

Solid Carbide Drill for Die & Mould Machining

**WSTAR DRILL SERIES**

**MHS**

Drills for die & mould machining now included in the WSTAR range!

**Innovative drilling for hardened steel !**

**Eliminates the need for a heat treatment process.**

**Possible to machine high precision**

**deep holes for resin and**

**die casting moulds!**



- Drill sizes available in 0.5mm increments from  $\varnothing 3.0$  through to  $\varnothing 12.0$ .
- Short shank pilot drills also available in the respective diameter drills.
- Flute lengths have been designed for use with the various plates thicknesses used in the die & mould industry, available in lengths of 40, 60, 90, 120, 150, 200, 250 and 300mm.
- Shank diameters are even, possible to use in combination with milling holders.  
(Possible for use with shrink-fit holders and drill collets.)

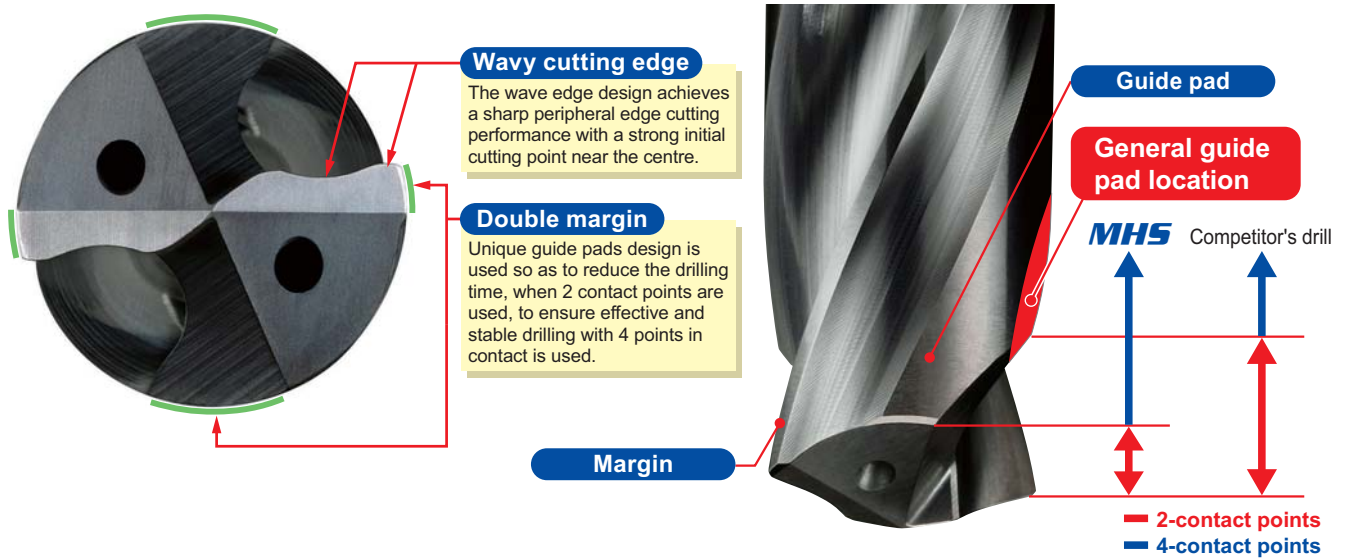
# Solid Carbide Drill for Die & Mould Machining

## WSTAR DRILL SERIES

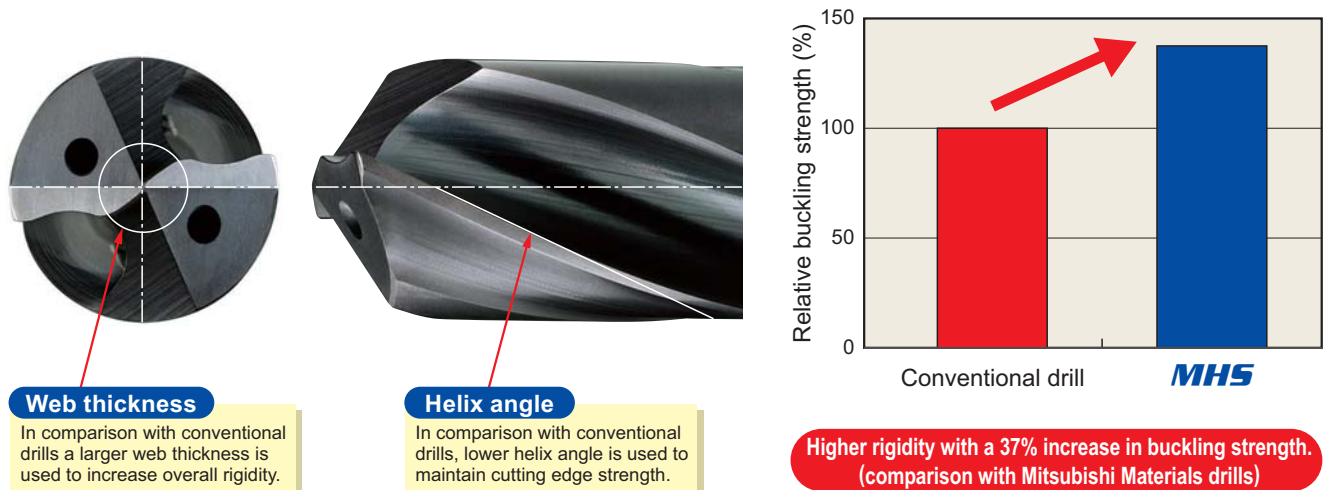
### MHS

#### Features

Stable machining can be obtained due to the unique cutting edge geometry & double margin flute

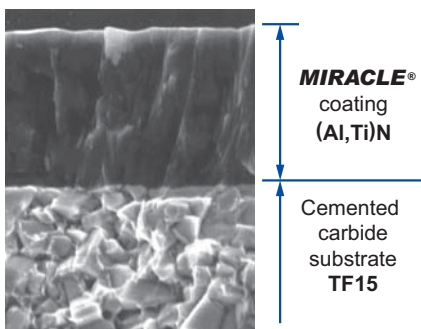


#### Strong geometry for stable machining of moulds



#### Tough drill tool grade

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



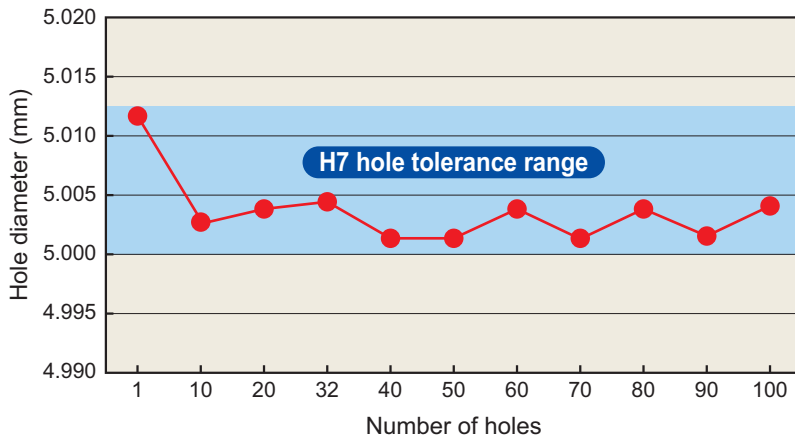
#### Features of **VP15TF**

Miracle coated VP15TF is suitable for the machining of 35–55HRC mould materials.

# Cutting Performance

## High precision (oversize) (48–50HRC)

● Unique geometry specially designed for die & mould machining provides superior hole accuracy!



<Cutting conditions>

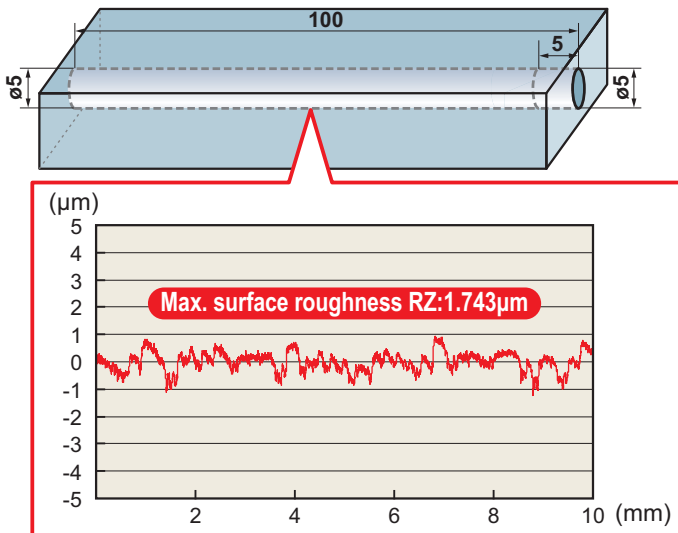
Workpiece : DH31S (Alloy tool steel)  
 Hardness : 48–50HRC  
 Drill : MHS0500L090B (ø5mm)  
 Hole depth : 70mm  
 Cutting speed : 20m/min  
 Feed : 0.15mm/rev (continuous)  
 Feed Rate : 191mm/min  
 Coolant : W.S.O.  
 Emission pressure : 2MPa (Internal coolant)  
 Machine : Machining centre

<Cutting conditions for pilot drilling>

Drill : MHS0500L020B (ø5mm)  
 Hole depth : 5mm  
 Cutting speed : 20m/min  
 Feed : 0.15mm/rev

## High precision (surface roughness) (48–50HRC)

● Unique geometry specially designed for die & mould machining allows for high quality holes!



<Cutting conditions>

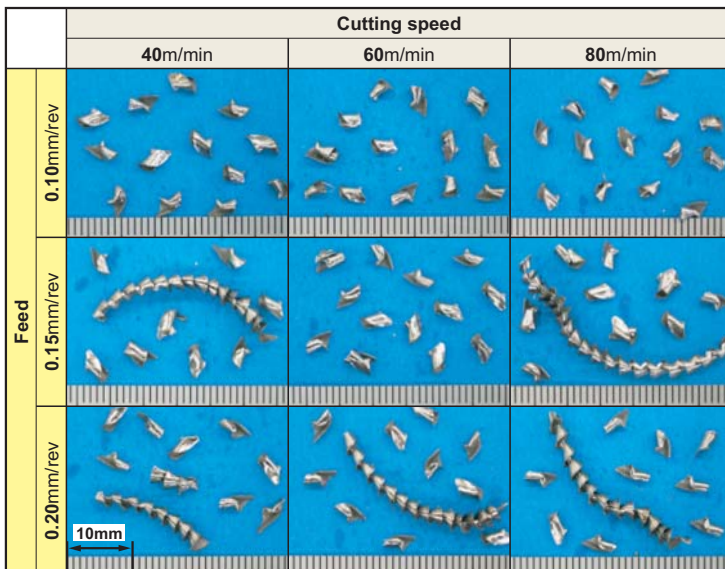
Workpiece : JIS SKD11  
 Hardness : 48–50HRC  
 Drill : MHS0500L120B (ø5mm)  
 Hole depth : 100mm (Through hole)  
 Cutting speed : 20m/min  
 Feed : 0.10mm/rev (continuous)  
 Feed Rate : 127mm/min  
 Coolant : W.S.O.  
 Emission pressure : 2MPa (Internal coolant)  
 Machine : Machining centre

<Cutting conditions for pilot drilling>

Drill : MHS0500L020B (ø5mm)  
 Hole depth : 5mm  
 Cutting speed : 20m/min  
 Feed : 0.10mm/rev

## High efficiency drilling (continuous feed) (40HRC)

● Unique geometry specially designed for die & mould machining offers high efficiency deep drilling!



<Cutting conditions>

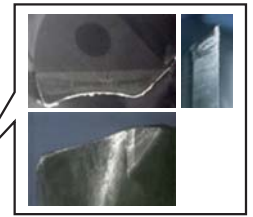
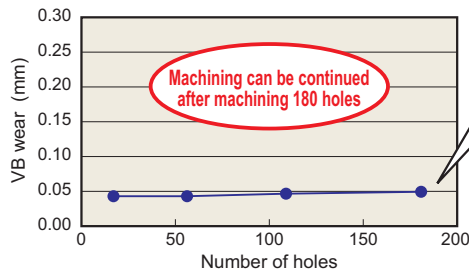
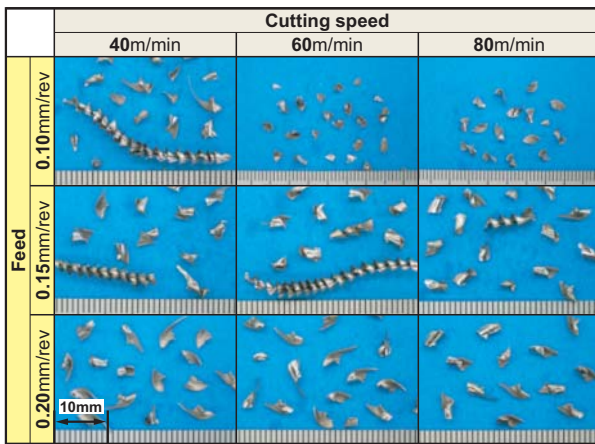
Workpiece : CENA1 (Plastic mould steel)  
 Hardness : 40HRC  
 Drill : MHS0600L150B (ø6mm)  
 Hole depth : 115mm  
 Cutting speed : 60m/min  
 Feed : 0.15mm/rev (continuous)  
 Feed Rate : 477mm/min  
 Coolant : W.S.O.  
 Emission pressure : 2MPa (Internal coolant)  
 Machine : Machining centre

<Cutting conditions for pilot drilling>

Drill : MHS0600L030B (ø6mm)  
 Hole depth : 6mm  
 Cutting speed : 60m/min  
 Feed : 0.15mm/rev

## Cutting performance for different workpieces

### STAVAX (33HRC)

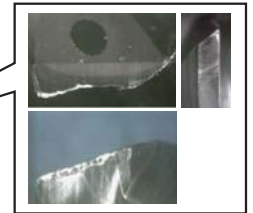
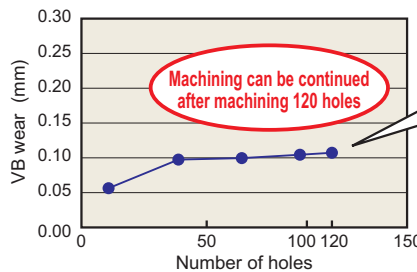
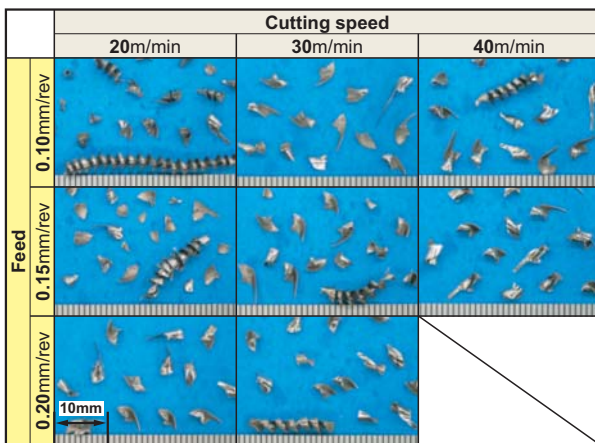


<Cutting conditions>  
 Workpiece : STAVAX (Chromium-alloy stainless steel)  
 Hardness : 33HRC  
 Drill : MHS0600L150B (ø6mm)  
 Hole depth : 115mm (Through hole)  
 Coolant : W.S.O.  
 Emission pressure : 2MPa (Internal coolant)

<Cutting conditions>  
 Cutting speed : 40m/min  
 Feed : 0.15mm/rev (continuous)  
 Feed Rate : 318mm/min

<Cutting conditions for pilot drilling>  
 Drill : MHS0600L030B (ø6mm)  
 Hole depth : 6mm  
 Cutting speed : 40m/min  
 Feed : 0.15mm/rev

### DAC55 (45HRC)



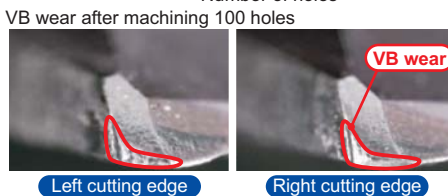
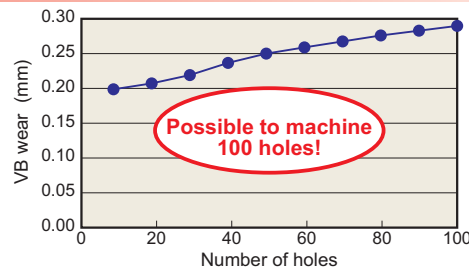
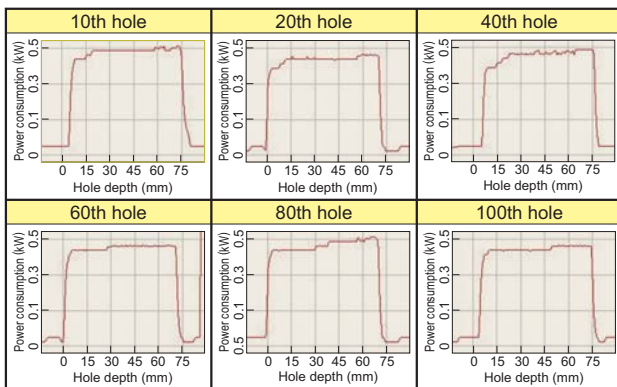
<Cutting conditions>  
 Workpiece : DAC55 (Die-cast mould steel)  
 Hardness : 45HRC  
 Drill : MHS0600L150B (ø6mm)  
 Hole depth : 115mm  
 Coolant : W.S.O.  
 Emission pressure : 2MPa (Internal coolant)

<Cutting conditions>  
 Cutting speed : 30m/min  
 Feed : 0.10mm/rev (continuous)  
 Feed Rate : 159mm/min

<Cutting conditions for pilot drilling>  
 Drill : MHS0600L030B (ø6mm)  
 Hole depth : 6mm  
 Cutting speed : 30m/min  
 Feed : 0.1mm/rev

### DH31S (50HRC)

#### Change in power consumption

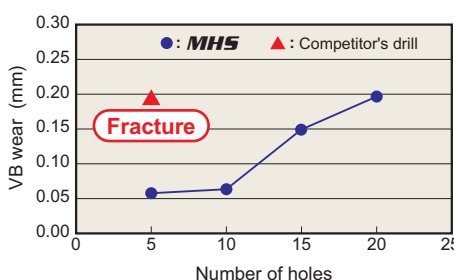


<Cutting conditions>  
 Workpiece : DH31S (Alloy tool steel)  
 Hardness : 50HRC  
 Drill : MHS0500L090B (ø5mm)  
 Hole depth : 70mm  
 Cutting speed : 20m/min  
 Feed : 0.15mm/rev (continuous)  
 Feed Rate : 191mm/min  
 Coolant : W.S.O.  
 Emission pressure : 2MPa (Internal coolant)  
 Machine : Machining centre

<Cutting conditions for pilot drilling>  
 Drill : MHS0500L020B (ø5mm)  
 Hole depth : 5mm  
 Cutting speed : 20m/min  
 Feed : 0.15mm/rev

### SKD11 (55HRC)

#### Cutting edges after machining 5 holes

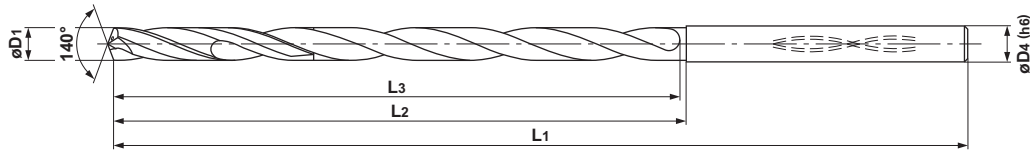


<Cutting conditions>  
 Workpiece : JIS SKD11  
 Hardness : 55HRC  
 Drill : MHS0600L120B (ø6mm)  
 Hole depth : 95mm  
 Cutting speed : 20m/min  
 Feed : 0.05mm/rev (continuous)  
 Feed Rate : 53mm/min  
 Coolant : W.S.O.  
 Emission pressure : 2MPa (Internal coolant)  
 Machine : Machining centre

<Cutting conditions for pilot drilling>  
 Drill : MHS0600L030B (ø6mm)  
 Hole depth : 6mm  
 Cutting speed : 20m/min  
 Feed : 0.05mm/rev

# MHS

## WSTAR DRILL SERIES



D1	3.0≤D1≤6.0	6.0<D1≤10.0	10.0<D1≤12.0
Tolerance (mm)	+0.010 -0.002	+0.010 -0.005	+0.010 -0.008

Note 1) MHS type can be used for shrink fit holders.  
 Note 2) Use the shortest type in the respective diameter as a pilot drill.

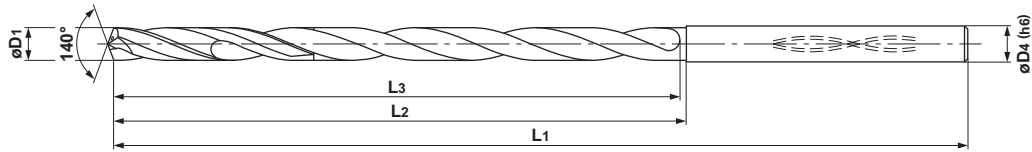
Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant	Stock VP15TF	Order Number	Dimensions (mm)			
					L3	L2	L1	D4
3.0	4	Int.	●	MHS0300L020B	19.0	20	70	4.0
	10	Int.	●	0300L040B	39.0	40	90	4.0
	17	Int.	●	0300L060B	59.0	60	110	4.0
	27	Int.	●	0300L090B	89.0	90	140	4.0
3.1	4	Int.	□	0310L020B	19.5	20	70	4.0
	10	Int.	□	0310L040B	39.5	40	90	4.0
	17	Int.	□	0310L060B	59.5	60	110	4.0
3.2	4	Int.	□	0320L020B	19.5	20	70	4.0
	10	Int.	□	0320L040B	39.5	40	90	4.0
	16	Int.	□	0320L060B	59.5	60	110	4.0
3.3	3	Int.	□	0330L020B	19.5	20	70	4.0
	9	Int.	□	0330L040B	39.5	40	90	4.0
	16	Int.	□	0330L060B	59.5	60	110	4.0
3.4	3	Int.	□	0340L020B	19.5	20	70	4.0
	9	Int.	□	0340L040B	39.5	40	90	4.0
	15	Int.	□	0340L060B	59.5	60	110	4.0
	24	Int.	□	0340L090B	89.5	90	140	4.0
3.5	3	Int.	●	0350L020B	19.5	20	70	4.0
	9	Int.	●	0350L040B	39.5	40	90	4.0
	14	Int.	●	0350L060B	59.5	60	110	4.0
	23	Int.	●	0350L090B	89.5	90	140	4.0
3.6	3	Int.	□	0360L020B	20.0	20	70	4.0
	9	Int.	□	0360L040B	40.0	40	90	4.0
	14	Int.	□	0360L060B	60.0	60	110	4.0
	22	Int.	□	0360L090B	90.0	90	140	4.0
3.7	3	Int.	□	0370L020B	20.0	20	70	4.0
	8	Int.	□	0370L040B	40.0	40	90	4.0
	14	Int.	□	0370L060B	60.0	60	110	4.0
	22	Int.	□	0370L090B	90.0	90	140	4.0
3.8	3	Int.	□	0380L020B	20.0	20	70	4.0
	8	Int.	□	0380L040B	40.0	40	90	4.0
	13	Int.	□	0380L060B	60.0	60	110	4.0
	21	Int.	□	0380L090B	90.0	90	140	4.0
3.9	3	Int.	□	0390L020B	20.0	20	70	4.0
	8	Int.	□	0390L040B	40.0	40	90	4.0
	13	Int.	□	0390L060B	60.0	60	110	4.0
	21	Int.	□	0390L090B	90.0	90	140	4.0
4.0	2	Int.	●	0400L020B	20.0	20	70	4.0
	7	Int.	●	0400L040B	40.0	40	90	4.0
	12	Int.	●	0400L060B	60.0	60	110	4.0
	20	Int.	●	0400L090B	90.0	90	140	4.0

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant	Stock VP15TF	Order Number	Dimensions (mm)			
					L3	L2	L1	D4
4.1	2	Int.	□	MHS0410L020B	18.5	20	70	6.0
	7	Int.	□	0410L040B	38.5	40	90	6.0
	12	Int.	□	0410L060B	58.5	60	110	6.0
	19	Int.	□	0410L090B	88.5	90	140	6.0
	26	Int.	□	0410L120B	118.5	120	170	6.0
4.2	2	Int.	□	0420L020B	18.5	20	70	6.0
	7	Int.	□	0420L040B	38.5	40	90	6.0
	11	Int.	□	0420L060B	58.5	60	110	6.0
	19	Int.	□	0420L090B	88.5	90	140	6.0
4.3	2	Int.	□	0430L020B	18.5	20	70	6.0
	6	Int.	□	0430L040B	38.5	40	90	6.0
	11	Int.	□	0430L060B	58.5	60	110	6.0
	18	Int.	□	0430L090B	88.5	90	140	6.0
4.4	2	Int.	□	0440L020B	18.5	20	70	6.0
	6	Int.	□	0440L040B	38.5	40	90	6.0
	11	Int.	□	0440L060B	58.5	60	110	6.0
	18	Int.	□	0440L090B	88.5	90	140	6.0
4.5	2	Int.	●	0450L020B	18.5	20	70	6.0
	6	Int.	●	0450L040B	38.5	40	90	6.0
	10	Int.	●	0450L060B	58.5	60	110	6.0
	17	Int.	●	0450L090B	88.5	90	140	6.0
4.6	2	Int.	□	0460L020B	19.0	20	70	6.0
	6	Int.	□	0460L040B	39.0	40	90	6.0
	10	Int.	□	0460L060B	59.0	60	110	6.0
	17	Int.	□	0460L090B	89.0	90	140	6.0
4.7	2	Int.	□	0470L020B	19.0	20	70	6.0
	6	Int.	□	0470L040B	39.0	40	90	6.0
	10	Int.	□	0470L060B	59.0	60	110	6.0
	16	Int.	□	0470L090B	89.0	90	140	6.0
4.8	1	Int.	□	0480L020B	19.0	20	70	6.0
	6	Int.	□	0480L040B	39.0	40	90	6.0
	10	Int.	□	0480L060B	59.0	60	110	6.0
	16	Int.	□	0480L090B	89.0	90	140	6.0
4.9	1	Int.	□	0490L020B	19.0	20	70	6.0
	5	Int.	□	0490L040B	39.0	40	90	6.0
	10	Int.	□	0490L060B	59.0	60	110	6.0
	16	Int.	□	0490L090B	89.0	90	140	6.0

Note) Please contact Mitsubishi Carbide for any geometry that is not in the brochure (e.g. different diameter and length).

# Solid Carbide Drill for Die & Mould Machining

## MHS WSTAR DRILL SERIES



D1	3.0≤D1≤6.0	6.0<D1≤10.0	10.0<D1≤12.0
Tolerance (mm)	+0.010 -0.002	+0.010 -0.005	+0.010 -0.008

Note 1) MHS type can be used for shrink fit holders.  
Note 2) Use the shortest type in the respective diameter as a pilot drill.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant	Stock VP15TF	Order Number	Dimensions (mm)			
					L3	L2	L1	D4
5.0	1	Int.	●	MHS0500L020B	19.0	20	70	6.0
	5	Int.	●	0500L040B	39.0	40	90	6.0
	9	Int.	●	0500L060B	59.0	60	110	6.0
	15	Int.	●	0500L090B	89.0	90	140	6.0
	21	Int.	●	0500L120B	119.0	120	170	6.0
	27	Int.	●	0500L150B	149.0	150	200	6.0
5.1	3	Int.	□	0510L030B	29.5	30	80	6.0
	9	Int.	□	0510L060B	59.5	60	110	6.0
	15	Int.	□	0510L090B	89.5	90	140	6.0
	21	Int.	□	0510L120B	119.5	120	170	6.0
	27	Int.	□	0510L150B	149.5	150	200	6.0
5.2	3	Int.	□	0520L030B	29.5	30	80	6.0
	9	Int.	□	0520L060B	59.5	60	110	6.0
	15	Int.	□	0520L090B	89.5	90	140	6.0
	20	Int.	□	0520L120B	119.5	120	170	6.0
	26	Int.	□	0520L150B	149.5	150	200	6.0
	5.3	3	Int.	□	0530L030B	29.5	30	80
9		Int.	□	0530L060B	59.5	60	110	6.0
14		Int.	□	0530L090B	89.5	90	140	6.0
20		Int.	□	0530L120B	119.5	120	170	6.0
26		Int.	□	0530L150B	149.5	150	200	6.0
5.4		3	Int.	□	0540L030B	29.5	30	80
	9	Int.	□	0540L060B	59.5	60	110	6.0
	14	Int.	□	0540L090B	89.5	90	140	6.0
	20	Int.	□	0540L120B	119.5	120	170	6.0
	25	Int.	□	0540L150B	149.5	150	200	6.0
5.5	3	Int.	●	0550L030B	29.5	30	80	6.0
	8	Int.	●	0550L060B	59.5	60	110	6.0
	14	Int.	●	0550L090B	89.5	90	140	6.0
	19	Int.	●	0550L120B	119.5	120	170	6.0
	25	Int.	●	0550L150B	149.5	150	200	6.0
5.6	3	Int.	□	0560L030B	30.0	30	80	6.0
	8	Int.	□	0560L060B	60.0	60	110	6.0
	14	Int.	□	0560L090B	90.0	90	140	6.0
	19	Int.	□	0560L120B	120.0	120	170	6.0
	24	Int.	□	0560L150B	150.0	150	200	6.0
5.7	3	Int.	□	0570L030B	30.0	30	80	6.0
	8	Int.	□	0570L060B	60.0	60	110	6.0
	13	Int.	□	0570L090B	90.0	90	140	6.0
	19	Int.	□	0570L120B	120.0	120	170	6.0
	24	Int.	□	0570L150B	150.0	150	200	6.0
5.8	3	Int.	□	0580L030B	30.0	30	80	6.0
	8	Int.	□	0580L060B	60.0	60	110	6.0
	13	Int.	□	0580L090B	90.0	90	140	6.0
	18	Int.	□	0580L120B	120.0	120	170	6.0
	23	Int.	□	0580L150B	150.0	150	200	6.0
5.9	3	Int.	□	0590L030B	30.0	30	80	6.0
	8	Int.	□	0590L060B	60.0	60	110	6.0
	13	Int.	□	0590L090B	90.0	90	140	6.0
	18	Int.	□	0590L120B	120.0	120	170	6.0
	23	Int.	□	0590L150B	150.0	150	200	6.0

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant	Stock VP15TF	Order Number	Dimensions (mm)			
					L3	L2	L1	D4
6.0	2	Int.	●	MHS0600L030B	30.0	30	80	6.0
	7	Int.	●	0600L060B	60.0	60	110	6.0
	12	Int.	●	0600L090B	90.0	90	140	6.0
	17	Int.	●	0600L120B	120.0	120	170	6.0
	22	Int.	●	0600L150B	150.0	150	200	6.0
6.1	2	Int.	□	0610L030B	28.5	30	80	8.0
	7	Int.	□	0610L060B	58.5	60	110	8.0
	12	Int.	□	0610L090B	88.5	90	140	8.0
	17	Int.	□	0610L120B	118.5	120	170	8.0
	22	Int.	□	0610L150B	148.5	150	200	8.0
6.2	2	Int.	□	0620L030B	28.5	30	80	8.0
	7	Int.	□	0620L060B	58.5	60	110	8.0
	12	Int.	□	0620L090B	88.5	90	140	8.0
	17	Int.	□	0620L120B	118.5	120	170	8.0
	21	Int.	□	0620L150B	148.5	150	200	8.0
6.3	2	Int.	□	0630L030B	28.5	30	80	8.0
	7	Int.	□	0630L060B	58.5	60	110	8.0
	12	Int.	□	0630L090B	88.5	90	140	8.0
	16	Int.	□	0630L120B	118.5	120	170	8.0
	21	Int.	□	0630L150B	148.5	150	200	8.0
6.4	2	Int.	□	0640L030B	28.5	30	80	8.0
	7	Int.	□	0640L060B	58.5	60	110	8.0
	11	Int.	□	0640L090B	88.5	90	140	8.0
	16	Int.	□	0640L120B	118.5	120	170	8.0
	21	Int.	□	0640L150B	148.5	150	200	8.0
6.5	2	Int.	●	0650L030B	28.5	30	80	8.0
	6	Int.	●	0650L060B	58.5	60	110	8.0
	11	Int.	●	0650L090B	88.5	90	140	8.0
	16	Int.	●	0650L120B	118.5	120	170	8.0
	20	Int.	●	0650L150B	148.5	150	200	8.0
6.6	2	Int.	□	0660L030B	29.0	30	80	8.0
	6	Int.	□	0660L060B	59.0	60	110	8.0
	11	Int.	□	0660L090B	89.0	90	140	8.0
	16	Int.	□	0660L120B	119.0	120	170	8.0
	20	Int.	□	0660L150B	149.0	150	200	8.0
	28	Int.	□	0660L200B	199.0	200	250	8.0
6.7	2	Int.	□	0670L030B	29.0	30	80	8.0
	6	Int.	□	0670L060B	59.0	60	110	8.0
	11	Int.	□	0670L090B	89.0	90	140	8.0
	15	Int.	□	0670L120B	119.0	120	170	8.0
	20	Int.	□	0670L150B	149.0	150	200	8.0
	27	Int.	□	0670L200B	199.0	200	250	8.0
6.8	2	Int.	□	0680L030B	29.0	30	80	8.0
	6	Int.	□	0680L060B	59.0	60	110	8.0
	11	Int.	□	0680L090B	89.0	90	140	8.0
	15	Int.	□	0680L120B	119.0	120	170	8.0
	19	Int.	□	0680L150B	149.0	150	200	8.0
27	Int.	□	0680L200B	199.0	200	250	8.0	

Note) Please contact Mitsubishi Carbide for any geometry that is not in the brochure (e.g. different diameter and length).

● : Inventory maintained. □ : Non stock, produced to order only.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant	Stock VP15TF	Order Number	Dimensions (mm)			
					L3	L2	L1	D4
6.9	2	Int.	□	MHS0690L030B	29.0	30	80	8.0
	6	Int.	□	0690L060B	59.0	60	110	8.0
	10	Int.	□	0690L090B	89.0	90	140	8.0
	15	Int.	□	0690L120B	119.0	120	170	8.0
	19	Int.	□	0690L150B	149.0	150	200	8.0
	26	Int.	□	0690L200B	199.0	200	250	8.0
7.0	2	Int.	●	0700L030B	29.0	30	80	8.0
	6	Int.	●	0700L060B	59.0	60	110	8.0
	10	Int.	●	0700L090B	89.0	90	140	8.0
	14	Int.	●	0700L120B	119.0	120	170	8.0
	19	Int.	●	0700L150B	149.0	150	200	8.0
	26	Int.	●	0700L200B	199.0	200	250	8.0
7.1	2	Int.	□	0710L030B	29.5	30	80	8.0
	6	Int.	□	0710L060B	59.5	60	110	8.0
	10	Int.	□	0710L090B	89.5	90	140	8.0
	14	Int.	□	0710L120B	119.5	120	170	8.0
	19	Int.	□	0710L150B	149.5	150	200	8.0
	26	Int.	□	0710L200B	199.5	200	250	8.0
7.2	2	Int.	□	0720L030B	29.5	30	80	8.0
	6	Int.	□	0720L060B	59.5	60	110	8.0
	10	Int.	□	0720L090B	89.5	90	140	8.0
	14	Int.	□	0720L120B	119.5	120	170	8.0
	18	Int.	□	0720L150B	149.5	150	200	8.0
	25	Int.	□	0720L200B	199.5	200	250	8.0
7.3	2	Int.	□	0730L030B	29.5	30	80	8.0
	6	Int.	□	0730L060B	59.5	60	110	8.0
	10	Int.	□	0730L090B	89.5	90	140	8.0
	14	Int.	□	0730L120B	119.5	120	170	8.0
	18	Int.	□	0730L150B	149.5	150	200	8.0
	25	Int.	□	0730L200B	199.5	200	250	8.0
7.4	1	Int.	□	0740L030B	29.5	30	80	8.0
	6	Int.	□	0740L060B	59.5	60	110	8.0
	10	Int.	□	0740L090B	89.5	90	140	8.0
	14	Int.	□	0740L120B	119.5	120	170	8.0
	18	Int.	□	0740L150B	149.5	150	200	8.0
	24	Int.	□	0740L200B	199.5	200	250	8.0
7.5	1	Int.	●	0750L030B	29.5	30	80	8.0
	5	Int.	●	0750L060B	59.5	60	110	8.0
	9	Int.	●	0750L090B	89.5	90	140	8.0
	13	Int.	●	0750L120B	119.5	120	170	8.0
	17	Int.	●	0750L150B	149.5	150	200	8.0
	24	Int.	●	0750L200B	199.5	200	250	8.0
7.6	1	Int.	□	0760L030B	30.0	30	80	8.0
	5	Int.	□	0760L060B	60.0	60	110	8.0
	9	Int.	□	0760L090B	90.0	90	140	8.0
	13	Int.	□	0760L120B	120.0	120	170	8.0
	17	Int.	□	0760L150B	150.0	150	200	8.0
	24	Int.	□	0760L200B	200.0	200	250	8.0
7.7	1	Int.	□	0770L030B	30.0	30	80	8.0
	5	Int.	□	0770L060B	60.0	60	110	8.0
	9	Int.	□	0770L090B	90.0	90	140	8.0
	13	Int.	□	0770L120B	120.0	120	170	8.0
	17	Int.	□	0770L150B	150.0	150	200	8.0
	23	Int.	□	0770L200B	200.0	200	250	8.0
7.8	1	Int.	□	0780L030B	30.0	30	80	8.0
	5	Int.	□	0780L060B	60.0	60	110	8.0
	9	Int.	□	0780L090B	90.0	90	140	8.0
	13	Int.	□	0780L120B	120.0	120	170	8.0
	17	Int.	□	0780L150B	150.0	150	200	8.0
	23	Int.	□	0780L200B	200.0	200	250	8.0
7.9	1	Int.	□	0790L030B	30.0	30	80	8.0
	5	Int.	□	0790L060B	60.0	60	110	8.0
	9	Int.	□	0790L090B	90.0	90	140	8.0
	13	Int.	□	0790L120B	120.0	120	170	8.0
	16	Int.	□	0790L150B	150.0	150	200	8.0
	23	Int.	□	0790L200B	200.0	200	250	8.0
29	Int.	□	0790L250B	250.0	250	300	8.0	

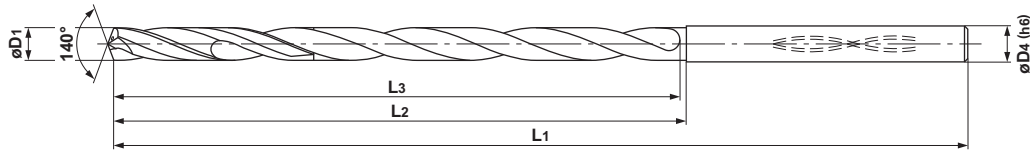
Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant	Stock VP15TF	Order Number	Dimensions (mm)				
					L3	L2	L1	D4	
8.0	1	Int.	●	MHS0800L030B	30.0	30	80	8.0	
	5	Int.	●	0800L060B	60.0	60	110	8.0	
	9	Int.	●	0800L090B	90.0	90	140	8.0	
	12	Int.	●	0800L120B	120.0	120	170	8.0	
	16	Int.	●	0800L150B	150.0	150	200	8.0	
	22	Int.	●	0800L200B	200.0	200	250	8.0	
	29	Int.	●	0800L250B	250.0	250	300	8.0	
	8.1	2	Int.	□	0810L040B	38.5	40	100	10.0
8		Int.	□	0810L090B	88.5	90	150	10.0	
12		Int.	□	0810L120B	118.5	120	180	10.0	
16		Int.	□	0810L150B	148.5	150	210	10.0	
22		Int.	□	0810L200B	198.5	200	260	10.0	
28		Int.	□	0810L250B	248.5	250	310	10.0	
8.2		2	Int.	□	0820L040B	38.5	40	100	10.0
		8	Int.	□	0820L090B	88.5	90	150	10.0
	12	Int.	□	0820L120B	118.5	120	180	10.0	
	16	Int.	□	0820L150B	148.5	150	210	10.0	
	22	Int.	□	0820L200B	198.5	200	260	10.0	
	28	Int.	□	0820L250B	248.5	250	310	10.0	
	8.3	2	Int.	□	0830L040B	38.5	40	100	10.0
		8	Int.	□	0830L090B	88.5	90	150	10.0
12		Int.	□	0830L120B	118.5	120	180	10.0	
15		Int.	□	0830L150B	148.5	150	210	10.0	
21		Int.	□	0830L200B	198.5	200	260	10.0	
27		Int.	□	0830L250B	248.5	250	310	10.0	
8.4		2	Int.	□	0840L040B	38.5	40	100	10.0
		8	Int.	□	0840L090B	88.5	90	150	10.0
	12	Int.	□	0840L120B	118.5	120	180	10.0	
	15	Int.	□	0840L150B	148.5	150	210	10.0	
	21	Int.	□	0840L200B	198.5	200	260	10.0	
	27	Int.	□	0840L250B	248.5	250	310	10.0	
	8.5	2	Int.	●	0850L040B	38.5	40	100	10.0
		8	Int.	●	0850L090B	88.5	90	150	10.0
11		Int.	●	0850L120B	118.5	120	180	10.0	
15		Int.	●	0850L150B	148.5	150	210	10.0	
21		Int.	●	0850L200B	198.5	200	260	10.0	
27		Int.	●	0850L250B	248.5	250	310	10.0	
8.6		2	Int.	□	0860L040B	39.0	40	100	10.0
		8	Int.	□	0860L090B	89.0	90	150	10.0
	11	Int.	□	0860L120B	119.0	120	180	10.0	
	15	Int.	□	0860L150B	149.0	150	210	10.0	
	21	Int.	□	0860L200B	199.0	200	260	10.0	
	26	Int.	□	0860L250B	249.0	250	310	10.0	
	8.7	2	Int.	□	0870L040B	39.0	40	100	10.0
		8	Int.	□	0870L090B	89.0	90	150	10.0
11		Int.	□	0870L120B	119.0	120	180	10.0	
15		Int.	□	0870L150B	149.0	150	210	10.0	
20		Int.	□	0870L200B	199.0	200	260	10.0	
26		Int.	□	0870L250B	249.0	250	310	10.0	
8.8		2	Int.	□	0880L040B	39.0	40	100	10.0
		8	Int.	□	0880L090B	89.0	90	150	10.0
	11	Int.	□	0880L120B	119.0	120	180	10.0	
	14	Int.	□	0880L150B	149.0	150	210	10.0	
	20	Int.	□	0880L200B	199.0	200	260	10.0	
	26	Int.	□	0880L250B	249.0	250	310	10.0	
	8.9	2	Int.	□	0890L040B	39.0	40	100	10.0
		7	Int.	□	0890L090B	89.0	90	150	10.0
11		Int.	□	0890L120B	119.0	120	180	10.0	
14		Int.	□	0890L150B	149.0	150	210	10.0	
20		Int.	□	0890L200B	199.0	200	260	10.0	
25		Int.	□	0890L250B	249.0	250	310	10.0	
9.0		2	Int.	●	0900L040B	39.0	40	100	10.0
		7	Int.	●	0900L090B	89.0	90	150	10.0
	11	Int.	●	0900L120B	119.0	120	180	10.0	
	14	Int.	●	0900L150B	149.0	150	210	10.0	
	20	Int.	●	0900L200B	199.0	200	260	10.0	
	25	Int.	●	0900L250B	249.0	250	310	10.0	

# Solid Carbide Drill for Die & Mould Machining

## MHS WSTAR DRILL SERIES



D1	3.0≤D1≤6.0	6.0<D1≤10.0	10.0<D1≤12.0
Tolerance (mm)	+0.010 -0.002	+0.010 -0.005	+0.010 -0.008



Note 1) MHS type can be used for shrink fit holders.  
Note 2) Use the shortest type in the respective diameter as a pilot drill.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant	Stock VP15TF	Order Number	Dimensions (mm)			
					L3	L2	L1	D4
9.1	2	Int.	□	MHS0910L040B	39.5	40	100	10.0
	7	Int.	□	0910L090B	89.5	90	150	10.0
	11	Int.	□	0910L120B	119.5	120	180	10.0
	14	Int.	□	0910L150B	149.5	150	210	10.0
	19	Int.	□	0910L200B	199.5	200	260	10.0
	25	Int.	□	0910L250B	249.5	250	310	10.0
30	Int.	□	0910L300B	299.5	300	360	10.0	
9.2	2	Int.	□	0920L040B	39.5	40	100	10.0
	7	Int.	□	0920L090B	89.5	90	150	10.0
	10	Int.	□	0920L120B	119.5	120	180	10.0
	14	Int.	□	0920L150B	149.5	150	210	10.0
	19	Int.	□	0920L200B	199.5	200	260	10.0
	25	Int.	□	0920L250B	249.5	250	310	10.0
30	Int.	□	0920L300B	299.5	300	360	10.0	
9.3	2	Int.	□	0930L040B	39.5	40	100	10.0
	7	Int.	□	0930L090B	89.5	90	150	10.0
	10	Int.	□	0930L120B	119.5	120	180	10.0
	14	Int.	□	0930L150B	149.5	150	210	10.0
	19	Int.	□	0930L200B	199.5	200	260	10.0
	24	Int.	□	0930L250B	249.5	250	310	10.0
30	Int.	□	0930L300B	299.5	300	360	10.0	
9.4	2	Int.	□	0940L040B	39.5	40	100	10.0
	7	Int.	□	0940L090B	89.5	90	150	10.0
	10	Int.	□	0940L120B	119.5	120	180	10.0
	13	Int.	□	0940L150B	149.5	150	210	10.0
	19	Int.	□	0940L200B	199.5	200	260	10.0
	24	Int.	□	0940L250B	249.5	250	310	10.0
29	Int.	□	0940L300B	299.5	300	360	10.0	
9.5	2	Int.	●	0950L040B	39.5	40	100	10.0
	7	Int.	●	0950L090B	89.5	90	150	10.0
	10	Int.	●	0950L120B	119.5	120	180	10.0
	13	Int.	●	0950L150B	149.5	150	210	10.0
	18	Int.	●	0950L200B	199.5	200	260	10.0
	24	Int.	●	0950L250B	249.5	250	310	10.0
29	Int.	●	0950L300B	299.5	300	360	10.0	
9.6	2	Int.	□	0960L040B	40.0	40	100	10.0
	7	Int.	□	0960L090B	90.0	90	150	10.0
	10	Int.	□	0960L120B	120.0	120	180	10.0
	13	Int.	□	0960L150B	150.0	150	210	10.0
	18	Int.	□	0960L200B	200.0	200	260	10.0
	24	Int.	□	0960L250B	250.0	250	310	10.0
29	Int.	□	0960L300B	300.0	300	360	10.0	
9.7	2	Int.	□	0970L040B	40.0	40	100	10.0
	7	Int.	□	0970L090B	90.0	90	150	10.0
	10	Int.	□	0970L120B	120.0	120	180	10.0
	13	Int.	□	0970L150B	150.0	150	210	10.0
	18	Int.	□	0970L200B	200.0	200	260	10.0
	23	Int.	□	0970L250B	250.0	250	310	10.0
28	Int.	□	0970L300B	300.0	300	360	10.0	

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant	Stock VP15TF	Order Number	Dimensions (mm)			
					L3	L2	L1	D4
9.8	2	Int.	□	MHS0980L040B	40.0	40	100	10.0
	7	Int.	□	0980L090B	90.0	90	150	10.0
	10	Int.	□	0980L120B	120.0	120	180	10.0
	13	Int.	□	0980L150B	150.0	150	210	10.0
	18	Int.	□	0980L200B	200.0	200	260	10.0
	23	Int.	□	0980L250B	250.0	250	310	10.0
28	Int.	□	0980L300B	300.0	300	360	10.0	
9.9	2	Int.	□	0990L040B	40.0	40	100	10.0
	7	Int.	□	0990L090B	90.0	90	150	10.0
	10	Int.	□	0990L120B	120.0	120	180	10.0
	13	Int.	□	0990L150B	150.0	150	210	10.0
	18	Int.	□	0990L200B	200.0	200	260	10.0
	23	Int.	□	0990L250B	250.0	250	310	10.0
28	Int.	□	0990L300B	300.0	300	360	10.0	
10.0	1	Int.	●	1000L040B	40.0	40	100	10.0
	6	Int.	●	1000L090B	90.0	90	150	10.0
	9	Int.	●	1000L120B	120.0	120	180	10.0
	12	Int.	●	1000L150B	150.0	150	210	10.0
	17	Int.	●	1000L200B	200.0	200	260	10.0
	22	Int.	●	1000L250B	250.0	250	310	10.0
27	Int.	●	1000L300B	300.0	300	360	10.0	
10.1	1	Int.	□	1010L040B	38.5	40	100	12.0
	6	Int.	□	1010L090B	88.5	90	150	12.0
	9	Int.	□	1010L120B	118.5	120	180	12.0
	12	Int.	□	1010L150B	148.5	150	210	12.0
	17	Int.	□	1010L200B	198.5	200	260	12.0
	22	Int.	□	1010L250B	248.5	250	310	12.0
27	Int.	□	1010L300B	298.5	300	360	12.0	
10.2	1	Int.	□	1020L040B	38.5	40	100	12.0
	6	Int.	□	1020L090B	88.5	90	150	12.0
	9	Int.	□	1020L120B	118.5	120	180	12.0
	12	Int.	□	1020L150B	148.5	150	210	12.0
	17	Int.	□	1020L200B	198.5	200	260	12.0
	22	Int.	□	1020L250B	248.5	250	310	12.0
27	Int.	□	1020L300B	298.5	300	360	12.0	
10.3	1	Int.	□	1030L040B	38.5	40	100	12.0
	6	Int.	□	1030L090B	88.5	90	150	12.0
	9	Int.	□	1030L120B	118.5	120	180	12.0
	12	Int.	□	1030L150B	148.5	150	210	12.0
	17	Int.	□	1030L200B	198.5	200	260	12.0
	22	Int.	□	1030L250B	248.5	250	310	12.0
26	Int.	□	1030L300B	298.5	300	360	12.0	
10.4	1	Int.	□	1040L040B	38.5	40	100	12.0
	6	Int.	□	1040L090B	88.5	90	150	12.0
	9	Int.	□	1040L120B	118.5	120	180	12.0
	12	Int.	□	1040L150B	148.5	150	210	12.0
	17	Int.	□	1040L200B	198.5	200	260	12.0
	21	Int.	□	1040L250B	248.5	250	310	12.0
26	Int.	□	1040L300B	298.5	300	360	12.0	

Note) Please contact Mitsubishi Carbide for any geometry that is not in the brochure (e.g. different diameter and length).



Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant	Stock VP15TF	Order Number	Dimensions (mm)			
					L3	L2	L1	D4
10.5	1	Int.	●	MHS1050L040B	38.5	40	100	12.0
	6	Int.	●	1050L090B	88.5	90	150	12.0
	9	Int.	●	1050L120B	118.5	120	180	12.0
	12	Int.	●	1050L150B	148.5	150	210	12.0
	16	Int.	●	1050L200B	198.5	200	260	12.0
	21	Int.	●	1050L250B	248.5	250	310	12.0
26	Int.	●	1050L300B	298.5	300	360	12.0	
10.6	1	Int.	□	1060L040B	39.0	40	100	12.0
	6	Int.	□	1060L090B	89.0	90	150	12.0
	9	Int.	□	1060L120B	119.0	120	180	12.0
	12	Int.	□	1060L150B	149.0	150	210	12.0
	16	Int.	□	1060L200B	199.0	200	260	12.0
	21	Int.	□	1060L250B	249.0	250	310	12.0
26	Int.	□	1060L300B	299.0	300	360	12.0	
10.7	1	Int.	□	1070L040B	39.0	40	100	12.0
	6	Int.	□	1070L090B	89.0	90	150	12.0
	9	Int.	□	1070L120B	119.0	120	180	12.0
	11	Int.	□	1070L150B	149.0	150	210	12.0
	16	Int.	□	1070L200B	199.0	200	260	12.0
	21	Int.	□	1070L250B	249.0	250	310	12.0
25	Int.	□	1070L300B	299.0	300	360	12.0	
10.8	1	Int.	□	1080L040B	39.0	40	100	12.0
	6	Int.	□	1080L090B	89.0	90	150	12.0
	9	Int.	□	1080L120B	119.0	120	180	12.0
	11	Int.	□	1080L150B	149.0	150	210	12.0
	16	Int.	□	1080L200B	199.0	200	260	12.0
	21	Int.	□	1080L250B	249.0	250	310	12.0
25	Int.	□	1080L300B	299.0	300	360	12.0	
10.9	1	Int.	□	1090L040B	39.0	40	100	12.0
	6	Int.	□	1090L090B	89.0	90	150	12.0
	8	Int.	□	1090L120B	119.0	120	180	12.0
	11	Int.	□	1090L150B	149.0	150	210	12.0
	16	Int.	□	1090L200B	199.0	200	260	12.0
	20	Int.	□	1090L250B	249.0	250	310	12.0
25	Int.	□	1090L300B	299.0	300	360	12.0	
11.0	1	Int.	●	1100L040B	39.0	40	100	12.0
	6	Int.	●	1100L090B	89.0	90	150	12.0
	8	Int.	●	1100L120B	119.0	120	180	12.0
	11	Int.	●	1100L150B	149.0	150	210	12.0
	16	Int.	●	1100L200B	199.0	200	260	12.0
	20	Int.	●	1100L250B	249.0	250	310	12.0
25	Int.	●	1100L300B	299.0	300	360	12.0	
11.1	1	Int.	□	1110L040B	39.5	40	100	12.0
	6	Int.	□	1110L090B	89.5	90	150	12.0
	8	Int.	□	1110L120B	119.5	120	180	12.0
	11	Int.	□	1110L150B	149.5	150	210	12.0
	15	Int.	□	1110L200B	199.5	200	260	12.0
	20	Int.	□	1110L250B	249.5	250	310	12.0
24	Int.	□	1110L300B	299.5	300	360	12.0	
11.2	1	Int.	□	1120L040B	39.5	40	100	12.0
	5	Int.	□	1120L090B	89.5	90	150	12.0
	8	Int.	□	1120L120B	119.5	120	180	12.0
	11	Int.	□	1120L150B	149.5	150	210	12.0
	15	Int.	□	1120L200B	199.5	200	260	12.0
	20	Int.	□	1120L250B	249.5	250	310	12.0
24	Int.	□	1120L300B	299.5	300	360	12.0	

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant	Stock VP15TF	Order Number	Order Number			
					L3	L2	L1	D4
11.3	1	Int.	□	MHS1130L040B	39.5	40	100	12.0
	5	Int.	□	1130L090B	89.5	90	150	12.0
	8	Int.	□	1130L120B	119.5	120	180	12.0
	11	Int.	□	1130L150B	149.5	150	210	12.0
	15	Int.	□	1130L200B	199.5	200	260	12.0
	20	Int.	□	1130L250B	249.5	250	310	12.0
24	Int.	□	1130L300B	299.5	300	360	12.0	
11.4	1	Int.	□	1140L040B	39.5	40	100	12.0
	5	Int.	□	1140L090B	89.5	90	150	12.0
	8	Int.	□	1140L120B	119.5	120	180	12.0
	11	Int.	□	1140L150B	149.5	150	210	12.0
	15	Int.	□	1140L200B	199.5	200	260	12.0
	19	Int.	□	1140L250B	249.5	250	310	12.0
24	Int.	□	1140L300B	299.5	300	360	12.0	
11.5	1	Int.	●	1150L040B	39.5	40	100	12.0
	5	Int.	●	1150L090B	89.5	90	150	12.0
	8	Int.	●	1150L120B	119.5	120	180	12.0
	10	Int.	●	1150L150B	149.5	150	210	12.0
	15	Int.	●	1150L200B	199.5	200	260	12.0
	19	Int.	●	1150L250B	249.5	250	310	12.0
24	Int.	●	1150L300B	299.5	300	360	12.0	
11.6	1	Int.	□	1160L040B	40.0	40	100	12.0
	5	Int.	□	1160L090B	90.0	90	150	12.0
	8	Int.	□	1160L120B	120.0	120	180	12.0
	10	Int.	□	1160L150B	150.0	150	210	12.0
	15	Int.	□	1160L200B	200.0	200	260	12.0
	19	Int.	□	1160L250B	250.0	250	310	12.0
23	Int.	□	1160L300B	300.0	300	360	12.0	
11.7	1	Int.	□	1170L040B	40.0	40	100	12.0
	5	Int.	□	1170L090B	90.0	90	150	12.0
	8	Int.	□	1170L120B	120.0	120	180	12.0
	10	Int.	□	1170L150B	150.0	150	210	12.0
	15	Int.	□	1170L200B	200.0	200	260	12.0
	19	Int.	□	1170L250B	250.0	250	310	12.0
23	Int.	□	1170L300B	300.0	300	360	12.0	
11.8	1	Int.	□	1180L040B	40.0	40	100	12.0
	5	Int.	□	1180L090B	90.0	90	150	12.0
	8	Int.	□	1180L120B	120.0	120	180	12.0
	10	Int.	□	1180L150B	150.0	150	210	12.0
	14	Int.	□	1180L200B	200.0	200	260	12.0
	19	Int.	□	1180L250B	250.0	250	310	12.0
23	Int.	□	1180L300B	300.0	300	360	12.0	
11.9	1	Int.	□	1190L040B	40.0	40	100	12.0
	5	Int.	□	1190L090B	90.0	90	150	12.0
	8	Int.	□	1190L120B	120.0	120	180	12.0
	10	Int.	□	1190L150B	150.0	150	210	12.0
	14	Int.	□	1190L200B	200.0	200	260	12.0
	19	Int.	□	1190L250B	250.0	250	310	12.0
23	Int.	□	1190L300B	300.0	300	360	12.0	
12.0	1	Int.	●	1200L040B	40.0	40	100	12.0
	5	Int.	●	1200L090B	90.0	90	150	12.0
	7	Int.	●	1200L120B	120.0	120	180	12.0
	10	Int.	●	1200L150B	150.0	150	210	12.0
	14	Int.	●	1200L200B	200.0	200	260	12.0
	18	Int.	●	1200L250B	250.0	250	310	12.0
22	Int.	●	1200L300B	300.0	300	360	12.0	

### Recommended Cutting Conditions

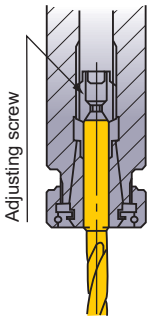
Work Material	Drill Diameter	φ3.0—φ6.0		φ6.0—φ10.0		φ10.0—φ12.0	
		Conditions Hardness	Cutting Speed (m/min)	Feed (mm/rev)	Cutting Speed (m/min)	Feed (mm/rev)	Cutting Speed (m/min)
H Heat-treated steel Pre-hardened steel	—40HRC	40—70	0.10—0.20	40—70	0.15—0.25	40—70	0.20—0.30
	40—50HRC	20—50	0.05—0.15	20—50	0.10—0.20	20—50	0.15—0.25
	50—55HRC	10—30	0.03—0.10	10—30	0.05—0.15	10—30	0.05—0.20

Note 1) When using the drill with a length over l/d 10, it is necessary to use a prep holes as a guide. (If no prep-hole is used then drill breakage can occur)

Note 2) Use the shortest flute drill in the respective size as a pilot drill.

### Operational Guidance for the MHS Drill

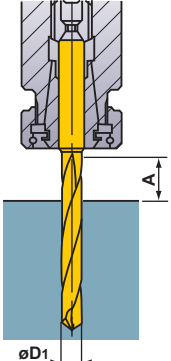
**Drill holding**



Adjusting screw

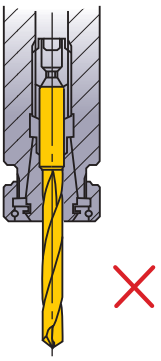
Thrust bearing type collet chuck holds the drill securely.

**Drill holding**



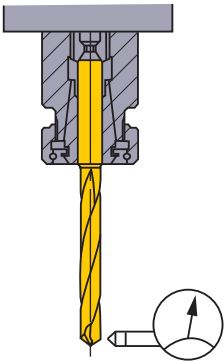
$A : \geq D_1 \times 1.5$

**Drill installation**



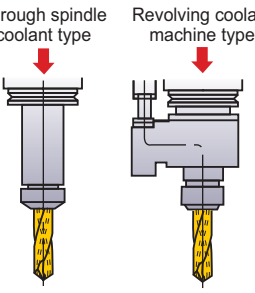
Do not clamp on the flutes.

**Installation tolerance**



Runout  $\leq 0.03\text{mm}$

**Coolant method (MHS)**



Through spindle coolant type    Revolving coolant machine type

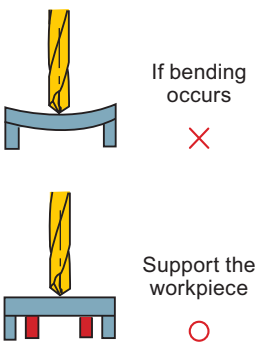
Coolant pressure is approx. 0.5 - 7MPa.

**Coolant handling**

< MHS type >

- 1) Dirt and dust particles in old coolant can clog the oil hole and prevent effective flow. Regular coolant exchange is recommended.
- 2) Small particles of swarf will jam in the oil hole. Use a filter as a preventative measure. When using small diameter drills, use a fine mesh filter.

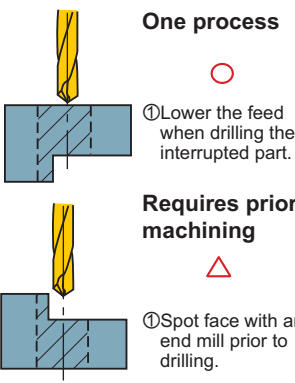
**Thin workpieces**



If bending occurs

Support the workpiece

**Interrupted cutting**



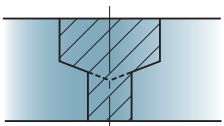
One process

① Lower the feed when drilling the interrupted part.

Requires prior machining

① Spot face with an end mill prior to drilling.

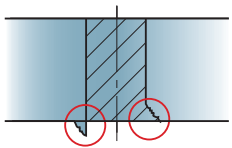
**Stepped holes**



- ① Divide the machining into two processes.
- ② Drill the larger hole first.

\*Tools for chamfering and spot facing can be produced to order.

**Burring and workpiece chipping**



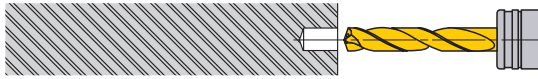
- ① Lower the feed rate when breaking through.
- ② Change the point angle.

## Operational Guidance for the MHS long type Drill ( $L/D \geq 10$ )

### Flat Face Drilling

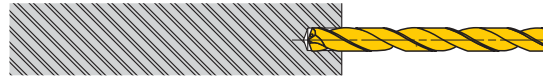
● Drilling a blind hole

#### 1. Drilling a pilot hole



- ① Use a drill with a larger (flatter) point angle than the super long type. Use the shortest flute possible.
- ② Ensure a high precision hole is drilled for the guide.
- ③ Drill depth : Approx 1D or deeper.  
(Adjust the pilot hole depth according to the length of the super long type.)

#### 2. Initial cutting with the long type drill



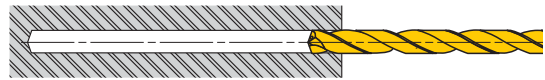
- ① Penetrate the pilot hole at low revolution. (Cutting speed 20m-30m/min, feed rate 0.2mm-0.3mm/rev)
- ② Stop the long type drill 1mm-3mm short of the pilot hole bottom.

#### 3. Drill the deep hole



- ① Start cutting at the recommended speed and feed with a non-peck (continuous feed) cycle.

#### 4. Drill retraction



- ① After drilling, lower the cutting revolution about 1mm-2mm short of the hole end. (Cutting speed of around 20m-30m/min)
- ② Retract the drill to the pilot hole depth starting point at a feed rate of 3000mm/min.
- ③ Finally, clear the hole at a cutting speed of 20m-30m/min and feed rate of 0.2mm-0.3mm/rev.

### Interrupted Drilling

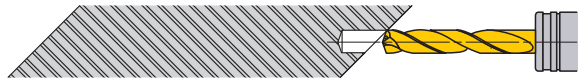
● Drilling and breaking through on irregular faces or angles

#### 1. Spot facing



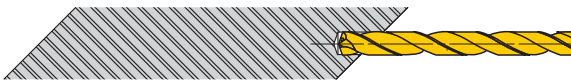
- ① Machine a flat or the irregular face by using an end mill or slot drill capable of spot facing. Make the spot face diameter the same size as the required deep hole diameter.

#### 2. Drilling a pilot hole



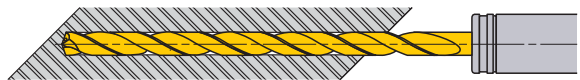
- ① Use a drill with a larger (flatter) point angle than the super long type. Use the shortest flute possible.
- ② Ensure a high precision hole is drilled for the guide.
- ③ Drill depth : Approx 1D or deeper.  
(Adjust the pilot hole depth according to the length of the super long type.)

#### 3. Initial cutting with the long type drill



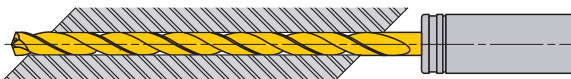
- ① Penetrate the pilot hole at a low revolution. (Cutting speed 20m-30m/min, feed rate 0.2mm-0.3mm/rev)
- ② Stop the long type drill 1mm-3mm short of the pilot hole bottom.

#### 4. Drill the deep hole



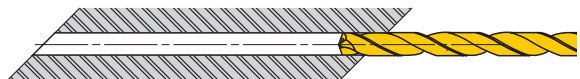
- ① Start cutting at the recommended speed and feed with a non-peck (continuous feed) cycle.

#### 5. Breaking through



- ① When breaking through, the cutting edge can be damaged.
- ② A feed rate of 0.03mm-0.1mm/rev is recommended.

#### 6. Drill retraction



- ① Retract the drill to the pilot hole depth starting point at a feed rate of 3000mm/min.
- ② Finally clear the hole at a cutting speed of 20m-30m/min and feed rate of 0.2mm-0.3mm/rev.

#### 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  
Drilling Tools, Cemented  
Carbide Blanks and Coated  
Products



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