KYOCERA

Flat Drill | 2ZDK-HP Series

NEW

Flat Drill

# 2ZDK-HP Series

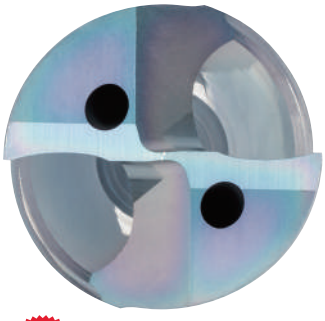
## New Generation Flat Bottom Drill for High Precision Machining in a Wide Range of Applications

**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**



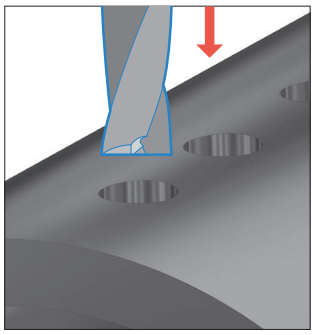
NEW With Internal Coolant
2ZDK-HP-OH

Flat Drill

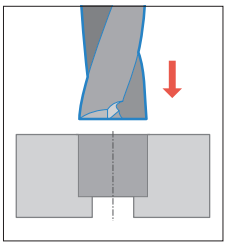
# 2ZDK-HP Series

**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**

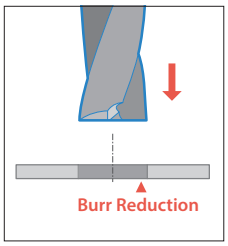
## SOLUTION Great solution for a variety of machining applications



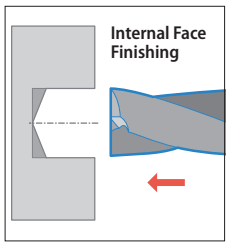
Drilling in Cylinder and Curved Surfaces



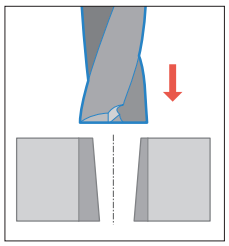
Hole Counterboring



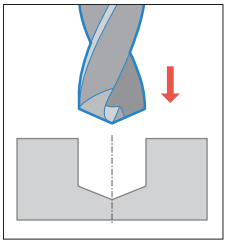

Plunging of Thin Plate

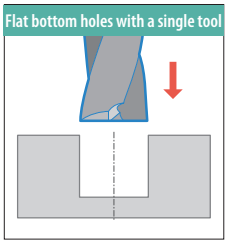



Turning in Automatic Lathes

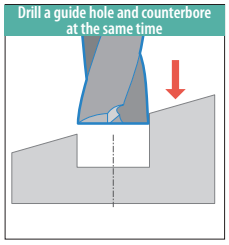


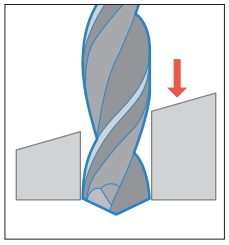
Hole Expanding






Flat Bottom Finishing after Drilling



Counterboring on Slant Surface/Spotting for Secondary Process

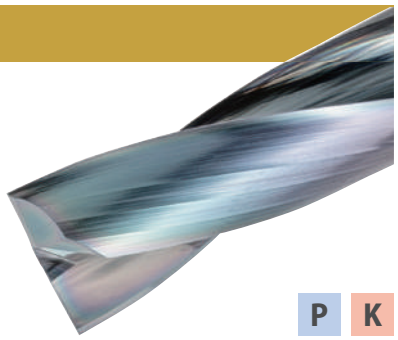
## Large Lineup

### Standard Type

**2ZDK-HP**

Economical Drilling

Large lineup with 2 drilling depths available



P K

### Internal Coolant Type NEW

**2ZDK-HP-OH**

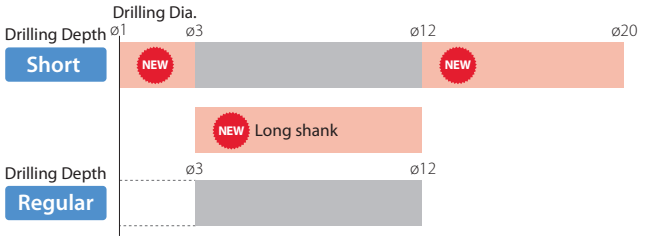
With oil holes (OH)

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

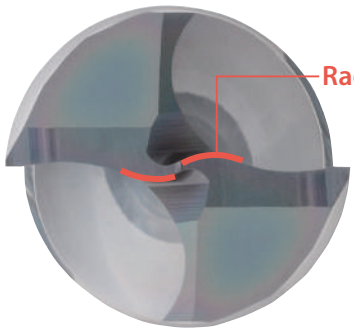
**Standard Economy Type**

**Large Lineup with 2 Drilling Depths Available**

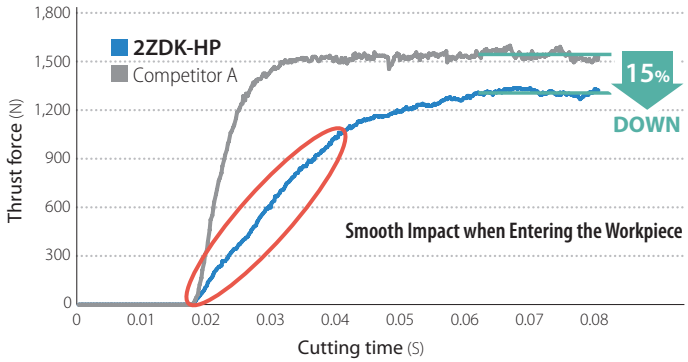
**Expanded of Drilling Diameter Range with New Long Shank Styles**

## 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)

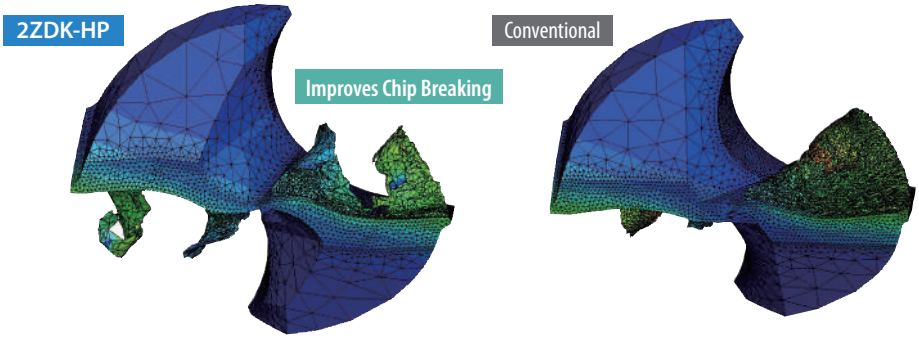



Cutting Conditions: n = 1,800 min$^{-1}$, Vf = 400 mm/min, Drilling Depth 10 mm, Dry  Drilling Dia. ø12 mm (Regular)
Workpiece: S50C

**Excellent chip evacuation and finely breaks chips into small pieces**

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

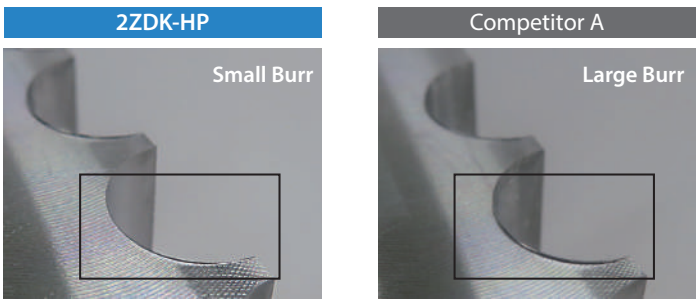
Chip generation simulation comparison (Image) (Internal evaluation)




## 2 Low Cutting Force Minimizes Burrs

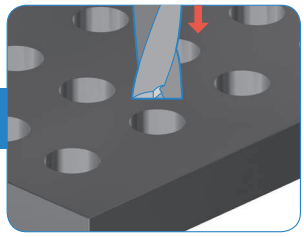
**Low Cutting Force with Flat Bottom and Sharp Cutting Edge Minimizes Burrs**


Burr Formation Comparison (Internal evaluation)




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

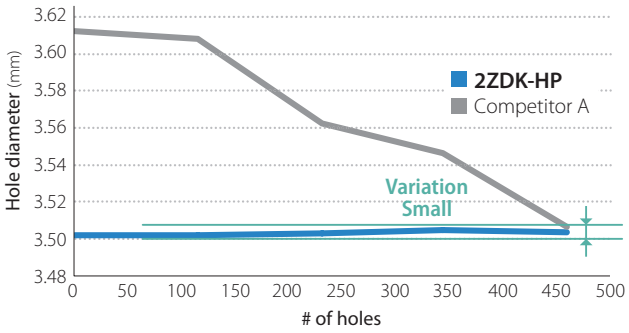
## Excellent Cutting Performance (Internal evaluation)



# Drilling in Flat Surface

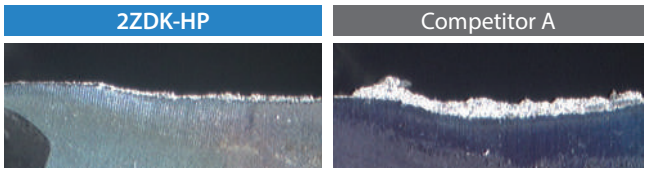
### Drilling Dia.: ø 3.5 mm

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



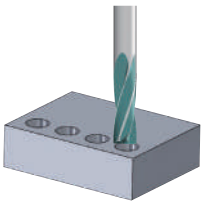

Cutting Conditions: n = 6,000 min$^{-1}$, Vf = 360 mm/min, Drilling Depth 5 mm, Wet
Drilling Dia. ø 3.5 mm (Regular) Workpiece: SCM 440

Cutting Edge after Machining 500 holes



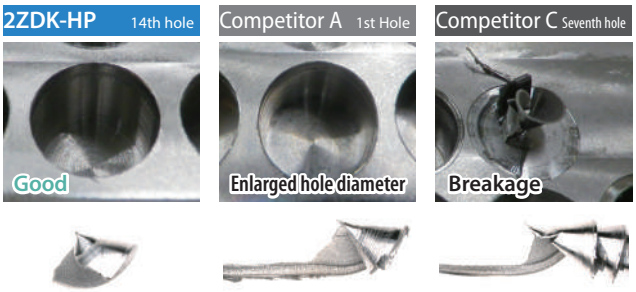

### Drilling Dia.: ø 12 mm

**Long shank type provides improved stability**

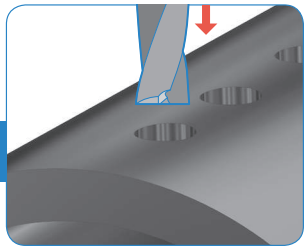


Set longer overhang amount (122 mm)
Performance comparison without pilot hole

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



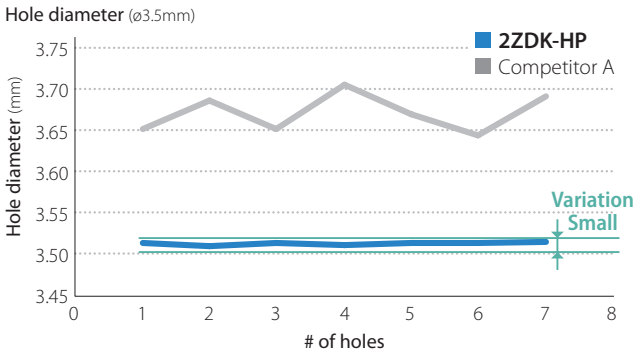

Cutting Conditions: n = 2,400 min$^{-1}$, Vf = 600 mm/min, Drilling Depth 12 mm, Wet
Drilling Dia. ø 12 mm (Regular, long shank) Workpiece: SCM 440



# Drilling in Cylindrical Face

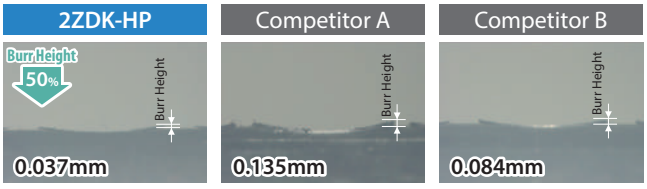
### Drilling Dia.: ø 3.5 mm

**Stable and High Precision Machining with Less Variation in Hole Diameter**




Burr Comparison

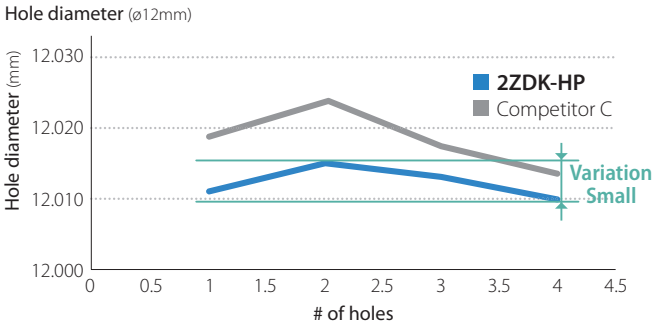
Drilling in Cylindrical Surface



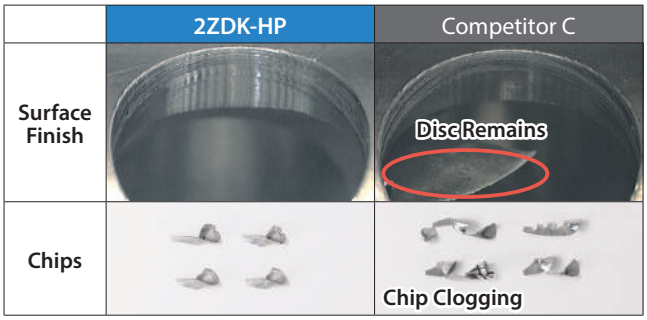

Cutting Conditions: n = 7,000 min$^{-1}$, Vf = 420 mm/min, Wet Drilling Dia. ø 3.5 mm (Regular)
Workpiece: Carbon steel pipe ø 17.3 mm (Thickness 3.2 mm)

### Drilling Dia.: ø 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 min$^{-1}$, Vf = 540 mm/min, Wet Drilling Dia. ø 12 mm (Regular)
Workpiece: Carbon steel pipe ø 25 mm (Thickness 4 mm)

# 2ZDK-HP-OH

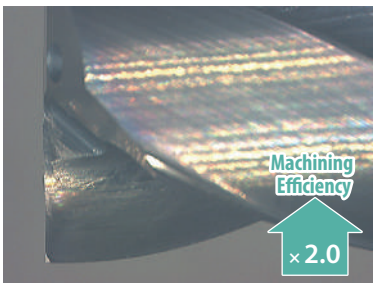
## Coolant-Through Holes for Efficient and Stable Machining of Stainless Steel Machining


## 1 Flat Bottom Drill with Internal Coolant for Stainless Steel

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

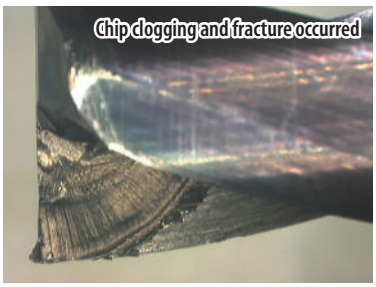
Stainless Steel with Internal Coolant (Internal evaluation)

**2ZDK-HP-OH**
**(Internal Coolant)**




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

**Conventional**
**(External Coolant)**

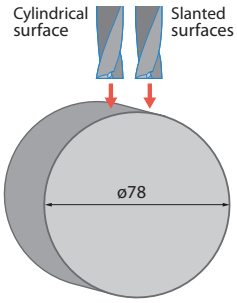



Cutting Conditions: Vc = 40 m/min, f = 0.1 mm/rev, Wet (External coolant)

### 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) **Vf=260mm/min** f=0.15mm/rev

Competitor A (External coolant) **Vf=173mm/min** f=0.1mm/rev

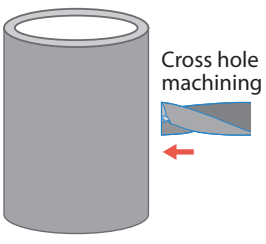
Machining Efficiency ×1.5

n = 1,730 min$^{-1}$ (Vc = 60 m/min), Vf = 260 mm/min (f = 0.15 mm/rev),
Drilling Depth 4-5 mm, Wet (External + Internal coolant) Drilling Dia.ø 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

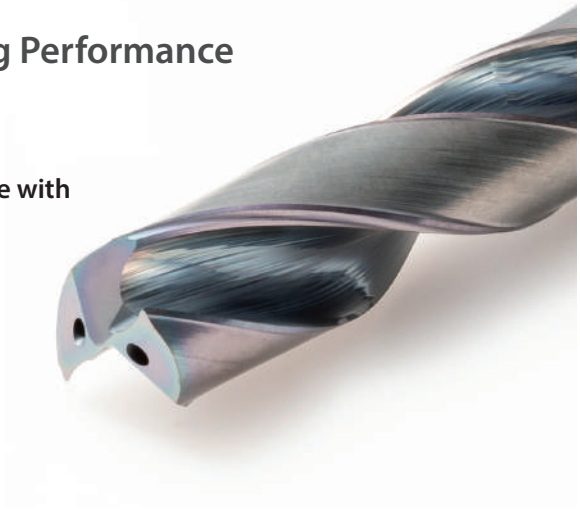
**2ZDK-HP-OH** (Internal coolant) **2,400 pcs/drill**

Competitor A
Internal Coolant **1,600 pcs/drill**
External Coolant **1,000 pcs/drill**

Tool Life ×1.5

n = 2,500 min$^{-1}$ (Vc = 75 m/min), Vf = ~ 320 mm/min (~ f = 0.13 mm/rev),
Drilling Depth 16 mm, Wet Drilling Dia. ø 9.6

# 2 Fine-Tuned Design for Advanced Cutting Performance

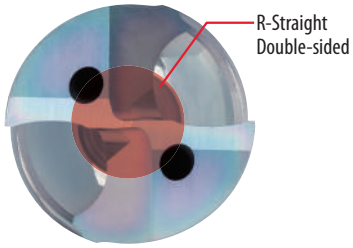


**High-precision, stable machining with five advantages**

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

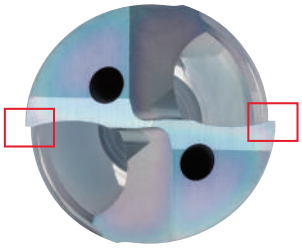
## 1 Special Chisel Edge

High rigidity and excellent chip control



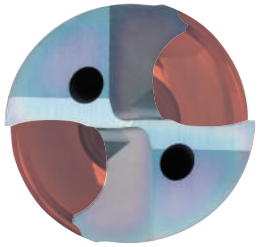

## 2 Corners: Flat Land

Sharpness and chipping resistance



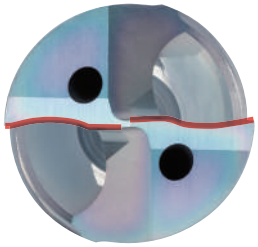
## 3 Unique Flute Shape

Optimized chip evacuation and rigidity

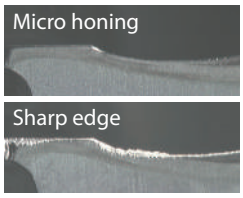


## 4 Micro Honing

Maintains sharpness and improves abrasion resistance



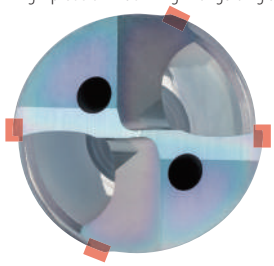
Wear Resistance Comparison (Internal evaluation)




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

## 5 Double Margin

High-precision machining with guiding action



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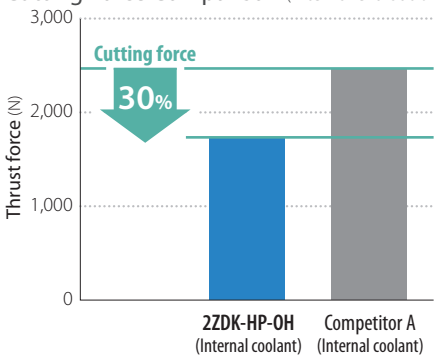
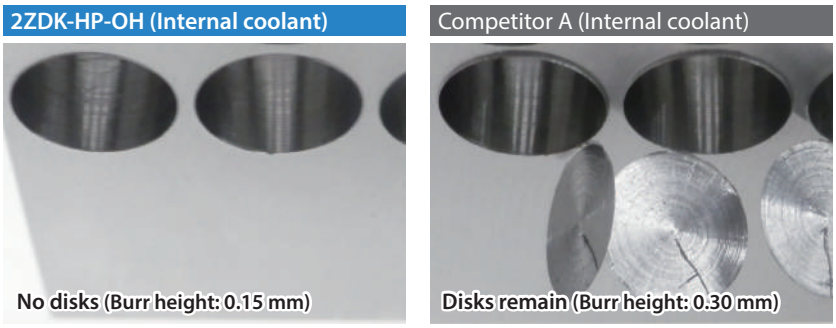
Cutting Force Comparison (Internal evaluation)




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

Burr Formation Comparison (Internal evaluation)




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

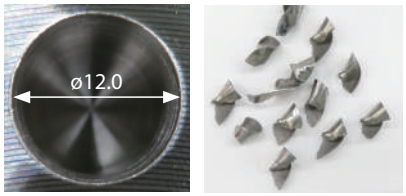
**2ZDK-HP-OH is lower in cutting force. There is no remaining disk and the sharpness is good.**

SUS 304 Cutting Performance Comparison (Internal evaluation)

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

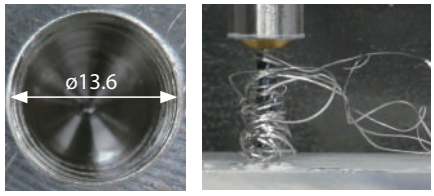
**Vf=760mm/min**

Machining Efficiency ×1.2




Competitor A (Internal coolant)

**Vf=630mm/min**




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

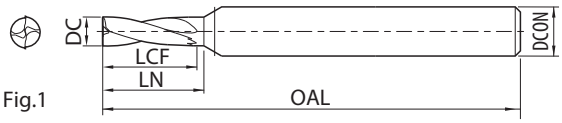



Fig.1

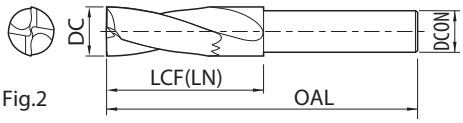



Fig.2

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

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

● : Standard Stock

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

## 2ZDK-HP Stock Items Drilling Depth **Short**

**Short**

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

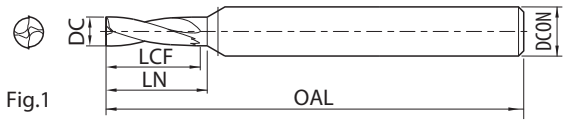


Fig.1

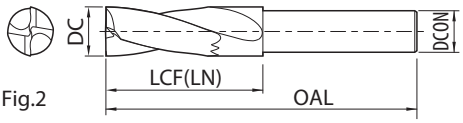


Fig.2

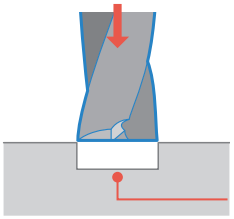
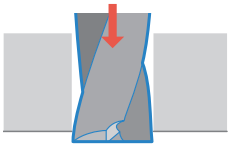
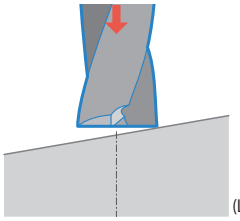
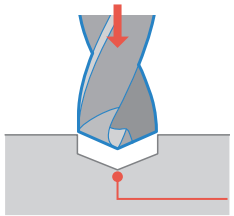
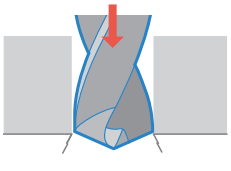
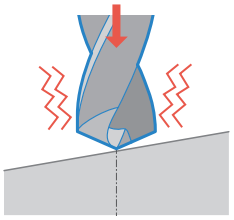
| Description | Stock | Dimension (mm) | | | | | | Shape |
|---|---|---|---|---|---|---|---|---|
| | | DC | Outside Dia. Tolerance | LCF | LN | DCON | OAL | |
| 2ZDK089HP-1.5D | ● | 8.9 | 0 -0.015 | 28 | 30 | 10 | 80 | Fig.1 |
| 2ZDK090HP-1.5D | ● | 9.0 | | | | | | |
| 2ZDK091HP-1.5D | ● | 9.1 | | |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

| Description | Stock | Dimension (mm) | | | | | | Shape |
|---|---|---|---|---|---|---|---|---|
| | | DC | Outside Dia. Tolerance | LCF | LN | DCON | OAL | |
| 2ZDK115HP-1.5D | ● | 11.5 | 0 -0.018 | 36 | 38 | 12 | 100 | Fig.1 |
| 2ZDK116HP-1.5D | ● | 11.6 | | | | | | |
| 2ZDK117HP-1.5D | ● | 11.7 | | | | | | |
| 2ZDK118HP-1.5D | ● | 11.8 | | | | | | |
| 2ZDK119HP-1.5D | ● | 11.9 | | | | | | |
| 2ZDK120HP-1.5D | ● | 12.0 | 0 -0.018 | 37 | 39 | 12 | 100 | Fig.1 |
| 2ZDK125HP-1.5D | ● | 12.5 | 0 -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 | | 45 | 45 | | | |
| 2ZDK145HP-1.5D | ● | 14.5 | 0 -0.018 | 47 | 47 | 12 | 115 | Fig.2 |
| 2ZDK150HP-1.5D | ● | 15.0 | | 48 | 48 | | | |
| 2ZDK155HP-1.5D | ● | 15.5 | | 50 | 50 | | | |
| 2ZDK160HP-1.5D | ● | 16.0 | 0 -0.018 | 52 | 52 | 16 | 115 | Fig.1 |
| 2ZDK165HP-1.5D | ● | 16.5 | 0 -0.018 | 53 | 53 | 16 | 115 | Fig.2 |
| 2ZDK170HP-1.5D | ● | 17.0 | | 54 | 54 | | | |
| 2ZDK175HP-1.5D | ● | 17.5 | | 56 | 56 | | | |
| 2ZDK180HP-1.5D | ● | 18.0 | | 57 | 57 | | | |
| 2ZDK185HP-1.5D | ● | 18.5 | 0 -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 -0.021 | 63 | 63 | 20 | 125 | Fig.1 |

● : Standard Stock

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

## Comparison with Standard Drill

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

# 2ZDK-HP Stock Items Drilling Depth Short Long shank type NEW

Scheduled for launch in stages in 2020

**Short** Long shank type

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

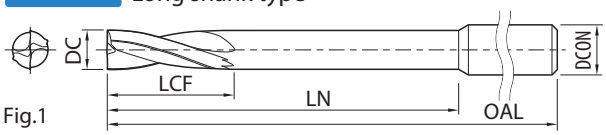



Fig.1

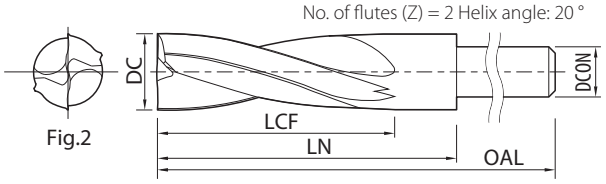



Fig.2

| Description | Stock | Dimension (mm) | | | | | | Shape |
|---|---|---|---|---|---|---|---|---|
| | | DC | Outside Dia. Tolerance | LCF | LN | DCON | OAL | |
| 2ZDK030HP-1.5D-LS | ● | 3.0 | 0 -0.010 | 9.0 | 30.0 | 6 | 100 | Fig.1 |
| 2ZDK031HP-1.5D-LS | MTO | 3.1 | 0 -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 | | 11.0 | 34.0 | | | |
| 2ZDK035HP-1.5D-LS | ● | 3.5 | | | 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 | | | 40.0 | | | |
| 2ZDK041HP-1.5D-LS | MTO | 4.1 | | 13.0 | 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 | | 14.0 | 44.0 | | | |
| 2ZDK045HP-1.5D-LS | ● | 4.5 | | | 45.0 | | | |
| 2ZDK046HP-1.5D-LS | MTO | 4.6 | | | 46.0 | | | |
| 2ZDK047HP-1.5D-LS | MTO | 4.7 | | 15.0 | 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 | 0 -0.012 | 16.0 | 50.0 | 6 | 110 | Fig.1 |
| 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 | | 18.0 | 57.0 | | | |
| 2ZDK058HP-1.5D-LS | MTO | 5.8 | | | 58.0 | | | |
| 2ZDK059HP-1.5D-LS | MTO | 5.9 | | | 59.0 | | | |
| 2ZDK060HP-1.5D-LS | ● | 6.0 | 0 -0.012 | 19.0 | 60.0 | 6 | 120 | Fig.1 |
| 2ZDK061HP-1.5D-LS | MTO | 6.1 | 0 -0.015 | 19.0 | 29.0 | 6 | 120 | Fig.2 |
| 2ZDK062HP-1.5D-LS | MTO | 6.2 | | | | | | |
| 2ZDK063HP-1.5D-LS | MTO | 6.3 | | 20.0 | 29.5 | | | |
| 2ZDK064HP-1.5D-LS | MTO | 6.4 | | | | | | |
| 2ZDK065HP-1.5D-LS | ● | 6.5 | | | | | | |
| 2ZDK066HP-1.5D-LS | MTO | 6.6 | | | | | | |
| 2ZDK067HP-1.5D-LS | MTO | 6.7 | | 21.0 | 30.0 | | | |
| 2ZDK068HP-1.5D-LS | MTO | 6.8 | | | | | | |
| 2ZDK069HP-1.5D-LS | MTO | 6.9 | | | | | | |
| 2ZDK070HP-1.5D-LS | ● | 7.0 | | 22.0 | 30.0 | | | |
| 2ZDK071HP-1.5D-LS | MTO | 7.1 | | | 30.5 | | | |
| 2ZDK072HP-1.5D-LS | MTO | 7.2 | | | | | | |
| 2ZDK073HP-1.5D-LS | MTO | 7.3 | | 23.0 | 30.5 | | | |
| 2ZDK074HP-1.5D-LS | MTO | 7.4 | | | | | | |
| 2ZDK075HP-1.5D-LS | ● | 7.5 | | | | | | |

| Description | Stock | Dimension (mm) | | | | | | Shape |
|---|---|---|---|---|---|---|---|---|
| | | DC | Outside Dia. Tolerance | LCF | LN | DCON | OAL | |
| 2ZDK076HP-1.5D-LS | MTO | 7.6 | 0 -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 -0.015 | 25.0 | 80.0 | 8 | 130 | Fig.1 |
| 2ZDK081HP-1.5D-LS | MTO | 8.1 | | | 31.5 | | | Fig.2 |
| 2ZDK082HP-1.5D-LS | MTO | 8.2 | | | | | | |
| 2ZDK083HP-1.5D-LS | MTO | 8.3 | | 26.0 | | | | |
| 2ZDK084HP-1.5D-LS | MTO | 8.4 | | | 32.0 | | | |
| 2ZDK085HP-1.5D-LS | ● | 8.5 | | | | | | |
| 2ZDK086HP-1.5D-LS | MTO | 8.6 | 0 -0.015 | 27.0 | 32.0 | 8 | 130 | Fig.2 |
| 2ZDK087HP-1.5D-LS | MTO | 8.7 | | | | | | |
| 2ZDK088HP-1.5D-LS | MTO | 8.8 | | | 32.5 | | | |
| 2ZDK089HP-1.5D-LS | MTO | 8.9 | | 28.0 | | | | |
| 2ZDK090HP-1.5D-LS | ● | 9.0 | | | | | | |
| 2ZDK091HP-1.5D-LS | MTO | 9.1 | | | | | | |
| 2ZDK092HP-1.5D-LS | MTO | 9.2 | 0 -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 -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 | | 31.0 | 34.5 | | | |
| 2ZDK100HP-1.5D-LS | ● | 10.0 | 0 -0.015 | 31.0 | 100.0 | 10 | 150 | Fig.1 |
| 2ZDK101HP-1.5D-LS | MTO | 10.1 | 0 -0.018 | 31.0 | 35.5 | 10 | 150 | Fig.2 |
| 2ZDK102HP-1.5D-LS | MTO | 10.2 | | 32.0 | | | | |
| 2ZDK103HP-1.5D-LS | MTO | 10.3 | | | 36.0 | | | |
| 2ZDK104HP-1.5D-LS | MTO | 10.4 | | | | | | |
| 2ZDK105HP-1.5D-LS | ● | 10.5 | | 33.0 | 36.5 | | | |
| 2ZDK106HP-1.5D-LS | MTO | 10.6 | | | | | | |
| 2ZDK107HP-1.5D-LS | MTO | 10.7 | | | | | | |
| 2ZDK108HP-1.5D-LS | MTO | 10.8 | | | | | | |
| 2ZDK109HP-1.5D-LS | MTO | 10.9 | 0 -0.018 | 34.0 | 37.5 | 10 | 150 | Fig.2 |
| 2ZDK110HP-1.5D-LS | ● | 11.0 | | | | | | |
| 2ZDK111HP-1.5D-LS | MTO | 11.1 | | | | | | |
| 2ZDK112HP-1.5D-LS | MTO | 11.2 | | 35.0 | 38.5 | | | |
| 2ZDK113HP-1.5D-LS | MTO | 11.3 | | | | | | |
| 2ZDK114HP-1.5D-LS | MTO | 11.4 | | | | | | |
| 2ZDK115HP-1.5D-LS | ● | 11.5 | 0 -0.018 | 36.0 | 39.5 | 10 | 150 | Fig.2 |
| 2ZDK116HP-1.5D-LS | MTO | 11.6 | | | | | | |
| 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 -0.018 | 37.0 | 120.0 | 12 | 170 | Fig.1 |

● : Standard Stock MTO : Made to order

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

# 2ZDK-HP Stock Items Drilling Depth Regular

**Regular**

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

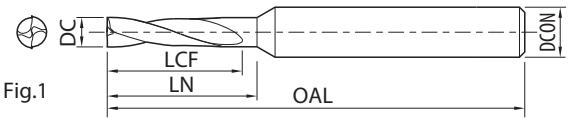



Fig.1

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

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

● : Standard Stock

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

# 2ZDK-HP-OH Stock Items Drilling Depth Regular NEW

**Regular**

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

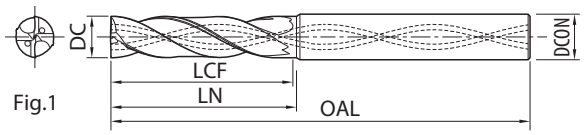



Fig.1

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

| Description | Stock | Dimension (mm) | | | | | | Shape |
|---|---|---|---|---|---|---|---|---|
| | | DC | Outside Dia. Tolerance | LCF | LN | DCON | OAL | |
| 2ZDK076HP-3D-0H | ● | 7.6 | 0 -0.015 | 34.2 | 36.2 | 8 | 94 | Fig.1 |
| 2ZDK077HP-3D-0H | ● | 7.7 | | 34.7 | 36.7 | | | |
| 2ZDK078HP-3D-0H | ● | 7.8 | | 35.1 | 37.1 | | | |
| 2ZDK079HP-3D-0H | ● | 7.9 | | 35.6 | 37.6 | | | |
| 2ZDK080HP-3D-0H | ● | 8.0 | 0 -0.015 | 36 | 38 | 8 | 94 | Fig.1 |
| 2ZDK081HP-3D-0H | ● | 8.1 | 0 -0.015 | 36.5 | 38.5 | 9 | 100 | Fig.1 |
| 2ZDK082HP-3D-0H | ● | 8.2 | | 36.9 | 38.9 | | | |
| 2ZDK083HP-3D-0H | ● | 8.3 | | 37.4 | 39.4 | | | |
| 2ZDK084HP-3D-0H | ● | 8.4 | | 37.8 | 39.8 | | | |
| 2ZDK085HP-3D-0H | ● | 8.5 | | 38.3 | 40.3 | | | |
| 2ZDK086HP-3D-0H | ● | 8.6 | | 38.7 | 40.7 | | | |
| 2ZDK087HP-3D-0H | ● | 8.7 | | 39.2 | 41.2 | | | |
| 2ZDK088HP-3D-0H | ● | 8.8 | | 39.6 | 41.6 | | | |
| 2ZDK089HP-3D-0H | ● | 8.9 | | 40.1 | 42.1 | | | |
| 2ZDK090HP-3D-0H | ● | 9.0 | 0 -0.015 | 40.5 | 42.5 | 9 | 100 | Fig.1 |
| 2ZDK091HP-3D-0H | ● | 9.1 | 0 -0.015 | 41 | 43 | 10 | 106 | Fig.1 |
| 2ZDK092HP-3D-0H | ● | 9.2 | | 41.4 | 43.4 | | | |
| 2ZDK093HP-3D-0H | ● | 9.3 | | 41.9 | 43.9 | | | |
| 2ZDK094HP-3D-0H | ● | 9.4 | | 42.3 | 44.3 | | | |
| 2ZDK095HP-3D-0H | ● | 9.5 | | 42.8 | 44.8 | | | |
| 2ZDK096HP-3D-0H | ● | 9.6 | | 43.2 | 45.2 | | | |
| 2ZDK097HP-3D-0H | ● | 9.7 | | 43.7 | 45.7 | | | |
| 2ZDK098HP-3D-0H | ● | 9.8 | | 44.1 | 46.1 | | | |
| 2ZDK099HP-3D-0H | ● | 9.9 | | 44.6 | 46.6 | | | |
| 2ZDK100HP-3D-0H | ● | 10.0 | 0 -0.015 | 45 | 47 | 10 | 106 | Fig.1 |
| 2ZDK101HP-3D-0H | ● | 10.1 | 0 -0.018 | 45.5 | 47.5 | 11 | 116 | Fig.1 |
| 2ZDK102HP-3D-0H | ● | 10.2 | | 45.9 | 47.9 | | | |
| 2ZDK103HP-3D-0H | ● | 10.3 | | 46.4 | 48.4 | | | |
| 2ZDK104HP-3D-0H | ● | 10.4 | | 46.8 | 48.8 | | | |
| 2ZDK105HP-3D-0H | ● | 10.5 | | 47.3 | 49.3 | | | |
| 2ZDK106HP-3D-0H | ● | 10.6 | | 47.7 | 49.7 | | | |
| 2ZDK107HP-3D-0H | ● | 10.7 | | 48.2 | 50.2 | | | |
| 2ZDK108HP-3D-0H | ● | 10.8 | | 48.6 | 50.6 | | | |
| 2ZDK109HP-3D-0H | ● | 10.9 | | 49.1 | 51.1 | | | |
| 2ZDK110HP-3D-0H | ● | 11.0 | 0 -0.018 | 49.5 | 51.5 | 11 | 116 | Fig.1 |
| 2ZDK111HP-3D-0H | ● | 11.1 | 0 -0.018 | 50 | 52 | 12 | 122 | Fig.1 |
| 2ZDK112HP-3D-0H | ● | 11.2 | | 50.4 | 52.4 | | | |
| 2ZDK113HP-3D-0H | ● | 11.3 | | 50.9 | 52.9 | | | |
| 2ZDK114HP-3D-0H | ● | 11.4 | | 51.3 | 53.3 | | | |
| 2ZDK115HP-3D-0H | ● | 11.5 | | 51.8 | 53.8 | | | |
| 2ZDK116HP-3D-0H | ● | 11.6 | | 52.2 | 54.2 | | | |
| 2ZDK117HP-3D-0H | ● | 11.7 | | 52.7 | 54.7 | | | |
| 2ZDK118HP-3D-0H | ● | 11.8 | | 53.1 | 55.1 | | | |
| 2ZDK119HP-3D-0H | ● | 11.9 | | 53.6 | 55.6 | | | |
| 2ZDK120HP-3D-0H | ● | 12.0 | 0 -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 SS400, S45C | Spindle Revolution ($min^{-1}$) | 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 SCM, SNCM | Spindle Revolution ($min^{-1}$) | 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 (30~45HRC) | Spindle Revolution ($min^{-1}$) | 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 FCD400 | Spindle Revolution ($min^{-1}$) | 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 A7075 | Spindle Revolution ($min^{-1}$) | 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 AC, ADC | Spindle Revolution ($min^{-1}$) | 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 Carbon Steel SS400, S45C | Spindle Revolution ($min^{-1}$) | 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 SCM, SNCM | Spindle Revolution ($min^{-1}$) | 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 (30~45HRC) | Spindle Revolution ($min^{-1}$) | 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 FCD400 | Spindle Revolution ($min^{-1}$) | 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 A7075 | Spindle Revolution ($min^{-1}$) | 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 Casting AC, ADC | Spindle Revolution ($min^{-1}$) | 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 Carbon Steel SS400, S45C | Spindle Revolution ($min^{-1}$) | 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 SCM, SNCM | Spindle Revolution ($min^{-1}$) | 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 (30~45HRC) | Spindle Revolution ($min^{-1}$) | 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 SUS304 | Spindle Revolution ($min^{-1}$) | 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 FCD400 | Spindle Revolution ($min^{-1}$) | 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 A7075 | Spindle Revolution ($min^{-1}$) | 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 Casting AC, ADC | Spindle Revolution ($min^{-1}$) | 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