 6.9mm  
 Coolant : Water-soluble  
 M/C (BT-50 Using tapping holder)

**Epoch Super Hard Tap  
enabled stable  
machining.**

**Epoch  
Super Hard Tap**  
(for High-hardened steel)

Conventional A  
Carbide Tap  
(for High-hardened steel)

Conventional B  
Carbide Tap  
(for High-hardened steel)



**Enables stable machining of tempered materials with hardnesses of 35 to 50HRC.**

**Utilizes reverse-rotation teeth to minimize breakage or chipping when machining blind holes.**

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**Suppresses teeth clogging by chips when rotated reversely.**

A reverse-rotation teeth is provided to minimize teeth clogging by chips when the tap is reversely rotated, minimizing breakage or chipping.

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**TH coating with excellent heat and wear resistance**

TH coating with good results on end mills is fine-tuned specifically for taps.

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**Employs a 1-rank larger shaft diameter.**

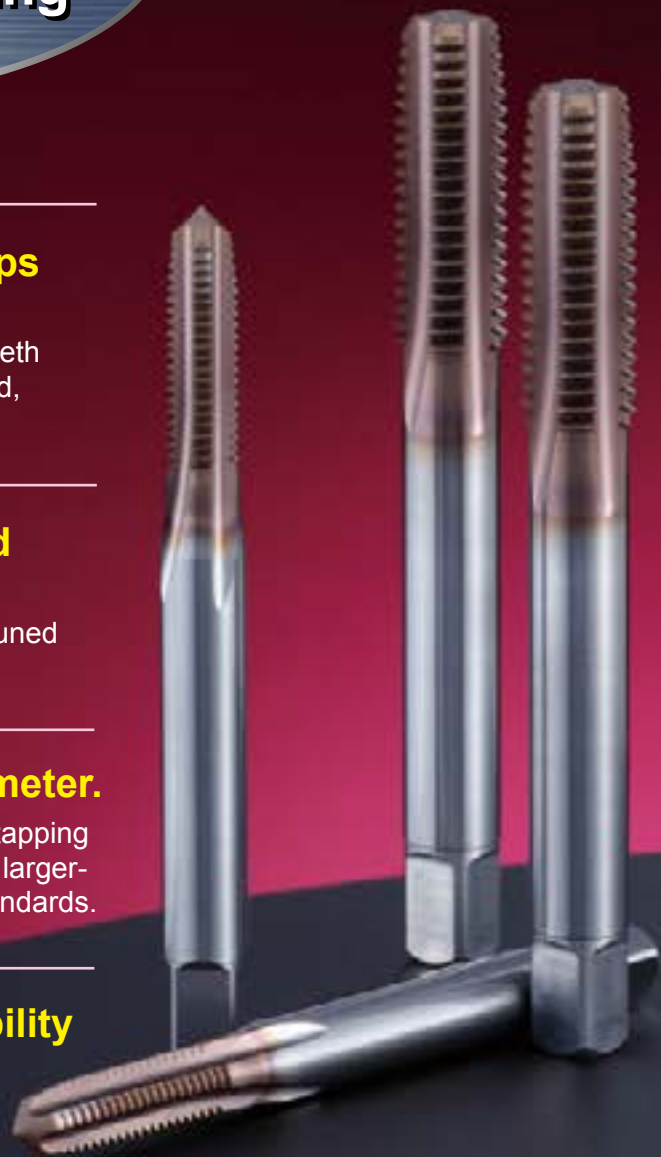
In order to withstand the severe conditions when tapping high-hardness steel, the taps are designed with a larger-diameter shank which is 1 size larger than JIS standards.

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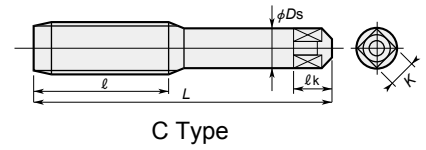
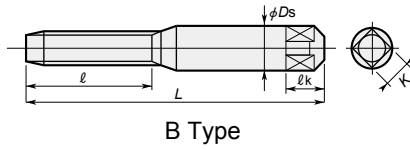
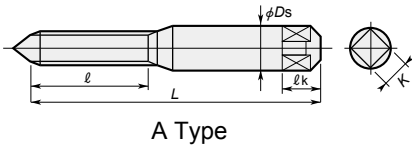
**Carbide substrate with high durability**

Durable carbide substrate with high resistance to breaking or chipping is used to minimize problems during machining.

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## Dimensions



## EHT-M-TH

Unit : mm

Item Code	Stocks	Size	Pitch <i>P</i>	Thread accuracy <i>d</i> <sub>2</sub> Tolerance zone(+)	No. of Threads	Thread Length <i>ℓ</i>	Overall Length <i>L</i>	Shank Dia. <i>D</i> <sub>s</sub>	Flutes	Type	<i>K</i>	<i>ℓ</i> <sub>k</sub>
EHT3-M3-0.5-TH	●	M3	0.5	55~40	3	11	46	5	4	A	4	7
EHT5-M3-0.5-TH	●				5							
EHT3-M4-0.7-TH	●	M4	0.7	60~40	3	13	52	5.5	4	A	4.5	7
EHT5-M4-0.7-TH	●				5							
EHT3-M5-0.8-TH	●	M5	0.8	60~40	3	16	60	6	4	A	4.5	7
EHT5-M5-0.8-TH	●				5							
EHT3-M6-1.0-TH	●	M6	1	60~40	3	19	62	6.2	4	B	5	8
EHT5-M6-1.0-TH	●				5							
EHT3-M8-1.25-TH	●	M8	1.25	80~60	3	22	70	7	4	C	5.5	8
EHT5-M8-1.25-TH	●				5							
EHT3-M10-1.5-TH	●	M10	1.5	80~60	3	24	75	8.5	4	C	6.5	9
EHT5-M10-1.5-TH	●				5							
EHT3-M12-1.75-TH	●	M12	1.75	80~60	3	30	82	10.5	4	C	8	11
EHT5-M12-1.75-TH	●				5							

*d*<sub>2</sub> tolerance zone : The pitch diameter tolerance to tap is shown from upper tolerance to lower tolerance by  $\mu$ m.

● : Stocked items.

※ Tap accuracy does not guarantee thread accuracy.

## Recommended cutting conditions

Work material	General criteria for cutting speed
Pre-hardened steel (35~45HRC)	3~6m/min
Hardened steel (45~50HRC)	2~4m/min

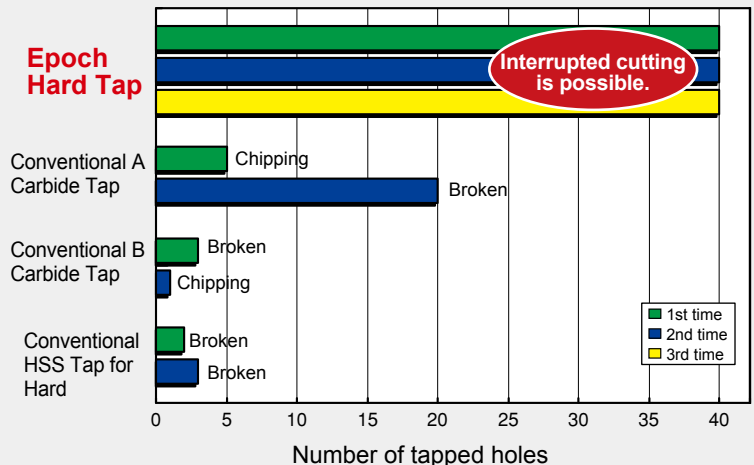
## Field data

### Performance comparison with products from conventional ~M8×P1.25~

#### Cutting condition

Work material : SKD61(42HRC)  
 Tool : M8×1.25  
 $n=160\text{min}^{-1}$  ( $v_c=4\text{m/min}$ )  
 $v_f=200\text{mm/min}$   
 Tap depth : 16mm  
 Pilot hole dia. : 6.9mm  
 (Pilot hole depth 20mm)  
 Coolant : Water-soluble

**Epoch Hard Tap enabled stable machining.**



# Epoch Hard Tap

## Features

## Reverse-rotation cutting tooth shape PAT.P



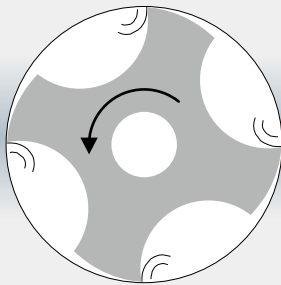
The majority of tap breakage or chipping occurs when the tap is reversely rotated.

During reverse rotation, not only is the direction of torque becomes reversed and loads placed on the tap, but also clogging of the teeth by chips is more likely, leading to breakage and chipping.

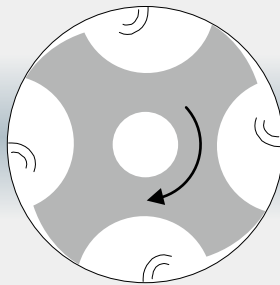
Epoch Hard Taps are equipped with reverse-rotation cutting tooth shape to reduce the load during reverse rotation and minimize tooth clogging by chips, enabling stable tapping.

**No tooth clogging by chips during reverse rotation, enabling stable machining.**

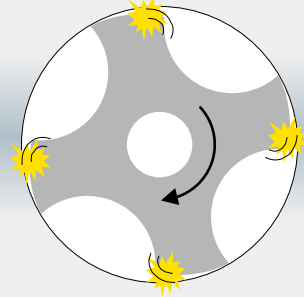
### Standard Tap



Forward rotation

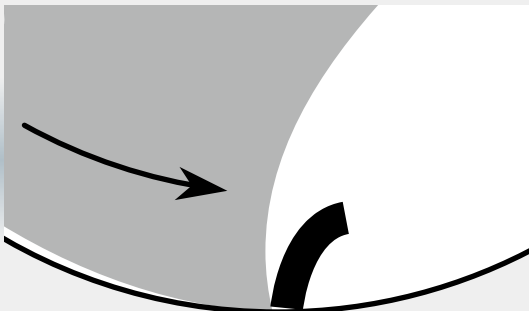


During reverse rotation, chips are left attached to the work.

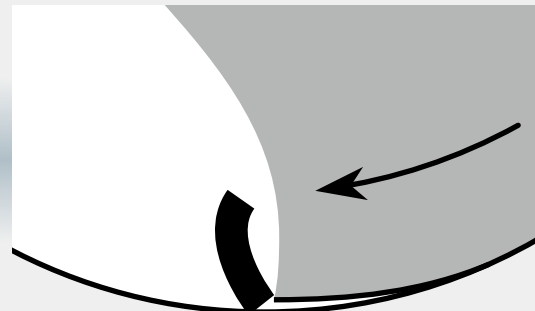


The attached chips clog the teeth and chipping occurs.

### Epoch Hard Tap



During forward rotation, chips are discharged.



Remaining chips are removed by the heel portion (reverse-rotation teeth).



## Recommended pilot-hole drills

	Tap (for Tapping)	Drill (for pilot-hole)
60HRC	Epoch Super Hard Tap	Epoch Hard Drill
50HRC		
40HRC	Epoch Hard Tap	
30HRC		Carbide Non Step Borer
20HRC		

## Size

For other sizes, refer to the drill catalog.

### Epoch Hard Drill (50HRC or more)

Item code	Stock	Size (mm)			
		Tool Dia.	Flute Length	Overall Length	Shank Dia.
EHSE2.6-TH	●	2.6	17	55	3
EHSE3.4-TH	●	3.4	24	60	4
EHSE3.5-TH	●	3.5	24	60	4
EHSE4.3-TH	●	4.3	29	63	5
EHSE4.4-TH	●	4.4	29	63	5
EHSE5.1-TH	●	5.1	34	72	6
EHSE5.2-TH	●	5.2	34	72	6

● : Stocked Items.

Item code	Stock	Size (mm)			
		Tool Dia.	Flute Length	Overall Length	Shank Dia.
EHSE6.9-TH	●	6.9	43	83	7
EHSE7.0-TH	●	7	43	83	7
EHSE8.6-TH	●	8.6	55	98	9
EHSE8.7-TH	●	8.7	55	98	9
EHSE10.4-TH	●	10.4	66	112	11
EHSE10.5-TH	●	10.5	66	112	11

### Carbide Non Step Borer (50HRC or less)

3D						4D					5D				
Tool Dia.	Item Code	Stock	Size (mm)			Item Code	Stock	Size (mm)			Item Code	Stock	Size (mm)		
			Flute Length	Overall Length	Shank Dia.			Flute Length	Overall Length	Shank Dia.			Flute Length	Overall Length	Shank Dia.
2.6						04WNSB0260-TH	●	19	50	3	05WHNSB0260-TH	●	29	79	3
3.4	03WHNSB0340-TH	●	23	73	4	04WNSB0340-TH	●	23	58	4	05WHNSB0340-TH	●	37	87	4
3.5	03WHNSB0350-TH	●	23	73	4	04WNSB0350-TH	●	23	58	4	05WHNSB0350-TH	●	37	87	4
4.3	03WHNSB0430-TH	●	29	82	5	04WNSB0430-TH	●	29	64	5	05WHNSB0430-TH	●	47	100	5
4.4	03WHNSB0440-TH	●	29	82	5	04WNSB0440-TH	●	29	64	5	05WHNSB0440-TH	●	47	100	5
5.1	03WHNSB0510-TH	●	29	82	6	04WNSB0510-TH	●	36	78	6	05WHNSB0510-TH	●	47	100	6
5.2	03WHNSB0520-TH	●	29	82	6	04WNSB0520-TH	●	36	78	6	05WHNSB0520-TH	●	47	100	6
6.9	03WHNSB0690-TH	●	34	89	7	04WNSB0690-TH	●	43	83	7	05WHNSB0690-TH	●	55	110	7
7	03WHNSB0700-TH	●	34	89	7	04WNSB0700-TH	●	43	83	7	05WHNSB0700-TH	●	55	110	7
8.6	03WHNSB0860-TH	●	44	101	9	04WNSB0860-TH	●	54	96	9	05WHNSB0860-TH	●	71	128	9
8.7	03WHNSB0870-TH	●	44	101	9	04WNSB0870-TH	●	54	96	9	05WHNSB0870-TH	●	71	128	9
10.4						04WNSB1040-TH	●	63	112	11					
10.5	03WHNSB1050-TH	●	54	117	11	04WNSB1050-TH	●	63	112	11	05WHNSB1050-TH	●	87	150	11

● : Stocked Items.



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

"Epoch", "*Hi-Pre<sup>2</sup>*" and "MOLDINO" are registered trademarks of Mitsubishi Hitachi Tool Engineering, Ltd. in Japan.

## **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) 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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