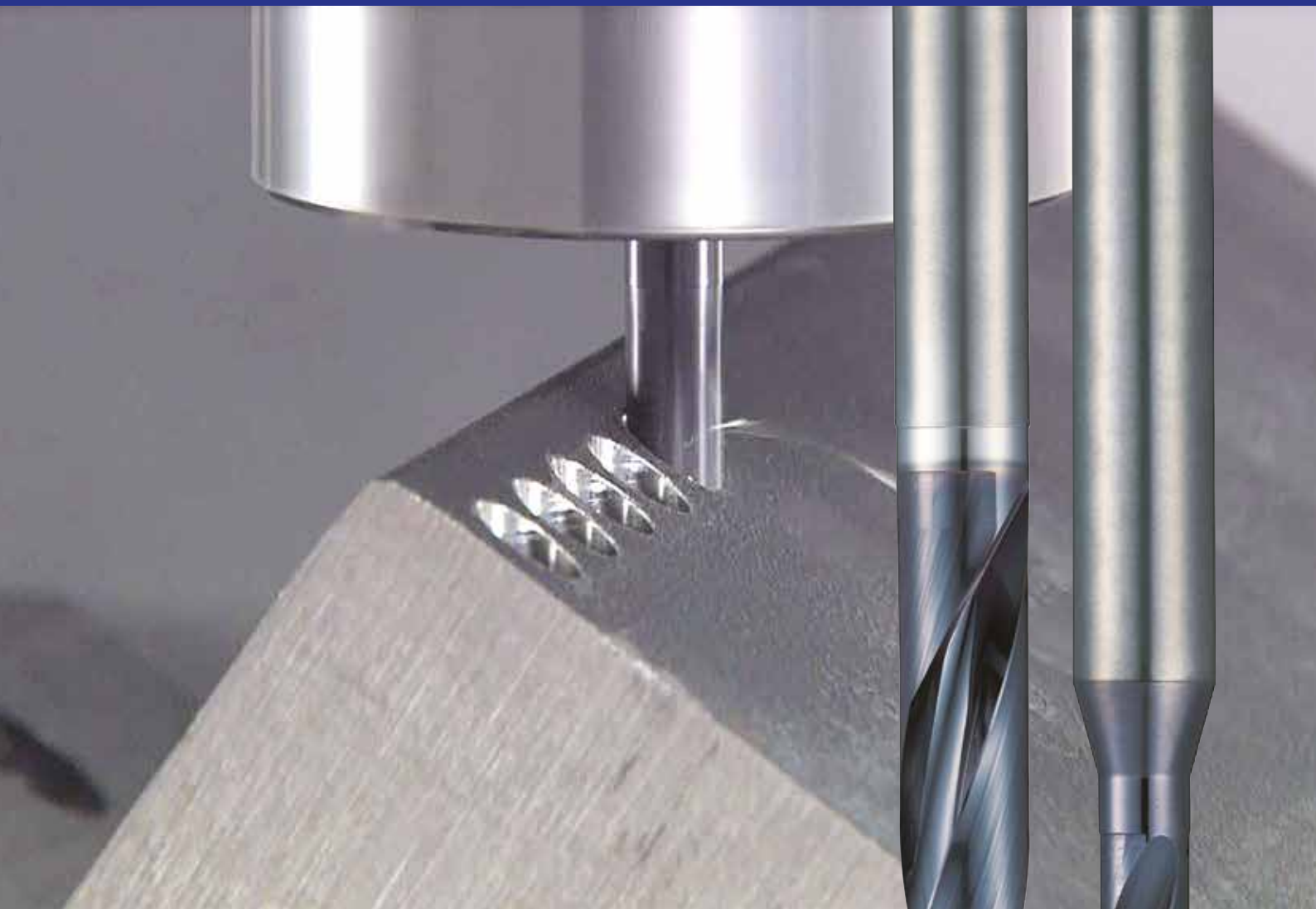


Coated Carbide Drills for Spot Facing

Flat MultiDrill MDF Series

Expansion



- Long Type Drills with Diameter $\text{Ø}3,0\text{mm}$ - $\text{Ø}20,0\text{mm}$
- Flat MultiDrill with Coolant Hole (3D and 5D)
- Effective for inclined and curved surface spot drilling.
- Applicable for interrupted and cross drilling (thin plates and tubing).

Flat MultiDrill MDF Type



General Features

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



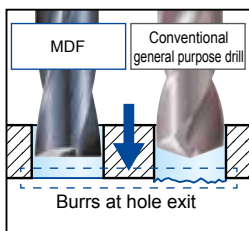
Advantages

- 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.
- Expanded lineup of long type**
 An expanded lineup of long type drills with diameters between $\varnothing 3,0$ and $\varnothing 20,0$ mm that are capable of drilling with an overhang length up to $L/D=10$.
- Expanded lineup of types with oil hole**
 Supports internal coolant. For deeper drilling (3D, 5D).

Improves drilling stability by ensuring web thickness.



Reduction of Burrs at Hole Exit



Work Material: 15CrMo5
 Drill: MDF0500S2D ($\varnothing 5,0$ mm 2D)
 Cutting Conditions: $v_c = 65$ m/min, $f = 0,12$ mm/rev
 $H = 10$ mm, 150 holes, wet
 Machine: Vertical machining center

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

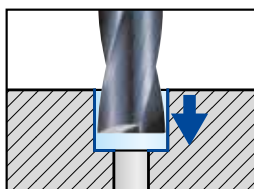


Burr height: 0,18mm
Flat MultiDrill MDF type

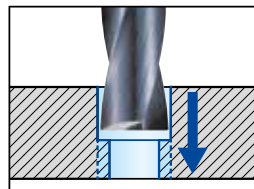


Burr height: 0,44mm
Conventional drill design

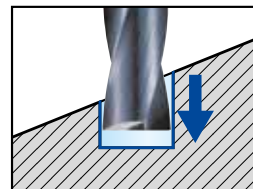
Applications



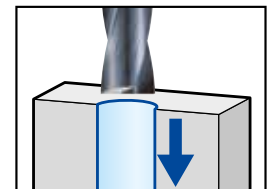
High-efficient spot facing



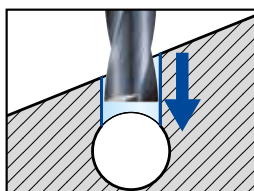
Hole expansion drilling



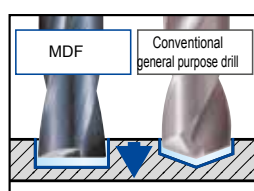
Drilling in non-horizontal surfaces (such as inclined and cylindrical)



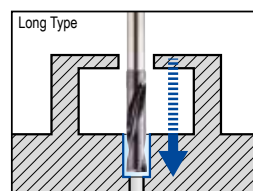
Interrupted drilling



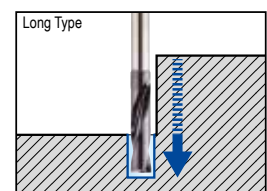
Cross drilling



Pre-tap hole drilling in thin sheets



Deep spot facing

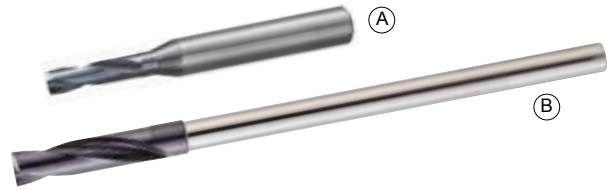


Avoiding interference with work materials

Long Shank Type (L2D Type)

For flat base drilling in long overhang conditions, hole expansion, burr prevention.
For deep flat base drilling and to avoid interference with workpiece.
Drilling that uses the long shank type requires a guide hole of the same diameter or a centering hole larger than the tool diameter.

- Two types: (A) $\varnothing D_c < 6\text{mm}$ Stepped shank products
(B) $\varnothing D_c \geq 6\text{mm}$ Relief shank products



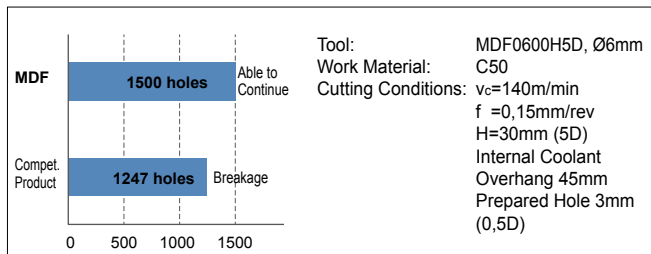
With Oil Hole (H3D Type / H5D Type)

Support for internal coolant allows for deeper flat hole drilling.
Drilling that uses oil hole L/D=5 requires a guide hole of the same diameter or a centering hole larger than the tool diameter.

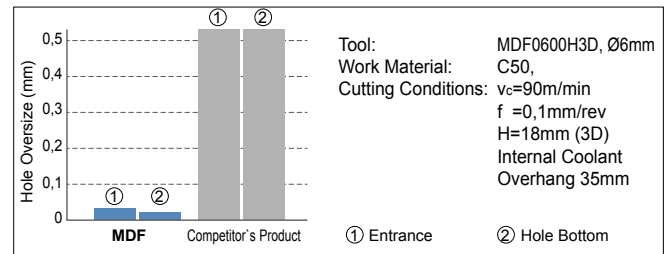


Application Examples

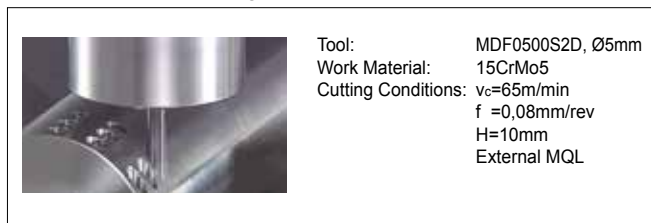
Deep Spot Facing



Long Overhang Spot Facing



Inclined Surface Drilling



Controlling Burrs and Chips when Withdrawn



Using Flat Drills, General-Purpose Drills and Endmills

| Tool | Flat Drill MDF Type | General Purpose Drill GS / HGS Type | Endmill for Spot Facing GSX MILL Slot |
|-------------------------------------|---|--|--|
| Hole Bottom Shape | | | |
| Drilling in horizontal surfaces | ⊙ Feed rate approximately half of a general-purpose drill | ⊙ Optimal | ⊗ Within 1D, limited to low feed rate Feed rate one-fifth or lower of a general-purpose drill |
| Drilling in non-horizontal surfaces | ⊙ Optimal (within 2D is recommended) | ⊗ Unusable | ⊙ Within 1D, limited to low feed rate Feed rate half or lower of a flat drill |
| Traversing | ⊗ Unusable | ⊗ Unusable | ⊙ Optimal |

Series

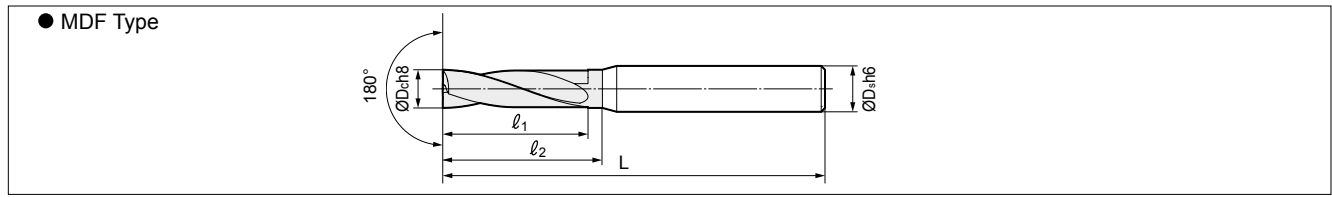
| Application | Series | Diameter Range (mm) | Hole Depth (L/D) |
|-------------|--------------|--------------------------------------|------------------|
| External | MDF □□□□ S2D | $\varnothing 0,3 - \varnothing 20,0$ | $\leq 2,0$ |
| | MDF □□□□ L2D | $\varnothing 3,0 - \varnothing 20,0$ | $\leq 2,0$ |
| Internal | MDF □□□□ H3D | $\varnothing 3,0 - \varnothing 16,0$ | $\leq 3,0$ |
| | MDF □□□□ H5D | $\varnothing 3,0 - \varnothing 16,0$ | $\leq 5,0$ |

Flat MultiDrill MDF Type

MDF S2D Type

External Coolant Supply (MDF S2D Type)

| | | | | | | | |
|--------------|-------------|----------------|----------------|-----------------|-----------|-------------------|-----------------|
| Carbon Steel | Alloy Steel | Tempered Steel | Hardened Steel | Stainless Steel | Cast Iron | Ductile Cast Iron | Aluminium Alloy |
| <0.28% | >0.28% | Steel | <45HRC | >45HRC | Steel | Iron | Alloy |



● Diameter ØDc: 0,3 ~ 7,0mm

| Diameter ØDc (mm) | Shank ØDs (mm) | Cat. No. | Stock | Dimensions (mm) | | |
|-------------------|----------------|-------------|-------|-----------------|----------------|----------------|
| | | | | L | ℓ ₁ | ℓ ₂ |
| 0,3* | 3,0 | MDF 0030S2D | ○ | 40 | 1,0 | 1,3 |
| 0,4* | | MDF 0040S2D | ○ | | 1,4 | 1,8 |
| 0,5 | 3,0 | MDF 0050S2D | ○ | 40 | 2,0 | 2,2 |
| 0,6 | | MDF 0060S2D | ● | | 2,4 | 2,6 |
| 0,7 | | MDF 0070S2D | ● | | 2,8 | 3,1 |
| 0,8 | | MDF 0080S2D | ● | | 3,2 | 3,5 |
| 0,9 | | MDF 0090S2D | ○ | | 3,6 | 4,0 |
| 1,0 | 3,0 | MDF 0100S2D | ● | 45 | 4,0 | 4,4 |
| 1,1 | | MDF 0110S2D | ● | | 4,4 | 4,8 |
| 1,2 | | MDF 0120S2D | ● | | 4,8 | 5,3 |
| 1,3 | | MDF 0130S2D | ○ | | 5,2 | 5,7 |
| 1,4 | | MDF 0140S2D | ● | | 5,6 | 6,2 |
| 1,5 | 3,0 | MDF 0150S2D | ● | 45 | 6,0 | 6,6 |
| 1,6 | | MDF 0160S2D | ● | | 6,4 | 7,0 |
| 1,7 | | MDF 0170S2D | ● | | 6,8 | 7,5 |
| 1,8 | | MDF 0180S2D | ● | | 7,2 | 7,9 |
| 1,9 | | MDF 0190S2D | ● | | 7,6 | 8,4 |
| 2,0 | 4,0 | MDF 0200S2D | ● | 50 | 8,0 | 8,8 |
| 2,1 | | MDF 0210S2D | ● | | 8,4 | 9,2 |
| 2,2 | | MDF 0220S2D | ● | | 8,8 | 9,7 |
| 2,3 | | MDF 0230S2D | ● | | 9,2 | 10,1 |
| 2,4 | | MDF 0240S2D | ● | | 9,6 | 10,6 |
| 2,5 | 4,0 | MDF 0250S2D | ● | 50 | 10,0 | 11,0 |
| 2,6 | | MDF 0260S2D | ● | | 10,4 | 11,4 |
| 2,7 | | MDF 0270S2D | ● | | 10,8 | 11,9 |
| 2,8 | | MDF 0280S2D | ● | | 11,2 | 12,3 |
| 2,9 | | MDF 0290S2D | ● | | 11,6 | 12,8 |
| 3,0 | 6,0 | MDF 0300S2D | ● | 50 | 12,0 | 13,2 |
| 3,1 | | MDF 0310S2D | ● | | 12,4 | 13,6 |
| 3,2 | | MDF 0320S2D | ● | | 12,8 | 14,1 |
| 3,3 | | MDF 0330S2D | ● | | 13,2 | 14,5 |
| 3,4 | | MDF 0340S2D | ● | | 13,6 | 15,0 |
| 3,5 | MDF 0350S2D | ● | 14,0 | 15,4 | | |
| 3,6 | 6,0 | MDF 0360S2D | ● | 50 | 14,4 | 15,8 |
| 3,7 | | MDF 0370S2D | ● | | 14,8 | 16,3 |
| 3,8 | | MDF 0380S2D | ● | | 15,2 | 16,7 |
| 3,9 | | MDF 0390S2D | ● | | 15,6 | 17,2 |
| 4,0 | | MDF 0400S2D | ● | | 16,0 | 17,6 |
| 4,1 | 6,0 | MDF 0410S2D | ● | 60 | 16,4 | 18,0 |
| 4,2 | | MDF 0420S2D | ● | | 16,8 | 18,5 |
| 4,3 | | MDF 0430S2D | ● | | 17,2 | 18,9 |
| 4,4 | | MDF 0440S2D | ● | | 17,6 | 19,4 |
| 4,5 | | MDF 0450S2D | ● | | 18,0 | 19,8 |
| 4,6 | 6,0 | MDF 0460S2D | ● | 60 | 18,4 | 20,2 |
| 4,7 | | MDF 0470S2D | ● | | 18,8 | 20,7 |
| 4,8 | | MDF 0480S2D | ● | | 19,2 | 21,1 |
| 4,9 | | MDF 0490S2D | ● | | 19,6 | 21,6 |
| 5,0 | | MDF 0500S2D | ● | | 20,0 | 22,0 |
| 5,1 | 6,0 | MDF 0510S2D | ● | 60 | 20,4 | 22,4 |
| 5,2 | | MDF 0520S2D | ● | | 20,8 | 22,9 |
| 5,3 | | MDF 0530S2D | ● | | 21,2 | 23,3 |
| 5,4 | | MDF 0540S2D | ● | | 21,6 | 23,8 |
| 5,5 | | MDF 0550S2D | ● | | 22,0 | 24,2 |
| 5,6 | 6,0 | MDF 0560S2D | ● | 60 | 22,4 | 24,6 |
| 5,7 | | MDF 0570S2D | ● | | 22,8 | 25,1 |
| 5,8 | | MDF 0580S2D | ● | | 23,2 | 25,5 |
| 5,9 | | MDF 0590S2D | ● | | 23,6 | 26,0 |
| 6,0 | | MDF 0600S2D | ● | | 24,0 | 26,4 |
| 6,1 | 8,0 | MDF 0610S2D | ● | 70 | 24,4 | 26,8 |
| 6,2 | | MDF 0620S2D | ● | | 24,8 | 27,3 |
| 6,3 | | MDF 0630S2D | ● | | 25,2 | 27,7 |
| 6,4 | | MDF 0640S2D | ● | | 25,6 | 28,2 |
| 6,5 | | MDF 0650S2D | ● | | 26,0 | 28,6 |
| 6,6 | 8,0 | MDF 0660S2D | ● | 70 | 26,4 | 29,0 |
| 6,7 | | MDF 0670S2D | ● | | 26,8 | 29,5 |
| 6,8 | | MDF 0680S2D | ● | | 27,2 | 29,9 |
| 6,9 | | MDF 0690S2D | ● | | 27,6 | 30,4 |
| 7,0 | | MDF 0700S2D | ● | | 28,0 | 30,8 |

● Diameter ØDc: 7,1 ~ 20,0mm

| Diameter ØDc (mm) | Shank ØDs (mm) | Cat. No. | Stock | Dimensions (mm) | | |
|-------------------|----------------|-------------|-------|-----------------|----------------|----------------|
| | | | | L | ℓ ₁ | ℓ ₂ |
| 7,1 | 8,0 | MDF 0710S2D | ● | 70 | 28,4 | 31,2 |
| 7,2 | | MDF 0720S2D | ● | | 28,8 | 31,7 |
| 7,3 | | MDF 0730S2D | ● | | 29,2 | 32,1 |
| 7,4 | | MDF 0740S2D | ● | | 29,6 | 32,6 |
| 7,5 | | MDF 0750S2D | ● | | 30,0 | 33,0 |
| 7,6 | 8,0 | MDF 0760S2D | ● | 70 | 30,4 | 33,4 |
| 7,7 | | MDF 0770S2D | ● | | 30,8 | 33,9 |
| 7,8 | | MDF 0780S2D | ● | | 31,2 | 34,3 |
| 7,9 | | MDF 0790S2D | ● | | 31,6 | 34,8 |
| 8,0 | | MDF 0800S2D | ● | | 32,0 | 35,2 |
| 8,1 | 10,0 | MDF 0810S2D | ● | 80 | 32,4 | 35,6 |
| 8,2 | | MDF 0820S2D | ● | | 32,8 | 36,1 |
| 8,3 | | MDF 0830S2D | ● | | 33,2 | 36,5 |
| 8,4 | | MDF 0840S2D | ● | | 33,6 | 37,0 |
| 8,5 | | MDF 0850S2D | ● | | 34,0 | 37,4 |
| 8,6 | 10,0 | MDF 0860S2D | ● | 80 | 34,4 | 37,8 |
| 8,7 | | MDF 0870S2D | ○ | | 34,8 | 38,3 |
| 8,8 | | MDF 0880S2D | ● | | 35,2 | 38,7 |
| 8,9 | | MDF 0890S2D | ○ | | 35,6 | 39,2 |
| 9,0 | | MDF 0900S2D | ● | | 36,0 | 39,6 |
| 9,1 | 10,0 | MDF 0910S2D | ● | 80 | 36,4 | 40,0 |
| 9,2 | | MDF 0920S2D | ○ | | 36,8 | 40,5 |
| 9,3 | | MDF 0930S2D | ● | | 37,2 | 40,9 |
| 9,4 | | MDF 0940S2D | ○ | | 37,6 | 41,4 |
| 9,5 | | MDF 0950S2D | ● | | 38,0 | 41,8 |
| 9,6 | 10,0 | MDF 0960S2D | ○ | 80 | 38,4 | 42,2 |
| 9,7 | | MDF 0970S2D | ○ | | 38,8 | 42,7 |
| 9,8 | | MDF 0980S2D | ● | | 39,2 | 43,1 |
| 9,9 | | MDF 0990S2D | ○ | | 39,6 | 43,6 |
| 10,0 | | MDF 1000S2D | ● | | 40,0 | 44,0 |
| 10,1 | 12,0 | MDF 1010S2D | ● | 90 | 40,4 | 44,4 |
| 10,2 | | MDF 1020S2D | ● | | 40,8 | 44,9 |
| 10,3 | | MDF 1030S2D | ● | | 41,2 | 45,3 |
| 10,4 | | MDF 1040S2D | ● | | 41,6 | 45,8 |
| 10,5 | | MDF 1050S2D | ● | | 42,0 | 46,2 |
| 10,6 | 12,0 | MDF 1060S2D | ● | 90 | 42,4 | 46,6 |
| 10,7 | | MDF 1070S2D | ○ | | 42,8 | 47,1 |
| 10,8 | | MDF 1080S2D | ○ | | 43,2 | 47,5 |
| 10,9 | | MDF 1090S2D | ○ | | 43,6 | 48,0 |
| 11,0 | | MDF 1100S2D | ● | | 44,0 | 48,4 |
| 11,1 | 12,0 | MDF 1110S2D | ● | 90 | 44,4 | 48,8 |
| 11,2 | | MDF 1120S2D | ○ | | 44,8 | 49,3 |
| 11,3 | | MDF 1130S2D | ○ | | 45,2 | 49,7 |
| 11,4 | | MDF 1140S2D | ○ | | 45,6 | 50,2 |
| 11,5 | | MDF 1150S2D | ● | | 46,0 | 50,6 |
| 11,6 | 12,0 | MDF 1160S2D | ○ | 90 | 46,4 | 51,0 |
| 11,7 | | MDF 1170S2D | ○ | | 46,8 | 51,5 |
| 11,8 | | MDF 1180S2D | ○ | | 47,2 | 51,9 |
| 11,9 | | MDF 1190S2D | ○ | | 47,6 | 52,4 |
| 12,0 | | MDF 1200S2D | ● | | 48,0 | 52,8 |
| 12,5 | 14,0 | MDF 1250S2D | ● | 100 | 50,0 | 54,0 |
| 13,0 | | MDF 1300S2D | ● | | 52,0 | 56,8 |
| 13,5 | | MDF 1350S2D | ○ | | 54,0 | 59,6 |
| 14,0 | 16,0 | MDF 1400S2D | ● | 110 | 56,0 | 62,4 |
| 14,5 | | MDF 1450S2D | ○ | | 58,0 | 65,2 |
| 15,0 | | MDF 1500S2D | ● | | 60,0 | 68,0 |
| 15,5 | 18,0 | MDF 1550S2D | ● | 115 | 62,0 | 70,8 |
| 16,0 | | MDF 1600S2D | ● | | 64,0 | 73,6 |
| 16,5 | | MDF 1650S2D | ● | | 66,0 | 72,4 |
| 17,0 | 20,0 | MDF 1700S2D | ○ | 125 | 68,0 | 75,2 |
| 17,5 | | MDF 1750S2D | ○ | | 70,0 | 78,0 |
| 18,0 | | MDF 1800S2D | ● | | 72,0 | 80,8 |
| 18,5 | 20,0 | MDF 1850S2D | ○ | 140 | 74,0 | 83,6 |
| 19,0 | | MDF 1900S2D | ○ | | 76,0 | 86,4 |
| 19,5 | | MDF 1950S2D | ○ | | 78,0 | 89,2 |
| 20,0 | | MDF 2000S2D | ● | | 80,0 | 92,0 |

*RS Thinning is used for ØDc ≥ 0,5mm.

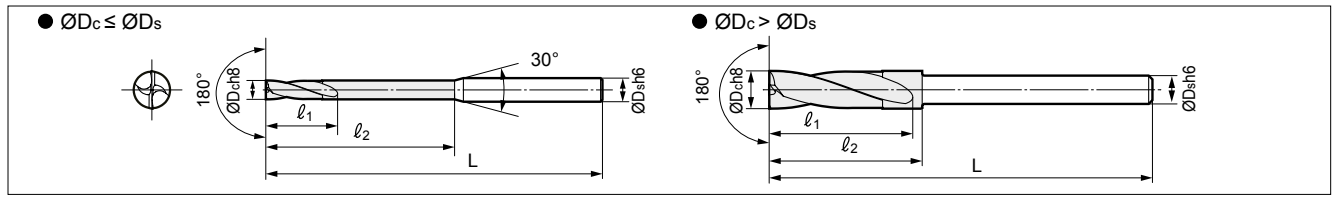
Grade: ACF75

● Euro stock ○ Japan stock

Flat MultiDrill MDF Type

External Coolant Supply (MDF L2D Type, Long Type)

| | | | | | | | | | |
|--------------|-------------|----------------|----------------|-----------------|-----------|-------------------|-----------------|-----|----|
| Carbon Steel | Alloy Steel | Tempered Steel | Hardened Steel | Stainless Steel | Cast Iron | Ductile Cast Iron | Aluminium Alloy | PVD | 2D |
| <0.28% | >0.28% | <45HRC | >45HRC | Steel | Iron | Cast Iron | Alloy | | |



● Diameter $\varnothing D_c$: 3.0 ~ 9.5mm

| Diameter $\varnothing D_c$ (mm) | Shank $\varnothing D_s$ (mm) | Cat. No. | Stock | Dimensions (mm) | | | |
|---------------------------------|------------------------------|---------------|-------------|-----------------|-------|-------|------|
| | | | | L | l_1 | l_2 | |
| 3.0 | 6.0 | MDF 0300L2D | ○ | 100 | 13.5 | 30.0 | |
| 3.1 | | 0310L2D | ○ | | 14.0 | 31.0 | |
| 3.2 | | 0320L2D | ○ | | 14.4 | 32.0 | |
| 3.3 | | 0330L2D | ● | | 14.9 | 33.0 | |
| 3.4 | | 0340L2D | ○ | | 15.3 | 34.0 | |
| 3.5 | | 0350L2D | ○ | | 15.8 | 35.0 | |
| 3.6 | 6.0 | MDF 0360L2D | ○ | 100 | 16.2 | 36.0 | |
| 3.7 | | 0370L2D | ○ | | 16.7 | 37.0 | |
| 3.8 | | 0380L2D | ○ | | 17.1 | 38.0 | |
| 3.9 | | 0390L2D | ○ | | 17.6 | 39.0 | |
| 4.0 | | 0400L2D | ● | | 18.0 | 40.0 | |
| 4.1 | | MDF 0410L2D | ○ | | 18.5 | 41.0 | |
| 4.2 | 0420L2D | ● | 18.9 | 42.0 | | | |
| 4.3 | 0430L2D | ○ | 19.4 | 43.0 | | | |
| 4.4 | 0440L2D | ○ | 19.8 | 44.0 | | | |
| 4.5 | 0450L2D | ○ | 20.3 | 45.0 | | | |
| 4.6 | 6.0 | MDF 0460L2D | ○ | 100 | 20.7 | 46.0 | |
| 4.7 | | 0470L2D | ○ | | 21.2 | 47.0 | |
| 4.8 | | 0480L2D | ○ | | 21.6 | 48.0 | |
| 4.9 | | 0490L2D | ○ | | 22.1 | 49.0 | |
| 5.0 | | 0500L2D | ● | | 22.5 | 50.0 | |
| 5.1 | | MDF 0510L2D | ○ | | 23.0 | 51.0 | |
| 5.2 | 0520L2D | ○ | 23.4 | 52.0 | | | |
| 5.3 | 0530L2D | ○ | 23.9 | 53.0 | | | |
| 5.4 | 0540L2D | ○ | 24.3 | 54.0 | | | |
| 5.5 | 0550L2D | ○ | 24.8 | 55.0 | | | |
| 5.6 | 6.0 | MDF 0560L2D | ○ | 110 | 25.2 | 56.0 | |
| 5.7 | | 0570L2D | ○ | | 25.7 | 57.0 | |
| 5.8 | | 0580L2D | ● | | 26.1 | 58.0 | |
| 5.9 | | 0590L2D | ○ | | 26.6 | 59.0 | |
| 6.0 | | MDF 0600L2DS5 | ○ | | 110 | 27.0 | 30.0 |
| 6.0 | | MDF 0600L2D | ● | | 110 | 27.0 | 60.0 |
| 6.1 | MDF 0610L2D | ○ | 27.5 | 30.5 | | | |
| 6.2 | 0620L2D | ○ | 27.9 | 30.9 | | | |
| 6.3 | 6.0 | MDF 0630L2D | ○ | 120 | 28.4 | 31.4 | |
| 6.4 | | 0640L2D | ○ | | 28.8 | 31.8 | |
| 6.5 | | 0650L2D | ○ | | 29.3 | 32.3 | |
| 6.6 | | MDF 0660L2D | ● | | 29.7 | 32.7 | |
| 6.7 | | 0670L2D | ○ | | 30.2 | 33.2 | |
| 6.8 | | 0680L2D | ○ | | 30.6 | 33.6 | |
| 6.9 | 0690L2D | ○ | 31.1 | 34.1 | | | |
| 7.0 | 0700L2D | ○ | 31.5 | 34.5 | | | |
| 7.1 | 6.0 | MDF 0710L2D | ○ | 130 | 32.0 | 35.0 | |
| 7.2 | | 0720L2D | ○ | | 32.4 | 35.4 | |
| 7.3 | | 0730L2D | ○ | | 32.9 | 35.9 | |
| 7.4 | | 0740L2D | ○ | | 33.3 | 36.3 | |
| 7.5 | | 0750L2D | ○ | | 33.8 | 36.8 | |
| 7.6 | | 6.0 | MDF 0760L2D | | ○ | 130 | 34.2 |
| 7.7 | 0770L2D | | ○ | 34.7 | 37.7 | | |
| 7.8 | 0780L2D | | ○ | 35.1 | 38.1 | | |
| 7.9 | 0790L2D | | ○ | 35.6 | 38.6 | | |
| 8.0 | MDF 0800L2DS6 | | ○ | 130 | 36.0 | | 39.0 |
| 8.0 | MDF 0800L2D | | ● | 130 | 36.0 | | 80.0 |
| 8.1 | 8.0 | MDF 0810L2D | ○ | 140 | 36.5 | 39.5 | |
| 8.2 | | 0820L2D | ○ | | 36.9 | 39.9 | |
| 8.3 | | 0830L2D | ○ | | 37.4 | 40.4 | |
| 8.4 | | 0840L2D | ○ | | 37.8 | 40.8 | |
| 8.5 | | 0850L2D | ○ | | 38.3 | 41.3 | |
| 8.6 | | 8.0 | MDF 0860L2D | | ○ | 140 | 38.7 |
| 8.7 | 0870L2D | | ○ | 39.2 | 42.2 | | |
| 8.8 | 0880L2D | | ○ | 39.6 | 42.6 | | |
| 8.9 | 0890L2D | | ○ | 40.1 | 43.1 | | |
| 9.0 | 0900L2D | | ○ | 40.5 | 43.5 | | |
| 9.1 | 8.0 | | MDF 0910L2D | ○ | 150 | | 41.0 |
| 9.2 | | 0920L2D | ○ | 41.4 | | 44.4 | |
| 9.3 | | 0930L2D | ○ | 41.9 | | 44.9 | |
| 9.4 | | 0940L2D | ○ | 42.3 | | 45.3 | |
| 9.5 | | 0950L2D | ○ | 42.8 | | 45.8 | |

● Diameter $\varnothing D_c$: 9.6 ~ 20.0mm

| Diameter $\varnothing D_c$ (mm) | Shank $\varnothing D_s$ (mm) | Cat. No. | Stock | Dimensions (mm) | | | |
|---------------------------------|------------------------------|----------------|-------------|-----------------|-------|-------|-------|
| | | | | L | l_1 | l_2 | |
| 9.6 | 8.0 | MDF 0960L2D | ○ | 150 | 43.2 | 46.2 | |
| 9.7 | | 0970L2D | ○ | | 43.7 | 46.7 | |
| 9.8 | | 0980L2D | ○ | | 44.1 | 47.1 | |
| 9.9 | | 0990L2D | ○ | | 44.6 | 47.6 | |
| 10.0 | | MDF 1000L2DS8 | ○ | | 150 | 45.0 | 48.0 |
| 10.0 | | MDF 1000L2D | ○ | | 150 | 45.0 | 100.0 |
| 10.1 | 10.0 | MDF 1010L2D | ○ | 160 | 45.5 | 48.5 | |
| 10.2 | | 1020L2D | ○ | | 45.9 | 48.9 | |
| 10.3 | | 1030L2D | ○ | | 46.4 | 49.4 | |
| 10.4 | | 1040L2D | ○ | | 46.8 | 49.8 | |
| 10.5 | | 1050L2D | ○ | | 47.3 | 50.3 | |
| 10.6 | | 10.0 | MDF 1060L2D | | ○ | 160 | 47.7 |
| 10.7 | 1070L2D | | ○ | 48.2 | 51.2 | | |
| 10.8 | 1080L2D | | ○ | 48.6 | 51.6 | | |
| 10.9 | 1090L2D | | ○ | 49.1 | 52.1 | | |
| 11.0 | 1100L2D | | ○ | 49.5 | 52.5 | | |
| 11.1 | 10.0 | | MDF 1110L2D | ○ | 170 | | 50.0 |
| 11.2 | | 1120L2D | ○ | 50.4 | | 53.4 | |
| 11.3 | | 1130L2D | ○ | 50.9 | | 53.9 | |
| 11.4 | | 1140L2D | ○ | 51.3 | | 54.3 | |
| 11.5 | | 1150L2D | ○ | 51.8 | | 54.8 | |
| 11.6 | | 10.0 | MDF 1160L2D | ○ | | 170 | 52.2 |
| 11.7 | 1170L2D | | ○ | 52.7 | 55.7 | | |
| 11.8 | 1180L2D | | ○ | 53.1 | 56.1 | | |
| 11.9 | 1190L2D | | ○ | 53.6 | 56.6 | | |
| 12.0 | MDF 1200L2DS10 | | ○ | 170 | 54.0 | | 57.0 |
| 12.0 | MDF 1200L2D | | ○ | 170 | 54.0 | | 120.0 |
| 12.5 | 12.0 | MDF 1250L2D | ○ | 180 | 56.3 | 59.3 | |
| 13.0 | | 1300L2D | ○ | | 58.5 | 61.5 | |
| 13.5 | | 1350L2D | ○ | | 190 | 60.8 | 63.8 |
| 14.0 | | MDF 1400L2DS12 | ○ | | 190 | 63.0 | 66.0 |
| 14.0 | | MDF 1400L2D | ○ | | 190 | 63.0 | 140.0 |
| 14.5 | | MDF 1450L2D | ○ | | 200 | 65.3 | 68.3 |
| 15.0 | 14.0 | 1500L2D | ○ | 210 | 67.5 | 70.5 | |
| 15.5 | | 1550L2D | ○ | | 69.8 | 72.8 | |
| 16.0 | | MDF 1600L2DS14 | ○ | | 210 | 72.0 | 75.0 |
| 16.0 | | MDF 1600L2D | ○ | | 210 | 72.0 | 160.0 |
| 16.5 | | MDF 1650L2D | ○ | | 220 | 74.3 | 77.3 |
| 17.0 | | 1700L2D | ○ | | 220 | 76.5 | 79.5 |
| 17.5 | 16.0 | 1750L2D | ○ | 230 | 78.8 | 81.8 | |
| 18.0 | | MDF 1800L2DS16 | ○ | | 230 | 81.0 | 84.0 |
| 18.0 | | MDF 1800L2D | ○ | | 230 | 81.0 | 180.0 |
| 18.5 | | MDF 1850L2D | ○ | | 240 | 83.3 | 86.3 |
| 19.0 | | 1900L2D | ○ | | 240 | 85.5 | 88.5 |
| 19.5 | | 1950L2D | ○ | | 250 | 87.8 | 90.8 |
| 20.0 | 18.0 | MDF 2000L2DS18 | ○ | 250 | 90.0 | 93.0 | |
| 20.0 | | MDF 2000L2D | ○ | | 250 | 90.0 | 200.0 |

○ Japan stock

Grade: ACF75

Drilling that uses this tool requires a guide hole of the same diameter or a centering hole larger than the tool diameter.

Recommended Cutting Conditions

MDF S2D Type

- The recommended hole depth is 2 x D_c. 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 at ≤ 70% when the inclination angle is ≤ 30°
 - Set the feed rate at ≤ 50% when the inclination angle is > 30°
- This product is a drilling tool. Do not use it for traversing or helical milling

(v_c: Cutting Speed m/min f: Feed Rate mm/rev)

| Drill Diam. ØD _c (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 |

Min. - Optimum - Max.

MDF L2D Type, Long Type

- Drilling that uses this tool requires a guide hole of the same diameter.
- The cutting conditions are the recommended conditions with a guide hole.
- The recommended hole depth is 5 x D_c. The depth is measured from the highest point of the hole on drilling in inclined surfaces.
- This product is a drilling tool. Do not use it for traversing or helical milling.

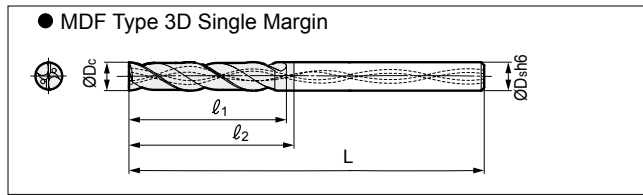
(v_c: Cutting Speed m/min f: Feed Rate mm/rev)

| Drill Diam. ØD _c (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 |
|----------------------------------|--------------------|-------------------------------------|----------------------|-------------------------|--------------------------|----------------------|--------------------|--------------------|
| ~ Ø4,0 | v _c | 60 - 80 - 100 | 50 - 70 - 90 | 20 - 30 - 40 | 20 - 30 - 40 | 70 - 85 - 100 | 65 - 75 - 85 | 90 - 120 - 150 |
| | 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 - 80 - 100 | 50 - 70 - 90 | 20 - 30 - 40 | 20 - 30 - 50 | 70 - 85 - 100 | 65 - 75 - 85 | 90 - 120 - 150 |
| | 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 - 80 - 100 | 50 - 70 - 90 | 20 - 30 - 40 | 20 - 30 - 50 | 70 - 85 - 100 | 65 - 75 - 85 | 90 - 120 - 150 |
| | 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 - 80 - 100 | 50 - 70 - 90 | 20 - 30 - 40 | 20 - 30 - 50 | 70 - 85 - 100 | 65 - 75 - 85 | 90 - 120 - 150 |
| | f | 0,15 - 0,20 - 0,25 | 0,15 - 0,20 - 0,25 | 0,08 - 0,10 - 0,12 | 0,06 - 0,08 - 0,10 | 0,15 - 0,20 - 0,25 | 0,12 - 0,15 - 0,18 | 0,15 - 0,20 - 0,25 |
| ~ Ø12,0 | v _c | 60 - 80 - 100 | 50 - 70 - 90 | 20 - 30 - 40 | 20 - 30 - 50 | 70 - 85 - 100 | 65 - 75 - 85 | 90 - 120 - 150 |
| | f | 0,20 - 0,25 - 0,30 | 0,20 - 0,25 - 0,30 | 0,12 - 0,15 - 0,18 | 0,08 - 0,10 - 0,12 | 0,17 - 0,22 - 0,27 | 0,15 - 0,20 - 0,25 | 0,20 - 0,25 - 0,30 |
| ~ Ø16,0 | v _c | 60 - 80 - 100 | 50 - 70 - 90 | 20 - 30 - 40 | 20 - 30 - 50 | 70 - 85 - 100 | 65 - 75 - 85 | 90 - 120 - 150 |
| | 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 | 0,20 - 0,25 - 0,30 | 0,20 - 0,25 - 0,30 | 0,25 - 0,30 - 0,35 |
| ~ Ø20,0 | v _c | 60 - 80 - 100 | 50 - 70 - 90 | 20 - 30 - 40 | 20 - 30 - 50 | 70 - 85 - 100 | 65 - 75 - 85 | 90 - 120 - 150 |
| | 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 | 0,30 - 0,35 - 0,40 | 0,25 - 0,30 - 0,35 | 0,35 - 0,40 - 0,45 |

Min. - Optimum - Max.

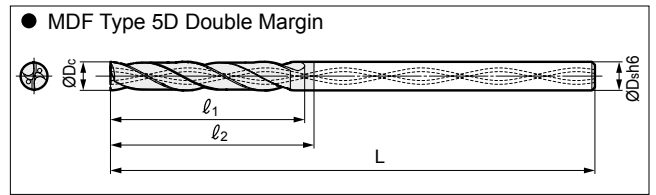
Flat MultiDrill MDF Type

Internal Coolant Supply (MDF H3D/H5D Type)



| | | | | | | | |
|--------------|-------------|----------------|----------------|-----------------|-----------|-------------------|----------------|
| Carbon Steel | Alloy Steel | Tempered Steel | Hardened Steel | Stainless Steel | Cast Iron | Ductile Cast Iron | Aluminum Alloy |
| <0.28% | >0.28% | ○ | <45HRC | >45HRC | ○ | ○ | ○ |

PVD **3D** **5D**



● Diameter ØDc: 3,0 ~ 6,0mm

| Diameter ØDc (mm) | Shank ØDs (mm) | Hole Depth (L/D) | Cat. No. | Stock | Dimensions (mm) | | |
|-------------------|----------------|------------------|-------------|-------|-----------------|----------------|----------------|
| | | | | | L | l ₁ | l ₂ |
| 3,0 | 3 | 3 | MDF 0300H3D | ● | 68 | 13,5 | 16,5 |
| | | 5 | 0300H5D | ● | 78 | 20,1 | 23,1 |
| 3,1 | 4 | 3 | MDF 0310H3D | ○ | 72 | 14,0 | 17,0 |
| | | 5 | 0310H5D | ● | 86 | 20,8 | 23,8 |
| 3,2 | 4 | 3 | 0320H3D | ○ | 72 | 14,4 | 17,4 |
| | | 5 | 0320H5D | ○ | 86 | 21,4 | 24,4 |
| 3,3 | 4 | 3 | 0330H3D | ○ | 72 | 14,9 | 17,9 |
| | | 5 | 0330H5D | ● | 86 | 22,1 | 25,1 |
| 3,4 | 4 | 3 | 0340H3D | ○ | 72 | 15,3 | 18,3 |
| | | 5 | 0340H5D | ○ | 86 | 22,8 | 25,8 |
| 3,5 | 4 | 3 | 0350H3D | ● | 72 | 15,8 | 18,8 |
| | | 5 | 0350H5D | ● | 86 | 23,5 | 26,5 |
| 3,6 | 4 | 3 | MDF 0360H3D | ○ | 72 | 16,2 | 19,2 |
| | | 5 | 0360H5D | ○ | 86 | 24,1 | 27,1 |
| 3,7 | 4 | 3 | 0370H3D | ○ | 72 | 16,7 | 19,7 |
| | | 5 | 0370H5D | ○ | 86 | 24,8 | 27,8 |
| 3,8 | 4 | 3 | 0380H3D | ○ | 72 | 17,1 | 20,1 |
| | | 5 | 0380H5D | ○ | 86 | 25,5 | 28,5 |
| 3,9 | 4 | 3 | 0390H3D | ○ | 72 | 17,6 | 20,6 |
| | | 5 | 0390H5D | ○ | 86 | 26,1 | 29,1 |
| 4,0 | 4 | 3 | 0400H3D | ● | 72 | 18,0 | 21,0 |
| | | 5 | 0400H5D | ● | 86 | 26,8 | 29,8 |
| 4,1 | 5 | 3 | MDF 0410H3D | ○ | 80 | 18,5 | 21,5 |
| | | 5 | 0410H5D | ○ | 98 | 27,5 | 30,5 |
| 4,2 | 5 | 3 | 0420H3D | ○ | 80 | 18,9 | 21,9 |
| | | 5 | 0420H5D | ○ | 98 | 28,1 | 31,1 |
| 4,3 | 5 | 3 | 0430H3D | ○ | 80 | 19,4 | 22,4 |
| | | 5 | 0430H5D | ○ | 98 | 28,8 | 31,8 |
| 4,4 | 5 | 3 | 0440H3D | ○ | 80 | 19,8 | 22,8 |
| | | 5 | 0440H5D | ○ | 98 | 29,5 | 32,5 |
| 4,5 | 5 | 3 | 0450H3D | ● | 80 | 20,3 | 23,3 |
| | | 5 | 0450H5D | ● | 98 | 30,2 | 33,2 |
| 4,6 | 5 | 3 | MDF 0460H3D | ○ | 80 | 20,7 | 23,7 |
| | | 5 | 0460H5D | ○ | 98 | 30,8 | 33,8 |
| 4,7 | 5 | 3 | 0470H3D | ○ | 80 | 21,2 | 24,2 |
| | | 5 | 0470H5D | ○ | 98 | 31,5 | 34,5 |
| 4,8 | 5 | 3 | 0480H3D | ● | 80 | 21,6 | 24,6 |
| | | 5 | 0480H5D | ○ | 98 | 32,2 | 35,2 |
| 4,9 | 5 | 3 | 0490H3D | ○ | 80 | 22,1 | 25,1 |
| | | 5 | 0490H5D | ○ | 98 | 32,8 | 35,8 |
| 5,0 | 5 | 3 | 0500H3D | ● | 80 | 22,5 | 25,5 |
| | | 5 | 0500H5D | ● | 98 | 33,5 | 36,5 |
| 5,1 | 6 | 3 | MDF 0510H3D | ○ | 82 | 23,0 | 26,0 |
| | | 5 | 0510H5D | ○ | 100 | 34,2 | 37,2 |
| 5,2 | 6 | 3 | 0520H3D | ● | 82 | 23,4 | 26,4 |
| | | 5 | 0520H5D | ○ | 100 | 34,8 | 37,8 |
| 5,3 | 6 | 3 | 0530H3D | ● | 82 | 23,9 | 26,9 |
| | | 5 | 0530H5D | ○ | 100 | 35,5 | 38,5 |
| 5,4 | 6 | 3 | 0540H3D | ○ | 82 | 24,3 | 27,3 |
| | | 5 | 0540H5D | ○ | 100 | 36,2 | 39,2 |
| 5,5 | 6 | 3 | 0550H3D | ● | 82 | 24,8 | 27,8 |
| | | 5 | 0550H5D | ● | 100 | 36,9 | 39,9 |
| 5,6 | 6 | 3 | MDF 0560H3D | ○ | 82 | 25,2 | 28,2 |
| | | 5 | 0560H5D | ○ | 100 | 37,5 | 40,5 |
| 5,7 | 6 | 3 | 0570H3D | ○ | 82 | 25,7 | 28,7 |
| | | 5 | 0570H5D | ○ | 100 | 38,2 | 41,2 |
| 5,8 | 6 | 3 | 0580H3D | ○ | 82 | 26,1 | 29,1 |
| | | 5 | 0580H5D | ○ | 100 | 38,9 | 41,9 |
| 5,9 | 6 | 3 | 0590H3D | ○ | 82 | 26,6 | 29,6 |
| | | 5 | 0590H5D | ○ | 100 | 39,5 | 42,5 |
| 6,0 | 6 | 3 | 0600H3D | ● | 82 | 27,0 | 30,0 |
| | | 5 | 0600H5D | ● | 100 | 40,2 | 43,2 |

● Diameter ØDc: 6,1 ~ 9,0mm

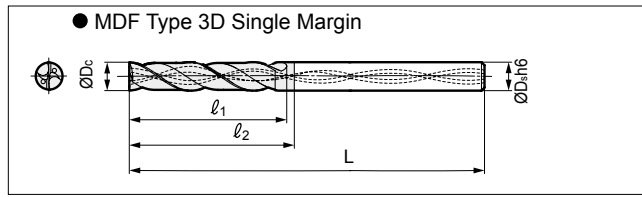
| Diameter ØDc (mm) | Shank ØDs (mm) | Hole Depth (L/D) | Cat. No. | Stock | Dimensions (mm) | | |
|-------------------|----------------|------------------|-------------|-------|-----------------|----------------|----------------|
| | | | | | L | l ₁ | l ₂ |
| 6,1 | 7 | 3 | MDF 0610H3D | ● | 88 | 27,5 | 30,5 |
| | | 5 | 0610H5D | ○ | 109 | 40,9 | 43,9 |
| 6,2 | 7 | 3 | 0620H3D | ○ | 88 | 27,9 | 30,9 |
| | | 5 | 0620H5D | ○ | 109 | 41,5 | 44,5 |
| 6,3 | 7 | 3 | 0630H3D | ○ | 88 | 28,4 | 31,4 |
| | | 5 | 0630H5D | ○ | 109 | 42,2 | 45,2 |
| 6,4 | 7 | 3 | 0640H3D | ○ | 88 | 28,8 | 31,8 |
| | | 5 | 0640H5D | ○ | 109 | 42,9 | 45,9 |
| 6,5 | 7 | 3 | 0650H3D | ● | 88 | 29,3 | 32,3 |
| | | 5 | 0650H5D | ● | 109 | 43,6 | 46,6 |
| 6,6 | 7 | 3 | MDF 0660H3D | ○ | 88 | 29,7 | 32,7 |
| | | 5 | 0660H5D | ○ | 109 | 44,2 | 47,2 |
| 6,7 | 7 | 3 | 0670H3D | ○ | 88 | 30,2 | 33,2 |
| | | 5 | 0670H5D | ○ | 109 | 44,9 | 47,9 |
| 6,8 | 7 | 3 | 0680H3D | ● | 88 | 30,6 | 33,6 |
| | | 5 | 0680H5D | ○ | 109 | 45,6 | 48,6 |
| 6,9 | 7 | 3 | 0690H3D | ○ | 88 | 31,1 | 34,1 |
| | | 5 | 0690H5D | ○ | 109 | 46,2 | 49,2 |
| 7,0 | 7 | 3 | 0700H3D | ● | 88 | 31,5 | 34,5 |
| | | 5 | 0700H5D | ● | 109 | 46,9 | 49,9 |
| 7,1 | 8 | 3 | MDF 0710H3D | ○ | 94 | 32,0 | 35,0 |
| | | 5 | 0710H5D | ○ | 118 | 47,6 | 50,6 |
| 7,2 | 8 | 3 | 0720H3D | ○ | 94 | 32,4 | 35,4 |
| | | 5 | 0720H5D | ○ | 118 | 48,2 | 51,2 |
| 7,3 | 8 | 3 | 0730H3D | ○ | 94 | 32,9 | 35,9 |
| | | 5 | 0730H5D | ○ | 118 | 48,9 | 51,9 |
| 7,4 | 8 | 3 | 0740H3D | ● | 94 | 33,3 | 36,3 |
| | | 5 | 0740H5D | ○ | 118 | 49,6 | 52,6 |
| 7,5 | 8 | 3 | 0750H3D | ● | 94 | 33,8 | 36,8 |
| | | 5 | 0750H5D | ● | 118 | 50,3 | 53,3 |
| 7,6 | 8 | 3 | MDF 0760H3D | ○ | 94 | 34,2 | 37,2 |
| | | 5 | 0760H5D | ○ | 118 | 50,9 | 53,9 |
| 7,7 | 8 | 3 | 0770H3D | ○ | 94 | 34,7 | 37,7 |
| | | 5 | 0770H5D | ○ | 118 | 51,6 | 54,6 |
| 7,8 | 8 | 3 | 0780H3D | ○ | 94 | 35,1 | 38,1 |
| | | 5 | 0780H5D | ● | 118 | 52,3 | 55,3 |
| 7,9 | 8 | 3 | 0790H3D | ○ | 94 | 35,6 | 38,6 |
| | | 5 | 0790H5D | ○ | 118 | 52,9 | 55,9 |
| 8,0 | 8 | 3 | 0800H3D | ● | 94 | 36,0 | 39,0 |
| | | 5 | 0800H5D | ● | 118 | 53,6 | 56,6 |
| 8,1 | 9 | 3 | MDF 0810H3D | ○ | 100 | 36,5 | 39,5 |
| | | 5 | 0810H5D | ○ | 127 | 54,3 | 57,3 |
| 8,2 | 9 | 3 | 0820H3D | ○ | 100 | 36,9 | 39,9 |
| | | 5 | 0820H5D | ● | 127 | 54,9 | 57,9 |
| 8,3 | 9 | 3 | 0830H3D | ○ | 100 | 37,4 | 40,4 |
| | | 5 | 0830H5D | ○ | 127 | 55,6 | 58,6 |
| 8,4 | 9 | 3 | 0840H3D | ○ | 100 | 37,8 | 40,8 |
| | | 5 | 0840H5D | ○ | 127 | 56,3 | 59,3 |
| 8,5 | 9 | 3 | 0850H3D | ● | 100 | 38,3 | 41,3 |
| | | 5 | 0850H5D | ● | 127 | 57,0 | 60,0 |
| 8,6 | 9 | 3 | MDF 0860H3D | ○ | 100 | 38,7 | 41,7 |
| | | 5 | 0860H5D | ○ | 127 | 57,6 | 60,6 |
| 8,7 | 9 | 3 | 0870H3D | ○ | 100 | 39,2 | 42,2 |
| | | 5 | 0870H5D | ○ | 127 | 58,3 | 61,3 |
| 8,8 | 9 | 3 | 0880H3D | ○ | 100 | 39,6 | 42,6 |
| | | 5 | 0880H5D | ○ | 127 | 59,0 | 62,0 |
| 8,9 | 9 | 3 | 0890H3D | ○ | 100 | 40,1 | 43,1 |
| | | 5 | 0890H5D | ○ | 127 | 59,6 | 62,6 |
| 9,0 | 9 | 3 | 0900H3D | ● | 100 | 40,5 | 43,5 |
| | | 5 | 0900H5D | ● | 127 | 60,3 | 63,3 |

● Euro stock ○ Japan stock Grade: ACF75

Flat MultiDrill MDF Type

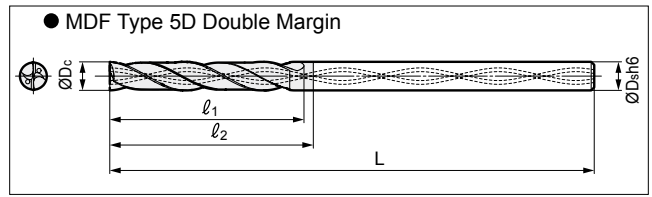
MDF Type with Oil Hole - H3D / H5D

Internal Coolant Supply (MDF H3D/H5D Type)



| | | | | | | | |
|--------------|-------------|----------------|----------------|-----------------|-----------|-------------------|-----------------|
| Carbon Steel | Alloy Steel | Tempered Steel | Hardened Steel | Stainless Steel | Cast Iron | Ductile Cast Iron | Aluminium Alloy |
| <0.28% | >0.28% | Steel | <45HRC | >45HRC | Steel | Iron | Cast Iron |
| ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

PVD **3D** **5D**



● Diameter ØDc: 9,1 ~ 12,0mm

| Diameter ØDc (mm) | Shank ØDs (mm) | Hole Depth (L/D) | Cat. No. | Stock | Dimensions (mm) | | |
|-------------------|----------------|------------------|-------------|-------|-----------------|----------------|----------------|
| | | | | | L | l ₁ | l ₂ |
| 9,1 | 10 | 3 | MDF 0910H3D | ○ | 106 | 41,0 | 44,0 |
| | | 5 | 0910H5D | ○ | 136 | 61,0 | 64,0 |
| 9,2 | 10 | 3 | 0920H3D | ○ | 106 | 41,4 | 44,4 |
| | | 5 | 0920H5D | ○ | 136 | 61,6 | 64,6 |
| 9,3 | 10 | 3 | 0930H3D | ○ | 106 | 41,9 | 44,9 |
| | | 5 | 0930H5D | ○ | 136 | 62,3 | 65,3 |
| 9,4 | 10 | 3 | 0940H3D | ○ | 106 | 42,3 | 45,3 |
| | | 5 | 0940H5D | ○ | 136 | 63,0 | 66,0 |
| 9,5 | 10 | 3 | 0950H3D | ● | 106 | 42,8 | 45,8 |
| | | 5 | 0950H5D | ● | 136 | 63,7 | 66,7 |
| 9,6 | 10 | 3 | MDF 0960H3D | ○ | 106 | 43,2 | 46,2 |
| | | 5 | 0960H5D | ○ | 136 | 64,3 | 67,3 |
| 9,7 | 10 | 3 | 0970H3D | ○ | 106 | 43,7 | 46,7 |
| | | 5 | 0970H5D | ○ | 136 | 65,0 | 68,0 |
| 9,8 | 10 | 3 | 0980H3D | ● | 106 | 44,1 | 47,1 |
| | | 5 | 0980H5D | ○ | 136 | 65,7 | 68,7 |
| 9,9 | 10 | 3 | 0990H3D | ○ | 106 | 44,6 | 47,6 |
| | | 5 | 0990H5D | ○ | 136 | 66,3 | 69,3 |
| 10,0 | 10 | 3 | 1000H3D | ● | 106 | 45,0 | 48,0 |
| | | 5 | 1000H5D | ● | 136 | 67,0 | 70,0 |
| 10,1 | 11 | 3 | MDF 1010H3D | ○ | 116 | 45,5 | 48,5 |
| | | 5 | 1010H5D | ○ | 149 | 67,7 | 70,7 |
| 10,2 | 11 | 3 | 1020H3D | ● | 116 | 45,9 | 48,9 |
| | | 5 | 1020H5D | ○ | 149 | 68,3 | 71,3 |
| 10,3 | 11 | 3 | 1030H3D | ● | 116 | 46,4 | 49,4 |
| | | 5 | 1030H5D | ○ | 149 | 69,0 | 72,0 |
| 10,4 | 11 | 3 | 1040H3D | ○ | 116 | 46,8 | 49,8 |
| | | 5 | 1040H5D | ○ | 149 | 69,7 | 72,7 |
| 10,5 | 11 | 3 | 1050H3D | ● | 116 | 47,3 | 50,3 |
| | | 5 | 1050H5D | ● | 149 | 70,4 | 73,4 |
| 10,6 | 11 | 3 | MDF 1060H3D | ○ | 116 | 47,7 | 50,7 |
| | | 5 | 1060H5D | ○ | 149 | 71,0 | 74,0 |
| 10,7 | 11 | 3 | 1070H3D | ○ | 116 | 48,2 | 51,2 |
| | | 5 | 1070H5D | ○ | 149 | 71,7 | 74,7 |
| 10,8 | 11 | 3 | 1080H3D | ○ | 116 | 48,6 | 51,6 |
| | | 5 | 1080H5D | ○ | 149 | 72,4 | 75,4 |
| 10,9 | 11 | 3 | 1090H3D | ○ | 116 | 49,1 | 52,1 |
| | | 5 | 1090H5D | ○ | 149 | 73,0 | 76,0 |
| 11,0 | 11 | 3 | 1100H3D | ● | 116 | 49,5 | 52,5 |
| | | 5 | 1100H5D | ● | 149 | 73,7 | 76,7 |
| 11,1 | 12 | 3 | MDF 1110H3D | ○ | 122 | 50,0 | 53,0 |
| | | 5 | 1110H5D | ○ | 158 | 74,4 | 77,4 |
| 11,2 | 12 | 3 | 1120H3D | ○ | 122 | 50,4 | 53,4 |
| | | 5 | 1120H5D | ○ | 158 | 75,0 | 78,0 |
| 11,3 | 12 | 3 | 1130H3D | ○ | 122 | 50,9 | 53,9 |
| | | 5 | 1130H5D | ○ | 158 | 75,7 | 78,7 |
| 11,4 | 12 | 3 | 1140H3D | ○ | 122 | 51,3 | 54,3 |
| | | 5 | 1140H5D | ○ | 158 | 76,4 | 79,4 |
| 11,5 | 12 | 3 | 1150H3D | ● | 122 | 51,8 | 54,8 |
| | | 5 | 1150H5D | ● | 158 | 77,1 | 80,1 |
| 11,6 | 12 | 3 | MDF 1160H3D | ○ | 122 | 52,2 | 55,2 |
| | | 5 | 1160H5D | ○ | 158 | 77,7 | 80,7 |
| 11,7 | 12 | 3 | 1170H3D | ○ | 122 | 52,7 | 55,7 |
| | | 5 | 1170H5D | ○ | 158 | 78,4 | 81,4 |
| 11,8 | 12 | 3 | 1180H3D | ● | 122 | 53,1 | 56,1 |
| | | 5 | 1180H5D | ○ | 158 | 79,1 | 82,1 |
| 11,9 | 12 | 3 | 1190H3D | ○ | 122 | 53,6 | 56,6 |
| | | 5 | 1190H5D | ○ | 158 | 79,7 | 82,7 |
| 12,0 | 12 | 3 | 1200H3D | ● | 122 | 54,0 | 57,0 |
| | | 5 | 1200H5D | ● | 158 | 80,4 | 83,4 |

● Diameter ØDc: 12,5 ~ 16,0mm

| Diameter ØDc (mm) | Shank ØDs (mm) | Hole Depth (L/D) | Cat. No. | Stock | Dimensions (mm) | | |
|-------------------|----------------|------------------|-------------|-------|-----------------|----------------|----------------|
| | | | | | L | l ₁ | l ₂ |
| 12,5 | 13 | 3 | MDF 1250H3D | ○ | 128 | 56,3 | 59,3 |
| | | 5 | 1250H5D | ○ | 167 | 83,8 | 86,8 |
| 13,0 | 13 | 3 | 1300H3D | ● | 128 | 58,5 | 61,5 |
| | | 5 | 1300H5D | ○ | 167 | 87,1 | 90,1 |
| 13,5 | 14 | 3 | MDF 1350H3D | ○ | 134 | 60,8 | 63,8 |
| | | 5 | 1350H5D | ○ | 176 | 90,5 | 93,5 |
| 14,0 | 14 | 3 | 1400H3D | ● | 134 | 63,0 | 66,0 |
| | | 5 | 1400H5D | ○ | 176 | 93,8 | 96,8 |
| 14,5 | 15 | 3 | MDF 1450H3D | ○ | 140 | 65,3 | 68,3 |
| | | 5 | 1450H5D | ○ | 185 | 97,2 | 100,2 |
| 15,0 | 15 | 3 | 1500H3D | ○ | 140 | 67,5 | 70,5 |
| | | 5 | 1500H5D | ○ | 185 | 100,5 | 103,5 |
| 15,5 | 16 | 3 | MDF 1550H3D | ○ | 146 | 69,8 | 72,8 |
| | | 5 | 1550H5D | ○ | 194 | 103,9 | 106,9 |
| 16,0 | 16 | 3 | 1600H3D | ● | 146 | 72,0 | 75,0 |
| | | 5 | 1600H5D | ○ | 194 | 107,2 | 110,2 |

● Euro stock ○ Japan stock Grade: ACF75

Recommended Cutting Conditions

MDF Type with Oil Hole (H3D)

- The recommended hole depth is 3 x D_c. The depth is measured from the highest point of the hole on drilling in inclined surfaces.
- The recommended cutting conditions are those for drilling on flat horizontal surfaces.
- Adjust the feed rate according to the inclination angle when drilling in an inclined surface.
 - Set the feed rate at ≤ 70% when the inclination angle is ≤ 30°.
 - Set the feed rate at ≤ 50% when the inclination angle is > 30°.
- This product is a drilling tool. Do not use it for traversing or helical milling.
- A guide hole of the same diameter is recommended when drilling stainless steel.

(v_c: Cutting Speed m/min f: Feed Rate mm/rev)

| Drill Diam. ØD _c (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 |
|-------------------------------------|-----------------------|---|-------------------------|----------------------------|-----------------------------|-------------------------|----------------------|--------------------|
| ~ Ø4,0 | v _c | 70 - 85 - 100 | 60 - 75 - 90 | 30 - 40 - 50 | 25 - 35 - 45 | 70 - 85 - 100 | 65 - 75 - 85 | 90 - 120 - 150 |
| | 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 | 70 - 85 - 100 | 60 - 75 - 90 | 30 - 40 - 50 | 25 - 35 - 45 | 70 - 85 - 100 | 70 - 80 - 90 | 90 - 120 - 150 |
| | 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 | 70 - 85 - 100 | 60 - 75 - 90 | 30 - 40 - 50 | 25 - 35 - 45 | 70 - 85 - 100 | 70 - 80 - 90 | 90 - 120 - 150 |
| | 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 | 70 - 85 - 100 | 60 - 75 - 90 | 30 - 40 - 50 | 25 - 35 - 45 | 70 - 85 - 100 | 70 - 80 - 90 | 90 - 120 - 150 |
| | 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 | 0,15 - 0,20 - 0,25 |
| ~ Ø12,0 | v _c | 70 - 85 - 100 | 60 - 75 - 90 | 30 - 40 - 50 | 25 - 35 - 45 | 70 - 85 - 100 | 70 - 80 - 90 | 90 - 120 - 150 |
| | 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 | 0,20 - 0,25 - 0,30 |
| ~ Ø16,0 | v _c | 70 - 85 - 100 | 60 - 75 - 90 | 30 - 40 - 50 | 25 - 35 - 45 | 70 - 85 - 100 | 70 - 80 - 90 | 90 - 120 - 150 |
| | f | 0,15 - 0,20 - 0,25 | 0,15 - 0,20 - 0,25 | 0,12 - 0,15 - 0,18 | 0,10 - 0,15 - 0,20 | 0,17 - 0,22 - 0,27 | 0,15 - 0,20 - 0,25 | 0,25 - 0,30 - 0,40 |

Min. - Optimum - Max.

MDF Type with Oil Hole (H5D)

- Drilling that uses this tool requires a guide hole of the same diameter.
- The cutting conditions are the recommended conditions with a guide hole.
- The recommended hole depth is 5 x D_c. The depth is measured from the highest point of the hole on drilling in inclined surfaces.
- This product is a drilling tool. Do not use it for traversing or helical milling.

(v_c: Cutting Speed m/min f: Feed Rate mm/rev)

| Drill Diam. ØD _c (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 |
|-------------------------------------|-----------------------|---|-------------------------|----------------------------|-----------------------------|-------------------------|----------------------|--------------------|
| ~ Ø4,0 | v _c | 70 - 85 - 100 | 60 - 75 - 90 | 30 - 40 - 50 | 25 - 35 - 45 | 70 - 85 - 100 | 65 - 75 - 85 | 90 - 120 - 150 |
| | 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 | 70 - 85 - 100 | 60 - 75 - 90 | 30 - 40 - 50 | 25 - 35 - 45 | 70 - 85 - 100 | 65 - 75 - 85 | 90 - 120 - 150 |
| | 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 | 70 - 85 - 100 | 60 - 75 - 90 | 30 - 40 - 50 | 25 - 35 - 45 | 70 - 85 - 100 | 65 - 75 - 85 | 90 - 120 - 150 |
| | 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 | 70 - 85 - 100 | 60 - 75 - 90 | 30 - 40 - 50 | 25 - 35 - 45 | 70 - 85 - 100 | 65 - 75 - 85 | 90 - 120 - 150 |
| | f | 0,15 - 0,20 - 0,25 | 0,15 - 0,20 - 0,25 | 0,08 - 0,10 - 0,12 | 0,06 - 0,08 - 0,10 | 0,15 - 0,20 - 0,25 | 0,12 - 0,15 - 0,18 | 0,15 - 0,20 - 0,25 |
| ~ Ø12,0 | v _c | 70 - 85 - 100 | 60 - 75 - 90 | 30 - 40 - 50 | 25 - 35 - 45 | 70 - 85 - 100 | 65 - 75 - 85 | 90 - 120 - 150 |
| | f | 0,20 - 0,25 - 0,30 | 0,20 - 0,25 - 0,30 | 0,12 - 0,15 - 0,18 | 0,08 - 0,10 - 0,12 | 0,17 - 0,22 - 0,27 | 0,15 - 0,20 - 0,25 | 0,20 - 0,25 - 0,30 |
| ~ Ø16,0 | v _c | 70 - 85 - 100 | 60 - 75 - 90 | 30 - 40 - 50 | 25 - 35 - 45 | 70 - 85 - 100 | 65 - 75 - 85 | 90 - 120 - 150 |
| | 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 | 0,20 - 0,25 - 0,30 | 0,20 - 0,25 - 0,30 | 0,25 - 0,30 - 0,35 |

Min. - Optimum - Max.

Application Examples

34CrMo4, Gear Frame Component

5.0mm
Tool life criteria:
Surface roughness

MDF
Competitor

No. of Holes

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: $v_r = 414\text{mm/min}$, $H = 5\text{mm}$ (Blind hole)
External Coolant

15CrMo5, Gear Component

Continuous
Continuous Interrupted

Clearance between drill and wall is 0,1mm

Stable drilling is achieved for non planar surface.

Drill: MDF0600S2D (Ø6,0mm)
 $v_c = 65\text{m/min}$, $f = 0,04\sim 0,15\text{mm/rev}$
Cutting Conditions: $v_r = 138\sim 518\text{mm/min}$, $H = \sim 15\text{mm}$ (Through)
External Coolant

C35, Automotive Component

60° Inclination

MDF

Chipping

Competitor

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: $v_r = 370\text{mm/min}$, $H = 8\text{mm}$ (Through)
External Coolant

Cr-Mo Steels, Jig Component

Drill Hole Diameter

11,10
11,05
11,00
10,95

ØD Accuracy (mm)

MDF Competitor

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: $v_r = 347\text{mm/min}$, $H = 11\text{mm}$ (Blind hole)
External Coolant



(Germany)
SUMITOMO ELECTRIC Hartmetall GmbH
Konrad-Zuse-Straße 9, 47877 Willich

Tel. +49 2154 4992-0, Fax +49 2154 4992-161
Info@SumitomoTool.com
www.SumitomoTool.com



(UK and Ireland)
SUMITOMO ELECTRIC Hardmetal Ltd.
3 Paper Mill Drive
Redditch, B98 8QJ, UK

Tel. +44 1844 342081, Fax: +44 1844 342415
InfoUK@SumitomoTool.com
www.SumitomoTool.com



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