

Solid Carbide Drill

**MHE** Drill for Wheel Hubs



Unique design provides superior hole accuracy for shallow hole drilling.

**Effective drilling of hub bolt holes can be achieved.**

# Solid Carbide Drill

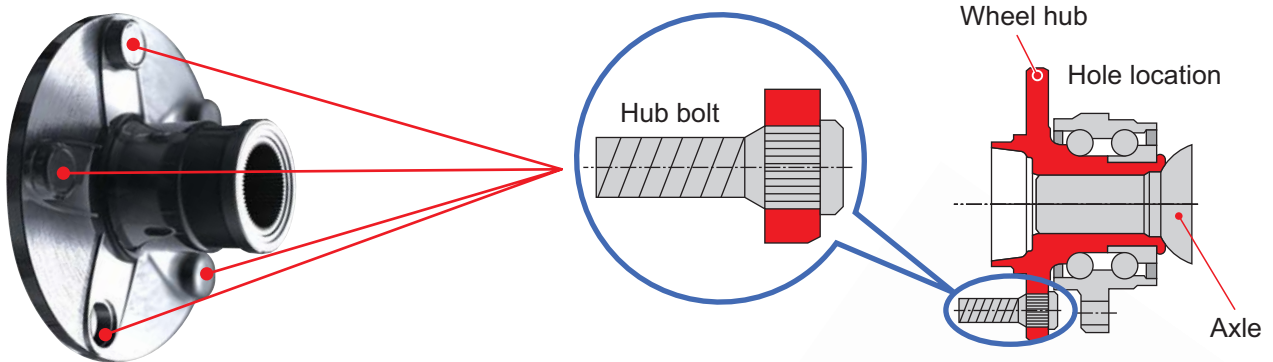
# MHE Drill for Wheel Hubs

## Outline

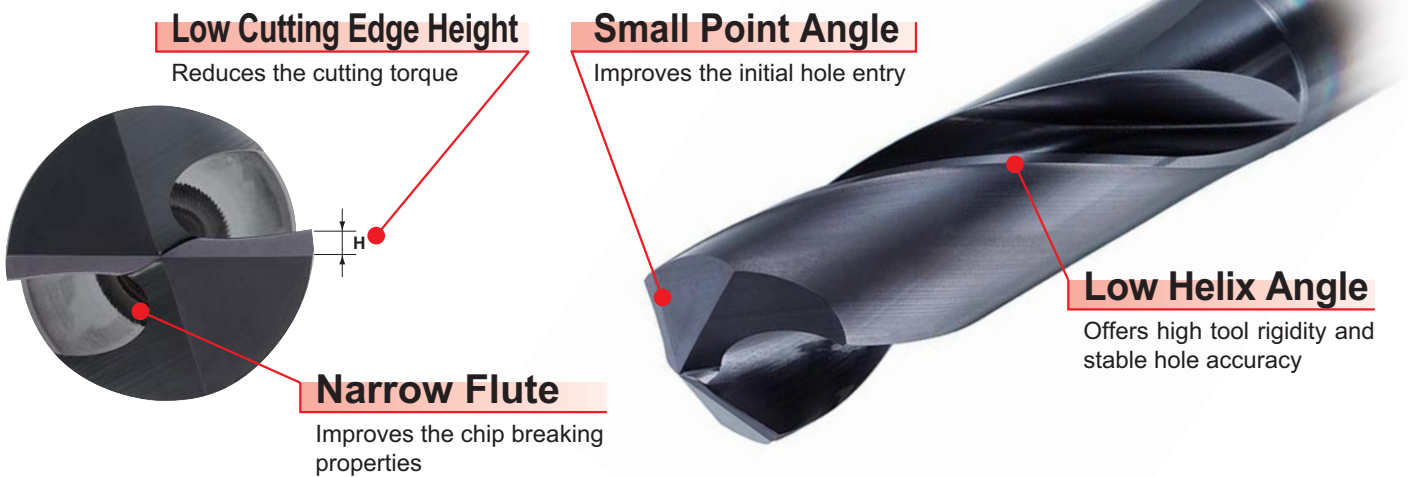
For machining of the bolt holes of hubs, general-purpose drills are widely used. However, these are not highly productive due to the following problems.

- Chips elongate and damage the periphery of drilled holes and lead to poor surface finishes.
- Plastic deformation can occur leading to a work hardened layer generating in the wall of the hole. This can result in a poor press fitting of the hub bolts.
- Due to poor surface finish, a reaming operation maybe required to finish the holes.

The MHE solid carbide drill overcomes the above problems as it exhibits excellent chip control and offers efficient, high precision drilling due to the use of low resistance cutting edges and low helix angle.



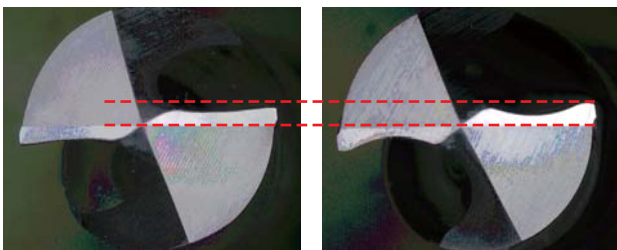
## Features



### Low Cutting Edge Height

**MHE Drill**

**WSTAR Drill**

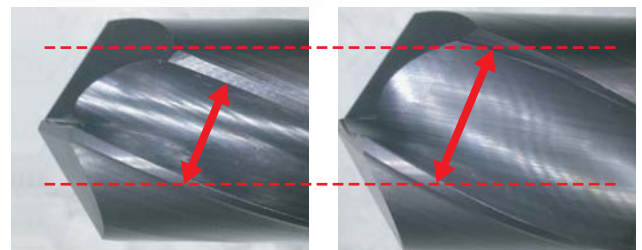


Reduces cutting torque

### Narrow Flute

**MHE Drill**

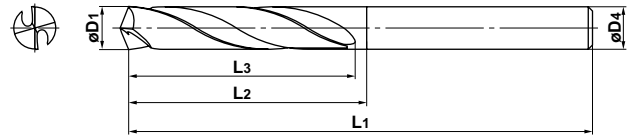
**WSTAR Drill**



Finely breaks up chips

# MHE Drill for Wheel Hubs

**Straight Type**



**Dimensions**

Drill Dia. D1 (mm)	Stock		Dimensions (mm)		
	VP15TF		L3	L1	L2
10.0–10.2	◇		43	87	43
10.2–10.5	◇		43	87	43
10.5–10.7	◇		43	87	43
10.7–11.0	◇		47	93	47
11.0–11.2	◇		47	93	47
11.2–11.5	◇		47	93	47
11.5–11.9	◇		47	93	47
11.9–12.0	◇		51	100	51
12.0–12.5	◇		51	100	51
12.5–13.0	◇		51	100	51

Drill Dia. D1 (mm)	Stock		Dimensions (mm)		
	VP15TF		L3	L1	L2
13.0–13.5	◇		54	104	54
13.5–14.0	◇		54	104	54
14.0–14.2	◇		56	104	56
14.2–14.5	◇		56	108	56
14.5–15.0	◇		56	108	56
15.0–15.5	◇		58	112	58
15.5–16.0	◇		58	112	58
16.0–16.5	◇		60	116	60
16.5–17.0	◇		60	116	60
17.0–17.5	◇		62	119	62
17.5–18.0	◇		62	119	62

◇ Made to order product.

**Product Range**

Drill dia. :  $\phi 10\text{--}\phi 18\text{mm}$

Drilling depth:  $L/D \leq 1$  (L: hole depth; D: drill dia.)

Dimensions : Flute length is less than 4 times the drill diameter; Shank length will be determined based on present standards.

Tool grade : VP15TF

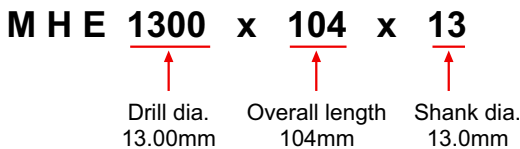
Note) Contact Mitsubishi Materials for any geometry that is not shown above (e.g. different diameters and flute lengths can be made to order).

**Order Number**

When placing an order clearly indicate the following information.

Drill dia. (D1), Overall length (L1), Shank dia. (D4)

Ex)

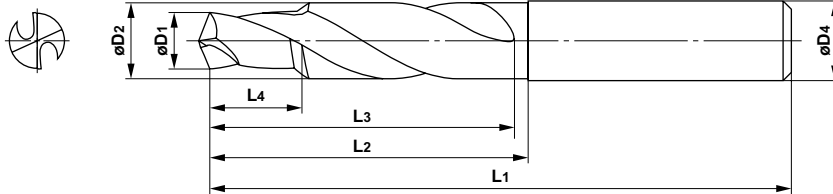


- The flute length will be determined by Mitsubishi Materials.
- Specify the hole diameter (including the hole tolerance) when placing an order.

**Notes When Regrinding and Recoating the Drill**

- When carrying out regrinding, it is necessary to recoat the drill to maintain tool life.
- When requesting regrinding and recoating of the drill, contact Mitsubishi Materials sales staff.

## Step Type



## Dimensions

Drill Dia. D1 (mm)	Stock	Dimensions (mm)					
	VP15TF	D2	L4	L3	L1	L2	D4
10	◇	16	15	50	100	50	16
11	◇	17	20	55	110	55	17
12	◇	18	20	55	110	55	18
13	◇	18	20	55	110	55	18
14	◇	18	20	55	110	55	18

◇ : Made to order product.

## Chamfer Diameter Reference Range

  : Applicable Range

Max. Chamfer Cutting Edge Dia. (mm)	Drill Dia. D1 (mm)	Chamfer Cutting Edge Dia. D2 (mm)								
		10	11	12	13	14	15	16	17	18
16	10									
17.6	11									
19.2	12									
20	13									
20	14									
20	15									
20	16									
20	17									

## Step Length Range

  : Applicable Range

Drill Dia. D1 (mm)	Step Length L4 (mm)				
	10	15	20	25	30
10					
11					
12					
13					
14					
15					
16					
17					

## Flute Length Range

  : Applicable Range

Drill Dia. D1 (mm)	Flute Length L3 (mm)				
	45	50	55	60	65
10					
11					
12					
13					
14					
15					
16					
17					

## Order Number

When placing an order clearly indicate the following information.

Drill dia. (D1), Chamfer dia. (D2), Overall length (L1),  
Shank dia. (D4)

Ex)

**M H E 1400 x 1800 x 110 x 18**

Drill dia. 14.00mm    Chamfer dia. 18.00mm    Overall length 110mm    Shank dia. 18.0mm

- The flute length will be determined by Mitsubishi Materials.
- Specify the hole diameter (including the hole tolerance) when placing an order.

- Notes
1. These products are made to order.
  2. Specify the hole diameter (including the hole tolerance) when placing an order.

## Product Range

Drill dia.    D1:  $\phi 10\text{--}\phi 18\text{mm}$

Chamfer dia.    D2:  $D2/D1 \leq 1.6$  and up to  $\phi 18\text{m}$

Overall length L1 : To be determined based on the straight type drill.

If the chamfer diameter is  $\phi 16\text{mm}$ , the maximum overall length is 112mm.

Shank dia.    D4: Same as the chamfer diameter up to  $\phi 16$ .

Increases in 0.5mm increments for the diameter larger than  $\phi 16$ .

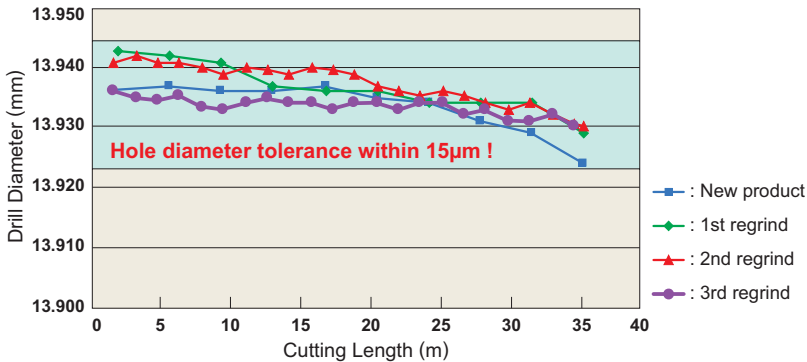
Tool grade    : VP15TF

## Notes When Regrinding and Recoating the Drill

- When carrying out regrinding, it is necessary to recoat the drill to maintain tool life.
- When requesting regrinding and recoating of the drill, contact Mitsubishi Materials sales staff.

# Cutting Performance

## Hole Accuracy



<Cutting Conditions>

Workpiece: JIS S53C    Cutting speed: 60m/min    Feed: 0.15mm/rev  
 Hole depth: 6mm    Coolant: W.S.O.

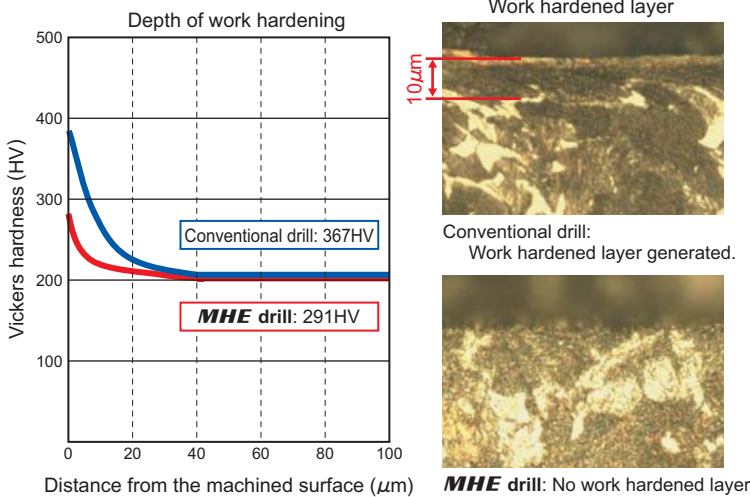
## Chip Geometry



Chip breaking properties  
 The workpiece surface is not damaged due to the fine chips that were generated.

## Result of Reducing the Cutting Torque

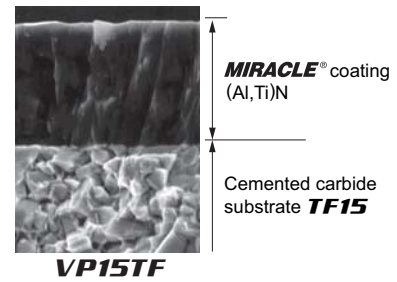
Prevents the generation of high cutting temperatures and the formation of the work hardened layer.



The **MHE** drill can prevent the formation of a work hardened layer (that usually cause tool damage), which makes it possible to produce high quality products.

## Tough Drill Tool Grade

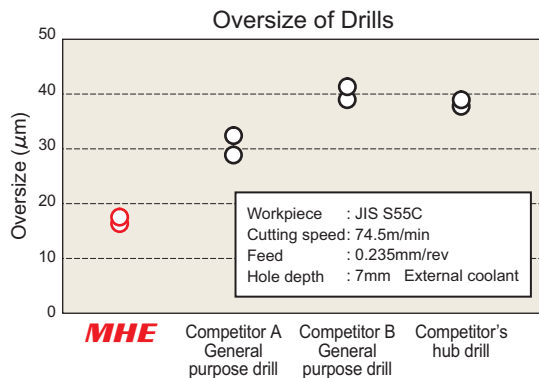
● Long tool life **MIRACLE**® coated **VP15TF**



**MIRACLE**® Coated  
 Features of **VP15TF**

**MIRACLE**® coated **VP15TF** has a high welding resistance, making it suitable for machining a wide range of workpiece materials from mild steels and carbon steels, through to stainless steels and cast iron.

## Oversize Comparison



Due to reduced oversize, the **MHE** drill can produce holes without reaming.

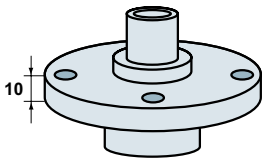
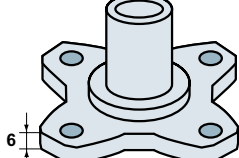

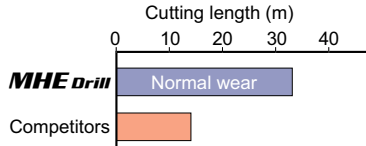
## Recommended Cutting Conditions

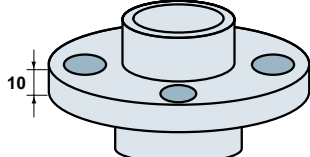
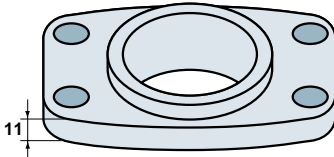

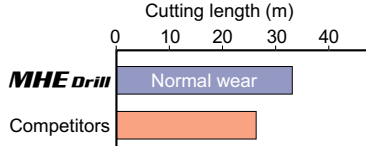
Work Material	Hardness	φ10.0—φ18.0	
		Cutting Speed (m/min)	Feed (mm/rev)
<b>P</b> Carbon Steel	180—280HB	75 (60—90)	0.25 (0.15—0.30)

(Note) The above cutting conditions should be used as a guide and need to be adjusted according to the machine rigidity, workpiece clamping and shape.

# MHE Drill for Wheel Hubs

## Application Examples

Tool		MHE 13.93 x 104 x 14	MHE 13.93 x 104 x 14
Workpiece		Carbon Steel (JIS S55C) 	Carbon Steel (JIS S55C) 
Component		Inner face of hub	Inner face of hub
Cutting Conditions	Cutting Speed (m/min)	80	60
	Feed (mm/rev)	0.3	0.15
	Revolution (min <sup>-1</sup> )	1,800	1,400
Coolant		W.S.O.	W.S.O.
Machine Type		Machining centre	Machining centre
Results			

Tool		MHE 16.10 x 110 x 16.1	MHE 10.8 x 93 x 10.8
Workpiece		Carbon Steel (JIS S55C) 	Carbon Steel (JIS S55C) 
Component		Inner face of hub	Outer face of hub
Cutting Conditions	Cutting Speed (m/min)	68	68
	Feed (mm/rev)	0.2	0.2
	Revolution (min <sup>-1</sup> )	1,350	2,000
Coolant		W.S.O.	W.S.O.
Machine Type		Machining centre	Machining centre
Results			

**For Your Safety**

●Don't handle inserts and chips without gloves. ●Please machine within the recommended application range and exchange expired tools with new ones in advance of breakage. ●Please use safety covers and wear safety glasses. ●When using compounded cutting oils, please take fire precautions. ●When using rotating tools, please make a trial run to check run-out, vibration and abnormal sounds etc. ●Grinding or heating of cutting tools produces dust and mist. Inhaling large amount of dust or contacting with eyes and skins may harm your body.

**MITSUBISHI MATERIALS CORPORATION**



The Scope of the Registration:  
Design, Development, and  
Production of Cemented  
Carbide Tools and Carbide  
Blanks



The Scope of the Registration:  
Design, Development and  
Production of Cutting Tools,  
Wear-resistant Tools, Rock  
Chilling Tools, Cemented  
Carbide Blanks and Coated  
Products



**MITSUBISHI MATERIALS CORPORATION**  
**Area Marketing & Operations Dept.**

KFC bldg., 8F, 1-6-1, Yokoami, Sumida-ku, Tokyo 130-0015, Japan  
TEL +81-3-5819-8772 FAX +81-3-5819-8774

**MMC HARTMETALL GmbH**

Comeniusstr.2, 40670, Meerbusch GERMANY  
TEL +49-2159-9189-0 FAX +49-2159-918966

**MITSUBISHI MATERIALS U.S.A. CORPORATION**  
**Headquarters**

17401, Eastman Street, Irvine, California, 92614, USA  
TEL +1-949-862-5100 FAX +1-949-862-5180

**MMC METAL SINGAPORE PTE LTD.**

10, Arumugam Road, #04-00 Lion Industrial Bldg., 409957, SINGAPORE  
TEL +65-6743-9370 FAX +65-6749-1469

**Mitsubishi Carbide Home page : <http://www.mitsubishicarbide.com>**  
(Tools specifications subject to change without notice.)