



Flat Drill

# 2ZDK-HP Series



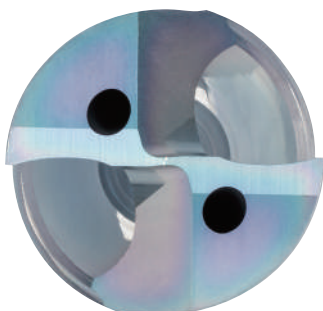
New Generation Flat Bottom Drill for High Precision Machining in a Wide Range of Applications

Stable Machining in a Wide Range of Applications Including Counterboring and Drilling in Cylinder Surfaces

Chisel Edge with S-curve Reduces Shock during Machining

**2ZDK-HP Short Type Lineup Expansion**

**New 2ZDK-HP-OH with Internal Coolant for Stainless Steel Machining**



With Internal Coolant  
**2ZDK-HP-OH**



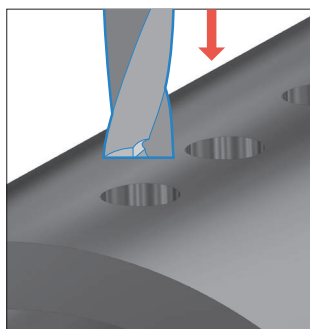
Flat Drill

# 2ZDK-HP Series

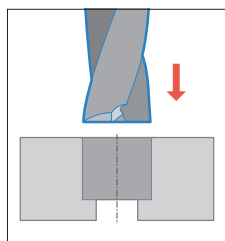
Next Generation Flat Bottom Drill. Stable Machining in a Wide Range of Applications Including Counterboring and Drilling in Cylinder Surfaces. OH type with Internal Coolant for Stainless Steel Machining

## SOLUTION

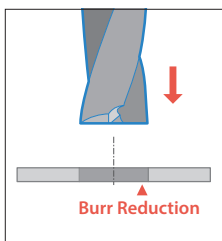
Great solution for a variety of machining applications



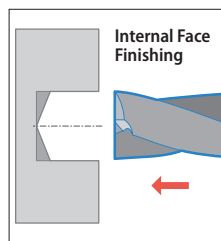
Drilling in Cylinder and Curved Surfaces



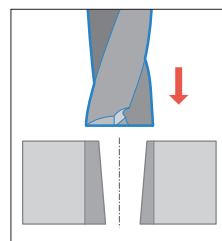
Hole Counterboring



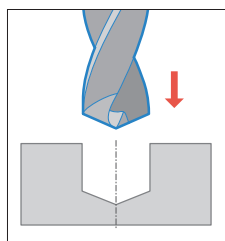
Plunging of Thin Plate



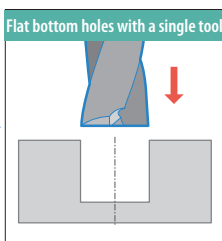
Turning in Automatic Lathes



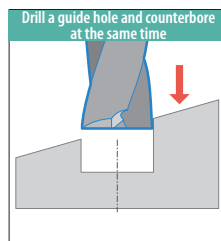
Hole Expanding



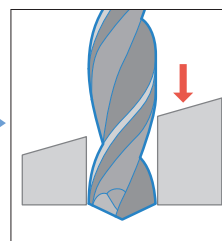
Flat Bottom Finishing after Drilling



Flat bottom holes with a single tool



Counterboring on Slant Surface/Spotting for Secondary Process



## Large Lineup

### Standard Type

#### 2ZDK-HP

Economical Drilling

Large lineup with 2 drilling depths available



P K

### Internal Coolant Type

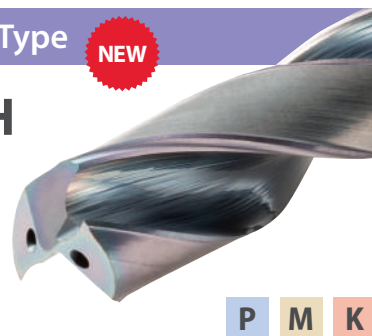
NEW

#### 2ZDK-HP-OH

With oil holes (OH)

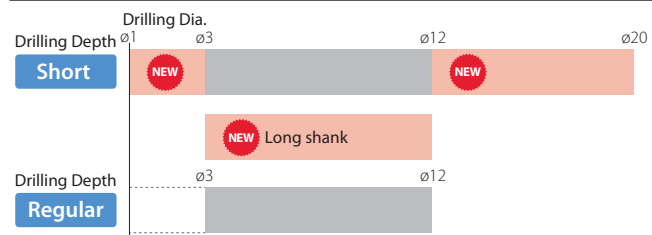
High efficiency and stable machining

For stainless steel machining



P M K

### Lineup



### Lineup



## MEGACOAT NANO

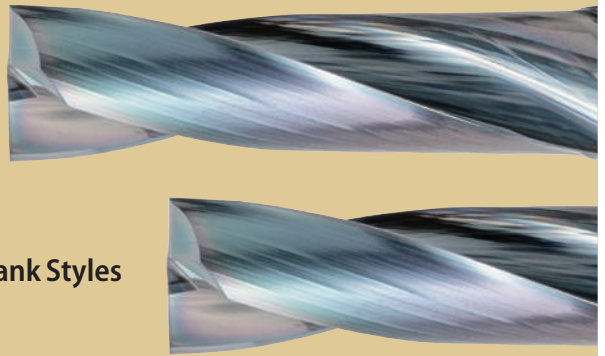
High hardness and excellent oxidation resistance with a special Multilayer Nano Coating  
Stable machining and long tool life

# 2ZDK-HP

Standard Economy Type

Large Lineup with 2 Drilling Depths Available

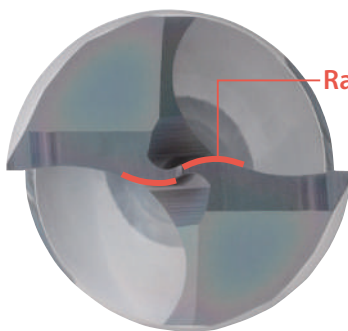
Expanded of Drilling Diameter Range with New Long Shank Styles



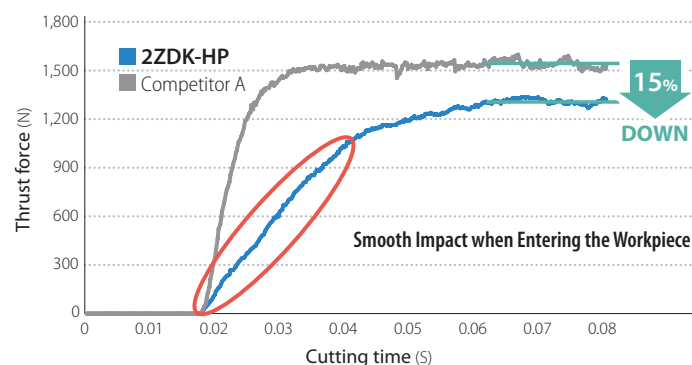
## 1 Chisel Edge with S-curve Provides High Precision and Stable Machining Results

### Special Chisel Edge

Reduced Impact Forces when Entering the Workpiece and Provides Excellent Vibration Control for High Precision Drilling



Cutting Force Comparison (Internal evaluation)

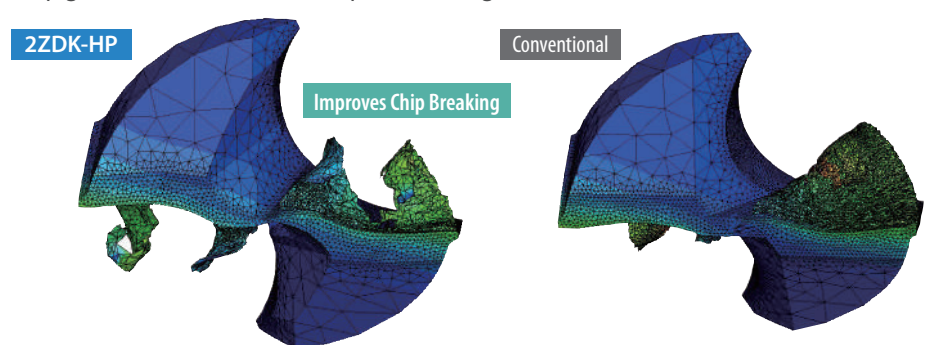


Cutting Conditions:  $n = 1,800 \text{ min}^{-1}$ ,  $V_f = 400 \text{ mm/min}$ , Drilling Depth 10 mm, Dry Workpiece: S50C Drilling Dia.  $\phi 12 \text{ mm}$  (Regular)

Excellent chip evacuation and finely breaks chips into small pieces

Suppress cutting edge damage with lower cutting force on the center of cutting edge

Chip generation simulation comparison (Image) (Internal evaluation)

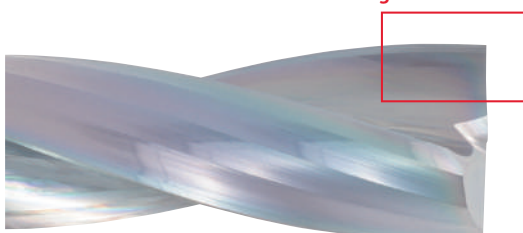


## 2 Low Cutting Force Minimizes Burrs

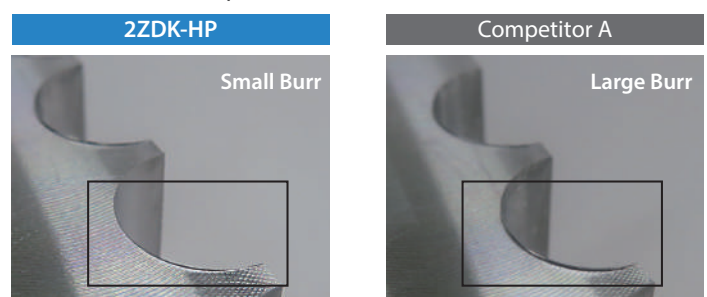
Low Cutting Force with Flat Bottom and Sharp Cutting Edge

Minimizes Burrs

Low Cutting Force Corner Edge Design



Burr Formation Comparison (Internal evaluation)



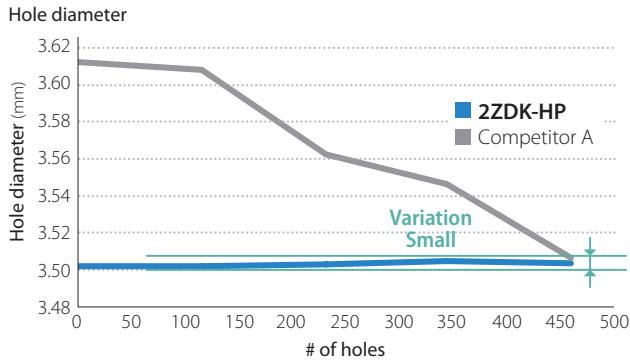
Cutting Conditions:  $n = 1,800 \text{ min}^{-1}$ ,  $V_f = 300 \text{ mm/min}$ , Drilling Depth 15 mm, Wet Drilling Dia.  $\phi 12 \text{ mm}$  (Regular) Workpiece: SCM 435

## Excellent Cutting Performance (Internal evaluation)

### Drilling in Flat Surface

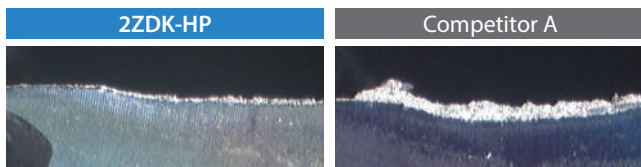
Drilling Dia.:  $\phi$  3.5 mm

Stable and High Precision Machining with Less Variation in Hole Diameter  
Excellent Cutting Edge Condition



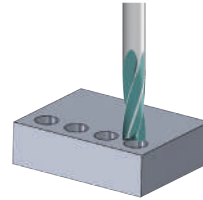
Cutting Conditions:  $n = 6,000 \text{ min}^{-1}$ ,  $V_f = 360 \text{ mm/min}$ , Drilling Depth 5 mm, Wet  
Drilling Dia.  $\phi$  3.5 mm (Regular) Workpiece: SCM 440

Cutting Edge after Machining 500 holes



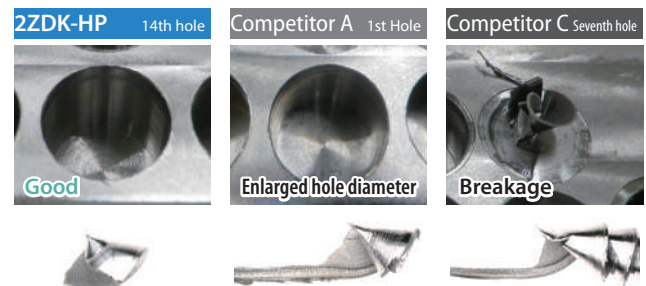
Drilling Dia.:  $\phi$  12 mm

Long shank type provides improved stability



Set longer overhang amount (122 mm)  
Performance comparison without pilot hole

Competitor showed chattering and breakage due to long overhang amount.  
2ZDK-HP reduces impact forces when entering the workpiece and provides stable machining without pilot holes

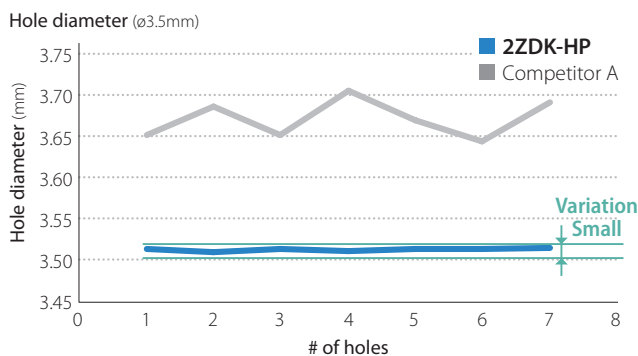


Cutting Conditions:  $n = 2,400 \text{ min}^{-1}$ ,  $V_f = 600 \text{ mm/min}$ , Drilling Depth 12 mm, Wet  
Drilling Dia.  $\phi$  12 mm (Regular, long shank) Workpiece: SCM 440

### Drilling in Cylindrical Face

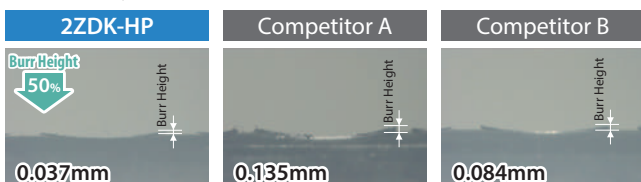
Drilling Dia.:  $\phi$  3.5 mm

Stable and High Precision Machining with Less Variation in Hole Diameter



Burr Comparison

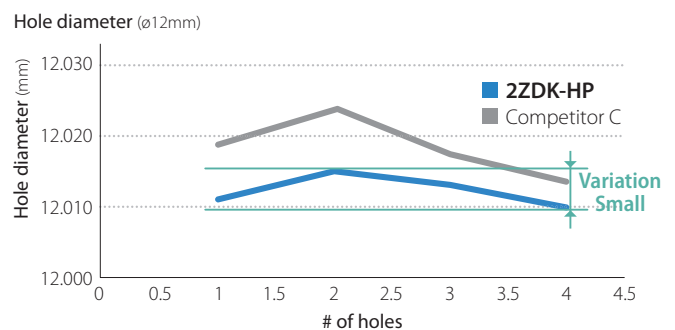
Drilling in Cylindrical Surface



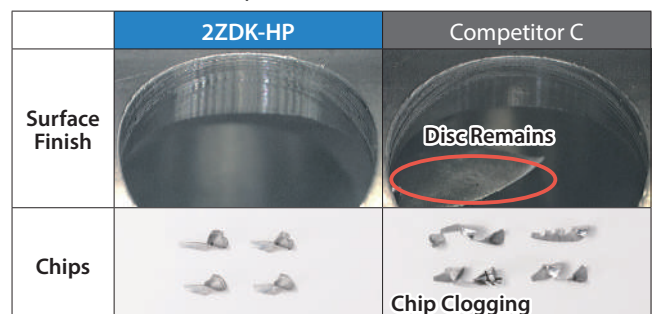
Cutting Conditions:  $n = 7,000 \text{ min}^{-1}$ ,  $V_f = 420 \text{ mm/min}$ , Wet Drilling Dia.  $\phi$  3.5 mm (Regular)  
Workpiece: Carbon steel pipe  $\phi$  17.3 mm (Thickness 3.2 mm)

Drilling Dia.:  $\phi$  12 mm

Minimizes Hole Diameter Variation even at Feed Rates as High as 0.3mm/rev.  
Stable Machining without Chip Clogging



Surface Finish and Chips



Cutting Conditions:  $n = 1,800 \text{ min}^{-1}$ ,  $V_f = 540 \text{ mm/min}$ , Wet Drilling Dia.  $\phi$  12 mm (Regular)  
Workpiece: Carbon steel pipe  $\phi$  25 mm (Thickness 4 mm)

# 2ZDK-HP-OH

Coolant-Through Holes for Efficient and Stable Machining of Stainless Steel Machining

NEW

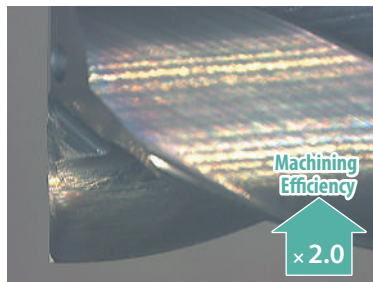
1

## Flat Bottom Drill with Internal Coolant for Stainless Steel

Internal coolant can double machining efficiency. Reduces chip clogging and fractures

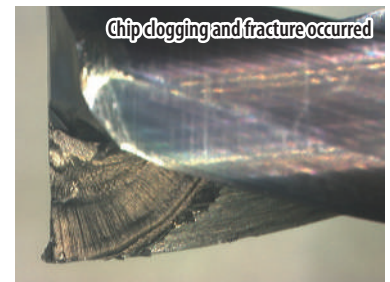
Stainless Steel with Internal Coolant (Internal evaluation)

2ZDK-HP-OH  
(Internal Coolant)



Cutting Conditions:  $V_c = 100$  m/min,  $f = 0.2$  mm/rev, Wet (Internal coolant)

Conventional  
(External Coolant)



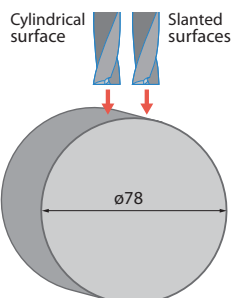
Cutting Conditions:  $V_c = 40$  m/min,  $f = 0.1$  mm/rev, Wet (External coolant)

### SOLUTION 1

2ZDK-HP-OH (Internal coolant) showed 1.5 times machining efficiency. Higher machining accuracy

(User evaluation)

Machine part  
SUS 304



Machining Efficiency

2ZDK-HP-OH  
(Internal coolant)

$V_f = 260$  mm/min

$f = 0.15$  mm/rev

Competitor A  
(External coolant)

$V_f = 173$  mm/min

$f = 0.1$  mm/rev

Machining  
Efficiency

$\times 1.5$

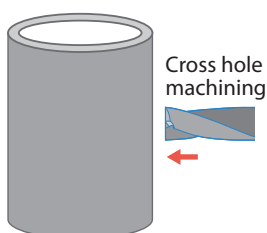
$n = 1,730$  min<sup>-1</sup> ( $V_c = 60$  m/min),  $V_f = 260$  mm/min ( $f = 0.15$  mm/rev),  
Drilling Depth 4-5 mm, Wet (External + Internal coolant) Drilling Dia.  $\phi 11$

### SOLUTION 2

Tool life was 1.5 times longer than that of Competitor A with internal coolant

(User evaluation)

Automotive Part  
Equivalent to  
SUS 630



Tool Life

2ZDK-HP-OH  
(Internal coolant)

2,400 pcs/drill

Competitor A  
Internal Coolant

1,600 pcs/drill

External Coolant

1,000 pcs/drill

Tool Life

$\times 1.5$

$n = 2,500$  min<sup>-1</sup> ( $V_c = 75$  m/min),  $V_f \sim 320$  mm/min ( $\sim f = 0.13$  mm/rev),  
Drilling Depth 16 mm, Wet Drilling Dia.  $\phi 9.6$

## 2

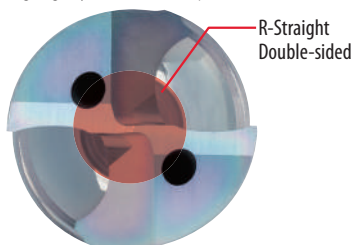
## Fine-Tuned Design for Advanced Cutting Performance

High-precision, stable machining with five advantages

Both sharpness and edge strength, which are difficult to achieve with conventional tools

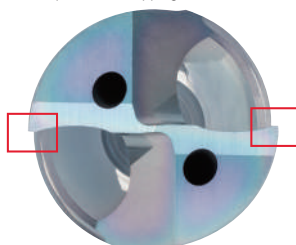
## 1 Special Chisel Edge

High rigidity and excellent chip control



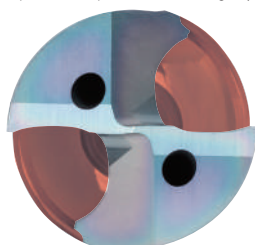
## 2 Corners: Flat Land

Sharpness and chipping resistance



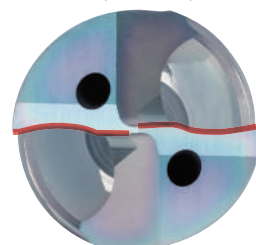
## 3 Unique Flute Shape

Optimized chip evacuation and rigidity

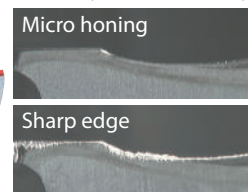


## 4 Micro Honing

Maintains sharpness and improves abrasion resistance

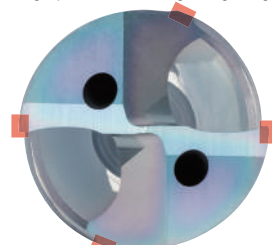


Wear Resistance Comparison  
(Internal evaluation)



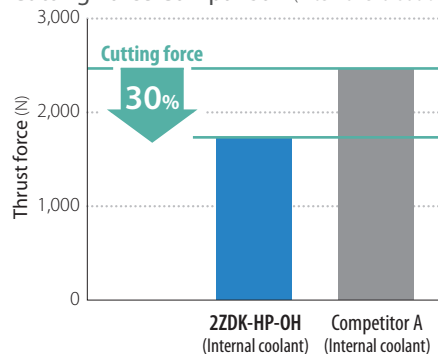
## 5 Double Margin

High-precision machining with guiding action



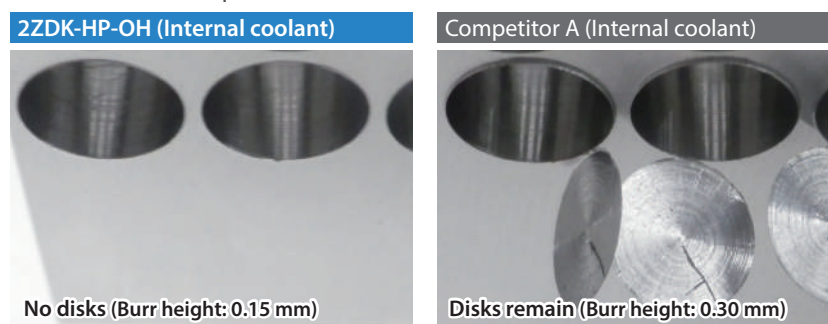
Cutting Conditions:  $n = 3,800 \text{ min}^{-1}$ ,  $V_f = 950 \text{ mm/min}$ , Drilling Depth 20 mm  
Wet (Internal coolant) Drilling Dia.  $\phi 10 \text{ mm}$  Workpiece: S 45 C

## Cutting Force Comparison (Internal evaluation)



Cutting Conditions:  $n = 3,180 \text{ min}^{-1}$ ,  $V_f = 800 \text{ mm/min}$ , Drilling Depth 12 mm  
Wet Drilling Dia.  $\phi 12 \text{ mm}$  Workpiece: SCM 440

## Burr Formation Comparison (Internal evaluation)



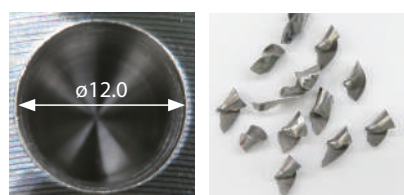
Cutting conditions:  $n = 3,800 \text{ min}^{-1}$ ,  $V_f = 950 \text{ mm/min}$ , Drilling Depth 20 mm,  
Wet Drilling Dia.  $\phi 10 \text{ mm}$  Workpiece: S 45 C

2ZDK-HP-OH is lower in cutting force. There is no remaining disk and the sharpness is good.

## SUS 304 Cutting Performance Comparison (Internal evaluation)

## 2ZDK-HP-OH (Internal coolant)

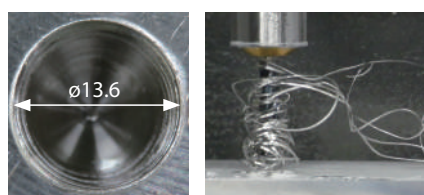
$V_f = 760 \text{ mm/min}$



Machining Efficiency  
 $\times 1.2$

## Competitor A (Internal coolant)

$V_f = 630 \text{ mm/min}$

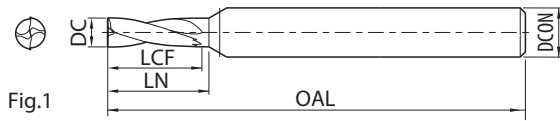


Cutting Conditions:  $n = 2,650 \text{ min}^{-1}$ , Drilling Depth 24 mm, Wet Drilling Dia.  $\phi 12 \text{ mm}$

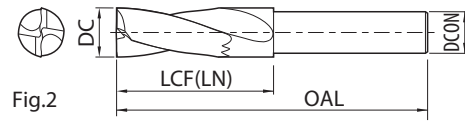
2ZDK-HP-OH showed 1.2 times machining efficiency in stainless steel machining. Also showed stable cutting diameter and good chip control.

## 2ZDK-HP Stock Items Drilling Depth Short

Short



No. of flutes (Z) = 2 Helix Angle: 20 °



| Description    | Stock | Dimension (mm) |                                                     |     |      |      |     | Shape |
|----------------|-------|----------------|-----------------------------------------------------|-----|------|------|-----|-------|
|                |       | DC             | Outside Dia. Tolerance                              | LCF | LN   | DCON | OAL |       |
| 2ZDK010HP-1.5D | ●     | 1.0            | $\begin{smallmatrix} 0 \\ -0.010 \end{smallmatrix}$ | 3.5 | 4.3  | 4    | 50  | Fig.1 |
| 2ZDK011HP-1.5D | ●     | 1.1            | $\begin{smallmatrix} 0 \\ -0.010 \end{smallmatrix}$ | 3.9 | 4.7  | 4    | 50  | Fig.1 |
| 2ZDK012HP-1.5D | ●     | 1.2            | $\begin{smallmatrix} 0 \\ -0.010 \end{smallmatrix}$ | 4.3 | 5.1  | 4    | 50  | Fig.1 |
| 2ZDK013HP-1.5D | ●     | 1.3            | $\begin{smallmatrix} 0 \\ -0.010 \end{smallmatrix}$ | 4.7 | 5.5  | 4    | 50  | Fig.1 |
| 2ZDK014HP-1.5D | ●     | 1.4            | $\begin{smallmatrix} 0 \\ -0.010 \end{smallmatrix}$ | 5.1 | 5.9  | 4    | 50  | Fig.1 |
| 2ZDK015HP-1.5D | ●     | 1.5            | $\begin{smallmatrix} 0 \\ -0.010 \end{smallmatrix}$ | 5.5 | 6.3  | 4    | 50  | Fig.1 |
| 2ZDK016HP-1.5D | ●     | 1.6            | $\begin{smallmatrix} 0 \\ -0.010 \end{smallmatrix}$ | 5.7 | 6.5  | 4    | 50  | Fig.1 |
| 2ZDK017HP-1.5D | ●     | 1.7            | $\begin{smallmatrix} 0 \\ -0.010 \end{smallmatrix}$ | 5.9 | 6.7  | 4    | 50  | Fig.1 |
| 2ZDK018HP-1.5D | ●     | 1.8            | $\begin{smallmatrix} 0 \\ -0.010 \end{smallmatrix}$ | 6.1 | 6.9  | 4    | 50  | Fig.1 |
| 2ZDK019HP-1.5D | ●     | 1.9            | $\begin{smallmatrix} 0 \\ -0.010 \end{smallmatrix}$ | 6.3 | 7.1  | 4    | 50  | Fig.1 |
| 2ZDK020HP-1.5D | ●     | 2.0            | $\begin{smallmatrix} 0 \\ -0.010 \end{smallmatrix}$ | 6.5 | 7.3  | 4    | 50  | Fig.1 |
| 2ZDK021HP-1.5D | ●     | 2.1            | $\begin{smallmatrix} 0 \\ -0.010 \end{smallmatrix}$ | 6.9 | 7.7  | 4    | 50  | Fig.1 |
| 2ZDK022HP-1.5D | ●     | 2.2            | $\begin{smallmatrix} 0 \\ -0.010 \end{smallmatrix}$ | 7.3 | 8.1  | 4    | 50  | Fig.1 |
| 2ZDK023HP-1.5D | ●     | 2.3            | $\begin{smallmatrix} 0 \\ -0.010 \end{smallmatrix}$ | 7.7 | 8.5  | 4    | 50  | Fig.1 |
| 2ZDK024HP-1.5D | ●     | 2.4            | $\begin{smallmatrix} 0 \\ -0.010 \end{smallmatrix}$ | 8.1 | 8.9  | 4    | 50  | Fig.1 |
| 2ZDK025HP-1.5D | ●     | 2.5            | $\begin{smallmatrix} 0 \\ -0.010 \end{smallmatrix}$ | 8.5 | 9.3  | 4    | 50  | Fig.1 |
| 2ZDK026HP-1.5D | ●     | 2.6            | $\begin{smallmatrix} 0 \\ -0.010 \end{smallmatrix}$ | 8.8 | 9.5  | 4    | 50  | Fig.1 |
| 2ZDK027HP-1.5D | ●     | 2.7            | $\begin{smallmatrix} 0 \\ -0.010 \end{smallmatrix}$ | 9.1 | 9.8  | 4    | 50  | Fig.1 |
| 2ZDK028HP-1.5D | ●     | 2.8            | $\begin{smallmatrix} 0 \\ -0.010 \end{smallmatrix}$ | 9.3 | 10.0 | 4    | 50  | Fig.1 |
| 2ZDK029HP-1.5D | ●     | 2.9            | $\begin{smallmatrix} 0 \\ -0.010 \end{smallmatrix}$ | 9.5 | 10.3 | 4    | 50  | Fig.1 |
| 2ZDK030HP-1.5D | ●     | 3.0            | $\begin{smallmatrix} 0 \\ -0.010 \end{smallmatrix}$ | 9   | 10   | 6    | 60  | Fig.1 |
| 2ZDK031HP-1.5D | ●     | 3.1            | $\begin{smallmatrix} 0 \\ -0.012 \end{smallmatrix}$ | 10  | 11   | 6    | 60  | Fig.1 |
| 2ZDK032HP-1.5D | ●     | 3.2            |                                                     |     |      |      |     |       |
| 2ZDK033HP-1.5D | ●     | 3.3            |                                                     |     |      |      |     |       |
| 2ZDK034HP-1.5D | ●     | 3.4            | $\begin{smallmatrix} 0 \\ -0.012 \end{smallmatrix}$ | 11  | 12   | 6    | 60  | Fig.1 |
| 2ZDK035HP-1.5D | ●     | 3.5            |                                                     |     |      |      |     |       |
| 2ZDK036HP-1.5D | ●     | 3.6            |                                                     |     |      |      |     |       |
| 2ZDK037HP-1.5D | ●     | 3.7            | $\begin{smallmatrix} 0 \\ -0.012 \end{smallmatrix}$ | 12  | 13   | 6    | 60  | Fig.1 |
| 2ZDK038HP-1.5D | ●     | 3.8            |                                                     |     |      |      |     |       |
| 2ZDK039HP-1.5D | ●     | 3.9            |                                                     |     |      |      |     |       |
| 2ZDK040HP-1.5D | ●     | 4.0            | $\begin{smallmatrix} 0 \\ -0.012 \end{smallmatrix}$ | 13  | 14   | 6    | 60  | Fig.1 |
| 2ZDK041HP-1.5D | ●     | 4.1            |                                                     |     |      |      |     |       |
| 2ZDK042HP-1.5D | ●     | 4.2            |                                                     |     |      |      |     |       |
| 2ZDK043HP-1.5D | ●     | 4.3            | $\begin{smallmatrix} 0 \\ -0.012 \end{smallmatrix}$ | 14  | 15   | 6    | 60  | Fig.1 |
| 2ZDK044HP-1.5D | ●     | 4.4            |                                                     |     |      |      |     |       |
| 2ZDK045HP-1.5D | ●     | 4.5            |                                                     |     |      |      |     |       |
| 2ZDK046HP-1.5D | ●     | 4.6            | $\begin{smallmatrix} 0 \\ -0.012 \end{smallmatrix}$ | 15  | 16   | 6    | 60  | Fig.1 |
| 2ZDK047HP-1.5D | ●     | 4.7            |                                                     |     |      |      |     |       |
| 2ZDK048HP-1.5D | ●     | 4.8            |                                                     |     |      |      |     |       |
| 2ZDK049HP-1.5D | ●     | 4.9            |                                                     |     |      |      |     |       |

The standard Drilling Depth is 1.5 D (1.5 x DC).

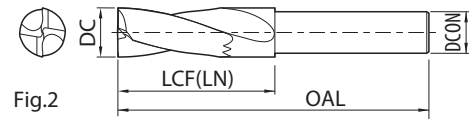
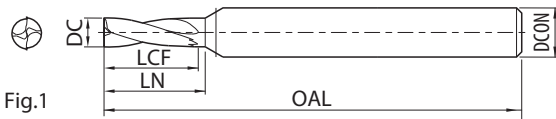
| Description    | Stock | Dimension (mm) |                                                     |     |    |      |     | Shape |
|----------------|-------|----------------|-----------------------------------------------------|-----|----|------|-----|-------|
|                |       | DC             | Outside Dia. Tolerance                              | LCF | LN | DCON | OAL |       |
| 2ZDK050HP-1.5D | ●     | 5.0            | $\begin{smallmatrix} 0 \\ -0.012 \end{smallmatrix}$ | 16  | 17 | 6    | 60  | Fig.1 |
| 2ZDK051HP-1.5D | ●     | 5.1            |                                                     |     |    |      |     |       |
| 2ZDK052HP-1.5D | ●     | 5.2            |                                                     |     |    |      |     |       |
| 2ZDK053HP-1.5D | ●     | 5.3            | $\begin{smallmatrix} 0 \\ -0.012 \end{smallmatrix}$ | 17  | 18 | 6    | 60  | Fig.1 |
| 2ZDK054HP-1.5D | ●     | 5.4            |                                                     |     |    |      |     |       |
| 2ZDK055HP-1.5D | ●     | 5.5            |                                                     |     |    |      |     |       |
| 2ZDK056HP-1.5D | ●     | 5.6            | $\begin{smallmatrix} 0 \\ -0.012 \end{smallmatrix}$ | 18  | 19 | 6    | 60  | Fig.1 |
| 2ZDK057HP-1.5D | ●     | 5.7            |                                                     |     |    |      |     |       |
| 2ZDK058HP-1.5D | ●     | 5.8            |                                                     |     |    |      |     |       |
| 2ZDK059HP-1.5D | ●     | 5.9            | $\begin{smallmatrix} 0 \\ -0.012 \end{smallmatrix}$ | 19  | 21 | 6    | 60  | Fig.1 |
| 2ZDK060HP-1.5D | ●     | 6.0            |                                                     |     |    |      |     |       |
| 2ZDK061HP-1.5D | ●     | 6.1            |                                                     |     |    |      |     |       |
| 2ZDK062HP-1.5D | ●     | 6.2            | $\begin{smallmatrix} 0 \\ -0.015 \end{smallmatrix}$ | 19  | 21 | 8    | 70  | Fig.1 |
| 2ZDK063HP-1.5D | ●     | 6.3            |                                                     |     |    |      |     |       |
| 2ZDK064HP-1.5D | ●     | 6.4            |                                                     |     |    |      |     |       |
| 2ZDK065HP-1.5D | ●     | 6.5            | $\begin{smallmatrix} 0 \\ -0.015 \end{smallmatrix}$ | 20  | 22 | 8    | 70  | Fig.1 |
| 2ZDK066HP-1.5D | ●     | 6.6            |                                                     |     |    |      |     |       |
| 2ZDK067HP-1.5D | ●     | 6.7            |                                                     |     |    |      |     |       |
| 2ZDK068HP-1.5D | ●     | 6.8            | $\begin{smallmatrix} 0 \\ -0.015 \end{smallmatrix}$ | 21  | 23 | 8    | 70  | Fig.1 |
| 2ZDK069HP-1.5D | ●     | 6.9            |                                                     |     |    |      |     |       |
| 2ZDK070HP-1.5D | ●     | 7.0            |                                                     |     |    |      |     |       |
| 2ZDK071HP-1.5D | ●     | 7.1            | $\begin{smallmatrix} 0 \\ -0.015 \end{smallmatrix}$ | 22  | 24 | 8    | 70  | Fig.1 |
| 2ZDK072HP-1.5D | ●     | 7.2            |                                                     |     |    |      |     |       |
| 2ZDK073HP-1.5D | ●     | 7.3            |                                                     |     |    |      |     |       |
| 2ZDK074HP-1.5D | ●     | 7.4            | $\begin{smallmatrix} 0 \\ -0.015 \end{smallmatrix}$ | 23  | 25 | 8    | 70  | Fig.1 |
| 2ZDK075HP-1.5D | ●     | 7.5            |                                                     |     |    |      |     |       |
| 2ZDK076HP-1.5D | ●     | 7.6            |                                                     |     |    |      |     |       |
| 2ZDK077HP-1.5D | ●     | 7.7            | $\begin{smallmatrix} 0 \\ -0.015 \end{smallmatrix}$ | 24  | 25 | 8    | 70  | Fig.1 |
| 2ZDK078HP-1.5D | ●     | 7.8            |                                                     |     |    |      |     |       |
| 2ZDK079HP-1.5D | ●     | 7.9            |                                                     |     |    |      |     |       |
| 2ZDK080HP-1.5D | ●     | 8.0            | $\begin{smallmatrix} 0 \\ -0.015 \end{smallmatrix}$ | 25  | 27 | 8    | 70  | Fig.1 |
| 2ZDK081HP-1.5D | ●     | 8.1            |                                                     |     |    |      |     |       |
| 2ZDK082HP-1.5D | ●     | 8.2            |                                                     |     |    |      |     |       |
| 2ZDK083HP-1.5D | ●     | 8.3            | $\begin{smallmatrix} 0 \\ -0.015 \end{smallmatrix}$ | 26  | 28 | 10   | 80  | Fig.1 |
| 2ZDK084HP-1.5D | ●     | 8.4            |                                                     |     |    |      |     |       |
| 2ZDK085HP-1.5D | ●     | 8.5            |                                                     |     |    |      |     |       |
| 2ZDK086HP-1.5D | ●     | 8.6            | $\begin{smallmatrix} 0 \\ -0.015 \end{smallmatrix}$ | 27  | 29 | 10   | 80  | Fig.1 |
| 2ZDK087HP-1.5D | ●     | 8.7            |                                                     |     |    |      |     |       |
| 2ZDK088HP-1.5D | ●     | 8.8            |                                                     |     |    |      |     |       |

● : Standard Stock

## 2ZDK-HP Stock Items Drilling Depth Short

Short

No. of flutes (Z) = 2 Helix Angle: 20°



| Description    | Stock | Dimension (mm) |                        |     |    |      |     | Shape |
|----------------|-------|----------------|------------------------|-----|----|------|-----|-------|
|                |       | DC             | Outside Dia. Tolerance | LCF | LN | DCON | OAL |       |
| 2ZDK089HP-1.5D | ●     | 8.9            | 0<br>-0.015            | 28  | 30 | 10   | 80  | Fig.1 |
| 2ZDK090HP-1.5D | ●     | 9.0            |                        |     |    |      |     |       |
| 2ZDK091HP-1.5D | ●     | 9.1            |                        |     |    |      |     |       |
| 2ZDK092HP-1.5D | ●     | 9.2            | 0<br>-0.015            | 29  | 31 | 10   | 80  | Fig.1 |
| 2ZDK093HP-1.5D | ●     | 9.3            |                        |     |    |      |     |       |
| 2ZDK094HP-1.5D | ●     | 9.4            |                        |     |    |      |     |       |
| 2ZDK095HP-1.5D | ●     | 9.5            | 0<br>-0.015            | 30  | 32 | 10   | 80  | Fig.1 |
| 2ZDK096HP-1.5D | ●     | 9.6            |                        |     |    |      |     |       |
| 2ZDK097HP-1.5D | ●     | 9.7            |                        |     |    |      |     |       |
| 2ZDK098HP-1.5D | ●     | 9.8            | 0<br>-0.015            | 31  | 33 | 10   | 80  | Fig.1 |
| 2ZDK099HP-1.5D | ●     | 9.9            |                        |     |    |      |     |       |
| 2ZDK100HP-1.5D | ●     | 10.0           |                        |     |    |      |     |       |
| 2ZDK101HP-1.5D | ●     | 10.1           | 0<br>-0.018            | 31  | 33 | 12   | 100 | Fig.1 |
| 2ZDK102HP-1.5D | ●     | 10.2           |                        |     |    |      |     |       |
| 2ZDK103HP-1.5D | ●     | 10.3           |                        |     |    |      |     |       |
| 2ZDK104HP-1.5D | ●     | 10.4           | 0<br>-0.018            | 32  | 34 | 12   | 100 | Fig.1 |
| 2ZDK105HP-1.5D | ●     | 10.5           |                        |     |    |      |     |       |
| 2ZDK106HP-1.5D | ●     | 10.6           |                        |     |    |      |     |       |
| 2ZDK107HP-1.5D | ●     | 10.7           | 0<br>-0.018            | 33  | 35 | 12   | 100 | Fig.1 |
| 2ZDK108HP-1.5D | ●     | 10.8           |                        |     |    |      |     |       |
| 2ZDK109HP-1.5D | ●     | 10.9           |                        |     |    |      |     |       |
| 2ZDK110HP-1.5D | ●     | 11.0           | 0<br>-0.018            | 34  | 36 | 12   | 100 | Fig.1 |
| 2ZDK111HP-1.5D | ●     | 11.1           |                        |     |    |      |     |       |
| 2ZDK112HP-1.5D | ●     | 11.2           |                        |     |    |      |     |       |
| 2ZDK113HP-1.5D | ●     | 11.3           | 0<br>-0.018            | 35  | 37 | 12   | 100 | Fig.1 |
| 2ZDK114HP-1.5D | ●     | 11.4           |                        |     |    |      |     |       |

The standard Drilling Depth is 1.5 D (1.5 x DC).

| Description    | Stock | Dimension (mm) |                        |     |    |      |     | Shape |
|----------------|-------|----------------|------------------------|-----|----|------|-----|-------|
|                |       | DC             | Outside Dia. Tolerance | LCF | LN | DCON | OAL |       |
| 2ZDK115HP-1.5D | ●     | 11.5           | 0<br>-0.018            | 36  | 38 | 12   | 100 | Fig.1 |
| 2ZDK116HP-1.5D | ●     | 11.6           |                        |     |    |      |     |       |
| 2ZDK117HP-1.5D | ●     | 11.7           |                        |     |    |      |     |       |
| 2ZDK118HP-1.5D | ●     | 11.8           | 0<br>-0.018            | 37  | 39 | 12   | 100 | Fig.1 |
| 2ZDK119HP-1.5D | ●     | 11.9           |                        |     |    |      |     |       |
| 2ZDK120HP-1.5D | ●     | 12.0           |                        |     |    |      |     |       |
| 2ZDK125HP-1.5D | ●     | 12.5           | 0<br>-0.018            | 41  | 41 | 12   | 100 | Fig.2 |
| 2ZDK130HP-1.5D | ●     | 13.0           |                        | 43  | 43 |      |     |       |
| 2ZDK135HP-1.5D | ●     | 13.5           |                        | 44  | 44 |      |     |       |
| 2ZDK140HP-1.5D | ●     | 14.0           | 0<br>-0.018            | 45  | 45 | 12   | 115 | Fig.2 |
| 2ZDK145HP-1.5D | ●     | 14.5           |                        | 47  | 47 |      |     |       |
| 2ZDK150HP-1.5D | ●     | 15.0           |                        | 48  | 48 |      |     |       |
| 2ZDK155HP-1.5D | ●     | 15.5           | 0<br>-0.018            | 50  | 50 | 16   | 115 | Fig.1 |
| 2ZDK160HP-1.5D | ●     | 16.0           |                        | 52  | 52 |      |     |       |
| 2ZDK165HP-1.5D | ●     | 16.5           |                        | 53  | 53 |      |     |       |
| 2ZDK170HP-1.5D | ●     | 17.0           | 0<br>-0.018            | 54  | 54 | 16   | 115 | Fig.2 |
| 2ZDK175HP-1.5D | ●     | 17.5           |                        | 56  | 56 |      |     |       |
| 2ZDK180HP-1.5D | ●     | 18.0           |                        | 57  | 57 |      |     |       |
| 2ZDK185HP-1.5D | ●     | 18.5           | 0<br>-0.021            | 59  | 59 | 16   | 125 | Fig.2 |
| 2ZDK190HP-1.5D | ●     | 19.0           |                        | 60  | 60 |      |     |       |
| 2ZDK195HP-1.5D | ●     | 19.5           |                        | 62  | 62 |      |     |       |
| 2ZDK200HP-1.5D | ●     | 20.0           | 0<br>-0.021            | 63  | 63 | 20   | 125 | Fig.1 |

● : Standard Stock

## Comparison with Standard Drill

|                | Bottom Shape             | Burr                      | Drilling in Slant Surface                  |
|----------------|--------------------------|---------------------------|--------------------------------------------|
| 2ZDK-HP        | <br>Almost even          | <br>Minimizes Burrs       | <br>Stable Machining<br>(Lowered the Feed) |
| Standard Drill | <br>Same as Bottom Shape | <br>Burr<br>Burr Build-up | <br>Unstable Machining                     |

## Short Long shank type

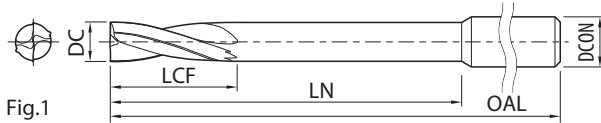


Fig.1

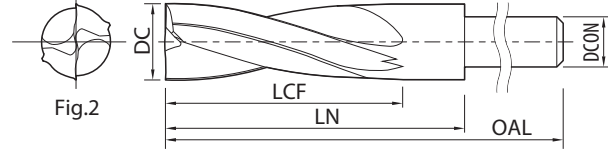


Fig.2

| Description       | Stock | Dimension (mm) |                        |      |      |      |     | Shape |
|-------------------|-------|----------------|------------------------|------|------|------|-----|-------|
|                   |       | DC             | Outside Dia. Tolerance | LCF  | LN   | DCON | OAL |       |
| 2ZDK030HP-1.5D-LS | ●     | 3.0            | 0<br>-0.010            | 9.0  | 30.0 | 6    | 100 | Fig.1 |
| 2ZDK031HP-1.5D-LS | MTO   | 3.1            | 0<br>-0.012            | 10.0 | 31.0 | 6    | 100 | Fig.1 |
| 2ZDK032HP-1.5D-LS | MTO   | 3.2            |                        |      | 32.0 |      |     |       |
| 2ZDK033HP-1.5D-LS | MTO   | 3.3            |                        |      | 33.0 |      |     |       |
| 2ZDK034HP-1.5D-LS | MTO   | 3.4            |                        |      | 34.0 |      |     |       |
| 2ZDK035HP-1.5D-LS | ●     | 3.5            |                        | 11.0 | 35.0 |      |     |       |
| 2ZDK036HP-1.5D-LS | MTO   | 3.6            |                        |      | 36.0 |      |     |       |
| 2ZDK037HP-1.5D-LS | MTO   | 3.7            |                        | 12.0 | 37.0 |      |     |       |
| 2ZDK038HP-1.5D-LS | MTO   | 3.8            |                        |      | 38.0 |      |     |       |
| 2ZDK039HP-1.5D-LS | MTO   | 3.9            |                        |      | 39.0 |      |     |       |
| 2ZDK040HP-1.5D-LS | ●     | 4.0            |                        | 13.0 | 40.0 |      |     |       |
| 2ZDK041HP-1.5D-LS | MTO   | 4.1            |                        |      | 41.0 |      |     |       |
| 2ZDK042HP-1.5D-LS | MTO   | 4.2            |                        |      | 42.0 |      |     |       |
| 2ZDK043HP-1.5D-LS | MTO   | 4.3            |                        |      | 43.0 |      |     |       |
| 2ZDK044HP-1.5D-LS | MTO   | 4.4            | 0<br>-0.012            | 14.0 | 44.0 | 6    | 110 | Fig.1 |
| 2ZDK045HP-1.5D-LS | ●     | 4.5            |                        |      | 45.0 |      |     |       |
| 2ZDK046HP-1.5D-LS | MTO   | 4.6            |                        | 15.0 | 46.0 |      |     |       |
| 2ZDK047HP-1.5D-LS | MTO   | 4.7            |                        |      | 47.0 |      |     |       |
| 2ZDK048HP-1.5D-LS | MTO   | 4.8            |                        |      | 48.0 |      |     |       |
| 2ZDK049HP-1.5D-LS | MTO   | 4.9            |                        |      | 49.0 |      |     |       |
| 2ZDK050HP-1.5D-LS | ●     | 5.0            |                        | 16.0 | 50.0 |      |     |       |
| 2ZDK051HP-1.5D-LS | MTO   | 5.1            |                        |      | 51.0 |      |     |       |
| 2ZDK052HP-1.5D-LS | MTO   | 5.2            |                        |      | 52.0 |      |     |       |
| 2ZDK053HP-1.5D-LS | MTO   | 5.3            |                        |      | 53.0 |      |     |       |
| 2ZDK054HP-1.5D-LS | MTO   | 5.4            |                        | 17.0 | 54.0 |      |     |       |
| 2ZDK055HP-1.5D-LS | ●     | 5.5            |                        |      | 55.0 |      |     |       |
| 2ZDK056HP-1.5D-LS | MTO   | 5.6            |                        |      | 56.0 |      |     |       |
| 2ZDK057HP-1.5D-LS | MTO   | 5.7            |                        |      | 57.0 |      |     |       |
| 2ZDK058HP-1.5D-LS | MTO   | 5.8            | 0<br>-0.015            | 18.0 | 58.0 | 6    | 120 | Fig.2 |
| 2ZDK059HP-1.5D-LS | MTO   | 5.9            |                        |      | 59.0 |      |     |       |
| 2ZDK060HP-1.5D-LS | ●     | 6.0            |                        | 19.0 | 60.0 |      |     |       |
| 2ZDK061HP-1.5D-LS | MTO   | 6.1            |                        |      | 29.0 |      |     |       |
| 2ZDK062HP-1.5D-LS | MTO   | 6.2            |                        |      |      |      |     |       |
| 2ZDK063HP-1.5D-LS | MTO   | 6.3            |                        |      |      |      |     |       |
| 2ZDK064HP-1.5D-LS | MTO   | 6.4            |                        | 20.0 | 29.5 |      |     |       |
| 2ZDK065HP-1.5D-LS | ●     | 6.5            |                        |      |      |      |     |       |
| 2ZDK066HP-1.5D-LS | MTO   | 6.6            |                        |      |      |      |     |       |
| 2ZDK067HP-1.5D-LS | MTO   | 6.7            |                        |      |      |      |     |       |
| 2ZDK068HP-1.5D-LS | MTO   | 6.8            |                        | 21.0 | 30.0 |      |     |       |
| 2ZDK069HP-1.5D-LS | MTO   | 6.9            |                        |      |      |      |     |       |
| 2ZDK070HP-1.5D-LS | ●     | 7.0            |                        |      | 30.0 |      |     |       |
| 2ZDK071HP-1.5D-LS | MTO   | 7.1            |                        |      | 30.5 |      |     |       |
| 2ZDK072HP-1.5D-LS | MTO   | 7.2            | 0<br>-0.018            | 22.0 |      | 6    | 150 | Fig.2 |
| 2ZDK073HP-1.5D-LS | MTO   | 7.3            |                        |      |      |      |     |       |
| 2ZDK074HP-1.5D-LS | MTO   | 7.4            |                        |      |      |      |     |       |
| 2ZDK075HP-1.5D-LS | ●     | 7.5            |                        |      | 30.5 |      |     |       |

The standard drilling depth is 1.5 D (1.5 x DC).

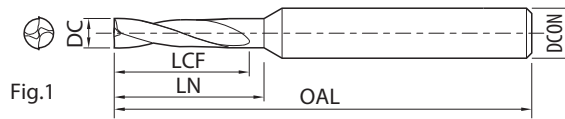
| Description       | Stock | Dimension (mm) |                        |      |       |      |     | Shape |
|-------------------|-------|----------------|------------------------|------|-------|------|-----|-------|
|                   |       | DC             | Outside Dia. Tolerance | LCF  | LN    | DCON | OAL |       |
| 2ZDK076HP-1.5D-LS | MTO   | 7.6            | 0<br>-0.015            | 24.0 | 31.0  | 6    | 120 | Fig.2 |
| 2ZDK077HP-1.5D-LS | MTO   | 7.7            |                        |      |       |      |     |       |
| 2ZDK078HP-1.5D-LS | MTO   | 7.8            |                        |      |       |      |     |       |
| 2ZDK079HP-1.5D-LS | MTO   | 7.9            |                        |      |       |      |     |       |
| 2ZDK080HP-1.5D-LS | ●     | 8.0            | 0<br>-0.015            | 25.0 | 80.0  | 8    | 130 | Fig.2 |
| 2ZDK081HP-1.5D-LS | MTO   | 8.1            |                        |      |       |      |     |       |
| 2ZDK082HP-1.5D-LS | MTO   | 8.2            |                        |      |       |      |     |       |
| 2ZDK083HP-1.5D-LS | MTO   | 8.3            |                        |      |       |      |     |       |
| 2ZDK084HP-1.5D-LS | MTO   | 8.4            | 0<br>-0.015            | 26.0 | 32.0  | 8    | 130 | Fig.2 |
| 2ZDK085HP-1.5D-LS | ●     | 8.5            |                        |      |       |      |     |       |
| 2ZDK086HP-1.5D-LS | MTO   | 8.6            |                        |      |       |      |     |       |
| 2ZDK087HP-1.5D-LS | MTO   | 8.7            |                        |      |       |      |     |       |
| 2ZDK088HP-1.5D-LS | MTO   | 8.8            | 0<br>-0.015            | 27.0 | 32.0  | 8    | 130 | Fig.2 |
| 2ZDK089HP-1.5D-LS | MTO   | 8.9            |                        |      |       |      |     |       |
| 2ZDK090HP-1.5D-LS | ●     | 9.0            |                        |      |       |      |     |       |
| 2ZDK091HP-1.5D-LS | MTO   | 9.1            |                        |      |       |      |     |       |
| 2ZDK092HP-1.5D-LS | MTO   | 9.2            | 0<br>-0.015            | 29.0 | 32.5  | 8    | 130 | Fig.2 |
| 2ZDK093HP-1.5D-LS | MTO   | 9.3            |                        |      |       |      |     |       |
| 2ZDK094HP-1.5D-LS | MTO   | 9.4            |                        |      |       |      |     |       |
| 2ZDK095HP-1.5D-LS | ●     | 9.5            |                        |      |       |      |     |       |
| 2ZDK096HP-1.5D-LS | MTO   | 9.6            | 0<br>-0.015            | 30.0 | 33.5  | 8    | 130 | Fig.2 |
| 2ZDK097HP-1.5D-LS | MTO   | 9.7            |                        |      |       |      |     |       |
| 2ZDK098HP-1.5D-LS | MTO   | 9.8            |                        |      |       |      |     |       |
| 2ZDK099HP-1.5D-LS | MTO   | 9.9            |                        |      |       |      |     |       |
| 2ZDK100HP-1.5D-LS | ●     | 10.0           | 0<br>-0.015            | 31.0 | 100.0 | 10   | 150 | Fig.1 |
| 2ZDK101HP-1.5D-LS | MTO   | 10.1           |                        |      |       |      |     |       |
| 2ZDK102HP-1.5D-LS | MTO   | 10.2           |                        |      |       |      |     |       |
| 2ZDK103HP-1.5D-LS | MTO   | 10.3           |                        |      |       |      |     |       |
| 2ZDK104HP-1.5D-LS | MTO   | 10.4           | 0<br>-0.018            | 32.0 | 36.0  | 10   | 150 | Fig.2 |
| 2ZDK105HP-1.5D-LS | ●     | 10.5           |                        |      |       |      |     |       |
| 2ZDK106HP-1.5D-LS | MTO   | 10.6           |                        |      |       |      |     |       |
| 2ZDK107HP-1.5D-LS | MTO   | 10.7           |                        |      |       |      |     |       |
| 2ZDK108HP-1.5D-LS | MTO   | 10.8           | 0<br>-0.018            | 33.0 | 36.5  | 10   | 150 | Fig.2 |
| 2ZDK109HP-1.5D-LS | MTO   | 10.9           |                        |      |       |      |     |       |
| 2ZDK110HP-1.5D-LS | ●     | 11.0           |                        |      |       |      |     |       |
| 2ZDK111HP-1.5D-LS | MTO   | 11.1           |                        |      |       |      |     |       |
| 2ZDK112HP-1.5D-LS | MTO   | 11.2           | 0<br>-0.018            | 34.0 | 37.5  | 10   | 150 | Fig.2 |
| 2ZDK113HP-1.5D-LS | MTO   | 11.3           |                        |      |       |      |     |       |
| 2ZDK114HP-1.5D-LS | MTO   | 11.4           |                        |      |       |      |     |       |
| 2ZDK115HP-1.5D-LS | ●     | 11.5           |                        |      |       |      |     |       |
| 2ZDK116HP-1.5D-LS | MTO   | 11.6           | 0<br>-0.018            | 35.0 | 38.5  | 10   | 150 | Fig.2 |
| 2ZDK117HP-1.5D-LS | MTO   | 11.7           |                        |      |       |      |     |       |
| 2ZDK118HP-1.5D-LS | MTO   | 11.8           |                        |      |       |      |     |       |
| 2ZDK119HP-1.5D-LS | MTO   | 11.9           |                        |      |       |      |     |       |
| 2ZDK120HP-1.5D-LS | ●     | 12.0           | 0<br>-0.018            | 37.0 | 120.0 | 12   | 170 | Fig.1 |

● : Standard Stock MTO : Made to order

## 2ZDK-HP Stock Items Drilling Depth Regular

Regular

No. of flutes (Z) = 2 Helix angle: 20°



| Description  | Stock | Dimension (mm) |                                                  |     |    |      |     | Shape |
|--------------|-------|----------------|--------------------------------------------------|-----|----|------|-----|-------|
|              |       | DC             | Outside Dia. Tolerance                           | LCF | LN | DCON | OAL |       |
| 2ZDK030HP-3D | ●     | 3.0            | $0 \begin{smallmatrix} -0.010 \end{smallmatrix}$ | 14  | 15 | 6    | 60  | Fig.1 |
| 2ZDK031HP-3D | ●     | 3.1            | $0 \begin{smallmatrix} -0.012 \end{smallmatrix}$ | 14  | 15 | 6    | 60  | Fig.1 |
| 2ZDK032HP-3D | ●     | 3.2            | $0 \begin{smallmatrix} -0.012 \end{smallmatrix}$ | 15  | 16 | 6    | 60  | Fig.1 |
| 2ZDK033HP-3D | ●     | 3.3            | $0 \begin{smallmatrix} -0.012 \end{smallmatrix}$ | 17  | 18 | 6    | 60  | Fig.1 |
| 2ZDK034HP-3D | ●     | 3.4            | $0 \begin{smallmatrix} -0.012 \end{smallmatrix}$ | 19  | 20 | 6    | 60  | Fig.1 |
| 2ZDK035HP-3D | ●     | 3.5            | $0 \begin{smallmatrix} -0.012 \end{smallmatrix}$ | 20  | 21 | 6    | 60  | Fig.1 |
| 2ZDK036HP-3D | ●     | 3.6            | $0 \begin{smallmatrix} -0.012 \end{smallmatrix}$ | 21  | 22 | 6    | 60  | Fig.1 |
| 2ZDK037HP-3D | ●     | 3.7            | $0 \begin{smallmatrix} -0.012 \end{smallmatrix}$ | 23  | 24 | 6    | 60  | Fig.1 |
| 2ZDK038HP-3D | ●     | 3.8            | $0 \begin{smallmatrix} -0.012 \end{smallmatrix}$ | 24  | 25 | 6    | 60  | Fig.1 |
| 2ZDK039HP-3D | ●     | 3.9            | $0 \begin{smallmatrix} -0.012 \end{smallmatrix}$ | 25  | 26 | 6    | 60  | Fig.1 |
| 2ZDK040HP-3D | ●     | 4.0            | $0 \begin{smallmatrix} -0.012 \end{smallmatrix}$ | 26  | 27 | 6    | 60  | Fig.1 |
| 2ZDK041HP-3D | ●     | 4.1            | $0 \begin{smallmatrix} -0.012 \end{smallmatrix}$ | 28  | 29 | 8    | 70  | Fig.1 |
| 2ZDK042HP-3D | ●     | 4.2            | $0 \begin{smallmatrix} -0.012 \end{smallmatrix}$ | 30  | 31 | 8    | 70  | Fig.1 |
| 2ZDK043HP-3D | ●     | 4.3            | $0 \begin{smallmatrix} -0.012 \end{smallmatrix}$ | 31  | 32 | 8    | 70  | Fig.1 |
| 2ZDK044HP-3D | ●     | 4.4            | $0 \begin{smallmatrix} -0.012 \end{smallmatrix}$ | 32  | 33 | 8    | 70  | Fig.1 |
| 2ZDK045HP-3D | ●     | 4.5            | $0 \begin{smallmatrix} -0.012 \end{smallmatrix}$ | 34  | 35 | 8    | 70  | Fig.1 |
| 2ZDK046HP-3D | ●     | 4.6            | $0 \begin{smallmatrix} -0.012 \end{smallmatrix}$ | 30  | 31 | 8    | 70  | Fig.1 |
| 2ZDK047HP-3D | ●     | 4.7            | $0 \begin{smallmatrix} -0.012 \end{smallmatrix}$ | 31  | 32 | 8    | 70  | Fig.1 |
| 2ZDK048HP-3D | ●     | 4.8            | $0 \begin{smallmatrix} -0.012 \end{smallmatrix}$ | 32  | 33 | 8    | 70  | Fig.1 |
| 2ZDK049HP-3D | ●     | 4.9            | $0 \begin{smallmatrix} -0.012 \end{smallmatrix}$ | 33  | 34 | 8    | 70  | Fig.1 |
| 2ZDK050HP-3D | ●     | 5.0            | $0 \begin{smallmatrix} -0.012 \end{smallmatrix}$ | 34  | 35 | 8    | 70  | Fig.1 |
| 2ZDK051HP-3D | ●     | 5.1            | $0 \begin{smallmatrix} -0.012 \end{smallmatrix}$ | 35  | 36 | 8    | 70  | Fig.1 |
| 2ZDK052HP-3D | ●     | 5.2            | $0 \begin{smallmatrix} -0.012 \end{smallmatrix}$ | 36  | 37 | 8    | 70  | Fig.1 |
| 2ZDK053HP-3D | ●     | 5.3            | $0 \begin{smallmatrix} -0.012 \end{smallmatrix}$ | 37  | 38 | 8    | 70  | Fig.1 |
| 2ZDK054HP-3D | ●     | 5.4            | $0 \begin{smallmatrix} -0.012 \end{smallmatrix}$ | 38  | 39 | 8    | 70  | Fig.1 |
| 2ZDK055HP-3D | ●     | 5.5            | $0 \begin{smallmatrix} -0.012 \end{smallmatrix}$ | 39  | 40 | 8    | 70  | Fig.1 |
| 2ZDK056HP-3D | ●     | 5.6            | $0 \begin{smallmatrix} -0.012 \end{smallmatrix}$ | 40  | 41 | 8    | 70  | Fig.1 |
| 2ZDK057HP-3D | ●     | 5.7            | $0 \begin{smallmatrix} -0.012 \end{smallmatrix}$ | 41  | 42 | 8    | 70  | Fig.1 |
| 2ZDK058HP-3D | ●     | 5.8            | $0 \begin{smallmatrix} -0.012 \end{smallmatrix}$ | 42  | 43 | 8    | 70  | Fig.1 |
| 2ZDK059HP-3D | ●     | 5.9            | $0 \begin{smallmatrix} -0.012 \end{smallmatrix}$ | 43  | 44 | 8    | 70  | Fig.1 |
| 2ZDK060HP-3D | ●     | 6.0            | $0 \begin{smallmatrix} -0.012 \end{smallmatrix}$ | 44  | 45 | 8    | 70  | Fig.1 |
| 2ZDK061HP-3D | ●     | 6.1            | $0 \begin{smallmatrix} -0.012 \end{smallmatrix}$ | 45  | 46 | 8    | 70  | Fig.1 |
| 2ZDK062HP-3D | ●     | 6.2            | $0 \begin{smallmatrix} -0.015 \end{smallmatrix}$ | 46  | 47 | 8    | 70  | Fig.1 |
| 2ZDK063HP-3D | ●     | 6.3            | $0 \begin{smallmatrix} -0.015 \end{smallmatrix}$ | 47  | 48 | 8    | 70  | Fig.1 |
| 2ZDK064HP-3D | ●     | 6.4            | $0 \begin{smallmatrix} -0.015 \end{smallmatrix}$ | 48  | 49 | 8    | 70  | Fig.1 |
| 2ZDK065HP-3D | ●     | 6.5            | $0 \begin{smallmatrix} -0.015 \end{smallmatrix}$ | 49  | 50 | 8    | 70  | Fig.1 |
| 2ZDK066HP-3D | ●     | 6.6            | $0 \begin{smallmatrix} -0.015 \end{smallmatrix}$ | 50  | 51 | 8    | 70  | Fig.1 |
| 2ZDK067HP-3D | ●     | 6.7            | $0 \begin{smallmatrix} -0.015 \end{smallmatrix}$ | 51  | 52 | 8    | 70  | Fig.1 |
| 2ZDK068HP-3D | ●     | 6.8            | $0 \begin{smallmatrix} -0.015 \end{smallmatrix}$ | 52  | 53 | 8    | 70  | Fig.1 |
| 2ZDK069HP-3D | ●     | 6.9            | $0 \begin{smallmatrix} -0.015 \end{smallmatrix}$ | 53  | 54 | 8    | 70  | Fig.1 |
| 2ZDK070HP-3D | ●     | 7.0            | $0 \begin{smallmatrix} -0.015 \end{smallmatrix}$ | 54  | 55 | 8    | 70  | Fig.1 |
| 2ZDK071HP-3D | ●     | 7.1            | $0 \begin{smallmatrix} -0.015 \end{smallmatrix}$ | 55  | 56 | 8    | 70  | Fig.1 |
| 2ZDK072HP-3D | ●     | 7.2            | $0 \begin{smallmatrix} -0.015 \end{smallmatrix}$ | 56  | 57 | 8    | 70  | Fig.1 |
| 2ZDK073HP-3D | ●     | 7.3            | $0 \begin{smallmatrix} -0.015 \end{smallmatrix}$ | 57  | 58 | 8    | 70  | Fig.1 |
| 2ZDK074HP-3D | ●     | 7.4            | $0 \begin{smallmatrix} -0.015 \end{smallmatrix}$ | 58  | 59 | 8    | 70  | Fig.1 |
| 2ZDK075HP-3D | ●     | 7.5            | $0 \begin{smallmatrix} -0.015 \end{smallmatrix}$ | 59  | 60 | 8    | 70  | Fig.1 |

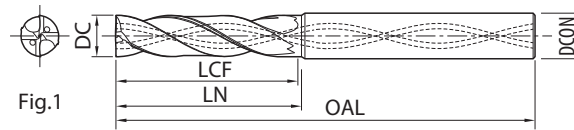
The standard drilling depth is 3.0 D (3.0 x DC).

| Description  | Stock | Dimension (mm) |                                                  |     |      |      |     | Shape |
|--------------|-------|----------------|--------------------------------------------------|-----|------|------|-----|-------|
|              |       | DC             | Outside Dia. Tolerance                           | LCF | LN   | DCON | OAL |       |
| 2ZDK076HP-3D | ●     | 7.6            | $0 \begin{smallmatrix} -0.015 \end{smallmatrix}$ | 34  | 35   | 8    | 70  | Fig.1 |
| 2ZDK077HP-3D | ●     | 7.7            | $0 \begin{smallmatrix} -0.015 \end{smallmatrix}$ | 36  | (36) | 8    | 70  | Fig.1 |
| 2ZDK078HP-3D | ●     | 7.8            | $0 \begin{smallmatrix} -0.015 \end{smallmatrix}$ | 36  | 37   | 10   | 80  | Fig.1 |
| 2ZDK079HP-3D | ●     | 7.9            | $0 \begin{smallmatrix} -0.015 \end{smallmatrix}$ | 38  | 39   | 10   | 80  | Fig.1 |
| 2ZDK080HP-3D | ●     | 8.0            | $0 \begin{smallmatrix} -0.015 \end{smallmatrix}$ | 39  | 40   | 10   | 80  | Fig.1 |
| 2ZDK081HP-3D | ●     | 8.1            | $0 \begin{smallmatrix} -0.015 \end{smallmatrix}$ | 40  | 41   | 10   | 80  | Fig.1 |
| 2ZDK082HP-3D | ●     | 8.2            | $0 \begin{smallmatrix} -0.015 \end{smallmatrix}$ | 42  | 43   | 10   | 80  | Fig.1 |
| 2ZDK083HP-3D | ●     | 8.3            | $0 \begin{smallmatrix} -0.015 \end{smallmatrix}$ | 43  | 44   | 10   | 80  | Fig.1 |
| 2ZDK084HP-3D | ●     | 8.4            | $0 \begin{smallmatrix} -0.015 \end{smallmatrix}$ | 44  | 45   | 10   | 80  | Fig.1 |
| 2ZDK085HP-3D | ●     | 8.5            | $0 \begin{smallmatrix} -0.015 \end{smallmatrix}$ | 45  | (45) | 10   | 80  | Fig.1 |
| 2ZDK086HP-3D | ●     | 8.6            | $0 \begin{smallmatrix} -0.018 \end{smallmatrix}$ | 46  | 47   | 12   | 100 | Fig.1 |
| 2ZDK087HP-3D | ●     | 8.7            | $0 \begin{smallmatrix} -0.018 \end{smallmatrix}$ | 47  | 48   | 12   | 100 | Fig.1 |
| 2ZDK088HP-3D | ●     | 8.8            | $0 \begin{smallmatrix} -0.018 \end{smallmatrix}$ | 48  | 49   | 12   | 100 | Fig.1 |
| 2ZDK089HP-3D | ●     | 8.9            | $0 \begin{smallmatrix} -0.018 \end{smallmatrix}$ | 49  | 50   | 12   | 100 | Fig.1 |
| 2ZDK090HP-3D | ●     | 9.0            | $0 \begin{smallmatrix} -0.018 \end{smallmatrix}$ | 50  | 51   | 12   | 100 | Fig.1 |
| 2ZDK091HP-3D | ●     | 9.1            | $0 \begin{smallmatrix} -0.018 \end{smallmatrix}$ | 51  | 52   | 12   | 100 | Fig.1 |
| 2ZDK092HP-3D | ●     | 9.2            | $0 \begin{smallmatrix} -0.018 \end{smallmatrix}$ | 52  | 53   | 12   | 100 | Fig.1 |
| 2ZDK093HP-3D | ●     | 9.3            | $0 \begin{smallmatrix} -0.018 \end{smallmatrix}$ | 53  | 54   | 12   | 100 | Fig.1 |
| 2ZDK094HP-3D | ●     | 9.4            | $0 \begin{smallmatrix} -0.018 \end{smallmatrix}$ | 54  | (54) | 12   | 100 | Fig.1 |
| 2ZDK095HP-3D | ●     | 9.5            | $0 \begin{smallmatrix} -0.018 \end{smallmatrix}$ | 55  | 56   | 12   | 100 | Fig.1 |
| 2ZDK096HP-3D | ●     | 9.6            | $0 \begin{smallmatrix} -0.018 \end{smallmatrix}$ | 56  | 57   | 12   | 100 | Fig.1 |
| 2ZDK097HP-3D | ●     | 9.7            | $0 \begin{smallmatrix} -0.018 \end{smallmatrix}$ | 57  | 58   | 12   | 100 | Fig.1 |
| 2ZDK098HP-3D | ●     | 9.8            | $0 \begin{smallmatrix} -0.018 \end{smallmatrix}$ | 58  | 59   | 12   | 100 | Fig.1 |
| 2ZDK099HP-3D | ●     | 9.9            | $0 \begin{smallmatrix} -0.018 \end{smallmatrix}$ | 59  | 60   | 12   | 100 | Fig.1 |
| 2ZDK100HP-3D | ●     | 10.0           | $0 \begin{smallmatrix} -0.018 \end{smallmatrix}$ | 60  | (60) | 12   | 100 | Fig.1 |
| 2ZDK101HP-3D | ●     | 10.1           | $0 \begin{smallmatrix} -0.018 \end{smallmatrix}$ | 61  | 62   | 12   | 100 | Fig.1 |
| 2ZDK102HP-3D | ●     | 10.2           | $0 \begin{smallmatrix} -0.018 \end{smallmatrix}$ | 62  | 63   | 12   | 100 | Fig.1 |
| 2ZDK103HP-3D | ●     | 10.3           | $0 \begin{smallmatrix} -0.018 \end{smallmatrix}$ | 63  | 64   | 12   | 100 | Fig.1 |
| 2ZDK104HP-3D | ●     | 10.4           | $0 \begin{smallmatrix} -0.018 \end{smallmatrix}$ | 64  | 65   | 12   | 100 | Fig.1 |
| 2ZDK105HP-3D | ●     | 10.5           | $0 \begin{smallmatrix} -0.018 \end{smallmatrix}$ | 65  | 66   | 12   | 100 | Fig.1 |
| 2ZDK106HP-3D | ●     | 10.6           | $0 \begin{smallmatrix} -0.018 \end{smallmatrix}$ | 66  | 67   | 12   | 100 | Fig.1 |
| 2ZDK107HP-3D | ●     | 10.7           | $0 \begin{smallmatrix} -0.018 \end{smallmatrix}$ | 67  | 68   | 12   | 100 | Fig.1 |
| 2ZDK108HP-3D | ●     | 10.8           | $0 \begin{smallmatrix} -0.018 \end{smallmatrix}$ | 68  | 69   | 12   | 100 | Fig.1 |
| 2ZDK109HP-3D | ●     | 10.9           | $0 \begin{smallmatrix} -0.018 \end{smallmatrix}$ | 69  | 70   | 12   | 100 | Fig.1 |
| 2ZDK110HP-3D | ●     | 11.0           | $0 \begin{smallmatrix} -0.018 \end{smallmatrix}$ | 70  | (70) | 12   | 100 | Fig.1 |
| 2ZDK111HP-3D | ●     | 11.1           | $0 \begin{smallmatrix} -0.018 \end{smallmatrix}$ | 71  | 72   | 12   | 100 | Fig.1 |
| 2ZDK112HP-3D | ●     | 11.2           | $0 \begin{smallmatrix} -0.018 \end{smallmatrix}$ | 72  | 73   | 12   | 100 | Fig.1 |
| 2ZDK113HP-3D | ●     | 11.3           | $0 \begin{smallmatrix} -0.018 \end{smallmatrix}$ | 73  | 74   | 12   | 100 | Fig.1 |
| 2ZDK114HP-3D | ●     | 11.4           | $0 \begin{smallmatrix} -0.018 \end{smallmatrix}$ | 74  | 75   | 12   | 100 | Fig.1 |
| 2ZDK115HP-3D | ●     | 11.5           | $0 \begin{smallmatrix} -0.018 \end{smallmatrix}$ | 75  | 76   | 12   | 100 | Fig.1 |
| 2ZDK116HP-3D | ●     | 11.6           | $0 \begin{smallmatrix} -0.018 \end{smallmatrix}$ | 76  | 77   | 12   | 100 | Fig.1 |
| 2ZDK117HP-3D | ●     | 11.7           | $0 \begin{smallmatrix} -0.018 \end{smallmatrix}$ | 77  | 78   | 12   | 100 | Fig.1 |
| 2ZDK118HP-3D | ●     | 11.8           | $0 \begin{smallmatrix} -0.018 \end{smallmatrix}$ | 78  | 79   | 12   | 100 | Fig.1 |
| 2ZDK119HP-3D | ●     | 11.9           | $0 \begin{smallmatrix} -0.018 \end{smallmatrix}$ | 79  | 80   | 12   | 100 | Fig.1 |
| 2ZDK120HP-3D | ●     | 12.0           | $0 \begin{smallmatrix} -0.018 \end{smallmatrix}$ | 80  | (80) | 12   | 100 | Fig.1 |

● : Standard Stock

**Regular**

No. of flutes (Z) = 2 Helix angle: about 30°



| Description     | Stock | Dimension (mm) |                        |      |      |      |     | Shape |
|-----------------|-------|----------------|------------------------|------|------|------|-----|-------|
|                 |       | DC             | Outside Dia. Tolerance | LCF  | LN   | DCON | OAL |       |
| 2ZDK030HP-3D-OH | ●     | 3.0            | 0<br>-0.010            | 13.5 | 15.5 | 3    | 68  | Fig.1 |
| 2ZDK031HP-3D-OH | ●     | 3.1            | 0<br>-0.012            | 14   | 16   | 4    | 72  | Fig.1 |
| 2ZDK032HP-3D-OH | ●     | 3.2            |                        | 14.4 | 16.4 |      |     |       |
| 2ZDK033HP-3D-OH | ●     | 3.3            |                        | 14.9 | 16.9 |      |     |       |
| 2ZDK034HP-3D-OH | ●     | 3.4            |                        | 15.3 | 17.3 |      |     |       |
| 2ZDK035HP-3D-OH | ●     | 3.5            |                        | 15.8 | 17.8 |      |     |       |
| 2ZDK036HP-3D-OH | ●     | 3.6            |                        | 16.2 | 18.2 |      |     |       |
| 2ZDK037HP-3D-OH | ●     | 3.7            |                        | 16.7 | 18.7 |      |     |       |
| 2ZDK038HP-3D-OH | ●     | 3.8            |                        | 17.1 | 19.1 |      |     |       |
| 2ZDK039HP-3D-OH | ●     | 3.9            |                        | 17.6 | 19.6 |      |     |       |
| 2ZDK040HP-3D-OH | ●     | 4.0            | 0<br>-0.012            | 18   | 20   | 4    | 72  | Fig.1 |
| 2ZDK041HP-3D-OH | ●     | 4.1            | 0<br>-0.012            | 18.5 | 20.5 | 5    | 80  | Fig.1 |
| 2ZDK042HP-3D-OH | ●     | 4.2            |                        | 18.9 | 20.9 |      |     |       |
| 2ZDK043HP-3D-OH | ●     | 4.3            |                        | 19.4 | 21.4 |      |     |       |
| 2ZDK044HP-3D-OH | ●     | 4.4            |                        | 19.8 | 21.8 |      |     |       |
| 2ZDK045HP-3D-OH | ●     | 4.5            |                        | 20.3 | 22.3 |      |     |       |
| 2ZDK046HP-3D-OH | ●     | 4.6            |                        | 20.7 | 22.7 |      |     |       |
| 2ZDK047HP-3D-OH | ●     | 4.7            |                        | 21.2 | 23.2 |      |     |       |
| 2ZDK048HP-3D-OH | ●     | 4.8            |                        | 21.6 | 23.6 |      |     |       |
| 2ZDK049HP-3D-OH | ●     | 4.9            |                        | 22.1 | 24.1 |      |     |       |
| 2ZDK050HP-3D-OH | ●     | 5.0            | 0<br>-0.012            | 22.5 | 24.5 | 5    | 80  | Fig.1 |
| 2ZDK051HP-3D-OH | ●     | 5.1            | 0<br>-0.012            | 23   | 25   | 6    | 82  | Fig.1 |
| 2ZDK052HP-3D-OH | ●     | 5.2            |                        | 23.4 | 25.4 |      |     |       |
| 2ZDK053HP-3D-OH | ●     | 5.3            |                        | 23.9 | 25.9 |      |     |       |
| 2ZDK054HP-3D-OH | ●     | 5.4            |                        | 24.3 | 26.3 |      |     |       |
| 2ZDK055HP-3D-OH | ●     | 5.5            |                        | 24.8 | 26.8 |      |     |       |
| 2ZDK056HP-3D-OH | ●     | 5.6            |                        | 25.2 | 27.2 |      |     |       |
| 2ZDK057HP-3D-OH | ●     | 5.7            |                        | 25.7 | 27.7 |      |     |       |
| 2ZDK058HP-3D-OH | ●     | 5.8            |                        | 26.1 | 28.1 |      |     |       |
| 2ZDK059HP-3D-OH | ●     | 5.9            |                        | 26.6 | 28.6 |      |     |       |
| 2ZDK060HP-3D-OH | ●     | 6.0            | 0<br>-0.012            | 27   | 29   | 6    | 82  | Fig.1 |
| 2ZDK061HP-3D-OH | ●     | 6.1            | 0<br>-0.015            | 27.5 | 29.5 | 7    | 88  | Fig.1 |
| 2ZDK062HP-3D-OH | ●     | 6.2            |                        | 27.9 | 29.9 |      |     |       |
| 2ZDK063HP-3D-OH | ●     | 6.3            |                        | 28.4 | 30.4 |      |     |       |
| 2ZDK064HP-3D-OH | ●     | 6.4            |                        | 28.8 | 30.8 |      |     |       |
| 2ZDK065HP-3D-OH | ●     | 6.5            |                        | 29.3 | 31.3 |      |     |       |
| 2ZDK066HP-3D-OH | ●     | 6.6            |                        | 29.7 | 31.7 |      |     |       |
| 2ZDK067HP-3D-OH | ●     | 6.7            |                        | 30.2 | 32.2 |      |     |       |
| 2ZDK068HP-3D-OH | ●     | 6.8            |                        | 30.6 | 32.6 |      |     |       |
| 2ZDK069HP-3D-OH | ●     | 6.9            |                        | 31.1 | 33.1 |      |     |       |
| 2ZDK070HP-3D-OH | ●     | 7.0            | 0<br>-0.015            | 31.5 | 33.5 | 7    | 88  | Fig.1 |
| 2ZDK071HP-3D-OH | ●     | 7.1            | 0<br>-0.015            | 32   | 34   | 8    | 94  | Fig.1 |
| 2ZDK072HP-3D-OH | ●     | 7.2            |                        | 32.4 | 34.4 |      |     |       |
| 2ZDK073HP-3D-OH | ●     | 7.3            |                        | 32.9 | 34.9 |      |     |       |
| 2ZDK074HP-3D-OH | ●     | 7.4            |                        | 33.3 | 35.3 |      |     |       |
| 2ZDK075HP-3D-OH | ●     | 7.5            |                        | 33.8 | 35.8 |      |     |       |

| Description     | Stock | Dimension (mm) |                        |      |      |      |     | Shape |
|-----------------|-------|----------------|------------------------|------|------|------|-----|-------|
|                 |       | DC             | Outside Dia. Tolerance | LCF  | LN   | DCON | OAL |       |
| 2ZDK076HP-3D-OH | ●     | 7.6            | 0<br>-0.015            | 34.2 | 36.2 | 8    | 94  | Fig.1 |
| 2ZDK077HP-3D-OH | ●     | 7.7            |                        | 34.7 | 36.7 |      |     |       |
| 2ZDK078HP-3D-OH | ●     | 7.8            |                        | 35.1 | 37.1 |      |     |       |
| 2ZDK079HP-3D-OH | ●     | 7.9            |                        | 35.6 | 37.6 |      |     |       |
| 2ZDK080HP-3D-OH | ●     | 8.0            | 0<br>-0.015            | 36   | 38   | 8    | 94  | Fig.1 |
| 2ZDK081HP-3D-OH | ●     | 8.1            | 0<br>-0.015            | 36.5 | 38.5 | 9    | 100 | Fig.1 |
| 2ZDK082HP-3D-OH | ●     | 8.2            |                        | 36.9 | 38.9 |      |     |       |
| 2ZDK083HP-3D-OH | ●     | 8.3            |                        | 37.4 | 39.4 |      |     |       |
| 2ZDK084HP-3D-OH | ●     | 8.4            |                        | 37.8 | 39.8 |      |     |       |
| 2ZDK085HP-3D-OH | ●     | 8.5            |                        | 38.3 | 40.3 |      |     |       |
| 2ZDK086HP-3D-OH | ●     | 8.6            |                        | 38.7 | 40.7 |      |     |       |
| 2ZDK087HP-3D-OH | ●     | 8.7            |                        | 39.2 | 41.2 |      |     |       |
| 2ZDK088HP-3D-OH | ●     | 8.8            |                        | 39.6 | 41.6 |      |     |       |
| 2ZDK089HP-3D-OH | ●     | 8.9            |                        | 40.1 | 42.1 |      |     |       |
| 2ZDK090HP-3D-OH | ●     | 9.0            | 0<br>-0.015            | 40.5 | 42.5 | 9    | 100 | Fig.1 |
| 2ZDK091HP-3D-OH | ●     | 9.1            | 0<br>-0.015            | 41   | 43   | 10   | 106 | Fig.1 |
| 2ZDK092HP-3D-OH | ●     | 9.2            |                        | 41.4 | 43.4 |      |     |       |
| 2ZDK093HP-3D-OH | ●     | 9.3            |                        | 41.9 | 43.9 |      |     |       |
| 2ZDK094HP-3D-OH | ●     | 9.4            |                        | 42.3 | 44.3 |      |     |       |
| 2ZDK095HP-3D-OH | ●     | 9.5            |                        | 42.8 | 44.8 |      |     |       |
| 2ZDK096HP-3D-OH | ●     | 9.6            |                        | 43.2 | 45.2 |      |     |       |
| 2ZDK097HP-3D-OH | ●     | 9.7            |                        | 43.7 | 45.7 |      |     |       |
| 2ZDK098HP-3D-OH | ●     | 9.8            |                        | 44.1 | 46.1 |      |     |       |
| 2ZDK099HP-3D-OH | ●     | 9.9            |                        | 44.6 | 46.6 |      |     |       |
| 2ZDK100HP-3D-OH | ●     | 10.0           | 0<br>-0.015            | 45   | 47   | 10   | 106 | Fig.1 |
| 2ZDK101HP-3D-OH | ●     | 10.1           | 0<br>-0.018            | 45.5 | 47.5 | 11   | 116 | Fig.1 |
| 2ZDK102HP-3D-OH | ●     | 10.2           |                        | 45.9 | 47.9 |      |     |       |
| 2ZDK103HP-3D-OH | ●     | 10.3           |                        | 46.4 | 48.4 |      |     |       |
| 2ZDK104HP-3D-OH | ●     | 10.4           |                        | 46.8 | 48.8 |      |     |       |
| 2ZDK105HP-3D-OH | ●     | 10.5           |                        | 47.3 | 49.3 |      |     |       |
| 2ZDK106HP-3D-OH | ●     | 10.6           |                        | 47.7 | 49.7 |      |     |       |
| 2ZDK107HP-3D-OH | ●     | 10.7           |                        | 48.2 | 50.2 |      |     |       |
| 2ZDK108HP-3D-OH | ●     | 10.8           |                        | 48.6 | 50.6 |      |     |       |
| 2ZDK109HP-3D-OH | ●     | 10.9           |                        | 49.1 | 51.1 |      |     |       |
| 2ZDK110HP-3D-OH | ●     | 11.0           | 0<br>-0.018            | 49.5 | 51.5 | 11   | 116 | Fig.1 |
| 2ZDK111HP-3D-OH | ●     | 11.1           | 0<br>-0.018            | 50   | 52   | 12   | 122 | Fig.1 |
| 2ZDK112HP-3D-OH | ●     | 11.2           |                        | 50.4 | 52.4 |      |     |       |
| 2ZDK113HP-3D-OH | ●     | 11.3           |                        | 50.9 | 52.9 |      |     |       |
| 2ZDK114HP-3D-OH | ●     | 11.4           |                        | 51.3 | 53.3 |      |     |       |
| 2ZDK115HP-3D-OH | ●     | 11.5           |                        | 51.8 | 53.8 |      |     |       |
| 2ZDK116HP-3D-OH | ●     | 11.6           |                        | 52.2 | 54.2 |      |     |       |
| 2ZDK117HP-3D-OH | ●     | 11.7           |                        | 52.7 | 54.7 |      |     |       |
| 2ZDK118HP-3D-OH | ●     | 11.8           |                        | 53.1 | 55.1 |      |     |       |
| 2ZDK119HP-3D-OH | ●     | 11.9           |                        | 53.6 | 55.6 |      |     |       |
| 2ZDK120HP-3D-OH | ●     | 12.0           | 0<br>-0.018            | 54   | 56   | 12   | 122 | Fig.1 |

● : Standard Stock

The standard drilling depth is 3.0 D (3.0 x DC).

# Recommended Cutting Conditions

## 2ZDK-HP Short Regular

Drilling Depth Short: ap ≤ 1.5 DC Regular: ap ≤ 2DC

| Workpiece                                     | Outside Diameter DC (mm)                | 1      | 1.5    | 2      | 2.5    | 3      | 3.5    | 4      | 4.5    | 5      | 6     | 8     | 10    | 12    | 14    | 16    | 18    | 20    |
|-----------------------------------------------|-----------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|
| Structural Steel, Carbon Steel<br>S5400, S45C | Spindle Revolution (min <sup>-1</sup> ) | 20,700 | 13,800 | 11,150 | 9,200  | 9,100  | 7,800  | 6,800  | 6,100  | 5,500  | 4,600 | 3,500 | 2,800 | 2,300 | 1,800 | 1,600 | 1,400 | 1,300 |
|                                               | Feed Rate (mm/min)                      | 350    | 350    | 430    | 430    | 520    | 520    | 520    | 520    | 520    | 520   | 520   | 520   | 520   | 480   | 480   | 480   | 480   |
| Alloy Steel<br>SCM, SNCM                      | Spindle Revolution (min <sup>-1</sup> ) | 17,500 | 11,700 | 9,600  | 7,650  | 7,200  | 6,200  | 5,400  | 4,800  | 4,400  | 3,600 | 2,700 | 2,200 | 1,800 | 1,500 | 1,350 | 1,200 | 1,100 |
|                                               | Feed Rate (mm/min)                      | 290    | 290    | 380    | 380    | 450    | 450    | 450    | 450    | 450    | 450   | 450   | 450   | 450   | 420   | 420   | 420   | 420   |
| Pre-hardened Steel<br>(30~45HRC)              | Spindle Revolution (min <sup>-1</sup> ) | 9,600  | 6,400  | 5,570  | 4,460  | 3,900  | 3,400  | 2,900  | 2,600  | 2,300  | 1,900 | 1,500 | 1,200 | 1,000 | 850   | 750   | 650   | 600   |
|                                               | Feed Rate (mm/min)                      | 120    | 120    | 170    | 170    | 210    | 210    | 210    | 210    | 210    | 210   | 210   | 210   | 210   | 200   | 200   | 200   | 200   |
| Nodular Cast Iron<br>FCD400                   | Spindle Revolution (min <sup>-1</sup> ) | 15,900 | 10,600 | 10,360 | 8,290  | 7,200  | 6,200  | 5,400  | 4,800  | 4,400  | 3,600 | 2,700 | 2,200 | 1,800 | 1,550 | 1,350 | 1,200 | 1,100 |
|                                               | Feed Rate (mm/min)                      | 220    | 250    | 390    | 390    | 390    | 390    | 390    | 390    | 390    | 390   | 390   | 390   | 390   | 360   | 360   | 360   | 360   |
| Aluminum Alloy<br>A7075                       | Spindle Revolution (min <sup>-1</sup> ) | 39,800 | 26,600 | 23,000 | 18,500 | 17,800 | 15,200 | 13,100 | 11,800 | 10,500 | 8,900 | 6,700 | 5,400 | 4,500 | 3,800 | 3,400 | 3,000 | 2,700 |
|                                               | Feed Rate (mm/min)                      | 900    | 1,000  | 1,270  | 1,270  | 1,270  | 1,270  | 1,270  | 1,270  | 1,270  | 1,270 | 1,270 | 1,270 | 1,270 | 1,270 | 1,270 | 1,270 | 1,270 |
| Aluminum Alloy Casting<br>AC, ADC             | Spindle Revolution (min <sup>-1</sup> ) | 29,000 | 19,200 | 17,500 | 14,000 | 13,100 | 11,500 | 10,000 | 8,800  | 8,000  | 6,700 | 5,000 | 4,000 | 3,400 | 2,900 | 2,500 | 2,200 | 2,000 |
|                                               | Feed Rate (mm/min)                      | 550    | 550    | 820    | 820    | 820    | 820    | 820    | 820    | 820    | 820   | 820   | 820   | 820   | 820   | 820   | 820   | 820   |

## 2ZDK-HP Short Long Shank Type

Drilling Depth: ap ≤ 1DC

| Workpiece                                       | Outside Diameter DC (mm)                | 3      | 3.5    | 4     | 4.5   | 5     | 6     | 8     | 10    | 12    |
|-------------------------------------------------|-----------------------------------------|--------|--------|-------|-------|-------|-------|-------|-------|-------|
| Structural Steel<br>Carbon Steel<br>S5400, S45C | Spindle Revolution (min <sup>-1</sup> ) | 10,600 | 9,100  | 8,000 | 7,100 | 6,400 | 5,300 | 4,000 | 3,200 | 2,700 |
|                                                 | Feed Rate (mm/min)                      | 830    | 830    | 830   | 830   | 830   | 830   | 830   | 830   | 830   |
| Alloy Steel<br>SCM, SNCM                        | Spindle Revolution (min <sup>-1</sup> ) | 9,500  | 8,200  | 7,200 | 6,400 | 5,700 | 4,800 | 3,600 | 2,900 | 2,400 |
|                                                 | Feed Rate (mm/min)                      | 630    | 630    | 630   | 630   | 630   | 630   | 630   | 630   | 630   |
| Pre-hardened Steel<br>(30~45HRC)                | Spindle Revolution (min <sup>-1</sup> ) | 7,400  | 6,400  | 5,600 | 5,000 | 4,500 | 3,700 | 2,800 | 2,200 | 1,900 |
|                                                 | Feed Rate (mm/min)                      | 365    | 365    | 365   | 365   | 365   | 365   | 365   | 365   | 365   |
| Nodular Cast Iron<br>FCD400                     | Spindle Revolution (min <sup>-1</sup> ) | 9,600  | 8,200  | 7,200 | 6,400 | 5,700 | 4,800 | 3,600 | 2,900 | 2,400 |
|                                                 | Feed Rate (mm/min)                      | 475    | 475    | 475   | 475   | 475   | 475   | 475   | 475   | 475   |
| Aluminum Alloy<br>A7075                         | Spindle Revolution (min <sup>-1</sup> ) | 12,700 | 10,900 | 9,600 | 8,500 | 7,600 | 6,400 | 4,800 | 3,800 | 3,200 |
|                                                 | Feed Rate (mm/min)                      | 1,050  | 1,050  | 1,050 | 1,050 | 1,050 | 1,050 | 1,050 | 1,050 | 1,050 |
| Aluminum Alloy<br>Casting<br>AC, ADC            | Spindle Revolution (min <sup>-1</sup> ) | 9,500  | 8,200  | 7,200 | 6,400 | 5,700 | 4,800 | 3,600 | 2,900 | 2,400 |
|                                                 | Feed Rate (mm/min)                      | 675    | 675    | 675   | 675   | 675   | 675   | 675   | 675   | 675   |

## 2ZDK-HP-OH Regular

Drilling Depth: ap ≤ 3DC

| Workpiece                                       | Outside Diameter DC (mm)                | 3      | 4      | 5      | 6     | 8     | 10    | 12    |
|-------------------------------------------------|-----------------------------------------|--------|--------|--------|-------|-------|-------|-------|
| Structural Steel<br>Carbon Steel<br>S5400, S45C | Spindle Revolution (min <sup>-1</sup> ) | 10,600 | 7,950  | 6,350  | 5,300 | 3,980 | 3,180 | 2,650 |
|                                                 | Feed Rate (mm/min)                      | 750    | 750    | 750    | 750   | 750   | 750   | 750   |
| Alloy Steel<br>SCM, SNCM                        | Spindle Revolution (min <sup>-1</sup> ) | 9,550  | 7,160  | 5,730  | 4,770 | 3,580 | 2,860 | 2,390 |
|                                                 | Feed Rate (mm/min)                      | 700    | 680    | 630    | 600   | 600   | 600   | 600   |
| Pre-hardened Steel<br>(30~45HRC)                | Spindle Revolution (min <sup>-1</sup> ) | 5,300  | 3,980  | 3,180  | 2,650 | 1,990 | 1,590 | 1,330 |
|                                                 | Feed Rate (mm/min)                      | 300    | 300    | 300    | 300   | 300   | 280   | 280   |
| Stainless Steel<br>SUS304                       | Spindle Revolution (min <sup>-1</sup> ) | 7,430  | 5,570  | 5,100  | 4,240 | 3,180 | 2,550 | 2,120 |
|                                                 | Feed Rate (mm/min)                      | 400    | 400    | 400    | 500   | 500   | 500   | 500   |
| Nodular Cast Iron<br>FCD400                     | Spindle Revolution (min <sup>-1</sup> ) | 9,550  | 7,160  | 5,730  | 4,770 | 3,580 | 2,860 | 2,390 |
|                                                 | Feed Rate (mm/min)                      | 580    | 580    | 500    | 500   | 500   | 450   | 450   |
| Aluminum Alloy<br>A7075                         | Spindle Revolution (min <sup>-1</sup> ) | 18,000 | 13,500 | 10,800 | 9,000 | 6,800 | 5,400 | 4,500 |
|                                                 | Feed Rate (mm/min)                      | 1,270  | 1,270  | 1,270  | 1,270 | 1,270 | 1,270 | 1,270 |
| Aluminum Alloy<br>Casting<br>AC, ADC            | Spindle Revolution (min <sup>-1</sup> ) | 13,100 | 10,000 | 8,000  | 6,700 | 5,000 | 4,000 | 3,400 |
|                                                 | Feed Rate (mm/min)                      | 900    | 900    | 850    | 850   | 850   | 850   | 850   |

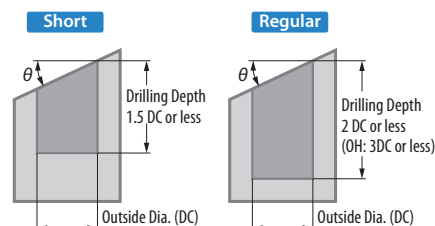
### Precautions

- **This tool is specially designed for plunging and NOT recommended for traversing**

- Coolant is recommended
- Adjust ap to suit machine rigidity and overhang length
- Use chuck and machine with the highest rigidity possible
- Pecking is recommended when Drilling Depth is 2D or over
- Cutting condition modifications may be needed when cutting a slant surface, depending on the slant angle (Right Figure)  
When workpiece slant is 30° or less, reduce the feed rate by 50%  
When workpiece slant is 30° or more, reduce the revolution by 70% and the feed rate by 30%

### 2ZDK-HP-OH

- Internal coolant is recommended
- If there is insufficient chip evacuation at the specified drill depth, it is recommended to peck or change cutting conditions
- Pre-drilling is recommended if cutting is unstable
- Pre-drilling and pecking are recommended for stainless steel machining
- Pecking is recommended when drilling depth is 2D or over



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