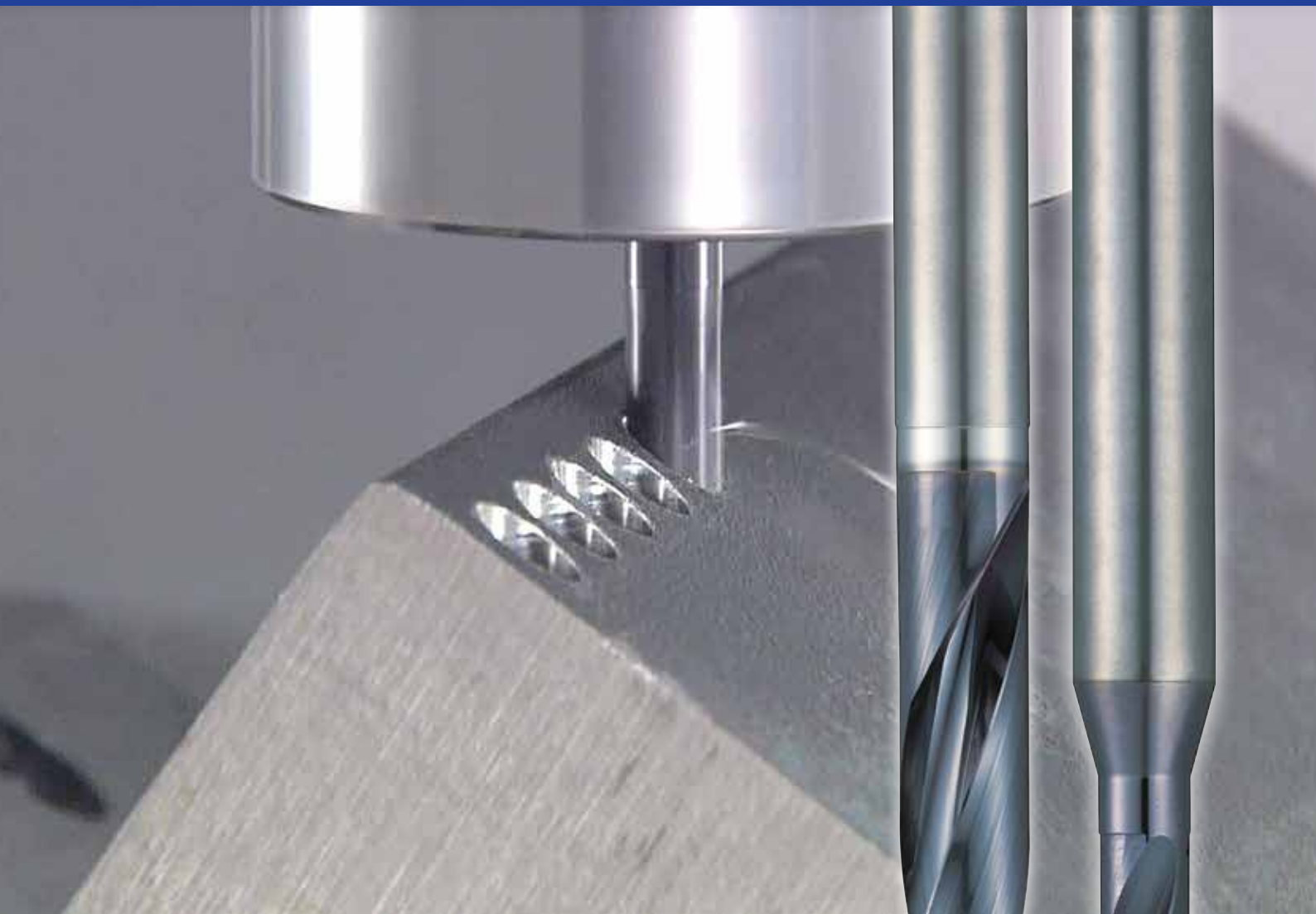


Coated Carbide Drills for Spot Facing

# Flat MultiDrill MDF Series



- Effective for inclined and curved surface spot drilling.
- Reduced burrs at hole exit.
- Applicable for interrupted and cross drilling.



# Flat MultiDrill MDF Series

## Coated Carbide Drills for Spot Facing

Improves drilling stability by ensuring web thickness.



### 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 in inclined and curved surfaces.

### Advantages

- Can be used in a variety of drilling applications thanks to its point angle of 180°**  
 Applicable to high-efficiency spot facing, drilling in non-horizontal surfaces such as inclined and cylindrical surfaces and interrupted drilling. It also reduces burrs at hole exits.
- Improved machining stability**  
 Achieves high rigidity by employing RS THINNING, which ensures web thickness on the bottom face.
- Excellent chip evacuation performance**  
 Achieves excellent chip evacuation thanks to its wide chip pocket and high-quality rake face shape.
- Excellent cutting edge strength**  
 Achieves excellent cutting edge strength thanks to optimized cutting edge design.

### Reduction of Burrs at Hole Exit

MDF Conventional general purpose drill

Burrs at hole exit

Work Material: 15CrMo5  
 Drill: MDF0500S2D (ø5,0mm 2D)  
 Cutting Conditions:  $v_c = 65\text{m/min}$ ,  $f = 0,12\text{mm/rev}$   
 $H = 10\text{mm}$ , 150 holes, wet  
 Equipment: Vertical machining center

Burr height: 0,18mm  
Flat MultiDrill MDF series

Burr height: 0,44mm  
Conventional general type

**Reduces exit burrs by more than half compared to general-purpose drills**

### Applications

High-efficient spot facing

Drilling in non-horizontal surfaces (such as inclined and cylindrical)

Interrupted drilling

Cross drilling

Pre-tap hole drilling in thin sheets

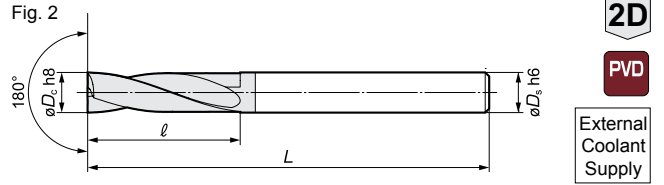
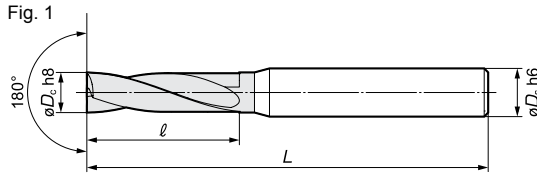
### Recommended Cutting Conditions

- The recommended hole depth is 2 x Dc. The depth shall be the depth from the highest point of the hole when drilling inclined surfaces.
- The recommended cutting conditions are those for drilling in flat horizontal surfaces.
- Adjust the feed rate according to the inclination angle when drilling in an inclined surface.
- Set the feed rate to 70% or lower when the inclination angle is:  $\leq 30^\circ$
- Set the feed rate to 50% or lower when the inclination angle is:  $> 30^\circ$
- This product is a drilling tool. Do not use it for traversing or helical milling

Min. - Optimum - Max.

| Drill Diam. ØDc(mm) | Cutting Conditions | Soft Steel / General Steel (~250HB) | Alloy Steel (~300HB)  | Hardened Steel (~50HRC) | Stainless Steel (~200HB) | Gray Cast Iron FC250  | Ductile Cast Iron     | Aluminium Alloy       |
|---------------------|--------------------|-------------------------------------|-----------------------|-------------------------|--------------------------|-----------------------|-----------------------|-----------------------|
| ~Ø0,5               | $v_c$              | 30 - 40 - 50                        | 30 - 35 - 40          | 15 - 20 - 25            | 15 - 20 - 25             | 30 - 40 - 50          | 20 - 30 - 40          | 60 - 80 - 100         |
|                     | $f$                | 0,004 - 0,005 - 0,006               | 0,004 - 0,005 - 0,006 | 0,001 - 0,002 - 0,003   | 0,003 - 0,004 - 0,005    | 0,004 - 0,005 - 0,006 | 0,001 - 0,003 - 0,005 | 0,003 - 0,005 - 0,007 |
| ~Ø1,0               | $v_c$              | 45 - 55 - 65                        | 35 - 45 - 55          | 20 - 30 - 40            | 20 - 25 - 30             | 45 - 55 - 65          | 30 - 40 - 50          | 80 - 100 - 120        |
|                     | $f$                | 0,01 - 0,03 - 0,05                  | 0,01 - 0,03 - 0,05    | 0,002 - 0,006 - 0,01    | 0,005 - 0,007 - 0,01     | 0,01 - 0,03 - 0,05    | 0,005 - 0,01 - 0,015  | 0,01 - 0,02 - 0,03    |
| ~Ø2,0               | $v_c$              | 50 - 60 - 70                        | 40 - 50 - 60          | 20 - 30 - 40            | 20 - 30 - 40             | 50 - 60 - 70          | 45 - 55 - 65          | 90 - 110 - 130        |
|                     | $f$                | 0,02 - 0,04 - 0,06                  | 0,02 - 0,04 - 0,06    | 0,01 - 0,018 - 0,025    | 0,01 - 0,015 - 0,02      | 0,02 - 0,04 - 0,06    | 0,015 - 0,03 - 0,045  | 0,03 - 0,05 - 0,07    |
| ~Ø4,0               | $v_c$              | 60 - 75 - 90                        | 50 - 65 - 80          | 20 - 30 - 40            | 20 - 30 - 40             | 60 - 75 - 90          | 55 - 65 - 75          | 90 - 110 - 130        |
|                     | $f$                | 0,06 - 0,08 - 0,10                  | 0,05 - 0,08 - 0,10    | 0,01 - 0,02 - 0,03      | 0,01 - 0,02 - 0,03       | 0,06 - 0,08 - 0,10    | 0,04 - 0,06 - 0,08    | 0,06 - 0,08 - 0,10    |
| ~Ø6,0               | $v_c$              | 60 - 75 - 90                        | 50 - 65 - 80          | 20 - 30 - 40            | 20 - 30 - 50             | 60 - 75 - 90          | 60 - 70 - 80          | 90 - 110 - 130        |
|                     | $f$                | 0,05 - 0,10 - 0,15                  | 0,05 - 0,10 - 0,15    | 0,04 - 0,06 - 0,08      | 0,03 - 0,04 - 0,05       | 0,05 - 0,10 - 0,15    | 0,06 - 0,09 - 0,12    | 0,05 - 0,10 - 0,15    |
| ~Ø8,0               | $v_c$              | 60 - 75 - 90                        | 50 - 65 - 80          | 20 - 30 - 40            | 20 - 30 - 50             | 60 - 75 - 90          | 60 - 70 - 80          | 90 - 110 - 130        |
|                     | $f$                | 0,10 - 0,15 - 0,20                  | 0,10 - 0,15 - 0,20    | 0,06 - 0,08 - 0,10      | 0,04 - 0,06 - 0,08       | 0,10 - 0,15 - 0,20    | 0,10 - 0,12 - 0,15    | 0,10 - 0,15 - 0,20    |
| ~Ø10,0              | $v_c$              | 60 - 75 - 90                        | 50 - 65 - 80          | 20 - 30 - 40            | 20 - 30 - 50             | 60 - 75 - 90          | 60 - 70 - 80          | 90 - 110 - 130        |
|                     | $f$                | 0,12 - 0,17 - 0,22                  | 0,12 - 0,17 - 0,22    | 0,08 - 0,10 - 0,12      | 0,06 - 0,08 - 0,10       | 0,12 - 0,17 - 0,22    | 0,12 - 0,15 - 0,18    | 0,12 - 0,17 - 0,22    |
| ~Ø12,0              | $v_c$              | 60 - 75 - 90                        | 50 - 65 - 80          | 20 - 30 - 40            | 20 - 30 - 50             | 60 - 75 - 90          | 60 - 70 - 80          | 90 - 110 - 130        |
|                     | $f$                | 0,15 - 0,20 - 0,25                  | 0,15 - 0,20 - 0,25    | 0,12 - 0,15 - 0,18      | 0,08 - 0,10 - 0,12       | 0,15 - 0,20 - 0,25    | 0,15 - 0,18 - 0,20    | 0,15 - 0,20 - 0,25    |
| ~Ø16,0              | $v_c$              | 60 - 75 - 90                        | 50 - 65 - 80          | 20 - 30 - 40            | 20 - 30 - 50             | 60 - 75 - 90          | 60 - 70 - 80          | 90 - 110 - 130        |
|                     | $f$                | 0,20 - 0,25 - 0,30                  | 0,20 - 0,25 - 0,30    | 0,14 - 0,17 - 0,20      | 0,10 - 0,15 - 0,20       | 0,17 - 0,22 - 0,27    | 0,15 - 0,20 - 0,25    | 0,20 - 0,25 - 0,30    |
| ~Ø20,0              | $v_c$              | 60 - 75 - 90                        | 50 - 65 - 80          | 20 - 30 - 40            | 20 - 30 - 50             | 60 - 75 - 90          | 60 - 70 - 80          | 90 - 110 - 130        |
|                     | $f$                | 0,25 - 0,30 - 0,35                  | 0,25 - 0,30 - 0,35    | 0,16 - 0,19 - 0,22      | 0,15 - 0,20 - 0,25       | 0,25 - 0,30 - 0,35    | 0,20 - 0,25 - 0,30    | 0,25 - 0,30 - 0,35    |

## MDF Series



### Diameter ØDc: 0,3 ~ 7,0mm

| Diameter ØDc (mm) | Shank ØDs (mm) | Cat. No.    | Stock | Dimensions (mm) |      | Fig. |   |
|-------------------|----------------|-------------|-------|-----------------|------|------|---|
|                   |                |             |       | L               | ℓ    |      |   |
| 0,3               | 3,0            | MDF 0030S2D | ○     | 40              | 1,0  | 1    |   |
| 0,4               |                | 0040S2D     | ○     |                 | 1,4  |      |   |
| 0,5               | 3,0            | MDF 0050S2D | ○     | 40              | 2,0  | 1    |   |
| 0,6               |                | 0060S2D     | ○     |                 | 2,4  |      |   |
| 0,7               |                | 0070S2D     | ○     |                 | 2,8  |      |   |
| 0,8               |                | 0080S2D     | ○     |                 | 3,2  |      |   |
| 0,9               |                | 0090S2D     | ○     |                 | 3,6  |      |   |
| 1,0               |                | MDF 0100S2D | ○     |                 | 4,0  |      |   |
| 1,1               |                | 0110S2D     | ○     |                 | 4,4  |      |   |
| 1,2               | 0120S2D        | ○           | 4,8   | 45              | 1    |      |   |
| 1,3               | 0130S2D        | ○           | 5,2   |                 |      |      |   |
| 1,4               | 0140S2D        | ○           | 5,6   |                 |      |      |   |
| 1,5               | 3,0            | MDF 0150S2D | ○     | 45              | 6,0  | 1    |   |
| 1,6               |                | 0160S2D     | ○     |                 | 6,4  |      |   |
| 1,7               |                | 0170S2D     | ○     |                 | 6,8  |      |   |
| 1,8               |                | 0180S2D     | ○     |                 | 7,2  |      |   |
| 1,9               |                | 0190S2D     | ○     |                 | 7,6  |      |   |
| 2,0               |                | MDF 0200S2D | ○     |                 | 8,0  |      |   |
| 2,1               |                | 0210S2D     | ○     |                 | 8,4  |      |   |
| 2,2               | 0220S2D        | ○           | 8,8   | 50              | 1    |      |   |
| 2,3               | 0230S2D        | ○           | 9,2   |                 |      |      |   |
| 2,4               | 0240S2D        | ○           | 9,6   |                 |      |      |   |
| 2,5               | 4,0            | MDF 0250S2D | ○     | 50              | 10,0 | 1    |   |
| 2,6               |                | 0260S2D     | ○     |                 | 10,4 |      |   |
| 2,7               |                | 0270S2D     | ○     |                 | 10,8 |      |   |
| 2,8               |                | 0280S2D     | ○     |                 | 11,2 |      |   |
| 2,9               |                | 0290S2D     | ○     |                 | 11,6 |      |   |
| 3,0               |                | MDF 0300S2D | ●     |                 | 12,0 |      |   |
| 3,1               |                | 0310S2D     | ○     |                 | 12,4 |      |   |
| 3,2               | 0320S2D        | ○           | 12,8  | 50              | 1    |      |   |
| 3,3               | 0330S2D        | ○           | 13,2  |                 |      |      |   |
| 3,4               | 0340S2D        | ○           | 13,6  |                 |      |      |   |
| 3,5               | 0350S2D        | ●           | 14,0  |                 |      |      |   |
| 3,6               | 6,0            | MDF 0360S2D | ○     | 50              | 14,4 | 1    |   |
| 3,7               |                | 0370S2D     | ○     |                 | 14,8 |      |   |
| 3,8               |                | 0380S2D     | ○     |                 | 15,2 |      |   |
| 3,9               |                | 0390S2D     | ○     |                 | 15,6 |      |   |
| 4,0               |                | 0400S2D     | ●     |                 | 16,0 |      |   |
| 4,1               |                | MDF 0410S2D | ○     |                 | 16,4 |      |   |
| 4,2               |                | 0420S2D     | ○     |                 | 16,8 |      |   |
| 4,3               | 0430S2D        | ○           | 17,2  | 60              | 1    |      |   |
| 4,4               | 0440S2D        | ○           | 17,6  |                 |      |      |   |
| 4,5               | 0450S2D        | ●           | 18,0  |                 |      |      |   |
| 4,6               | 6,0            | MDF 0460S2D | ○     | 60              | 18,4 | 1    |   |
| 4,7               |                | 0470S2D     | ○     |                 | 18,8 |      |   |
| 4,8               |                | 0480S2D     | ○     |                 | 19,2 |      |   |
| 4,9               |                | 0490S2D     | ○     |                 | 19,6 |      |   |
| 5,0               |                | 0500S2D     | ●     |                 | 20,0 |      |   |
| 5,1               |                | MDF 0510S2D | ○     |                 | 20,4 |      |   |
| 5,2               |                | 0520S2D     | ○     |                 | 20,8 |      |   |
| 5,3               | 0530S2D        | ○           | 21,2  | 60              | 1    |      |   |
| 5,4               | 0540S2D        | ○           | 21,6  |                 |      |      |   |
| 5,5               | 0550S2D        | ●           | 22,0  |                 |      |      |   |
| 5,6               | 6,0            | MDF 0560S2D | ○     | 60              | 22,4 | 1    |   |
| 5,7               |                | 0570S2D     | ○     |                 | 22,8 |      |   |
| 5,8               |                | 0580S2D     | ○     |                 | 23,2 |      |   |
| 5,9               |                | 0590S2D     | ○     |                 | 23,6 |      |   |
| 6,0               |                | 0600S2D     | ●     |                 | 24,0 |      | 2 |
| 6,1               |                | MDF 0610S2D | ○     |                 | 24,4 |      |   |
| 6,2               |                | 0620S2D     | ○     |                 | 24,8 |      |   |
| 6,3               | 0630S2D        | ○           | 25,2  | 70              | 1    |      |   |
| 6,4               | 0640S2D        | ○           | 25,6  |                 |      |      |   |
| 6,5               | 0650S2D        | ●           | 26,0  |                 |      |      |   |
| 6,6               | 8,0            | MDF 0660S2D | ○     | 70              | 26,4 | 1    |   |
| 6,7               |                | 0670S2D     | ○     |                 | 26,8 |      |   |
| 6,8               |                | 0680S2D     | ○     |                 | 27,2 |      |   |
| 6,9               |                | 0690S2D     | ○     |                 | 27,6 |      |   |
| 7,0               |                | 0700S2D     | ●     |                 | 28,0 |      |   |

### Diameter ØDc: 7,1 ~ 20,0mm

| Diameter ØDc (mm) | Shank ØDs (mm) | Cat. No.    | Stock       | Dimensions (mm) |      | Fig. |     |      |   |
|-------------------|----------------|-------------|-------------|-----------------|------|------|-----|------|---|
|                   |                |             |             | L               | ℓ    |      |     |      |   |
| 7,1               | 8,0            | MDF 0710S2D | ○           | 70              | 28,4 | 1    |     |      |   |
| 7,2               |                | 0720S2D     | ○           |                 | 28,8 |      |     |      |   |
| 7,3               |                | 0730S2D     | ○           |                 | 29,2 |      |     |      |   |
| 7,4               |                | 0740S2D     | ○           |                 | 29,6 |      |     |      |   |
| 7,5               |                | 0750S2D     | ●           |                 | 30,0 |      |     |      |   |
| 7,6               |                | MDF 0760S2D | ○           |                 | 30,4 |      |     |      |   |
| 7,7               |                | 0770S2D     | ○           |                 | 30,8 |      |     |      |   |
| 7,8               | 0780S2D        | ○           | 31,2        | 70              | 1    |      |     |      |   |
| 7,9               | 0790S2D        | ○           | 31,6        |                 |      |      |     |      |   |
| 8,0               | 0800S2D        | ●           | 32,0        | 2               |      |      |     |      |   |
| 8,1               | 10,0           | MDF 0810S2D | ○           | 80              | 32,4 | 1    |     |      |   |
| 8,2               |                | 0820S2D     | ○           |                 | 32,8 |      |     |      |   |
| 8,3               |                | 0830S2D     | ○           |                 | 33,2 |      |     |      |   |
| 8,4               |                | 0840S2D     | ○           |                 | 33,6 |      |     |      |   |
| 8,5               |                | 0850S2D     | ●           |                 | 34,0 |      |     |      |   |
| 8,6               |                | MDF 0860S2D | ○           |                 | 34,4 |      |     |      |   |
| 8,7               |                | 0870S2D     | ○           |                 | 34,8 |      |     |      |   |
| 8,8               | 0880S2D        | ○           | 35,2        | 80              | 1    |      |     |      |   |
| 8,9               | 0890S2D        | ○           | 35,6        |                 |      |      |     |      |   |
| 9,0               | 0900S2D        | ●           | 36,0        |                 |      |      |     |      |   |
| 9,1               | 10,0           | MDF 0910S2D | ○           | 80              | 36,4 | 1    |     |      |   |
| 9,2               |                | 0920S2D     | ○           |                 | 36,8 |      |     |      |   |
| 9,3               |                | 0930S2D     | ○           |                 | 37,2 |      |     |      |   |
| 9,4               |                | 0940S2D     | ○           |                 | 37,6 |      |     |      |   |
| 9,5               |                | 0950S2D     | ●           |                 | 38,0 |      |     |      |   |
| 9,6               |                | MDF 0960S2D | ○           |                 | 38,4 |      |     |      |   |
| 9,7               |                | 0970S2D     | ○           |                 | 38,8 |      |     |      |   |
| 9,8               | 0980S2D        | ○           | 39,2        | 80              | 1    |      |     |      |   |
| 9,9               | 0990S2D        | ○           | 39,6        |                 |      |      |     |      |   |
| 10,0              | 1000S2D        | ●           | 40,0        | 2               |      |      |     |      |   |
| 10,1              | 12,0           | MDF 1010S2D | ○           | 90              | 40,4 | 1    |     |      |   |
| 10,2              |                | 1020S2D     | ○           |                 | 40,8 |      |     |      |   |
| 10,3              |                | 1030S2D     | ○           |                 | 41,2 |      |     |      |   |
| 10,4              |                | 1040S2D     | ○           |                 | 41,6 |      |     |      |   |
| 10,5              |                | 1050S2D     | ●           |                 | 42,0 |      |     |      |   |
| 10,6              |                | MDF 1060S2D | ○           |                 | 42,4 |      |     |      |   |
| 10,7              |                | 1070S2D     | ○           |                 | 42,8 |      |     |      |   |
| 10,8              | 1080S2D        | ○           | 43,2        | 90              | 1    |      |     |      |   |
| 10,9              | 1090S2D        | ○           | 43,6        |                 |      |      |     |      |   |
| 11,0              | 1100S2D        | ●           | 44,0        |                 |      |      |     |      |   |
| 11,1              | 12,0           | MDF 1110S2D | ○           | 90              | 44,4 | 1    |     |      |   |
| 11,2              |                | 1120S2D     | ○           |                 | 44,8 |      |     |      |   |
| 11,3              |                | 1130S2D     | ○           |                 | 45,2 |      |     |      |   |
| 11,4              |                | 1140S2D     | ○           |                 | 45,6 |      |     |      |   |
| 11,5              |                | 1150S2D     | ●           |                 | 46,0 |      |     |      |   |
| 11,6              |                | MDF 1160S2D | ○           |                 | 46,4 |      |     |      |   |
| 11,7              |                | 1170S2D     | ○           |                 | 46,8 |      |     |      |   |
| 11,8              | 1180S2D        | ○           | 47,2        | 90              | 1    |      |     |      |   |
| 11,9              | 1190S2D        | ○           | 47,6        |                 |      |      |     |      |   |
| 12,0              | 1200S2D        | ●           | 48,0        | 2               |      |      |     |      |   |
| 12,5              | 14,0           | MDF 1250S2D | ○           | 100             | 50,0 | 1    |     |      |   |
| 13,0              |                | 1300S2D     | ○           |                 | 52,0 |      |     |      |   |
| 13,5              |                | 1350S2D     | ○           |                 | 54,0 |      |     |      |   |
| 14,0              |                | 1400S2D     | ○           |                 | 56,0 |      | 2   |      |   |
| 14,5              | 16,0           | MDF 1450S2D | ○           | 110             | 58,0 | 1    |     |      |   |
| 15,0              |                | 1500S2D     | ○           |                 | 60,0 |      |     |      |   |
| 15,5              |                | 1550S2D     | ○           |                 | 62,0 |      |     |      |   |
| 16,0              |                | 1600S2D     | ○           |                 | 64,0 |      | 2   |      |   |
| 16,5              |                | 18,0        | MDF 1650S2D |                 | ○    |      | 125 | 66,0 | 1 |
| 17,0              |                |             | 1700S2D     |                 | ○    |      |     | 68,0 |   |
| 17,5              |                |             | 1750S2D     |                 | ○    |      |     | 70,0 |   |
| 18,0              | 1800S2D        |             | ○           | 72,0            | 2    |      |     |      |   |
| 18,5              | 20,0           | MDF 1850S2D | ○           | 140             | 74,0 | 1    |     |      |   |
| 19,0              |                | 1900S2D     | ○           |                 | 76,0 |      |     |      |   |
| 19,5              |                | 1950S2D     | ○           |                 | 78,0 |      |     |      |   |
| 20,0              |                | 2000S2D     | ○           |                 | 80,0 |      | 2   |      |   |

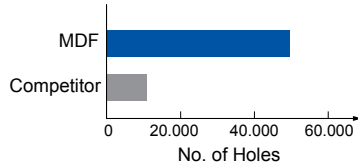
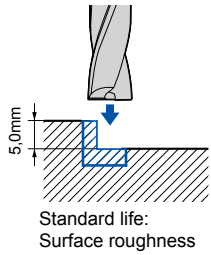
● Euro stock      ○ Japan stock      Grade: ACF75

# Flat MultiDrill MDF Series

## Coated Carbide Drills for Spot Facing

### Application Examples

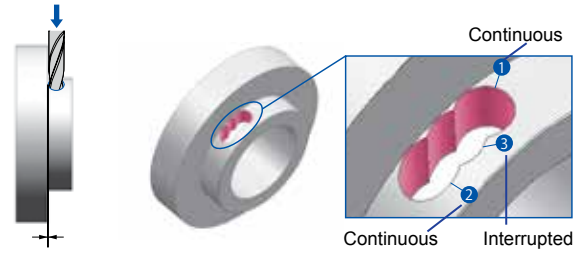
#### 34CrMo4, Gear Frame Component



4 times longer tool life compared to competitor's.

Drill: MDF0500S2D (Ø5,0mm)  
 $v_c = 65\text{m/min}$ ,  $f = 0,10\text{mm/rev}$   
 Cutting Conditions:  $v_f = 414\text{mm/min}$ ,  $H = 5\text{mm}$  (Blind hole)  
 External Coolant

#### 15CrMo5, Gear Component

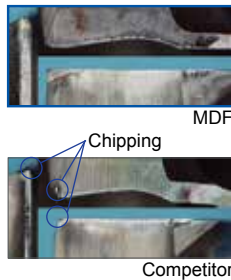
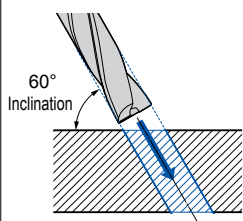


Clearance between drill and wall is 0,1mm

Stable drilling is achieved for non planar surface.

Drill: MDF0600S2D (Ø6,0mm)  
 $v_c = 65\text{m/min}$ ,  $f = 0,04\sim0,15\text{mm/rev}$   
 Cutting Conditions:  $v_f = 138\sim518\text{mm/min}$ ,  $H = \sim15\text{mm}$  (Through)  
 External Coolant

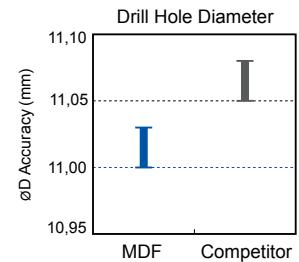
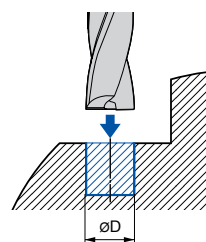
#### C35, Automotive Component



Reduces cutting edge damage to enable stable machining.

Drill: MDF0300S2D (Ø3,0mm)  
 $v_c = 80\text{m/min}$ ,  $f = 0,045\text{mm/rev}$   
 Cutting Conditions:  $v_f = 370\text{mm/min}$ ,  $H = 8\text{mm}$  (Through)  
 External Coolant

#### Cr-Mo Steels, Jig Component



The stable geometry of the drill leads to high accuracy.

Drill: MDF1100S2D (Ø11,0mm)  
 $v_c = 60\text{m/min}$ ,  $f = 0,2\text{mm/rev}$   
 Cutting Conditions:  $v_f = 347\text{mm/min}$ ,  $H = 11\text{mm}$  (Blind hole)  
 External Coolant



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