

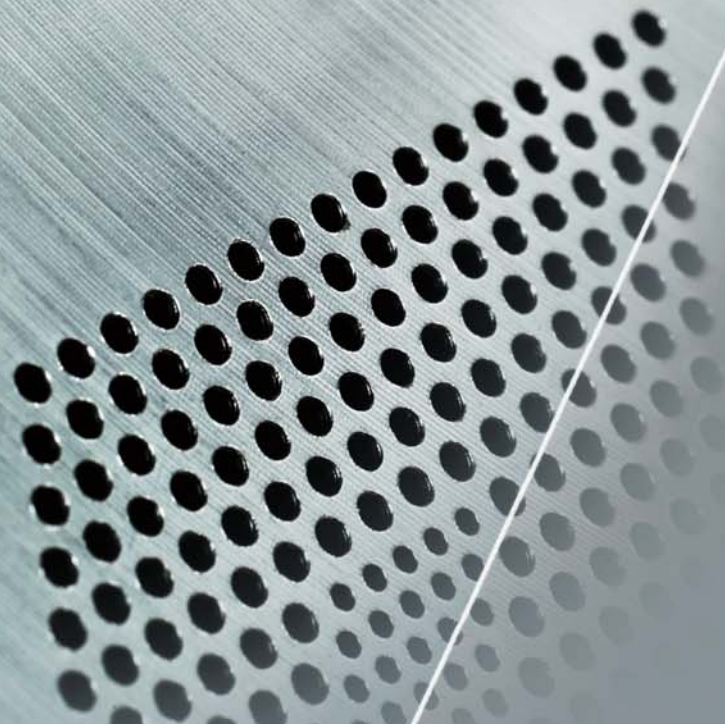
Solid Carbide Drill with Through Coolant Holes

**WSTAR DRILL SERIES**

## **MINI-MWS**

# For high efficiency micro deep hole drilling!

- Increased stability deep hole drilling is realised after using MWS-SB drills for pilot holes.
- Drill sizes available from  $\varnothing 0.5$  to  $\varnothing 2.95$  in lengths L/D1,5,12,20,25 and 30.



# Solid Carbide Drill with Through Coolant Holes

## **WSTAR DRILL SERIES**

# **MINI-MWS**

## ■ Features of MWS-LB/XB/DB Type

- Through coolant holes, flute geometry and cutting edge geometry are optimised for deep micro hole drilling.



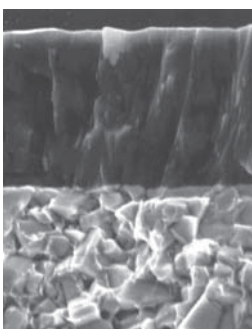
Smoother flute surface for improved chip disposal.

Through coolant forces efficient discharge of chips.

Special flute geometry for superior chip flow.

Optimum cutting edge geometry for breaking chips into small pieces.

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



**MIRACLE**®  
coating  
(Al,Ti)N

**TF15**  
micrograin  
cemented  
carbide

**VP15TF**



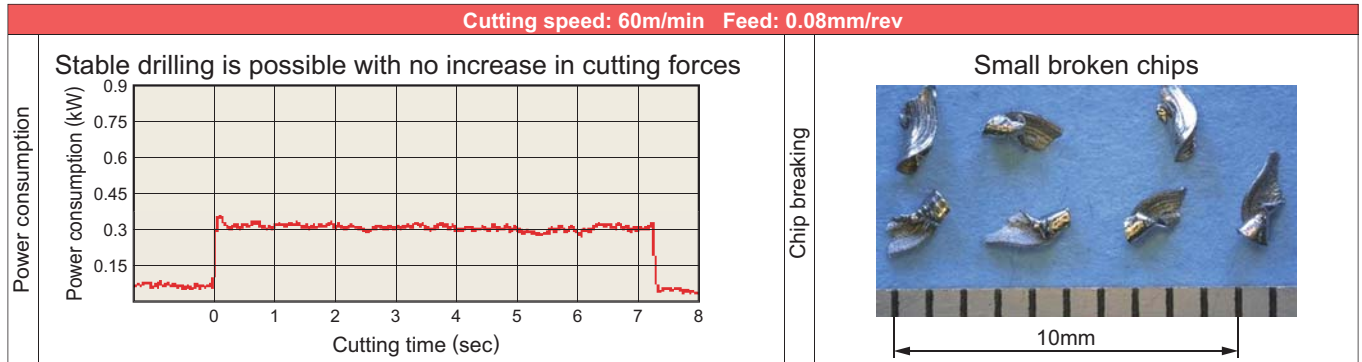
Features of **VP15TF**

**MIRACLE**® coated **VP15TF** is ideal for drilling due to its high resistance to chip welding. Suitable for machining a wide range of workpiece materials from mild and alloy steels through to stainless steel and cast iron.

# Cutting Performance

## ● Excellent chip disposal

Non-peck drilling is possible when drilling 75mm depth small holes!



<Cutting conditions>

Workpiece : JIS SCM440  
 Drill : MWS0255X30DB (φ2.55mm)  
 Hole depth : 75mm  
 Cutting speed: 60m/min

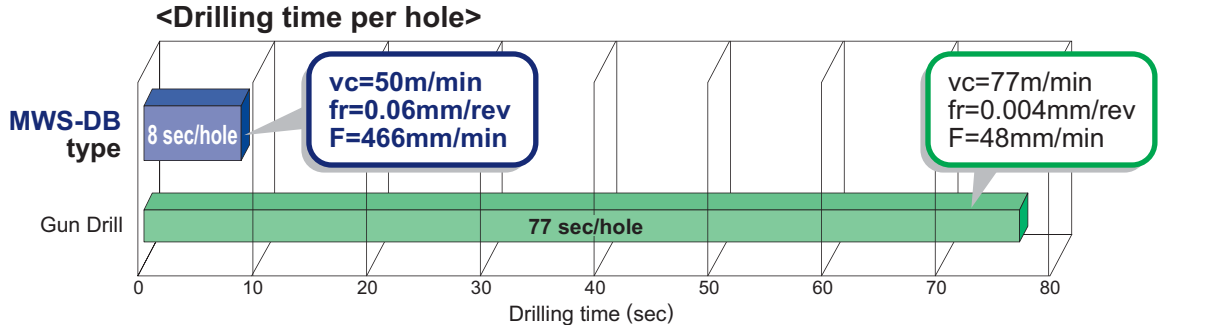
Feed : 0.08mm/rev  
 Coolant : W.S.O.  
 Emission pressure: 5MPa (Internal coolant)  
 Machine : Machining centre

<Cutting conditions for pilot drilling>

Drill : MWS0255SB (φ2.55mm)  
 Hole depth : 3mm  
 Cutting speed: 60m/min  
 Feed : 0.08mm/rev

## ● Ultra productivity machining

90% cycle time reduction when drilling 62mm depth small holes!



<Cutting conditions for MWS-DB>

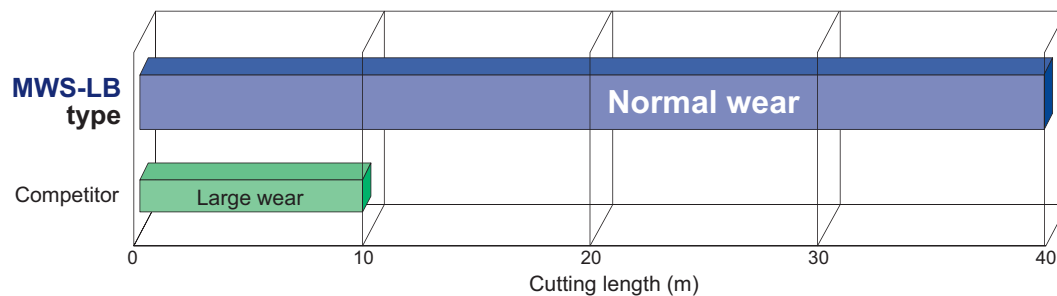
Workpiece : JIS SCM440  
 Drill : MWS0205X30DB (φ2.05mm)  
 Hole depth : 62mm  
 Cutting speed: 50m/min

Feed : 0.06mm/rev  
 Coolant : W.S.O.  
 Emission pressure: 1.5MPa (Internal coolant)  
 Machine : Machining centre

<Cutting conditions for pilot drilling>

Drill : MWS0205SB (φ2.05mm)  
 Hole depth : 3mm  
 Cutting speed: 60m/min  
 Feed : 0.08mm/rev

## ● Longer tool life when drilling stainless steel



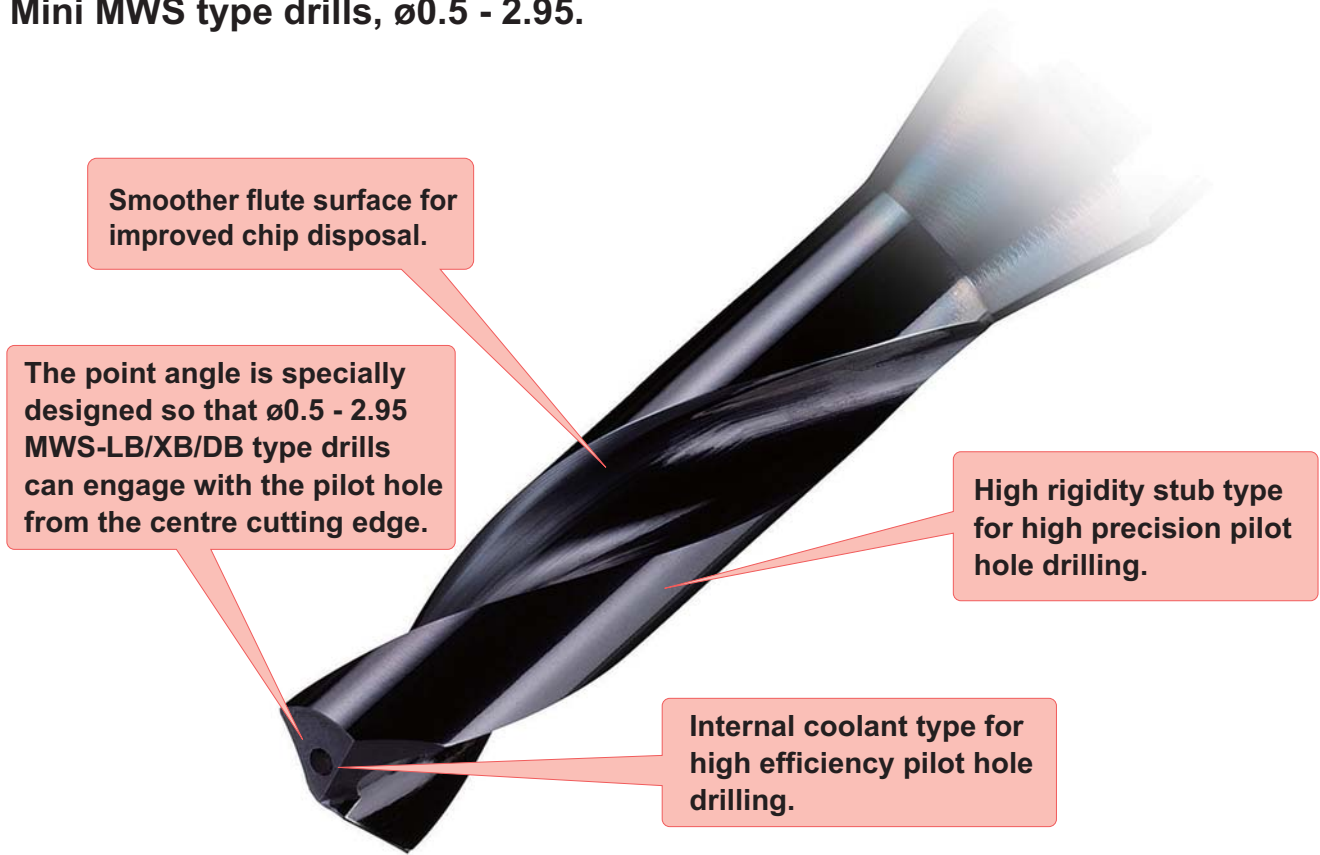
<Cutting conditions>

Workpiece : JIS SUS304  
 Drill : φ2.5mm  
 Hole depth : 13mm  
 Cutting speed: 40m/min

Feed : 0.06mm/rev  
 Coolant : W.S.O.  
 Emission pressure: 3MPa (Internal coolant)  
 Machine : Machining centre

## Features of MWS-SB Type

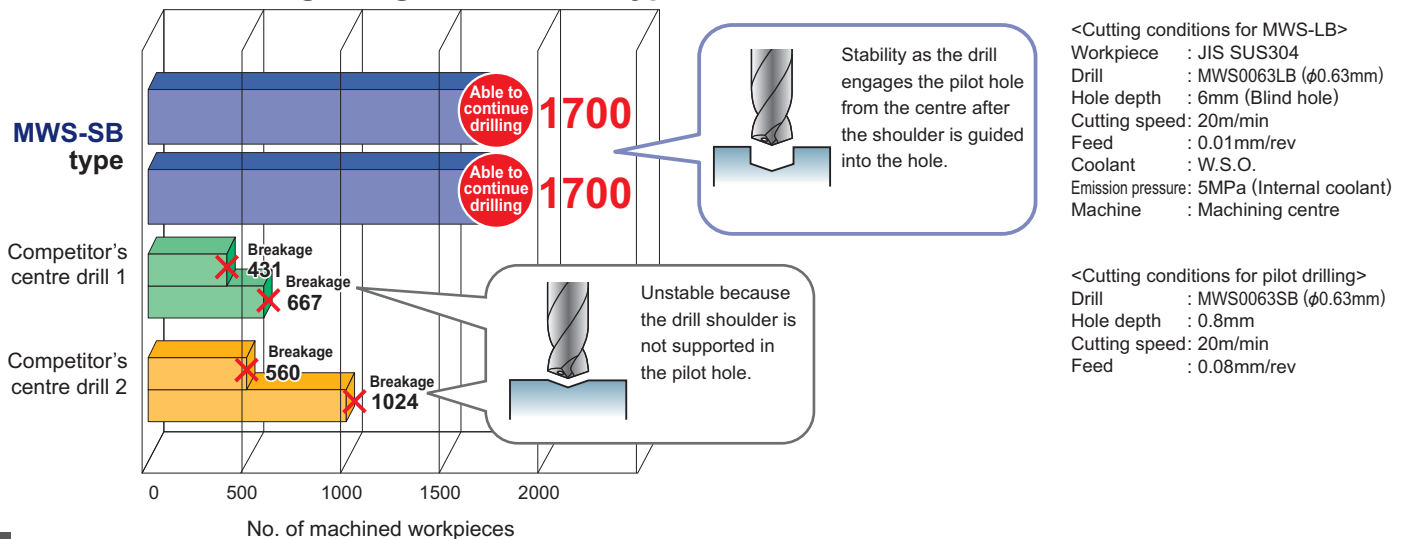
- The MWS-SB type is a pilot drill specially designed for use with Mini MWS type drills,  $\phi 0.5 - 2.95$ .



## Cutting Performance

- Drilling pilot holes with the MWS-SB type allows the long Mini-MWS type drills to deliver increased tool life.

### Micro hole drilling using the MWS-SB type drill





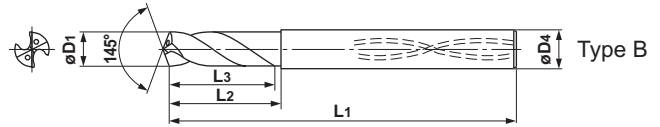
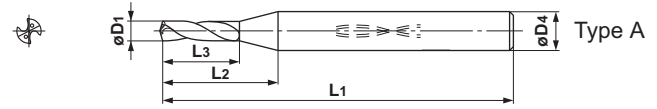
# Solid Carbide Drill with Through Coolant Holes

## MINI-MWS WSTAR DRILL SERIES

**MWS** (Internal coolant)

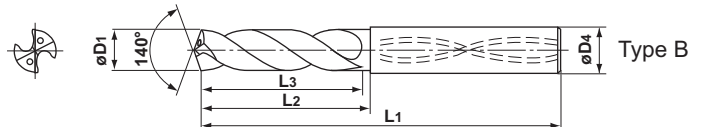
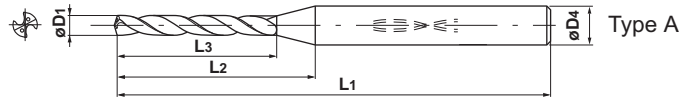
**SB Type** NEW  
(For pilot holes)

|                |                |                 |
|----------------|----------------|-----------------|
| D1             | 0.5 ≤ D1 < 1.0 | 1.0 ≤ D1 < 2.95 |
| Tolerance (mm) | +0.009<br>0    | +0.014<br>0     |



**LB/XB Type**

|                |                |                 |
|----------------|----------------|-----------------|
| D1             | 0.5 ≤ D1 < 1.0 | 1.0 ≤ D1 < 2.95 |
| Tolerance (mm) | 0<br>-0.009    | 0<br>-0.014     |



(Note) MWS type can be used for shrink fit holders.

| Drill Dia.<br>D1<br>(mm)   | Hole Depth<br>(l/d) | Coolant<br>(Int./Ext.) | Stock<br>VP15TF | Order Number | Dimensions (mm) |     |    |    | Type |
|--|---------------------|------------------------|-----------------|--------------|-----------------|-----|----|----|------|
|  |                     |                        |                 |              | L3              | L2  | L1 | D4 |      |
| <span style="background-color: yellow; border: 1px solid black; border-radius: 50%; padding: 2px;">NEW</span> 0.50 | 1                   | Int.                   | ●               | MWS0050SB    | 2.5             | 7.2 | 47 | 3  | A    |
|  | 5                   | Int.                   | ●               | MWS0050LB    | 8               | 13  | 47 | 3  | A    |
|  | 12                  | Int.                   | ●               | MWS0050XB    | 16              | 21  | 47 | 3  | A    |
| <span style="background-color: yellow; border: 1px solid black; border-radius: 50%; padding: 2px;">NEW</span> 0.51 | 1                   | Int.                   | ●               | MWS0051SB    | 2.6             | 7.2 | 47 | 3  | A    |
|  | 5                   | Int.                   | ●               | MWS0051LB    | 8               | 13  | 47 | 3  | A    |
|  | 12                  | Int.                   | ●               | MWS0051XB    | 16              | 21  | 47 | 3  | A    |
| <span style="background-color: yellow; border: 1px solid black; border-radius: 50%; padding: 2px;">NEW</span> 0.52 | 1                   | Int.                   | ●               | MWS0052SB    | 2.6             | 7.2 | 47 | 3  | A    |
|  | 5                   | Int.                   | ●               | MWS0052LB    | 8               | 13  | 47 | 3  | A    |
|  | 12                  | Int.                   | ●               | MWS0052XB    | 16              | 21  | 47 | 3  | A    |
| <span style="background-color: yellow; border: 1px solid black; border-radius: 50%; padding: 2px;">NEW</span> 0.53 | 1                   | Int.                   | ●               | MWS0053SB    | 2.6             | 7.2 | 47 | 3  | A    |
|  | 5                   | Int.                   | ●               | MWS0053LB    | 8               | 13  | 47 | 3  | A    |
|  | 12                  | Int.                   | ●               | MWS0053XB    | 16              | 21  | 47 | 3  | A    |
| <span style="background-color: yellow; border: 1px solid black; border-radius: 50%; padding: 2px;">NEW</span> 0.54 | 1                   | Int.                   | ●               | MWS0054SB    | 2.6             | 7.2 | 47 | 3  | A    |
|  | 5                   | Int.                   | ●               | MWS0054LB    | 8               | 13  | 47 | 3  | A    |
|  | 12                  | Int.                   | ●               | MWS0054XB    | 16              | 21  | 47 | 3  | A    |
| <span style="background-color: yellow; border: 1px solid black; border-radius: 50%; padding: 2px;">NEW</span> 0.55 | 1                   | Int.                   | ●               | MWS0055SB    | 2.6             | 7.2 | 47 | 3  | A    |
|  | 5                   | Int.                   | ●               | MWS0055LB    | 8               | 13  | 47 | 3  | A    |
|  | 12                  | Int.                   | ●               | MWS0055XB    | 16              | 21  | 47 | 3  | A    |
| <span style="background-color: yellow; border: 1px solid black; border-radius: 50%; padding: 2px;">NEW</span> 0.56 | 1                   | Int.                   | ●               | MWS0056SB    | 2.9             | 7.5 | 47 | 3  | A    |
|  | 5                   | Int.                   | ●               | MWS0056LB    | 8               | 13  | 47 | 3  | A    |
|  | 12                  | Int.                   | ●               | MWS0056XB    | 16              | 21  | 47 | 3  | A    |
| <span style="background-color: yellow; border: 1px solid black; border-radius: 50%; padding: 2px;">NEW</span> 0.57 | 1                   | Int.                   | ●               | MWS0057SB    | 2.9             | 7.4 | 47 | 3  | A    |
|  | 5                   | Int.                   | ●               | MWS0057LB    | 8               | 13  | 47 | 3  | A    |
|  | 12                  | Int.                   | ●               | MWS0057XB    | 16              | 21  | 47 | 3  | A    |
| <span style="background-color: yellow; border: 1px solid black; border-radius: 50%; padding: 2px;">NEW</span> 0.58 | 1                   | Int.                   | ●               | MWS0058SB    | 2.9             | 7.4 | 47 | 3  | A    |
|  | 5                   | Int.                   | ●               | MWS0058LB    | 8               | 13  | 47 | 3  | A    |
|  | 12                  | Int.                   | ●               | MWS0058XB    | 16              | 21  | 47 | 3  | A    |
| <span style="background-color: yellow; border: 1px solid black; border-radius: 50%; padding: 2px;">NEW</span> 0.59 | 1                   | Int.                   | ●               | MWS0059SB    | 2.9             | 7.4 | 47 | 3  | A    |
|  | 5                   | Int.                   | ●               | MWS0059LB    | 8               | 12  | 47 | 3  | A    |
|  | 12                  | Int.                   | ●               | MWS0059XB    | 16              | 20  | 47 | 3  | A    |

| Drill Dia.<br>D1<br>(mm)   | Hole Depth<br>(l/d) | Coolant<br>(Int./Ext.) | Stock<br>VP15TF | Order Number | Dimensions (mm) |     |    |    | Type |
|--|---------------------|------------------------|-----------------|--------------|-----------------|-----|----|----|------|
|  |                     |                        |                 |              | L3              | L2  | L1 | D4 |      |
| <span style="background-color: yellow; border: 1px solid black; border-radius: 50%; padding: 2px;">NEW</span> 0.60 | 1                   | Int.                   | ●               | MWS0060SB    | 2.9             | 7.4 | 47 | 3  | A    |
|  | 5                   | Int.                   | ●               | MWS0060LB    | 8               | 12  | 47 | 3  | A    |
|  | 12                  | Int.                   | ●               | MWS0060XB    | 16              | 20  | 47 | 3  | A    |
| <span style="background-color: yellow; border: 1px solid black; border-radius: 50%; padding: 2px;">NEW</span> 0.61 | 1                   | Int.                   | ●               | MWS0061SB    | 3.1             | 7.6 | 47 | 3  | A    |
|  | 5                   | Int.                   | ●               | MWS0061LB    | 8               | 12  | 47 | 3  | A    |
|  | 12                  | Int.                   | ●               | MWS0061XB    | 16              | 20  | 47 | 3  | A    |
| <span style="background-color: yellow; border: 1px solid black; border-radius: 50%; padding: 2px;">NEW</span> 0.62 | 1                   | Int.                   | ●               | MWS0062SB    | 3.1             | 7.5 | 47 | 3  | A    |
|  | 5                   | Int.                   | ●               | MWS0062LB    | 8               | 12  | 47 | 3  | A    |
|  | 12                  | Int.                   | ●               | MWS0062XB    | 16              | 20  | 47 | 3  | A    |
| <span style="background-color: yellow; border: 1px solid black; border-radius: 50%; padding: 2px;">NEW</span> 0.63 | 1                   | Int.                   | ●               | MWS0063SB    | 3.1             | 7.5 | 47 | 3  | A    |
|  | 5                   | Int.                   | ●               | MWS0063LB    | 8               | 12  | 47 | 3  | A    |
|  | 12                  | Int.                   | ●               | MWS0063XB    | 16              | 20  | 47 | 3  | A    |
| <span style="background-color: yellow; border: 1px solid black; border-radius: 50%; padding: 2px;">NEW</span> 0.64 | 1                   | Int.                   | ●               | MWS0064SB    | 3.1             | 7.5 | 47 | 3  | A    |
|  | 5                   | Int.                   | ●               | MWS0064LB    | 8               | 12  | 47 | 3  | A    |
|  | 12                  | Int.                   | ●               | MWS0064XB    | 16              | 20  | 47 | 3  | A    |
| <span style="background-color: yellow; border: 1px solid black; border-radius: 50%; padding: 2px;">NEW</span> 0.65 | 1                   | Int.                   | ●               | MWS0065SB    | 3.1             | 7.5 | 47 | 3  | A    |
|  | 5                   | Int.                   | ●               | MWS0065LB    | 8               | 12  | 47 | 3  | A    |
|  | 12                  | Int.                   | ●               | MWS0065XB    | 16              | 20  | 47 | 3  | A    |
| <span style="background-color: yellow; border: 1px solid black; border-radius: 50%; padding: 2px;">NEW</span> 0.66 | 1                   | Int.                   | ●               | MWS0066SB    | 3.4             | 7.8 | 47 | 3  | A    |
|  | 5                   | Int.                   | ●               | MWS0066LB    | 8               | 12  | 47 | 3  | A    |
|  | 12                  | Int.                   | ●               | MWS0066XB    | 16              | 20  | 47 | 3  | A    |
| <span style="background-color: yellow; border: 1px solid black; border-radius: 50%; padding: 2px;">NEW</span> 0.67 | 1                   | Int.                   | ●               | MWS0067SB    | 3.4             | 7.7 | 47 | 3  | A    |
|  | 5                   | Int.                   | ●               | MWS0067LB    | 8               | 12  | 47 | 3  | A    |
|  | 12                  | Int.                   | ●               | MWS0067XB    | 16              | 20  | 47 | 3  | A    |
| <span style="background-color: yellow; border: 1px solid black; border-radius: 50%; padding: 2px;">NEW</span> 0.68 | 1                   | Int.                   | ●               | MWS0068SB    | 3.4             | 7.7 | 47 | 3  | A    |
|  | 5                   | Int.                   | ●               | MWS0068LB    | 8               | 12  | 47 | 3  | A    |
|  | 12                  | Int.                   | ●               | MWS0068XB    | 16              | 20  | 47 | 3  | A    |
| <span style="background-color: yellow; border: 1px solid black; border-radius: 50%; padding: 2px;">NEW</span> 0.69 | 1                   | Int.                   | ●               | MWS0069SB    | 3.4             | 7.7 | 47 | 3  | A    |
|  | 5                   | Int.                   | ●               | MWS0069LB    | 8               | 12  | 47 | 3  | A    |
|  | 12                  | Int.                   | ●               | MWS0069XB    | 16              | 20  | 47 | 3  | A    |

\* Please contact us for any geometry that is not in this catalogue (e.g. different diameters and lengths can be made to order).

● : Inventory maintained.

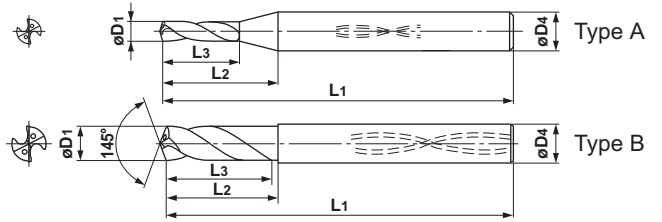
# Solid Carbide Drill with Through Coolant Holes

## MINI-MWS WSTAR DRILL SERIES

**MWS** (Internal coolant)

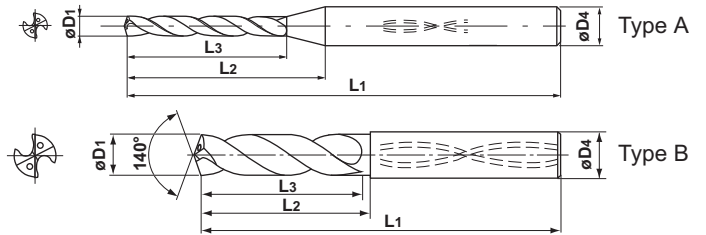
**SB Type** NEW  
(For pilot holes)

|                |             |             |
|----------------|-------------|-------------|
| D1             | 0.5≤D1<1.0  | 1.0≤D1<2.95 |
| Tolerance (mm) | +0.009<br>0 | +0.014<br>0 |



**LB/XB Type**

|                |             |             |
|----------------|-------------|-------------|
| D1             | 0.5≤D1<1.0  | 1.0≤D1<2.95 |
| Tolerance (mm) | 0<br>-0.009 | 0<br>-0.014 |



**DB Type** NEW



(Note) MWS type can be used for shrink fit holders.

| Drill Dia.<br>D1<br>(mm)   | Hole Depth<br>(l/d) | Coolant<br>(Int./Ext.) | Stock<br>VP15TF | Order Number | Dimensions (mm) |     |    |    | Type |
|--|---------------------|------------------------|-----------------|--------------|-----------------|-----|----|----|------|
|  |                     |                        |                 |              | L3              | L2  | L1 | D4 |      |
| <span style="background-color: yellow; border: 1px solid black; border-radius: 50%; padding: 2px;">NEW</span> 0.70 | 1                   | Int.                   | ●               | MWS0070SB    | 3.4             | 7.7 | 47 | 3  | A    |
|  | 5                   | Int.                   | ●               | MWS0070LB    | 8               | 12  | 47 | 3  | A    |
|  | 12                  | Int.                   | ●               | MWS0070XB    | 16              | 20  | 47 | 3  | A    |
| <span style="background-color: yellow; border: 1px solid black; border-radius: 50%; padding: 2px;">NEW</span> 0.71 | 1                   | Int.                   | ●               | MWS0071SB    | 3.6             | 7.9 | 50 | 3  | A    |
|  | 5                   | Int.                   | ●               | MWS0071LB    | 10              | 14  | 50 | 3  | A    |
|  | 12                  | Int.                   | ●               | MWS0071XB    | 20              | 24  | 50 | 3  | A    |
| <span style="background-color: yellow; border: 1px solid black; border-radius: 50%; padding: 2px;">NEW</span> 0.72 | 1                   | Int.                   | ●               | MWS0072SB    | 3.6             | 7.9 | 50 | 3  | A    |
|  | 5                   | Int.                   | ●               | MWS0072LB    | 10              | 14  | 50 | 3  | A    |
|  | 12                  | Int.                   | ●               | MWS0072XB    | 20              | 24  | 50 | 3  | A    |
| <span style="background-color: yellow; border: 1px solid black; border-radius: 50%; padding: 2px;">NEW</span> 0.73 | 1                   | Int.                   | ●               | MWS0073SB    | 3.6             | 7.8 | 50 | 3  | A    |
|  | 5                   | Int.                   | ●               | MWS0073LB    | 10              | 14  | 50 | 3  | A    |
|  | 12                  | Int.                   | ●               | MWS0073XB    | 20              | 24  | 50 | 3  | A    |
| <span style="background-color: yellow; border: 1px solid black; border-radius: 50%; padding: 2px;">NEW</span> 0.74 | 1                   | Int.                   | ●               | MWS0074SB    | 3.6             | 7.8 | 50 | 3  | A    |
|  | 5                   | Int.                   | ●               | MWS0074LB    | 10              | 14  | 50 | 3  | A    |
|  | 12                  | Int.                   | ●               | MWS0074XB    | 20              | 24  | 50 | 3  | A    |
| <span style="background-color: yellow; border: 1px solid black; border-radius: 50%; padding: 2px;">NEW</span> 0.75 | 1                   | Int.                   | ●               | MWS0075SB    | 3.6             | 7.8 | 50 | 3  | A    |
|  | 5                   | Int.                   | ●               | MWS0075LB    | 10              | 14  | 50 | 3  | A    |
|  | 12                  | Int.                   | ●               | MWS0075XB    | 20              | 24  | 50 | 3  | A    |
| <span style="background-color: yellow; border: 1px solid black; border-radius: 50%; padding: 2px;">NEW</span> 0.76 | 1                   | Int.                   | ●               | MWS0076SB    | 3.9             | 8.1 | 50 | 3  | A    |
|  | 5                   | Int.                   | ●               | MWS0076LB    | 10              | 14  | 50 | 3  | A    |
|  | 12                  | Int.                   | ●               | MWS0076XB    | 20              | 24  | 50 | 3  | A    |
| <span style="background-color: yellow; border: 1px solid black; border-radius: 50%; padding: 2px;">NEW</span> 0.77 | 1                   | Int.                   | ●               | MWS0077SB    | 3.9             | 8.1 | 50 | 3  | A    |
|  | 5                   | Int.                   | ●               | MWS0077LB    | 10              | 14  | 50 | 3  | A    |
|  | 12                  | Int.                   | ●               | MWS0077XB    | 20              | 24  | 50 | 3  | A    |
| <span style="background-color: yellow; border: 1px solid black; border-radius: 50%; padding: 2px;">NEW</span> 0.78 | 1                   | Int.                   | ●               | MWS0078SB    | 3.9             | 8.0 | 50 | 3  | A    |
|  | 5                   | Int.                   | ●               | MWS0078LB    | 10              | 14  | 50 | 3  | A    |
|  | 12                  | Int.                   | ●               | MWS0078XB    | 20              | 24  | 50 | 3  | A    |
| <span style="background-color: yellow; border: 1px solid black; border-radius: 50%; padding: 2px;">NEW</span> 0.79 | 1                   | Int.                   | ●               | MWS0079SB    | 3.9             | 8.0 | 50 | 3  | A    |
|  | 5                   | Int.                   | ●               | MWS0079LB    | 10              | 14  | 50 | 3  | A    |
|  | 12                  | Int.                   | ●               | MWS0079XB    | 20              | 24  | 50 | 3  | A    |

| Drill Dia.<br>D1<br>(mm)   | Hole Depth<br>(l/d) | Coolant<br>(Int./Ext.) | Stock<br>VP15TF | Order Number | Dimensions (mm) |     |    |    | Type |
|--|---------------------|------------------------|-----------------|--------------|-----------------|-----|----|----|------|
|  |                     |                        |                 |              | L3              | L2  | L1 | D4 |      |
| <span style="background-color: yellow; border: 1px solid black; border-radius: 50%; padding: 2px;">NEW</span> 0.80 | 1                   | Int.                   | ●               | MWS0080SB    | 3.9             | 8.0 | 50 | 3  | A    |
|  | 5                   | Int.                   | ●               | MWS0080LB    | 10              | 14  | 50 | 3  | A    |
|  | 12                  | Int.                   | ●               | MWS0080XB    | 20              | 24  | 50 | 3  | A    |
| <span style="background-color: yellow; border: 1px solid black; border-radius: 50%; padding: 2px;">NEW</span> 0.81 | 1                   | Int.                   | ●               | MWS0081SB    | 4.1             | 8.2 | 50 | 3  | A    |
|  | 5                   | Int.                   | ●               | MWS0081LB    | 10              | 14  | 50 | 3  | A    |
|  | 12                  | Int.                   | ●               | MWS0081XB    | 20              | 24  | 50 | 3  | A    |
| <span style="background-color: yellow; border: 1px solid black; border-radius: 50%; padding: 2px;">NEW</span> 0.82 | 1                   | Int.                   | ●               | MWS0082SB    | 4.1             | 8.2 | 50 | 3  | A    |
|  | 5                   | Int.                   | ●               | MWS0082LB    | 10              | 14  | 50 | 3  | A    |
|  | 12                  | Int.                   | ●               | MWS0082XB    | 20              | 24  | 50 | 3  | A    |
| <span style="background-color: yellow; border: 1px solid black; border-radius: 50%; padding: 2px;">NEW</span> 0.83 | 1                   | Int.                   | ●               | MWS0083SB    | 4.1             | 8.1 | 50 | 3  | A    |
|  | 5                   | Int.                   | ●               | MWS0083LB    | 10              | 14  | 50 | 3  | A    |
|  | 12                  | Int.                   | ●               | MWS0083XB    | 20              | 24  | 50 | 3  | A    |
| <span style="background-color: yellow; border: 1px solid black; border-radius: 50%; padding: 2px;">NEW</span> 0.84 | 1                   | Int.                   | ●               | MWS0084SB    | 4.1             | 8.1 | 50 | 3  | A    |
|  | 5                   | Int.                   | ●               | MWS0084LB    | 10              | 14  | 50 | 3  | A    |
|  | 12                  | Int.                   | ●               | MWS0084XB    | 20              | 24  | 50 | 3  | A    |
| <span style="background-color: yellow; border: 1px solid black; border-radius: 50%; padding: 2px;">NEW</span> 0.85 | 1                   | Int.                   | ●               | MWS0085SB    | 4.1             | 8.1 | 50 | 3  | A    |
|  | 5                   | Int.                   | ●               | MWS0085LB    | 10              | 14  | 50 | 3  | A    |
|  | 12                  | Int.                   | ●               | MWS0085XB    | 20              | 24  | 50 | 3  | A    |
| <span style="background-color: yellow; border: 1px solid black; border-radius: 50%; padding: 2px;">NEW</span> 0.86 | 1                   | Int.                   | ●               | MWS0086SB    | 4.4             | 8.4 | 50 | 3  | A    |
|  | 5                   | Int.                   | ●               | MWS0086LB    | 10              | 14  | 50 | 3  | A    |
|  | 12                  | Int.                   | ●               | MWS0086XB    | 20              | 24  | 50 | 3  | A    |
| <span style="background-color: yellow; border: 1px solid black; border-radius: 50%; padding: 2px;">NEW</span> 0.87 | 1                   | Int.                   | ●               | MWS0087SB    | 4.4             | 8.4 | 50 | 3  | A    |
|  | 5                   | Int.                   | ●               | MWS0087LB    | 10              | 14  | 50 | 3  | A    |
|  | 12                  | Int.                   | ●               | MWS0087XB    | 20              | 24  | 50 | 3  | A    |
| <span style="background-color: yellow; border: 1px solid black; border-radius: 50%; padding: 2px;">NEW</span> 0.88 | 1                   | Int.                   | ●               | MWS0088SB    | 4.4             | 8.4 | 50 | 3  | A    |
|  | 5                   | Int.                   | ●               | MWS0088LB    | 10              | 14  | 50 | 3  | A    |
|  | 12                  | Int.                   | ●               | MWS0088XB    | 20              | 24  | 50 | 3  | A    |
| <span style="background-color: yellow; border: 1px solid black; border-radius: 50%; padding: 2px;">NEW</span> 0.89 | 1                   | Int.                   | ●               | MWS0089SB    | 4.4             | 8.3 | 50 | 3  | A    |
|  | 5                   | Int.                   | ●               | MWS0089LB    | 10              | 14  | 50 | 3  | A    |
|  | 12                  | Int.                   | ●               | MWS0089XB    | 20              | 24  | 50 | 3  | A    |

\* Please contact us for any geometry that is not in this catalogue (e.g. different diameters and lengths can be made to order).

| Drill Dia.<br>D1<br>(mm) | Hole Depth<br>(l/d) | Coolant<br>(Int./Ext.) | Stock<br>VP15TF | Order Number | Dimensions (mm) |     |     |    | Type |
|--------------------------|---------------------|------------------------|-----------------|--------------|-----------------|-----|-----|----|------|
|                          |                     |                        |                 |              | L3              | L2  | L1  | D4 |      |
| NEW 0.90                 | 1                   | Int.                   | ●               | MWS0090SB    | 4.4             | 8.3 | 50  | 3  | A    |
|                          | 5                   | Int.                   | ●               | MWS0090LB    | 10              | 14  | 50  | 3  | A    |
|                          | 12                  | Int.                   | ●               | MWS0090XB    | 20              | 24  | 50  | 3  | A    |
| NEW 0.91                 | 1                   | Int.                   | ●               | MWS0091SB    | 4.6             | 8.5 | 50  | 3  | A    |
|                          | 5                   | Int.                   | ●               | MWS0091LB    | 10              | 14  | 50  | 3  | A    |
|                          | 12                  | Int.                   | ●               | MWS0091XB    | 20              | 24  | 50  | 3  | A    |
| NEW 0.92                 | 1                   | Int.                   | ●               | MWS0092SB    | 4.6             | 8.5 | 50  | 3  | A    |
|                          | 5                   | Int.                   | ●               | MWS0092LB    | 10              | 14  | 50  | 3  | A    |
|                          | 12                  | Int.                   | ●               | MWS0092XB    | 20              | 24  | 50  | 3  | A    |
| NEW 0.93                 | 1                   | Int.                   | ●               | MWS0093SB    | 4.6             | 8.5 | 50  | 3  | A    |
|                          | 5                   | Int.                   | ●               | MWS0093LB    | 10              | 14  | 50  | 3  | A    |
|                          | 12                  | Int.                   | ●               | MWS0093XB    | 20              | 24  | 50  | 3  | A    |
| NEW 0.94                 | 1                   | Int.                   | ●               | MWS0094SB    | 4.6             | 8.4 | 50  | 3  | A    |
|                          | 5                   | Int.                   | ●               | MWS0094LB    | 10              | 14  | 50  | 3  | A    |
|                          | 12                  | Int.                   | ●               | MWS0094XB    | 20              | 24  | 50  | 3  | A    |
| NEW 0.95                 | 1                   | Int.                   | ●               | MWS0095SB    | 4.6             | 8.4 | 50  | 3  | A    |
|                          | 5                   | Int.                   | ●               | MWS0095LB    | 10              | 14  | 50  | 3  | A    |
|                          | 12                  | Int.                   | ●               | MWS0095XB    | 20              | 24  | 50  | 3  | A    |
| NEW 0.96                 | 1                   | Int.                   | ●               | MWS0096SB    | 4.9             | 8.7 | 50  | 3  | A    |
|                          | 5                   | Int.                   | ●               | MWS0096LB    | 10              | 14  | 50  | 3  | A    |
|                          | 12                  | Int.                   | ●               | MWS0096XB    | 20              | 24  | 50  | 3  | A    |
| NEW 0.97                 | 1                   | Int.                   | ●               | MWS0097SB    | 4.9             | 8.7 | 50  | 3  | A    |
|                          | 5                   | Int.                   | ●               | MWS0097LB    | 10              | 14  | 50  | 3  | A    |
|                          | 12                  | Int.                   | ●               | MWS0097XB    | 20              | 24  | 50  | 3  | A    |
| NEW 0.98                 | 1                   | Int.                   | ●               | MWS0098SB    | 4.9             | 8.7 | 50  | 3  | A    |
|                          | 5                   | Int.                   | ●               | MWS0098LB    | 10              | 14  | 50  | 3  | A    |
|                          | 12                  | Int.                   | ●               | MWS0098XB    | 20              | 24  | 50  | 3  | A    |
| NEW 0.99                 | 1                   | Int.                   | ●               | MWS0099SB    | 4.9             | 8.7 | 50  | 3  | A    |
|                          | 5                   | Int.                   | ●               | MWS0099LB    | 10              | 14  | 50  | 3  | A    |
|                          | 12                  | Int.                   | ●               | MWS0099XB    | 20              | 24  | 50  | 3  | A    |
| NEW 1.00                 | 1                   | Int.                   | ●               | MWS0100SB    | 5.0             | 8.7 | 55  | 3  | A    |
|                          | 5                   | Int.                   | ●               | MWS0100LB    | 11              | 15  | 55  | 3  | A    |
|                          | 12                  | Int.                   | ●               | MWS0100XB    | 23              | 27  | 55  | 3  | A    |
|                          | 20                  | Int.                   | ●               | MWS0100X20DB | 24              | 28  | 60  | 3  | A    |
|                          | 25                  | Int.                   | ●               | MWS0100X25DB | 28              | 32  | 66  | 3  | A    |
| NEW 1.05                 | 1                   | Int.                   | □               | MWS0105SB    | 5.2             | 8.8 | 55  | 3  | A    |
|                          | 20                  | Int.                   | □               | MWS0105X20DB | 24              | 28  | 60  | 3  | A    |
|                          | 25                  | Int.                   | □               | MWS0105X25DB | 29              | 33  | 66  | 3  | A    |
| NEW 1.10                 | 1                   | Int.                   | ●               | MWS0110SB    | 5.4             | 8.9 | 55  | 3  | A    |
|                          | 5                   | Int.                   | ●               | MWS0110LB    | 17              | 21  | 55  | 3  | A    |
|                          | 12                  | Int.                   | ●               | MWS0110XB    | 23              | 27  | 55  | 3  | A    |
|                          | 20                  | Int.                   | ●               | MWS0110X20DB | 25              | 29  | 60  | 3  | A    |
|                          | 25                  | Int.                   | ●               | MWS0110X25DB | 31              | 34  | 66  | 3  | A    |
| NEW 1.15                 | 1                   | Int.                   | □               | MWS0115SB    | 5.6             | 9.1 | 55  | 3  | A    |
|                          | 20                  | Int.                   | □               | MWS0115X20DB | 26              | 30  | 60  | 3  | A    |
|                          | 25                  | Int.                   | □               | MWS0115X25DB | 32              | 36  | 66  | 3  | A    |
|                          | 30                  | Int.                   | □               | MWS0115X30DB | 38              | 41  | 72  | 3  | A    |
|                          | NEW 1.20            | 1                      | Int.            | ●            | MWS0120SB       | 6.0 | 9.4 | 55 | 3    |
| 5                        |                     | Int.                   | ●               | MWS0120LB    | 17              | 20  | 55  | 3  | A    |
| 12                       |                     | Int.                   | ●               | MWS0120XB    | 23              | 26  | 55  | 3  | A    |
| 20                       |                     | Int.                   | ●               | MWS0120X20DB | 28              | 31  | 60  | 3  | A    |
| 25                       |                     | Int.                   | ●               | MWS0120X25DB | 34              | 37  | 66  | 3  | A    |
| NEW 1.25                 | 1                   | Int.                   | □               | MWS0125SB    | 6.2             | 9.5 | 55  | 3  | A    |
|                          | 20                  | Int.                   | □               | MWS0125X20DB | 29              | 32  | 68  | 3  | A    |
|                          | 25                  | Int.                   | □               | MWS0125X25DB | 35              | 38  | 74  | 3  | A    |
|                          | 30                  | Int.                   | □               | MWS0125X30DB | 41              | 45  | 82  | 3  | A    |
| NEW 1.30                 | 1                   | Int.                   | ●               | MWS0130SB    | 6.4             | 9.6 | 55  | 3  | A    |
|                          | 5                   | Int.                   | ●               | MWS0130LB    | 17              | 20  | 55  | 3  | A    |
|                          | 12                  | Int.                   | ●               | MWS0130XB    | 23              | 26  | 55  | 3  | A    |
|                          | 20                  | Int.                   | ●               | MWS0130X20DB | 30              | 33  | 68  | 3  | A    |
|                          | 25                  | Int.                   | ●               | MWS0130X25DB | 36              | 40  | 74  | 3  | A    |
|                          | 30                  | Int.                   | ●               | MWS0130X30DB | 43              | 46  | 82  | 3  | A    |

| Drill Dia.<br>D1<br>(mm) | Hole Depth<br>(l/d) | Coolant<br>(Int./Ext.) | Stock<br>VP15TF | Order Number | Dimensions (mm) |      |     |    | Type |
|--------------------------|---------------------|------------------------|-----------------|--------------|-----------------|------|-----|----|------|
|                          |                     |                        |                 |              | L3              | L2   | L1  | D4 |      |
| NEW 1.35                 | 1                   | Int.                   | □               | MWS0135SB    | 6.6             | 9.7  | 55  | 3  | A    |
|                          | 20                  | Int.                   | □               | MWS0135X20DB | 31              | 34   | 68  | 3  | A    |
|                          | 25                  | Int.                   | □               | MWS0135X25DB | 38              | 41   | 74  | 3  | A    |
| NEW 1.40                 | 1                   | Int.                   | ●               | MWS0140SB    | 7.0             | 10.0 | 55  | 3  | A    |
|                          | 5                   | Int.                   | ●               | MWS0140LB    | 17              | 20   | 55  | 3  | A    |
|                          | 12                  | Int.                   | ●               | MWS0140XB    | 23              | 26   | 55  | 3  | A    |
| NEW 1.45                 | 1                   | Int.                   | □               | MWS0145SB    | 7.2             | 10.1 | 55  | 3  | A    |
|                          | 20                  | Int.                   | □               | MWS0145X20DB | 33              | 36   | 68  | 3  | A    |
|                          | 25                  | Int.                   | □               | MWS0145X25DB | 41              | 43   | 74  | 3  | A    |
| NEW 1.50                 | 1                   | Int.                   | ●               | MWS0150SB    | 7.4             | 10.2 | 55  | 3  | A    |
|                          | 5                   | Int.                   | ●               | MWS0150LB    | 17              | 20   | 55  | 3  | A    |
|                          | 12                  | Int.                   | ●               | MWS0150XB    | 23              | 26   | 55  | 3  | A    |
| NEW 1.55                 | 1                   | Int.                   | □               | MWS0155SB    | 7.6             | 10.3 | 68  | 3  | A    |
|                          | 20                  | Int.                   | □               | MWS0155X20DB | 36              | 38   | 78  | 3  | A    |
|                          | 25                  | Int.                   | □               | MWS0155X25DB | 43              | 46   | 86  | 3  | A    |
| NEW 1.60                 | 1                   | Int.                   | ●               | MWS0160SB    | 8.0             | 10.6 | 68  | 3  | A    |
|                          | 5                   | Int.                   | ●               | MWS0160LB    | 22              | 25   | 68  | 3  | A    |
|                          | 12                  | Int.                   | ●               | MWS0160XB    | 30              | 33   | 68  | 3  | A    |
| NEW 1.65                 | 1                   | Int.                   | □               | MWS0165SB    | 8.2             | 10.7 | 68  | 3  | A    |
|                          | 20                  | Int.                   | □               | MWS0165X20DB | 38              | 40   | 78  | 3  | A    |
|                          | 25                  | Int.                   | □               | MWS0165X25DB | 46              | 49   | 86  | 3  | A    |
| NEW 1.70                 | 1                   | Int.                   | ●               | MWS0170SB    | 8.4             | 10.8 | 68  | 3  | A    |
|                          | 5                   | Int.                   | ●               | MWS0170LB    | 22              | 24   | 68  | 3  | A    |
|                          | 12                  | Int.                   | ●               | MWS0170XB    | 30              | 32   | 68  | 3  | A    |
| NEW 1.75                 | 1                   | Int.                   | □               | MWS0175SB    | 8.6             | 10.9 | 68  | 3  | A    |
|                          | 20                  | Int.                   | □               | MWS0175X20DB | 40              | 43   | 84  | 3  | A    |
|                          | 25                  | Int.                   | □               | MWS0175X25DB | 49              | 51   | 94  | 3  | A    |
| NEW 1.80                 | 1                   | Int.                   | ●               | MWS0180SB    | 9.0             | 11.2 | 68  | 3  | A    |
|                          | 5                   | Int.                   | ●               | MWS0180LB    | 22              | 24   | 68  | 3  | A    |
|                          | 12                  | Int.                   | ●               | MWS0180XB    | 30              | 32   | 68  | 3  | A    |
| NEW 1.85                 | 1                   | Int.                   | □               | MWS0185SB    | 9.2             | 11.3 | 68  | 3  | A    |
|                          | 20                  | Int.                   | □               | MWS0185X20DB | 43              | 45   | 84  | 3  | A    |
|                          | 25                  | Int.                   | □               | MWS0185X25DB | 52              | 54   | 94  | 3  | A    |
| NEW 1.90                 | 1                   | Int.                   | ●               | MWS0190SB    | 9.4             | 11.5 | 68  | 3  | A    |
|                          | 5                   | Int.                   | ●               | MWS0190LB    | 22              | 24   | 68  | 3  | A    |
|                          | 12                  | Int.                   | ●               | MWS0190XB    | 30              | 32   | 68  | 3  | A    |
| NEW 1.95                 | 1                   | Int.                   | □               | MWS0195SB    | 9.6             | 11.6 | 68  | 3  | A    |
|                          | 20                  | Int.                   | □               | MWS0195X20DB | 45              | 47   | 84  | 3  | A    |
|                          | 25                  | Int.                   | □               | MWS0195X25DB | 55              | 57   | 94  | 3  | A    |
| NEW 2.00                 | 1                   | Int.                   | □               | MWS0200SB    | 10.0            | 12.0 | 68  | 3  | A    |
|                          | 20                  | Int.                   | □               | MWS0200X20DB | 48              | 50   | 94  | 3  | A    |
|                          | 25                  | Int.                   | □               | MWS0200X25DB | 58              | 60   | 102 | 3  | A    |

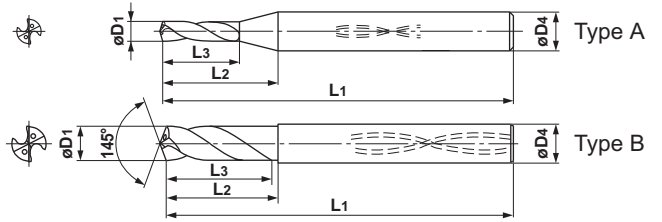
# Solid Carbide Drill with Through Coolant Holes

## MINI-MWS WSTAR DRILL SERIES

**MWS** (Internal coolant)

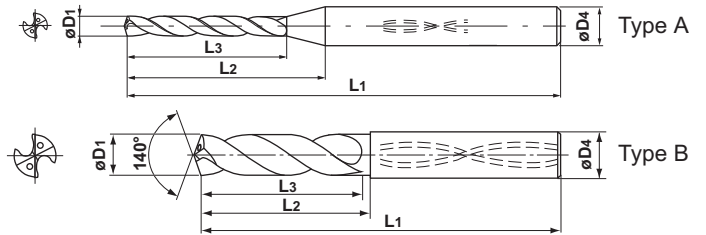
**SB Type** NEW  
(For pilot holes)

|                |             |             |
|----------------|-------------|-------------|
| D1             | 0.5≤D1<1.0  | 1.0≤D1<2.95 |
| Tolerance (mm) | +0.009<br>0 | +0.014<br>0 |



**LB/XB Type**

|                |             |             |
|----------------|-------------|-------------|
| D1             | 0.5≤D1<1.0  | 1.0≤D1<2.95 |
| Tolerance (mm) | 0<br>-0.009 | 0<br>-0.014 |



**DB Type** NEW



(Note) MWS type can be used for shrink fit holders.

| Drill Dia.<br>D1<br>(mm)   | Hole Depth<br>(l/d) | Coolant<br>(Int./Ext.) | Stock<br>VP15TF | Order Number | Dimensions (mm) |      |     |    | Type |
|--|---------------------|------------------------|-----------------|--------------|-----------------|------|-----|----|------|
|  |                     |                        |                 |              | L3              | L2   | L1  | D4 |      |
| <span style="background-color: yellow; border: 1px solid red; border-radius: 50%; padding: 2px;">NEW</span> 2.00 | 1                   | Int.                   | ●               | MWS0200SB    | 10.0            | 11.9 | 68  | 3  | A    |
|  | 5                   | Int.                   | ●               | MWS0200LB    | 22              | 24   | 68  | 3  | A    |
|  | 12                  | Int.                   | ●               | MWS0200XB    | 30              | 32   | 68  | 3  | A    |
|  | 20                  | Int.                   | ●               | MWS0200X20DB | 46              | 48   | 84  | 3  | A    |
|  | 25                  | Int.                   | ●               | MWS0200X25DB | 56              | 58   | 94  | 3  | A    |
| 30   | Int.                | ●                      | MWS0200X30DB    | 66           | 68              | 102  | 3   | A  |      |
| <span style="background-color: yellow; border: 1px solid red; border-radius: 50%; padding: 2px;">NEW</span> 2.05 | 1                   | Int.                   | □               | MWS0205SB    | 10.2            | 12.0 | 74  | 3  | A    |
|  | 20                  | Int.                   | □               | MWS0205X20DB | 47              | 49   | 94  | 3  | A    |
|  | 25                  | Int.                   | □               | MWS0205X25DB | 57              | 59   | 107 | 3  | A    |
|  | 30                  | Int.                   | □               | MWS0205X30DB | 68              | 69   | 118 | 3  | A    |
| <span style="background-color: yellow; border: 1px solid red; border-radius: 50%; padding: 2px;">NEW</span> 2.10 | 1                   | Int.                   | ●               | MWS0210SB    | 10.4            | 12.1 | 74  | 3  | A    |
|  | 5                   | Int.                   | ●               | MWS0210LB    | 28              | 30   | 74  | 3  | A    |
|  | 12                  | Int.                   | ●               | MWS0210XB    | 38              | 40   | 74  | 3  | A    |
|  | 20                  | Int.                   | ●               | MWS0210X20DB | 48              | 50   | 94  | 3  | A    |
|  | 25                  | Int.                   | ●               | MWS0210X25DB | 59              | 60   | 107 | 3  | A    |
| 30   | Int.                | ●                      | MWS0210X30DB    | 69           | 71              | 118  | 3   | A  |      |
| <span style="background-color: yellow; border: 1px solid red; border-radius: 50%; padding: 2px;">NEW</span> 2.15 | 1                   | Int.                   | □               | MWS0215SB    | 10.6            | 12.2 | 74  | 3  | A    |
|  | 20                  | Int.                   | □               | MWS0215X20DB | 49              | 51   | 94  | 3  | A    |
|  | 25                  | Int.                   | □               | MWS0215X25DB | 60              | 62   | 107 | 3  | A    |
|  | 30                  | Int.                   | □               | MWS0215X30DB | 71              | 73   | 118 | 3  | A    |
| <span style="background-color: yellow; border: 1px solid red; border-radius: 50%; padding: 2px;">NEW</span> 2.20 | 1                   | Int.                   | ●               | MWS0220SB    | 11.0            | 12.5 | 74  | 3  | A    |
|  | 5                   | Int.                   | ●               | MWS0220LB    | 28              | 29   | 74  | 3  | A    |
|  | 12                  | Int.                   | ●               | MWS0220XB    | 38              | 39   | 74  | 3  | A    |
|  | 20                  | Int.                   | ●               | MWS0220X20DB | 51              | 52   | 94  | 3  | A    |
|  | 25                  | Int.                   | ●               | MWS0220X25DB | 62              | 63   | 107 | 3  | A    |
| 30   | Int.                | ●                      | MWS0220X30DB    | 73           | 74              | 118  | 3   | A  |      |
| <span style="background-color: yellow; border: 1px solid red; border-radius: 50%; padding: 2px;">NEW</span> 2.25 | 1                   | Int.                   | □               | MWS0225SB    | 11.2            | 12.6 | 74  | 3  | A    |
|  | 20                  | Int.                   | □               | MWS0225X20DB | 52              | 53   | 94  | 3  | A    |
|  | 25                  | Int.                   | □               | MWS0225X25DB | 63              | 64   | 107 | 3  | A    |
| 30   | Int.                | □                      | MWS0225X30DB    | 74           | 76              | 118  | 3   | A  |      |

| Drill Dia.<br>D1<br>(mm)   | Hole Depth<br>(l/d) | Coolant<br>(Int./Ext.) | Stock<br>VP15TF | Order Number | Dimensions (mm) |      |     |    | Type |
|--|---------------------|------------------------|-----------------|--------------|-----------------|------|-----|----|------|
|  |                     |                        |                 |              | L3              | L2   | L1  | D4 |      |
| <span style="background-color: yellow; border: 1px solid red; border-radius: 50%; padding: 2px;">NEW</span> 2.30 | 1                   | Int.                   | ●               | MWS0230SB    | 11.4            | 12.7 | 74  | 3  | A    |
|  | 5                   | Int.                   | ●               | MWS0230LB    | 28              | 29   | 74  | 3  | A    |
|  | 12                  | Int.                   | ●               | MWS0230XB    | 38              | 39   | 74  | 3  | A    |
|  | 20                  | Int.                   | ●               | MWS0230X20DB | 53              | 54   | 94  | 3  | A    |
|  | 25                  | Int.                   | ●               | MWS0230X25DB | 64              | 66   | 107 | 3  | A    |
| 30   | Int.                | ●                      | MWS0230X30DB    | 76           | 77              | 118  | 3   | A  |      |
| <span style="background-color: yellow; border: 1px solid red; border-radius: 50%; padding: 2px;">NEW</span> 2.35 | 1                   | Int.                   | □               | MWS0235SB    | 11.6            | 12.8 | 74  | 3  | A    |
|  | 20                  | Int.                   | □               | MWS0235X20DB | 54              | 55   | 94  | 3  | A    |
|  | 25                  | Int.                   | □               | MWS0235X25DB | 66              | 67   | 107 | 3  | A    |
|  | 30                  | Int.                   | □               | MWS0235X30DB | 78              | 79   | 118 | 3  | A    |
| <span style="background-color: yellow; border: 1px solid red; border-radius: 50%; padding: 2px;">NEW</span> 2.40 | 1                   | Int.                   | ●               | MWS0240SB    | 12.0            | 13.1 | 74  | 3  | A    |
|  | 5                   | Int.                   | ●               | MWS0240LB    | 28              | 29   | 74  | 3  | A    |
|  | 12                  | Int.                   | ●               | MWS0240XB    | 38              | 39   | 74  | 3  | A    |
|  | 20                  | Int.                   | ●               | MWS0240X20DB | 55              | 56   | 94  | 3  | A    |
|  | 25                  | Int.                   | ●               | MWS0240X25DB | 67              | 68   | 107 | 3  | A    |
| 30   | Int.                | ●                      | MWS0240X30DB    | 79           | 80              | 118  | 3   | A  |      |
| <span style="background-color: yellow; border: 1px solid red; border-radius: 50%; padding: 2px;">NEW</span> 2.45 | 1                   | Int.                   | □               | MWS0245SB    | 12.2            | 13.2 | 74  | 3  | A    |
|  | 20                  | Int.                   | □               | MWS0245X20DB | 56              | 57   | 94  | 3  | A    |
|  | 25                  | Int.                   | □               | MWS0245X25DB | 69              | 70   | 107 | 3  | A    |
|  | 30                  | Int.                   | □               | MWS0245X30DB | 81              | 82   | 118 | 3  | A    |
| <span style="background-color: yellow; border: 1px solid red; border-radius: 50%; padding: 2px;">NEW</span> 2.50 | 1                   | Int.                   | ●               | MWS0250SB    | 12.4            | 13.3 | 74  | 3  | A    |
|  | 5                   | Int.                   | ●               | MWS0250LB    | 28              | 29   | 74  | 3  | A    |
|  | 12                  | Int.                   | ●               | MWS0250XB    | 38              | 39   | 74  | 3  | A    |
|  | 20                  | Int.                   | ●               | MWS0250X20DB | 58              | 59   | 94  | 3  | A    |
|  | 25                  | Int.                   | ●               | MWS0250X25DB | 70              | 71   | 107 | 3  | A    |
| 30   | Int.                | ●                      | MWS0250X30DB    | 83           | 84              | 118  | 3   | A  |      |
| <span style="background-color: yellow; border: 1px solid red; border-radius: 50%; padding: 2px;">NEW</span> 2.55 | 1                   | Int.                   | □               | MWS0255SB    | 12.6            | 12.6 | 81  | 3  | B    |
|  | 20                  | Int.                   | □               | MWS0255X20DB | 59              | 59   | 103 | 3  | B    |
|  | 25                  | Int.                   | □               | MWS0255X25DB | 71              | 71   | 117 | 3  | B    |
| 30   | Int.                | □                      | MWS0255X30DB    | 84           | 84              | 132  | 3   | B  |      |

\* Please contact us for any geometry that is not in this catalogue (e.g. different diameters and lengths can be made to order).

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



| Drill Dia.<br>D1<br>(mm) | Hole Depth<br>(l/d) | Coolant<br>(Int./Ext.) | Stock<br>VP15TF | Order Number | Dimensions (mm) |      |     |    | Type |
|--------------------------|---------------------|------------------------|-----------------|--------------|-----------------|------|-----|----|------|
|                          |                     |                        |                 |              | L3              | L2   | L1  | D4 |      |
| 2.60                     | 1                   | Int.                   | ●               | MWS0260SB    | 13.0            | 13.0 | 81  | 3  | B    |
|                          | 5                   | Int.                   | ●               | MWS0260LB    | 33              | 33   | 81  | 3  | B    |
|                          | 12                  | Int.                   | ●               | MWS0260XB    | 45              | 45   | 81  | 3  | B    |
|                          | 20                  | Int.                   | ●               | MWS0260X20DB | 60              | 60   | 103 | 3  | B    |
|                          | 25                  | Int.                   | ●               | MWS0260X25DB | 73              | 73   | 117 | 3  | B    |
| 2.65                     | 30                  | Int.                   | ●               | MWS0260X30DB | 86              | 86   | 132 | 3  | B    |
|                          | 1                   | Int.                   | □               | MWS0265SB    | 13.2            | 13.2 | 81  | 3  | B    |
|                          | 20                  | Int.                   | □               | MWS0265X20DB | 61              | 61   | 103 | 3  | B    |
|                          | 25                  | Int.                   | □               | MWS0265X25DB | 74              | 74   | 117 | 3  | B    |
| 2.70                     | 30                  | Int.                   | □               | MWS0265X30DB | 87              | 87   | 132 | 3  | B    |
|                          | 1                   | Int.                   | ●               | MWS0270SB    | 13.4            | 13.4 | 81  | 3  | B    |
|                          | 5                   | Int.                   | ●               | MWS0270LB    | 33              | 33   | 81  | 3  | B    |
|                          | 12                  | Int.                   | ●               | MWS0270XB    | 45              | 45   | 81  | 3  | B    |
|                          | 20                  | Int.                   | ●               | MWS0270X20DB | 62              | 62   | 103 | 3  | B    |
| 2.75                     | 25                  | Int.                   | ●               | MWS0270X25DB | 76              | 76   | 117 | 3  | B    |
|                          | 30                  | Int.                   | ●               | MWS0270X30DB | 89              | 89   | 132 | 3  | B    |
|                          | 1                   | Int.                   | □               | MWS0275SB    | 13.6            | 13.6 | 81  | 3  | B    |
| 2.85                     | 20                  | Int.                   | □               | MWS0275X20DB | 63              | 63   | 103 | 3  | B    |
|                          | 25                  | Int.                   | □               | MWS0275X25DB | 77              | 77   | 117 | 3  | B    |
|                          | 30                  | Int.                   | □               | MWS0275X30DB | 91              | 91   | 132 | 3  | B    |

| Drill Dia.<br>D1<br>(mm) | Hole Depth<br>(l/d) | Coolant<br>(Int./Ext.) | Stock<br>VP15TF | Order Number | Dimensions (mm) |      |     |    | Type |
|--------------------------|---------------------|------------------------|-----------------|--------------|-----------------|------|-----|----|------|
|                          |                     |                        |                 |              | L3              | L2   | L1  | D4 |      |
| 2.80                     | 1                   | Int.                   | ●               | MWS0280SB    | 14.0            | 14.0 | 81  | 3  | B    |
|                          | 5                   | Int.                   | ●               | MWS0280LB    | 33              | 33   | 81  | 3  | B    |
|                          | 12                  | Int.                   | ●               | MWS0280XB    | 45              | 45   | 81  | 3  | B    |
|                          | 20                  | Int.                   | ●               | MWS0280X20DB | 64              | 64   | 103 | 3  | B    |
|                          | 25                  | Int.                   | ●               | MWS0280X25DB | 78              | 78   | 117 | 3  | B    |
| 2.85                     | 30                  | Int.                   | ●               | MWS0280X30DB | 92              | 92   | 132 | 3  | B    |
|                          | 1                   | Int.                   | □               | MWS0285SB    | 14.2            | 14.2 | 81  | 3  | B    |
|                          | 20                  | Int.                   | □               | MWS0285X20DB | 66              | 66   | 103 | 3  | B    |
|                          | 25                  | Int.                   | □               | MWS0285X25DB | 80              | 80   | 117 | 3  | B    |
| 2.90                     | 30                  | Int.                   | □               | MWS0285X30DB | 94              | 94   | 132 | 3  | B    |
|                          | 1                   | Int.                   | ●               | MWS0290SB    | 14.4            | 14.4 | 81  | 3  | B    |
|                          | 5                   | Int.                   | ●               | MWS0290LB    | 33              | 33   | 81  | 3  | B    |
|                          | 12                  | Int.                   | ●               | MWS0290XB    | 45              | 45   | 81  | 3  | B    |
|                          | 20                  | Int.                   | ●               | MWS0290X20DB | 67              | 67   | 103 | 3  | B    |
| 2.95                     | 25                  | Int.                   | ●               | MWS0290X25DB | 81              | 81   | 117 | 3  | B    |
|                          | 30                  | Int.                   | ●               | MWS0290X30DB | 96              | 96   | 132 | 3  | B    |
|                          | 1                   | Int.                   | □               | MWS0295SB    | 14.6            | 14.6 | 81  | 3  | B    |
| 2.95                     | 20                  | Int.                   | □               | MWS0295X20DB | 68              | 68   | 103 | 3  | B    |
|                          | 25                  | Int.                   | □               | MWS0295X25DB | 83              | 83   | 117 | 3  | B    |
|                          | 30                  | Int.                   | □               | MWS0295X30DB | 97              | 97   | 132 | 3  | B    |

## Recommended Cutting Conditions

### SB/LB/XB Type Drill

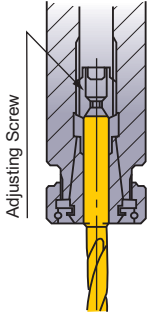
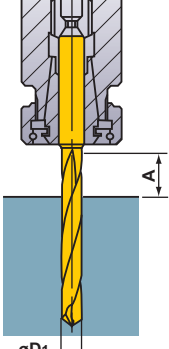
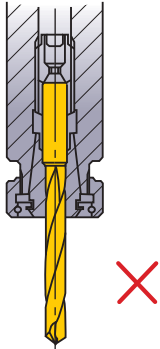
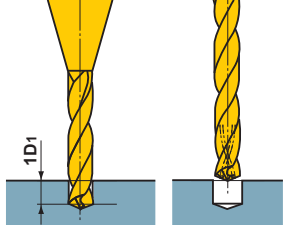
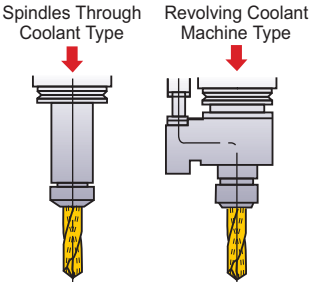
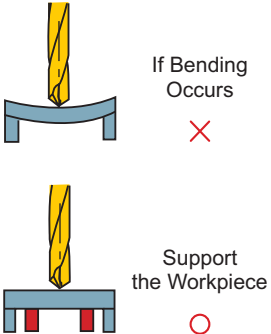
| Work Material | Drill Diameter              | Conditions<br>Hardness      | φ0.50-φ0.70              |                        | φ0.71-φ0.85              |                       | φ0.86-φ0.99              |                      | φ1.0-φ2.95               |                     |
|---------------|-----------------------------|-----------------------------|--------------------------|------------------------|--------------------------|-----------------------|--------------------------|----------------------|--------------------------|---------------------|
|               |                             |                             | Cutting Speed<br>(m/min) | Feed<br>(mm/rev)       | Cutting Speed<br>(m/min) | Feed<br>(mm/rev)      | Cutting Speed<br>(m/min) | Feed<br>(mm/rev)     | Cutting Speed<br>(m/min) | Feed<br>(mm/rev)    |
| P             | Mild Steel                  | ≤180HB                      | 50<br>(40-60)            | 0.010<br>(0.005-0.015) | 50<br>(40-60)            | 0.02<br>(0.01-0.03)   | 50<br>(40-60)            | 0.03<br>(0.02-0.05)  | 50<br>(40-60)            | 0.08<br>(0.04-0.12) |
|               |                             | 180-280HB                   | 50<br>(40-60)            | 0.010<br>(0.005-0.015) | 50<br>(40-60)            | 0.02<br>(0.01-0.03)   | 50<br>(40-60)            | 0.03<br>(0.02-0.05)  | 50<br>(40-60)            | 0.08<br>(0.04-0.12) |
|               | Carbon Steel<br>Alloy Steel | 280-350HB                   | 50<br>(40-60)            | 0.010<br>(0.005-0.015) | 50<br>(40-60)            | 0.02<br>(0.01-0.03)   | 50<br>(40-60)            | 0.03<br>(0.02-0.05)  | 50<br>(40-60)            | 0.08<br>(0.04-0.12) |
| M             | Stainless Steel             | ≤200HB                      | 30<br>(20-40)            | 0.008<br>(0.005-0.01)  | 30<br>(20-40)            | 0.015<br>(0.008-0.02) | 30<br>(20-40)            | 0.02<br>(0.01-0.03)  | 30<br>(20-40)            | 0.05<br>(0.02-0.10) |
| K             | Cast Iron                   | Tensile Strength<br>≤350MPa | 50<br>(40-60)            | 0.015<br>(0.008-0.02)  | 50<br>(40-60)            | 0.02<br>(0.01-0.03)   | 50<br>(40-60)            | 0.04<br>(0.02-0.06)  | 50<br>(40-60)            | 0.08<br>(0.04-0.12) |
|               | Ductile Cast Iron           | Tensile Strength<br>≤450MPa | 30<br>(20-40)            | 0.010<br>(0.005-0.015) | 30<br>(20-40)            | 0.02<br>(0.01-0.03)   | 30<br>(20-40)            | 0.03<br>(0.02-0.05)  | 30<br>(20-40)            | 0.06<br>(0.02-0.10) |
| N             | Aluminium Alloy             | -                           | 60<br>(50-80)            | 0.03<br>(0.02-0.05)    | 60<br>(50-80)            | 0.04<br>(0.03-0.06)   | 60<br>(50-80)            | 0.06<br>(0.04-0.08)  | 60<br>(50-80)            | 0.10<br>(0.05-0.15) |
| S             | Heat Resistant Alloy        | -                           | 10<br>(5-15)             | 0.006<br>(0.004-0.008) | 10<br>(5-15)             | 0.01<br>(0.005-0.02)  | 10<br>(5-15)             | 0.01<br>(0.005-0.02) | 10<br>(5-15)             | 0.03<br>(0.01-0.05) |

### DB Type Long Drill

| Work Material | Drill Diameter              | Conditions<br>Hardness      | φ1.0-φ2.0                |                     | φ2.05-φ2.95              |                     |
|---------------|-----------------------------|-----------------------------|--------------------------|---------------------|--------------------------|---------------------|
|               |                             |                             | Cutting Speed<br>(m/min) | Feed<br>(mm/rev)    | Cutting Speed<br>(m/min) | Feed<br>(mm/rev)    |
| P             | Mild Steel                  | ≤180HB                      | 50<br>(40-60)            | 0.08<br>(0.04-0.10) | 60<br>(50-70)            | 0.10<br>(0.08-0.12) |
|               |                             | 180-280HB                   | 40<br>(30-50)            | 0.07<br>(0.04-0.08) | 50<br>(40-60)            | 0.09<br>(0.06-0.12) |
|               | Carbon Steel<br>Alloy Steel | 280-350HB                   | 30<br>(20-40)            | 0.04<br>(0.03-0.06) | 50<br>(40-60)            | 0.07<br>(0.05-0.10) |
| M             | Stainless Steel             | ≤200HB                      | 30<br>(20-40)            | 0.03<br>(0.01-0.05) | 30<br>(20-40)            | 0.06<br>(0.04-0.08) |
| K             | Cast Iron                   | Tensile Strength<br>≤350MPa | 40<br>(30-50)            | 0.07<br>(0.04-0.08) | 50<br>(40-60)            | 0.09<br>(0.06-0.12) |
|               | Ductile Cast Iron           | Tensile Strength<br>≤450MPa | 30<br>(20-40)            | 0.04<br>(0.03-0.06) | 50<br>(40-60)            | 0.07<br>(0.05-0.10) |
| S             | Heat Resistant Alloy        | -                           | 10<br>(5-15)             | 0.02<br>(0.01-0.03) | 15<br>(10-20)            | 0.03<br>(0.01-0.05) |

## MINI-MWS WSTAR DRILL SERIES

### Operational Guidance for Mini MWS drills

| Drill Holding   | Drill Length   | Drill Installation  | Drill Installation  |
|---|--|---|---|
|  <p>Adjusting Screw</p> <p>Thrust bearing type collet chuck holds the drill securely.</p>  |  <p><math>A \geq D_1 \times 2</math></p>                |  <p>Do not clamp on the flutes.</p>   |  <p>① For pilot hole drilling, use the SB type drill.<br/>② Use the prepared hole as a guide when using a drill with an oil hole. Depending on the cutting conditions, peck feed is recommended.</p> |
| Through Coolant Type  | Thin Workpiece   | Coolant Handling  |   |
|  <p>Spindles Through Coolant Type      Revolving Coolant Machine Type</p> <p>Recommended coolant pressure:<br/><math>\geq 3\text{Mpa}</math><br/>At least 1.5Mpa is required.</p> |  <p>If Bending Occurs</p> <p>Support the Workpiece</p> | <p>1) Small particles of swarf will jam in the oil hole of small diameter drills. Always use a fine mesh filter as a preventative measure.</p> <p>2) Dirt and dust particles adhere to the oil in old coolant and prevent an efficient flow. Regular coolant exchange is recommended.</p> |   |

### Cautions for use

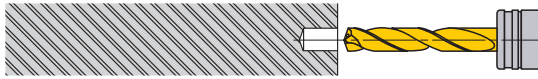
- Please use a fine mesh filter (mesh  $\leq 3\mu\text{m}$ ) for coolant to prevent jamming in the oil hole.
- For deep drilling with the long type drill, machining a pilot hole is recommended. (Otherwise, centrifugal forces may cause drill breakage.)

## Operational Guidance for MWS Long Type Drills (L/D ≥ 10)

### Flat Face Drilling

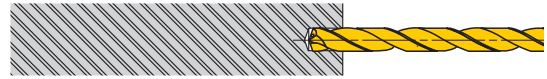
● Drilling a blind hole

#### 1. Drilling a pilot hole



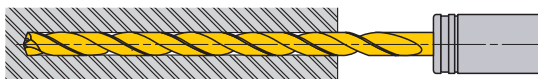
- ① Use the SB type drill.
- ② Ensure a high precision hole is drilled for the guide.
- ③ Drill depth : Approx 1D.

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



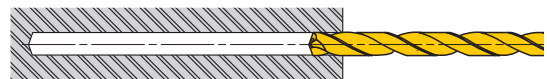
- ① Penetrate the pilot hole at a low revolution. (Revolution speed  $1000\text{min}^{-1}$ , feed rate  $0.2\text{--}0.3\text{mm/rev}$ )
- ② Stop the long type drill  $0.5\text{--}1.0\text{mm}$  short of the pilot hole bottom.

#### 3. Drill the deep hole



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

#### 4. Drill retraction

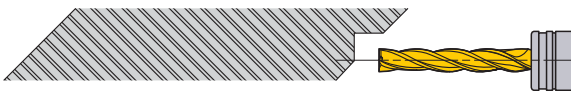


- ① After drilling, lower the cutting revolution about  $0.5\text{--}1.0\text{mm}$  short of the hole end. (Revolution speed of around  $1000\text{min}^{-1}$ )
- ② Retract the drill to the pilot hole depth starting point at a feed rate of  $3000\text{mm/min}$ .
- ③ Finally clear the hole at a cutting speed of  $20\text{--}30\text{m/min}$  and feed rate of  $0.2\text{--}0.3\text{mm/rev}$ .

### Interrupted Drilling

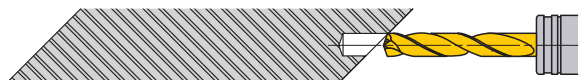
● Drilling and breaking through on irregular faces or angles

#### 1. Spot facing



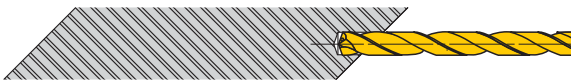
- ① Machine a flat on the irregular face by using an end mill or slot drill capable of spot facing. Make the spot face diameter the same size as the required deep hole diameter.

#### 2. Drilling a pilot hole



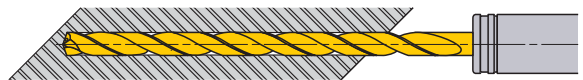
- ① Use a drill with a larger (flatter) point angle than the long type. The MWS-SB type is recommended.
- ② Ensure a high precision hole is drilled for the guide.
- ③ Drill depth : Approx 1D.

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



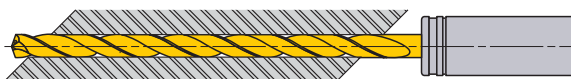
- ① Penetrate the pilot hole at a low revolution. (Revolution speed  $1000\text{min}^{-1}$ , feed rate  $0.2\text{--}0.3\text{mm/rev}$ )
- ② Stop the long type drill  $0.5\text{--}1.0\text{mm}$  short of the pilot hole bottom.

#### 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 Feed rate should be half the normal feed.

#### 6. Drill retraction



- ① Retract the drill to the pilot hole depth starting point at a feed rate of  $3000\text{mm/min}$ .
- ② Finally clear the hole at a revolution speed of  $1000\text{min}^{-1}$  and feed rate of  $0.2\text{--}0.3\text{mm/rev}$ .

#### 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  
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