



CARBIDE - CBN - DIAMOND

Sumitomo Electric Carbide, Inc.

# MDF Flat Bottom Drills

**P** **K** **M** **N**

More Details @  
[sumicarbide.com](http://sumicarbide.com)



## 180° Point Angle Solid Carbide Drills



## ■ General Features

The flat multidrill MDF type is a solid carbide drill that can be used for various purposes including high-efficiency spot facing and drilling on inclined surfaces and curved surfaces.



## ■ Features & Benefits

### ● Applicable to various types of drilling thanks to a point angle of 180°

Applicable to high-efficiency spot facing, drilling in non-horizontal surfaces such as inclined and cylindrical surfaces, and interrupted drilling. Also reduces burrs at the hole exit.

### ● Improves machining stability

Achieves high rigidity by employing RS THINNING, which ensures thick web at the bottom.

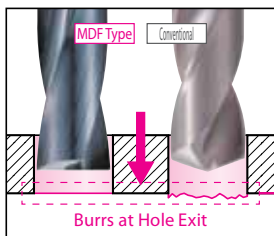
### ● Excellent chip evacuation

Achieves excellent chip evacuation thanks to the wide chip pocket and a high-quality rake face shape.

### ● Excellent cutting edge strength

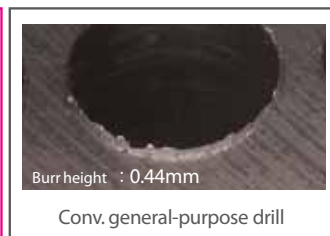
Achieves excellent cutting edge strength through optimized cutting edge design.

## ■ Reduction of Burrs at Hole Exit

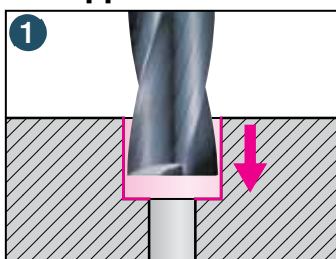


Work Material : SCM415  
 Tool : MDF0500S2D (ø5.0mm 2D)  
 Cutting Conditions :  $v_c=215$  SFM  $f=0.005$  IPR,  
 $H=0.394"$ , 150 Units, Wet  
 Equipment : Vertical Machining Center  
 M/C (BT40)

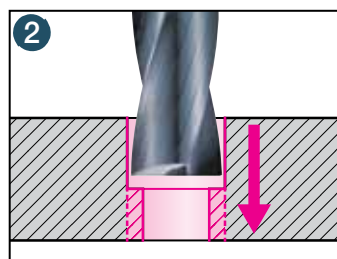
Reduces exit burrs by half compared  
 with general-purpose drills



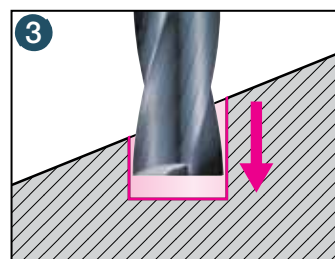
## ■ Applications



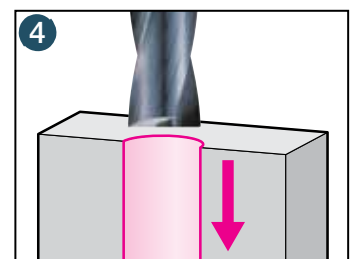
High-efficiency spot facing



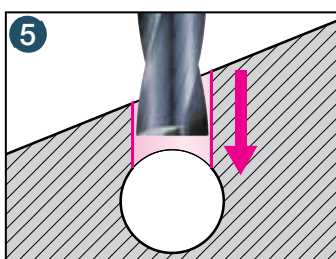
Hole Expansion Drilling



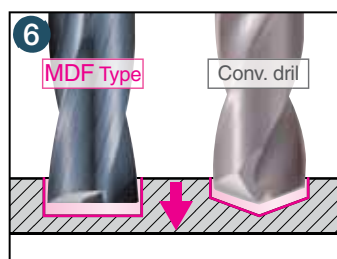
Drilling in non-horizontal surface  
 (inclined surface, cylindrical surface, etc.)



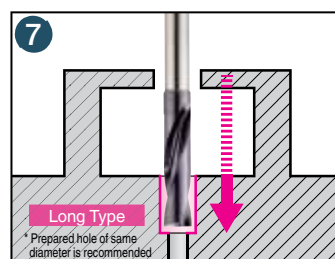
Interrupted drilling



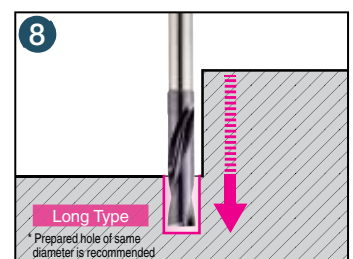
Cross drilling



Pre-tap hole drilling in thin sheets



Deep Spot Facing



Avoiding Interference With Work Materials

\* Prepared hole of same diameter is recommended

\* Prepared hole of same diameter is recommended

# MDF-L Long Shank Type (2XD) Characteristics

Long Shank Type (L2D Type) for flat base drilling, hole expansion, and burr prevention in long overhang conditions!

- For drilling with long overhang and to avoid interference with the workpiece.
- \* Drilling with long shank type drills require a prepared hole of the same diameter or a centering hole larger than the drill diameter.

$$DC < 6\text{mm} \quad DC \leq DMM$$



$$DC \geq 6\text{mm} \quad DC > DMM$$



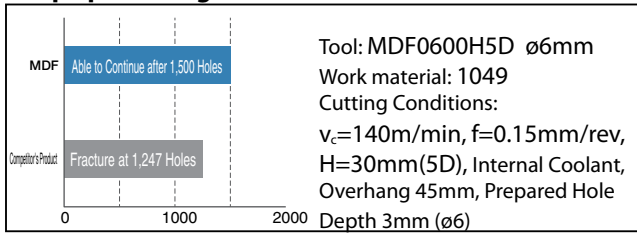
# MDF-H Type (3XD & 5XD) Characteristics

With Oil Hole (H3D Type/H5D Type) up to 5D deep hole drilling!

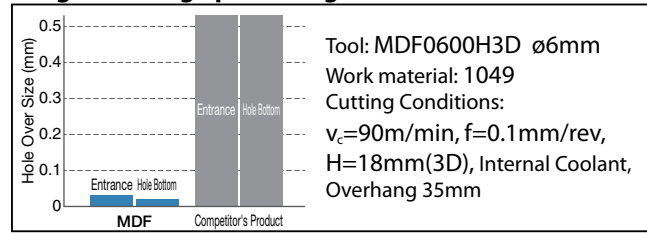
- Having internal coolant allows for deeper flat hole drilling.
- \* Drilling with L/D=5 drills with oil holes require a prepared hole of the same diameter or a centering hole larger than the drill diameter.



## Deep Spot Facing



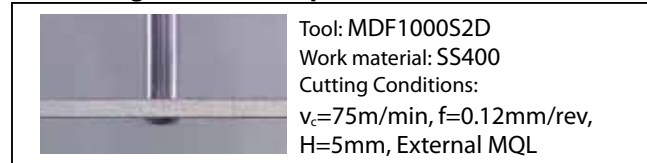
## Long Overhang Spot Facing



## Inclined Surface Drilling



## Controlling Burrs and Chips When Withdrawn



## Flat Drills, General-Purpose Drills, & Endmills Comparison

| Tool                          | Flat Drill<br>MDF Type                                      | General-Purpose Drill<br>GS/HGS Type | Endmill for Spot Facing<br>GSXSLT Type  |
|-------------------------------|---|--------------------------------------|---|
| Hole Bottom Shape             | Convex Shape (180°)<br>Nearly Flat (Concave Shape)<br>0-0.5 | Convex Shape (135°)<br>Concave Shape | Concave Shape (2° to 3° Concavity)<br>Convex Shape (Cannot be used for prepared hole drilling)<br>2-3 |
| Drilling in Flat Surfaces     | ○ Feed rate approximately half of a general-purpose drill   | ⊙ Best                               | △ Within 1D, limited to low feed rate<br>Feed rate one-fifth or lower of a general-purpose drill      |
| Drilling in Non-Flat Surfaces | ⊙ Optimal (Within 2D is recommended)                        | ✗ Unusable                           | ○ Within 1D, limited to low feed rate<br>Feed rate one-two or lower of a Flat Drill                   |
| Traversing                    | ✗ Unusable  | ✗ Unusable                           | ⊙ Best  |

## Series

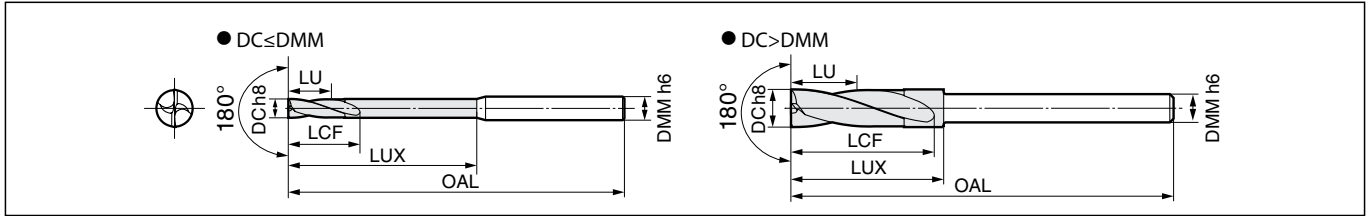
| Coolant Supply | Cat. No.   | Diameter Range (mm) | Drilling Depth (L/D) | Content   |
|----------------|------------|---------------------|----------------------|-----------|
| External       | MDF□□□□S2D | ø0.3 to 20.0        | Up to 2              | 132 items |
|                | MDF□□□□L2D | ø3.0 to 20.0        | Up to 2              | 107 items |
| Internal       | MDF□□□□H3D | ø3.0 to 16.0        | Up to 3              | 99 items  |
|                | MDF□□□□H5D | ø3.0 to 16.0        | Up to 5              | 99 items  |



# MDF-L Long Shank Type (2XD)

External Coolant Supply

|              |             |                |                |                 |          |                      |           |                   |                 |              |                |
|--------------|-------------|----------------|----------------|-----------------|----------|----------------------|-----------|-------------------|-----------------|--------------|----------------|
| Carbon Steel | Alloy Steel | Tempered Steel | Hardened Steel | Stainless steel | Ti Alloy | Heat-resistant steel | Cast Iron | Ductile Cast Iron | Aluminium Alloy | Copper alloy | Composite CFRP |
| Up to 0.2%   | From 0.2%   | Up to 4HRC     | From 4HRC      | ○               | ○        | ○                    | ○         | ○                 | ○               | ○            | ○              |



● Diameter  $\phi 3.0$  to  $\phi 8.5$ mm

● Diameter  $\phi 9.6$  to  $\phi 20.0$ mm

| Diameter DC (mm) | Shank DMM (mm) | Cat. No.      | Stock      | Dimensions (mm) |      |      |      |      |
|------------------|----------------|---------------|------------|-----------------|------|------|------|------|
|                  |                |               |            | LU              | LCF  | LUX  | OAL  |      |
| 3.0              | 6.0            | MDF0300L2D    | ★          | 9.0             | 13.5 | 30.0 | 100  |      |
| 3.1              |                | MDF0310L2D    | ★          | 9.3             | 14.0 | 31.0 |      |      |
| 3.2              |                | MDF0320L2D    | ★          | 9.6             | 14.4 | 32.0 |      |      |
| 3.3              |                | MDF0330L2D    | ★          | 9.9             | 14.9 | 33.0 |      |      |
| 3.4              |                | MDF0340L2D    | ★          | 10.2            | 15.3 | 34.0 |      |      |
| 3.5              |                | MDF0350L2D    | ★          | 10.5            | 15.8 | 35.0 |      |      |
| 3.6              | 6.0            | MDF0360L2D    | ★          | 10.8            | 16.2 | 36.0 | 100  |      |
| 3.7              |                | MDF0370L2D    | ★          | 11.1            | 16.7 | 37.0 |      |      |
| 3.8              |                | MDF0380L2D    | ★          | 11.4            | 17.1 | 38.0 |      |      |
| 3.9              |                | MDF0390L2D    | ★          | 11.7            | 17.6 | 39.0 |      |      |
| 4.0              |                | MDF0400L2D    | ★          | 12.0            | 18.0 | 40.0 |      |      |
| 4.1              |                | MDF0410L2D    | ★          | 12.3            | 18.5 | 41.0 |      |      |
| 4.2              | 6.0            | MDF0420L2D    | ★          | 12.6            | 18.9 | 42.0 | 100  |      |
| 4.3              |                | MDF0430L2D    | ★          | 12.9            | 19.4 | 43.0 |      |      |
| 4.4              |                | MDF0440L2D    | ★          | 13.2            | 19.8 | 44.0 |      |      |
| 4.5              |                | MDF0450L2D    | ★          | 13.5            | 20.3 | 45.0 |      |      |
| 4.6              |                | MDF0460L2D    | ★          | 13.8            | 20.7 | 46.0 |      |      |
| 4.7              |                | MDF0470L2D    | ★          | 14.1            | 21.2 | 47.0 |      |      |
| 4.8              | 6.0            | MDF0480L2D    | ★          | 14.4            | 21.6 | 48.0 | 100  |      |
| 4.9              |                | MDF0490L2D    | ★          | 14.7            | 22.1 | 49.0 |      |      |
| 5.0              |                | MDF0500L2D    | ★          | 15.0            | 22.5 | 50.0 |      |      |
| 5.1              |                | MDF0510L2D    | ★          | 15.3            | 23.0 | 51.0 |      |      |
| 5.2              |                | MDF0520L2D    | ★          | 15.6            | 23.4 | 52.0 |      |      |
| 5.3              |                | MDF0530L2D    | ★          | 15.9            | 23.9 | 53.0 |      |      |
| 5.4              | 6.0            | MDF0540L2D    | ★          | 16.2            | 24.3 | 54.0 | 110  |      |
| 5.5              |                | MDF0550L2D    | ★          | 16.5            | 24.8 | 55.0 |      |      |
| 5.6              |                | MDF0560L2D    | ★          | 16.8            | 25.2 | 56.0 |      |      |
| 5.7              |                | MDF0570L2D    | ★          | 17.1            | 25.7 | 57.0 |      |      |
| 5.8              |                | MDF0580L2D    | ★          | 17.4            | 26.1 | 58.0 |      |      |
| 5.9              |                | MDF0590L2D    | ★          | 17.7            | 26.6 | 59.0 |      |      |
| 6.0              | 5.0            | MDF0600L2D-S5 | ★          | 18.0            | 27.0 | 30.0 | 110  |      |
| 6.0              | 6.0            | MDF0600L2D    | ★          | 18.0            | 27.0 | 60.0 | 110  |      |
| 6.1              | 6.0            | MDF0610L2D    | ★          | 18.3            | 27.5 | 30.5 | 120  |      |
| 6.2              |                | MDF0620L2D    | ★          | 18.6            | 27.9 | 30.9 |      |      |
| 6.3              |                | MDF0630L2D    | ★          | 18.9            | 28.4 | 31.4 |      |      |
| 6.4              |                | MDF0640L2D    | ★          | 19.2            | 28.8 | 31.8 |      |      |
| 6.5              |                | MDF0650L2D    | ★          | 19.5            | 29.3 | 32.3 |      |      |
| 6.6              |                | MDF0660L2D    | ★          | 19.8            | 29.7 | 32.7 |      |      |
| 6.7              | 6.0            | MDF0670L2D    | ★          | 20.1            | 30.2 | 33.2 | 120  |      |
| 6.8              |                | MDF0680L2D    | ★          | 20.4            | 30.6 | 33.6 |      |      |
| 6.9              |                | MDF0690L2D    | ★          | 20.7            | 31.1 | 34.1 |      |      |
| 7.0              |                | MDF0700L2D    | ★          | 21.0            | 31.5 | 34.5 |      |      |
| 7.1              |                | MDF0710L2D    | ★          | 21.3            | 32.0 | 35.0 |      |      |
| 7.2              |                | MDF0720L2D    | ★          | 21.6            | 32.4 | 35.4 |      |      |
| 7.3              | 6.0            | MDF0730L2D    | ★          | 21.9            | 32.9 | 35.9 | 130  |      |
| 7.4              |                | MDF0740L2D    | ★          | 22.2            | 33.3 | 36.3 |      |      |
| 7.5              |                | MDF0750L2D    | ★          | 22.5            | 33.8 | 36.8 |      |      |
| 7.6              |                | MDF0760L2D    | ★          | 22.8            | 34.2 | 37.2 |      |      |
| 7.7              |                | MDF0770L2D    | ★          | 23.1            | 34.7 | 37.7 |      |      |
| 7.8              |                | MDF0780L2D    | ★          | 23.4            | 35.1 | 38.1 |      |      |
| 7.9              | 6.0            | MDF0790L2D    | ★          | 23.7            | 35.6 | 38.6 | 130  |      |
| 8.0              |                | MDF0800L2D-S6 | ★          | 24.0            | 36.0 | 39.0 |      |      |
| 8.0              |                | MDF0800L2D    | ★          | 24.0            | 36.0 | 80.0 |      | 130  |
| 8.1              |                | MDF0810L2D    | ★          | 24.3            | 36.5 | 39.5 |      |      |
| 8.2              |                | MDF0820L2D    | ★          | 24.6            | 36.9 | 39.9 |      |      |
| 8.3              |                | 8.0           | MDF0830L2D | ★               | 24.9 | 37.4 |      | 40.4 |
| 8.4              | MDF0840L2D     |               | ★          | 25.2            | 37.8 | 40.8 |      |      |
| 8.5              | MDF0850L2D     |               | ★          | 25.5            | 38.3 | 41.3 |      |      |
| 8.6              | MDF0860L2D     |               | ★          | 25.8            | 38.7 | 41.7 |      |      |
| 8.7              | MDF0870L2D     |               | ★          | 26.1            | 39.2 | 42.2 |      |      |
| 8.8              | 8.0            |               | MDF0880L2D | ★               | 26.4 | 39.6 | 42.6 | 140  |
| 8.9              |                | MDF0890L2D    | ★          | 26.7            | 40.1 | 43.1 |      |      |
| 9.0              |                | MDF0900L2D    | ★          | 27.0            | 40.5 | 43.5 |      |      |
| 9.1              |                | MDF0910L2D    | ★          | 27.3            | 41.0 | 44.0 |      |      |
| 9.2              |                | MDF0920L2D    | ★          | 27.6            | 41.4 | 44.4 |      |      |
| 9.3              |                | 8.0           | MDF0930L2D | ★               | 27.9 | 41.9 | 44.9 |      |
| 9.4              | MDF0940L2D     |               | ★          | 28.2            | 42.3 | 45.3 |      |      |
| 9.5              | MDF0950L2D     |               | ★          | 28.5            | 42.8 | 45.8 |      |      |

| Diameter DC (mm) | Shank DMM (mm) | Cat. No.   | Stock          | Dimensions (mm) |      |       |       |       |       |      |
|------------------|----------------|------------|----------------|-----------------|------|-------|-------|-------|-------|------|
|                  |                |            |                | LU              | LCF  | LUX   | OAL   |       |       |      |
| 9.6              | 8.0            | MDF0960L2D | ★              | 28.8            | 43.2 | 46.2  | 150   |       |       |      |
| 9.7              |                | MDF0970L2D | ★              | 29.1            | 43.7 | 46.7  |       |       |       |      |
| 9.8              |                | MDF0980L2D | ★              | 29.4            | 44.1 | 47.1  |       |       |       |      |
| 9.9              |                | MDF0990L2D | ★              | 29.7            | 44.6 | 47.6  |       |       |       |      |
| 10.0             |                | 8.0        | MDF1000L2D-S8  | ★               | 30.0 | 45.0  |       | 48.0  | 150   |      |
| 10.0             |                | 10.0       | MDF1000L2D     | ★               | 30.0 | 45.0  |       | 100.0 | 150   |      |
| 10.1             | 10.0           | MDF1010L2D | ★              | 30.3            | 45.5 | 48.5  | 160   |       |       |      |
| 10.2             |                | MDF1020L2D | ★              | 30.6            | 45.9 | 48.9  |       |       |       |      |
| 10.3             |                | MDF1030L2D | ★              | 30.9            | 46.4 | 49.4  |       |       |       |      |
| 10.4             |                | MDF1040L2D | ★              | 31.2            | 46.8 | 49.8  |       |       |       |      |
| 10.5             |                | MDF1050L2D | ★              | 31.5            | 47.3 | 50.3  |       |       |       |      |
| 10.6             |                | MDF1060L2D | ★              | 31.8            | 47.7 | 50.7  |       |       |       |      |
| 10.7             | 10.0           | MDF1070L2D | ★              | 32.1            | 48.2 | 51.2  | 160   |       |       |      |
| 10.8             |                | MDF1080L2D | ★              | 32.4            | 48.6 | 51.6  |       |       |       |      |
| 10.9             |                | MDF1090L2D | ★              | 32.7            | 49.1 | 52.1  |       |       |       |      |
| 11.0             |                | MDF1100L2D | ★              | 33.0            | 49.5 | 52.5  |       |       |       |      |
| 11.1             |                | 10.0       | MDF1110L2D     | ★               | 33.3 | 50.0  |       | 53.0  | 170   |      |
| 11.2             |                |            | MDF1120L2D     | ★               | 33.6 | 50.4  |       | 53.4  |       |      |
| 11.3             | MDF1130L2D     |            | ★              | 33.9            | 50.9 | 53.9  |       |       |       |      |
| 11.4             | MDF1140L2D     |            | ★              | 34.2            | 51.3 | 54.3  |       |       |       |      |
| 11.5             | MDF1150L2D     |            | ★              | 34.5            | 51.8 | 54.8  |       |       |       |      |
| 11.6             | MDF1160L2D     |            | ★              | 34.8            | 52.2 | 55.2  |       |       |       |      |
| 11.7             | 10.0           | MDF1170L2D | ★              | 35.1            | 52.7 | 55.7  | 170   |       |       |      |
| 11.8             |                | MDF1180L2D | ★              | 35.4            | 53.1 | 56.1  |       |       |       |      |
| 11.9             |                | MDF1190L2D | ★              | 35.7            | 53.6 | 56.6  |       |       |       |      |
| 12.0             |                | 10.0       | MDF1200L2D-S10 | ★               | 36.0 | 54.0  |       | 57.0  | 170   |      |
| 12.0             |                | 12.0       | MDF1200L2D     | ★               | 36.0 | 54.0  |       | 120.0 | 170   |      |
| 12.5             |                | 12.0       | MDF1250L2D     | ★               | 37.5 | 56.3  |       | 59.3  | 180   |      |
| 13.0             | MDF1300L2D     |            | ★              | 39.0            | 58.5 | 61.5  |       |       |       |      |
| 13.5             | MDF1350L2D     |            | ★              | 40.5            | 60.8 | 63.8  |       |       |       |      |
| 14.0             | 12.0           |            | MDF1400L2D-S12 | ★               | 42.0 | 63.0  | 66.0  | 190   |       |      |
| 14.0             |                |            | MDF1400L2D     | ★               | 42.0 | 63.0  | 140.0 |       |       | 190  |
| 14.5             |                |            | MDF1450L2D     | ★               | 43.5 | 65.3  | 68.3  |       |       |      |
| 15.0             |                | MDF1500L2D | ★              | 45.0            | 67.5 | 70.5  |       |       |       |      |
| 15.5             |                | MDF1550L2D | ★              | 46.5            | 69.8 | 72.8  |       |       |       |      |
| 16.0             |                | 14.0       | MDF1600L2D-S14 | ★               | 48.0 | 72.0  | 75.0  |       | 210   |      |
| 16.0             | 16.0           | MDF1600L2D | ★              | 48.0            | 72.0 | 160.0 | 210   |       |       |      |
| 16.5             | 16.0           | MDF1650L2D | ★              | 49.5            | 74.3 | 77.3  | 220   |       |       |      |
| 17.0             |                | MDF1700L2D | ★              | 51.0            | 76.5 | 79.5  |       |       |       |      |
| 17.5             |                | MDF1750L2D | ★              | 52.5            | 78.8 | 81.8  |       |       |       |      |
| 18.0             |                | 16.0       | MDF1800L2D-S16 | ★               | 54.0 | 81.0  |       | 84.0  | 230   |      |
| 18.0             |                |            | MDF1800L2D     | ★               | 54.0 | 81.0  |       | 180.0 |       | 230  |
| 18.5             |                |            | MDF1850L2D     | ★               | 55.5 | 83.3  |       | 86.3  |       |      |
| 19.0             | 18.0           |            | MDF1900L2D     | ★               | 57.0 | 85.5  | 88.5  | 240   |       |      |
| 19.5             |                |            | MDF1950L2D     | ★               | 58.5 | 87.8  | 90.8  |       |       |      |
| 20.0             |                |            | 18.0           | MDF2000L2D-S18  | ★    | 60.0  | 90.0  |       |       | 93.0 |
| 20.0             |                | 20.0       |                | MDF2000L2D      | ★    | 60.0  | 90.0  |       | 200.0 | 250  |

When using this series, a prepared hole of the same diameter or a centering hole larger than the drill diameter is required.

Grade: ACF75

★ - World Wide Warehouse Item



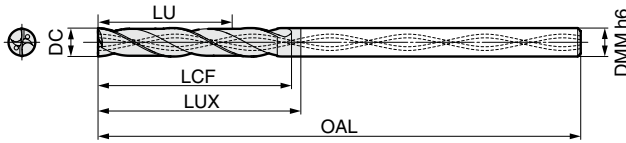
# MDF-H Type (3XD & 5XD)

## Internal Coolant Supply

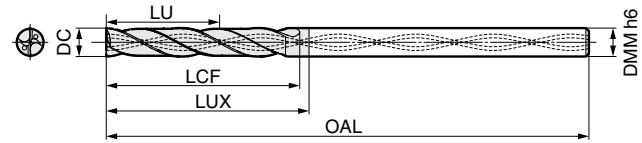
|   |                |  |                 |          |                       |           |                   |                |              |                |
|---|----------------|--|-----------------|----------|-----------------------|-----------|-------------------|----------------|--------------|----------------|
| Carbon Steel, Alloy Steel<br>Up to 0.28% From 0.28% | Tempered Steel | Hardened Steel<br>Up to 49HRC From 49HRC | Stainless Steel | Ti Alloy | Heat-resistant Steels | Cast Iron | Ductile Cast Iron | Aluminum Alloy | Copper Alloy | Composite CFRP |
| ◎   | ◎              | ◎  | ○               | ○        | ○                     | ○         | ○                 | ○              | ○            | ○              |



### • MDF Type 3D Single Margin



### • MDF Type 5D Double Margin



• Diameter  $\varnothing 9.8$  to  $\varnothing 16.0$ mm

| Diameter DC (mm) | Hole Depth (L/D) | Shank DMM (mm) | Cat. No.   | Stock | Dimensions (mm) |       |       |     |
|------------------|------------------|----------------|------------|-------|-----------------|-------|-------|-----|
|                  |                  |                |            |       | LU              | LCF   | LUX   | OAL |
| 9.8              | 3                | 10             | MDF0980H3D | ★     | 39.2            | 44.1  | 47.1  | 106 |
|                  | 5                |                | MDF0980H5D | ★     | 58.8            | 65.7  | 68.7  | 136 |
| 9.9              | 3                | 10             | MDF0990H3D | ★     | 39.6            | 44.6  | 47.6  | 106 |
|                  | 5                |                | MDF0990H5D | ★     | 59.4            | 66.3  | 69.3  | 136 |
| 10.0             | 3                | 10             | MDF1000H3D | ★     | 40.0            | 45.0  | 48.0  | 106 |
|                  | 5                |                | MDF1000H5D | ★     | 60.0            | 67.0  | 70.0  | 136 |
| 10.1             | 3                | 11             | MDF1010H3D | ★     | 40.4            | 45.5  | 48.5  | 116 |
|                  | 5                |                | MDF1010H5D | ★     | 60.6            | 67.7  | 70.7  | 149 |
| 10.2             | 3                | 11             | MDF1020H3D | ★     | 40.8            | 45.9  | 48.9  | 116 |
|                  | 5                |                | MDF1020H5D | ★     | 61.2            | 68.3  | 71.3  | 149 |
| 10.3             | 3                | 11             | MDF1030H3D | ★     | 41.2            | 46.4  | 49.4  | 116 |
|                  | 5                |                | MDF1030H5D | ★     | 61.8            | 69.0  | 72.0  | 149 |
| 10.4             | 3                | 11             | MDF1040H3D | ★     | 41.6            | 46.8  | 49.8  | 116 |
|                  | 5                |                | MDF1040H5D | ★     | 62.4            | 69.7  | 72.7  | 149 |
| 10.5             | 3                | 11             | MDF1050H3D | ★     | 42.0            | 47.3  | 50.3  | 116 |
|                  | 5                |                | MDF1050H5D | ★     | 63.0            | 70.4  | 73.4  | 149 |
| 10.6             | 3                | 11             | MDF1060H3D | ★     | 42.4            | 47.7  | 50.7  | 116 |
|                  | 5                |                | MDF1060H5D | ★     | 63.6            | 71.0  | 74.0  | 149 |
| 10.7             | 3                | 11             | MDF1070H3D | ★     | 42.8            | 48.2  | 51.2  | 116 |
|                  | 5                |                | MDF1070H5D | ★     | 64.2            | 71.7  | 74.7  | 149 |
| 10.8             | 3                | 11             | MDF1080H3D | ★     | 43.2            | 48.6  | 51.6  | 116 |
|                  | 5                |                | MDF1080H5D | ★     | 64.8            | 72.4  | 75.4  | 149 |
| 10.9             | 3                | 11             | MDF1090H3D | ★     | 43.6            | 49.1  | 52.1  | 116 |
|                  | 5                |                | MDF1090H5D | ★     | 65.4            | 73.0  | 76.0  | 149 |
| 11.0             | 3                | 11             | MDF1100H3D | ★     | 44.0            | 49.5  | 52.5  | 116 |
|                  | 5                |                | MDF1100H5D | ★     | 66.0            | 73.7  | 76.7  | 149 |
| 11.1             | 3                | 12             | MDF1110H3D | ★     | 44.4            | 50.0  | 53.0  | 122 |
|                  | 5                |                | MDF1110H5D | ★     | 66.6            | 74.4  | 77.4  | 158 |
| 11.2             | 3                | 12             | MDF1120H3D | ★     | 44.8            | 50.4  | 53.4  | 122 |
|                  | 5                |                | MDF1120H5D | ★     | 67.2            | 75.0  | 78.0  | 158 |
| 11.3             | 3                | 12             | MDF1130H3D | ★     | 45.2            | 50.9  | 53.9  | 122 |
|                  | 5                |                | MDF1130H5D | ★     | 67.8            | 75.7  | 78.7  | 158 |
| 11.4             | 3                | 12             | MDF1140H3D | ★     | 45.6            | 51.3  | 54.3  | 122 |
|                  | 5                |                | MDF1140H5D | ★     | 68.4            | 76.4  | 79.4  | 158 |
| 11.5             | 3                | 12             | MDF1150H3D | ★     | 46.0            | 51.8  | 54.8  | 122 |
|                  | 5                |                | MDF1150H5D | ★     | 69.0            | 77.1  | 80.1  | 158 |
| 11.6             | 3                | 12             | MDF1160H3D | ★     | 46.4            | 52.2  | 55.2  | 122 |
|                  | 5                |                | MDF1160H5D | ★     | 69.6            | 77.7  | 80.7  | 158 |
| 11.7             | 3                | 12             | MDF1170H3D | ★     | 46.8            | 52.7  | 55.7  | 122 |
|                  | 5                |                | MDF1170H5D | ★     | 70.2            | 78.4  | 81.4  | 158 |
| 11.8             | 3                | 12             | MDF1180H3D | ★     | 47.2            | 53.1  | 56.1  | 122 |
|                  | 5                |                | MDF1180H5D | ★     | 70.8            | 79.1  | 82.1  | 158 |
| 11.9             | 3                | 12             | MDF1190H3D | ★     | 47.6            | 53.6  | 56.6  | 122 |
|                  | 5                |                | MDF1190H5D | ★     | 71.4            | 79.7  | 82.7  | 158 |
| 12.0             | 3                | 12             | MDF1200H3D | ★     | 48.0            | 54.0  | 57.0  | 122 |
|                  | 5                |                | MDF1200H5D | ★     | 72.0            | 80.4  | 83.4  | 158 |
| 12.5             | 3                | 13             | MDF1250H3D | ★     | 50.0            | 56.3  | 59.3  | 128 |
|                  | 5                |                | MDF1250H5D | ★     | 75.0            | 83.8  | 86.8  | 167 |
| 13.0             | 3                | 13             | MDF1300H3D | ★     | 52.0            | 58.5  | 61.5  | 128 |
|                  | 5                |                | MDF1300H5D | ★     | 78.0            | 87.1  | 90.1  | 167 |
| 13.5             | 3                | 14             | MDF1350H3D | ★     | 54.0            | 60.8  | 63.8  | 134 |
|                  | 5                |                | MDF1350H5D | ★     | 81.0            | 90.5  | 93.5  | 176 |
| 14.0             | 3                | 14             | MDF1400H3D | ★     | 56.0            | 63.0  | 66.0  | 134 |
|                  | 5                |                | MDF1400H5D | ★     | 84.0            | 93.8  | 96.8  | 176 |
| 14.5             | 3                | 15             | MDF1450H3D | ★     | 58.0            | 65.3  | 68.3  | 140 |
|                  | 5                |                | MDF1450H5D | ★     | 87.0            | 97.2  | 100.2 | 185 |
| 15.0             | 3                | 15             | MDF1500H3D | ★     | 60.0            | 67.5  | 70.5  | 140 |
|                  | 5                |                | MDF1500H5D | ★     | 90.0            | 100.5 | 103.5 | 185 |
| 15.5             | 3                | 16             | MDF1550H3D | ★     | 62.0            | 69.8  | 72.8  | 146 |
|                  | 5                |                | MDF1550H5D | ★     | 93.0            | 103.9 | 106.9 | 194 |
| 16.0             | 3                | 16             | MDF1600H3D | ★     | 64.0            | 72.0  | 75.0  | 146 |
|                  | 5                |                | MDF1600H5D | ★     | 96.0            | 107.2 | 110.2 | 194 |

Grade: ACF75 ★ - World Wide Warehouse Item







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