

Solid Carbide **TRISTAR** Drill Series**DVAS**

Mini Size

 $\varnothing 1.0\text{ mm} - \varnothing 2.9\text{ mm}$   
L/D=2 – 50New  
Products

# A New Standard. No Flexing, No Breakages, No Delays

Faster cycle times and higher accuracy.

**Max.50D**

New Drills from Mitsubishi Materials

# TRISTAR Drill Series

High Efficiency - Long Tool Life - High Precision

TRISTAR, a new generation drill series from Mitsubishi Materials provides 3 strong advantages.

The first of the Tristar series is a small diameter drill with 5 technological features for FAST, RELIABLE and ACCURATE drilling.

**FAST**

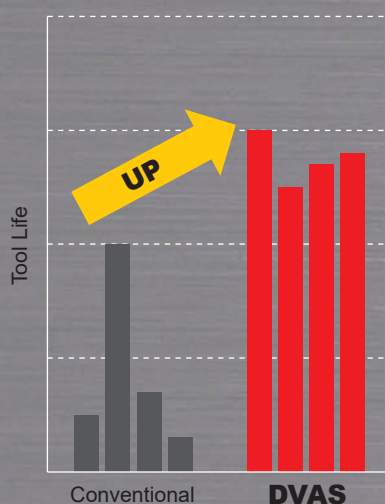
"Deep hole drilling is usually a slow process."



Deep holes can be drilled quickly and efficiently.

**RELIABLE**

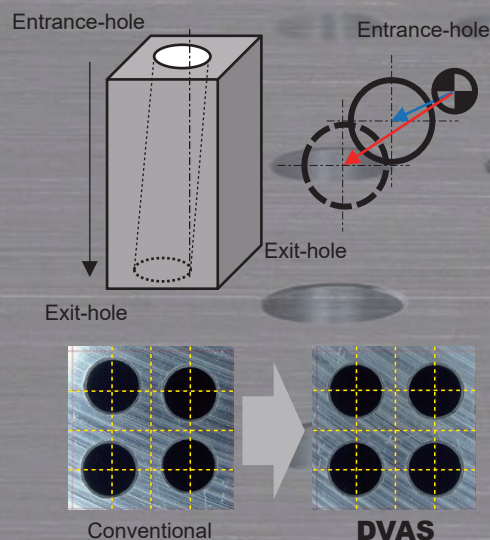
"Breakages, short tool life and lack of coolant can be common."



Tool life exceeds all normal expectations.

**ACCURATE**

"Holes can wander considerably and have poor positioning."



Straighter holes and improved dimensional accuracy.

# Solid Carbide Drill TRISTAR Drill Series

# DVAS

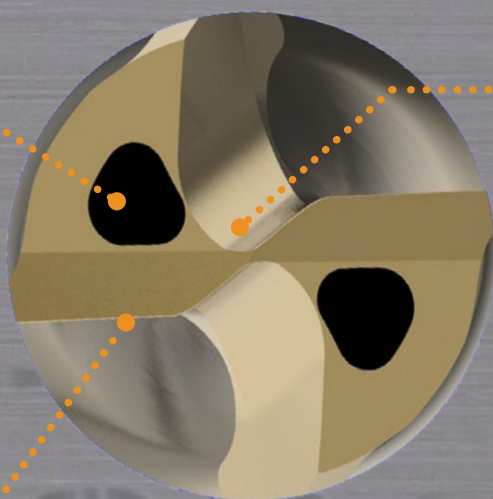
Mini Size

ø1.0 mm – ø2.9 mm  
L/D=2 – 50

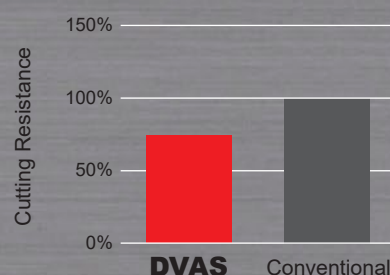
**FAST, RELIABLE and ACCURATE.**

**New standards enabled by the Five Technologies.**

## Advanced Coolant Hole



## New XR Point Thinning



<Cutting Conditions>

Workpiece Material : JIS SCM440

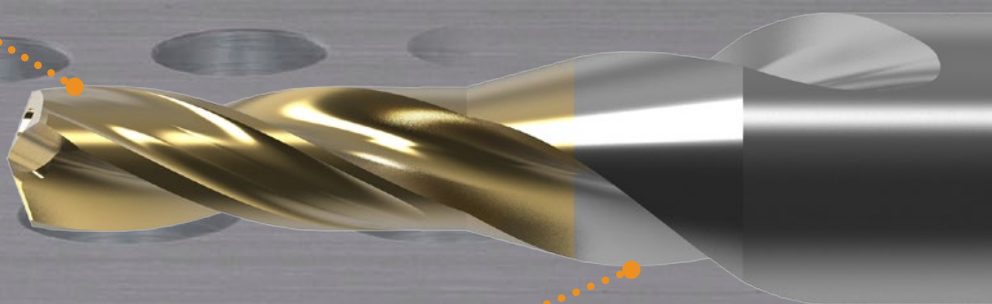
Tool : DC=ø1.0 mm, L/D=20

Cutting Speed : vc= 70 m/min

Feed per Rev. : fr= 0.04 mm/rev.

## Tough and Sharp Cutting Edge Design

## New Coated Grade **DP1120**

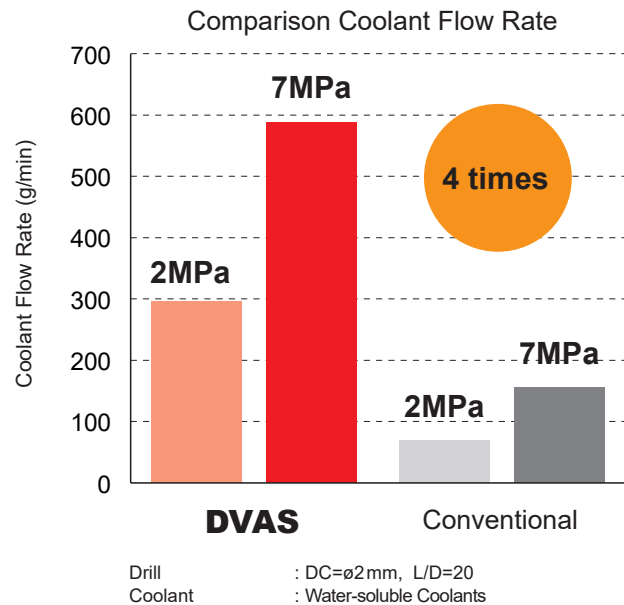
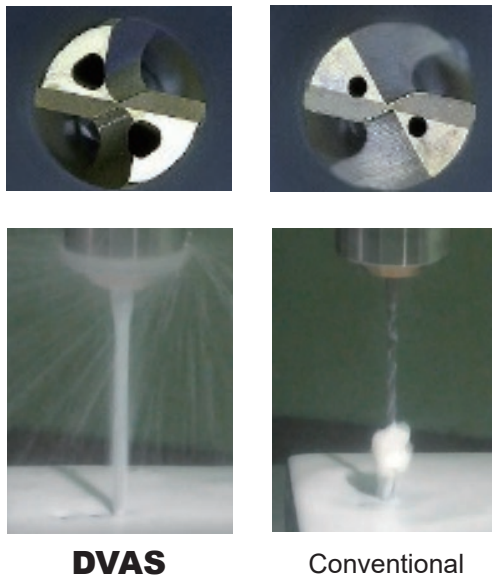


## Unique Rigid Form

\*By CG image

## Mitsubishi Materials unique coolant holes with TRI-Cooling Technology.

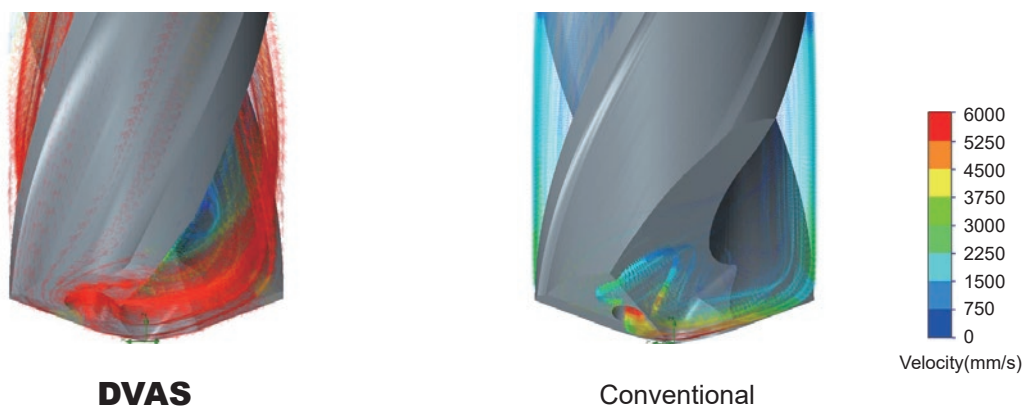
TRI-Cooling is optimal for small-diameter drills and can achieve more than double the conventional coolant discharge volume. This can dramatically improve chip discharge and heat dissipation, contributing greatly to tool life stability.



## Large coolant holes reduce tool damage due to the improved cooling effect thereby greatly improving tool life.

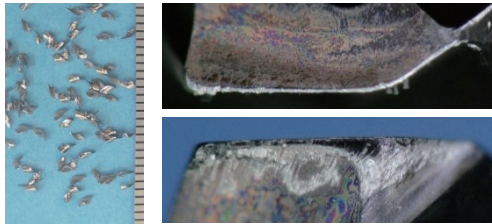
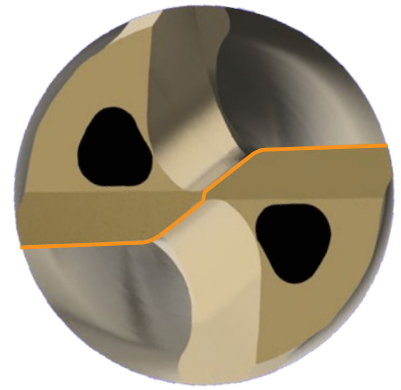
Increased coolant flow provides effective cooling even in difficult applications or when using an oil based cutting fluid.

Coolant Flow Speed Simulation



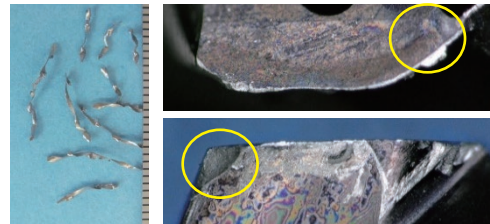
## Tough, sharp cutting edge design.

The straight cutting edge and thinned point are connected with a smoothly curved geometry that significantly improves fracture resistance. The geometry of the rake angles and lands also improves wear and chip disposal.



**DVAS**

Large crater wear and fracture of the outer edge.



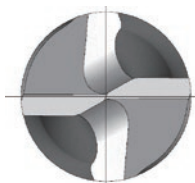
**Conventional**

<Cutting Conditions>  
 Workpiece Material : JIS SCM440  
 Tool : DC=ø2mm, L/D=20  
 Cutting Speed :  $v_c = 50 \text{ m/min}$   
 Feed per Rev. :  $f_r = 0.06 \text{ mm/rev.}$   
 Cutting Mode : Wet Cutting  
 Water-soluble Coolants, 2MPa

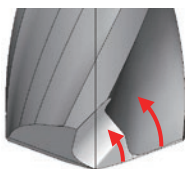
## New XR point thinning, reduces cutting load and optimises chip flow.

The new point thinning breaks chips into the optimum shape for streamlined flow and achieves a much lower cutting resistance.

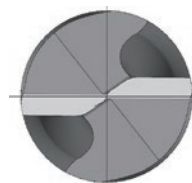
**DVAS**



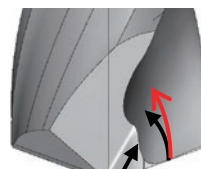
The R shaped space created by the point thinning forms compact chips that aids chip flow.



**Conventional**



Creates larger chips that creates a lower rate of chip flow and causes chip clogging.

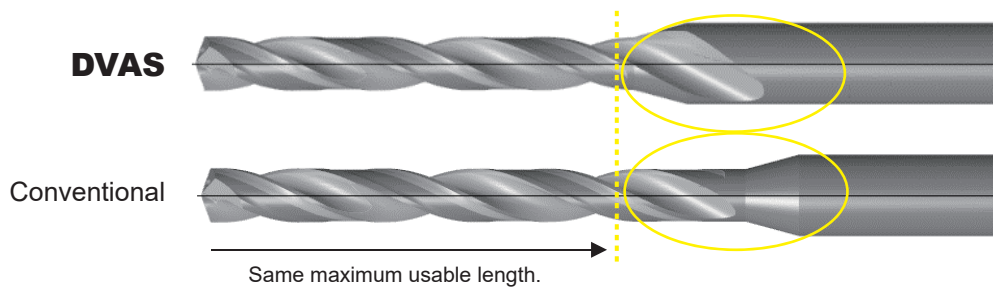


<Cutting Conditions>  
 Workpiece Material : JIS SCM440  
 Tool : DC=ø2mm, L/D=20  
 Cutting Speed :  $v_c = 50 \text{ m/min}$   
 Feed per Rev. :  $f_r = 0.06 \text{ mm/rev.}$   
 Cutting Mode : Wet Cutting  
 Water-soluble Coolants, 2MPa

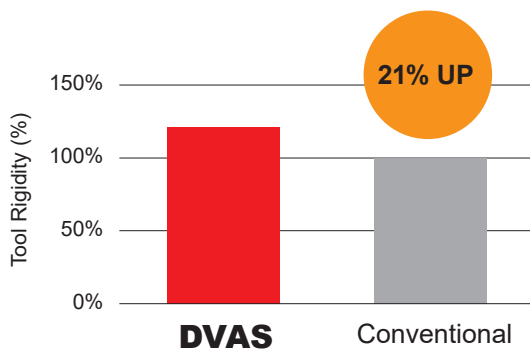
## Unique flute form for greater rigidity.

Applies to L/D=2, 7, 12

The short drill is designed for high rigidity and good chip evacuation by minimizing the neck length. A chip discharge area is provided over the taper part, increasing the tool rigidity by 20% more than the conventional model as well as improving the hole position accuracy.



### Comparison of Tool Rigidity



#### <Analysis Conditions>

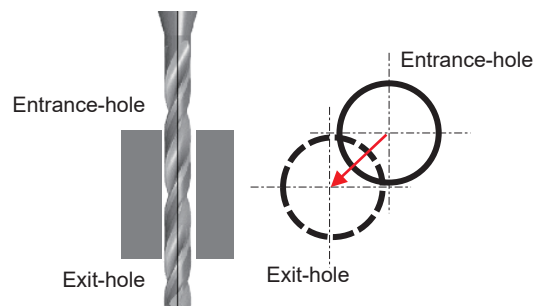
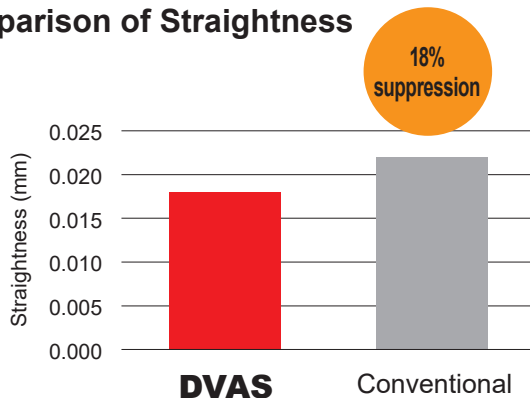
Analysis Model : DC=ø2mm, L/D=7

Overall Length : OAL= 60mm

Constrained : Shank tip range of 0-30 mm

Load : Distributed load of 140N in Z axis direction.

### Comparison of Straightness



#### <Cutting Conditions>

Workpiece Material : JIS SCM440

Tool : DC=ø2mm, L/D=7

Cutting Speed : vc= 70 m/min

Feed per Rev. : fr= 0.08 mm/rev.

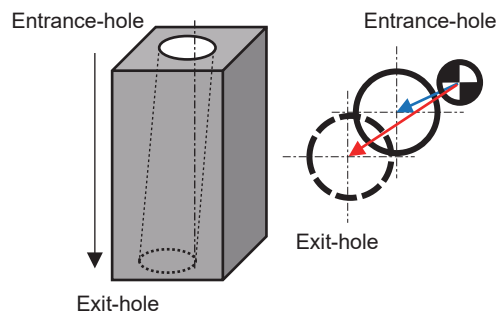
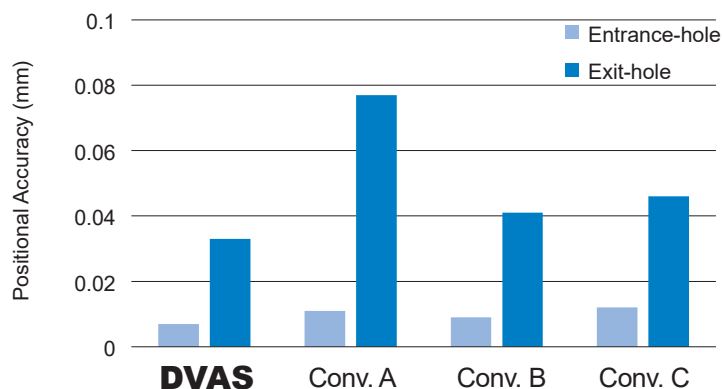
Hole Depth : 10 mm

Cutting Mode : Wet Cutting, Water-soluble Coolants, 5MPa  
Hydro Chuck

Number of Holes : 100 holes

## Deep Hole Machining Example

For deep holes it is recommended to use a pilot drill to improve hole entry and reduce deviation at the exit point.



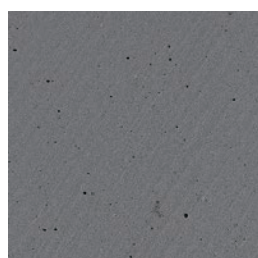
### <Cutting Conditions>

Workpiece Material : JIS SCM440  
 Tool : Pilot Drill DC=ø2mm, L/D=2  
           Long Drill DC=ø2mm, L/D=20  
 Cutting Speed : vc= 70m/min  
 Feed per Rev. : fr= 0.07mm/rev.  
 Cutting Mode : Wet Cutting, Water-soluble Coolants, 2MPa  
 Number of Holes : 100 holes

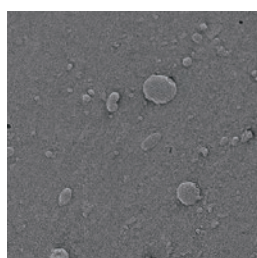
## New Coated Grade **DP1120**

DP1120 has a special multi-layer PVD coating and a micro-grain, cemented carbide substrate. The outstanding surface smoothness prevents chip clogging that reduces breakage. Additionally the excellent crater wear resistance maintains cutting edge sharpness to enable long tool life.

Enlarged view of the flute surface.



**DVAS**



Conventional

### **DVAS**



Conventional Large crater wear

### <Cutting Conditions>

Tool : DC=ø2mm, L/D=20  
 Cutting Speed : vc= 50m/min  
 Feed per Rev. : fr= 0.06mm/rev.  
 Cutting Mode : Wet Cutting,  
                   Water-soluble Coolants, 2MPa  
 Number of Holes : 500 holes

# DRILLS SELECTION CHART

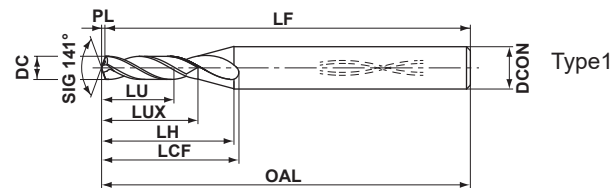
| Applications       | Product Code           | Size Range    | Size | Item | Hole Depth<br>(L/D) | Work Material |                 |           |                   |                      | Shape                                                                                                   |
|--------------------|------------------------|---------------|------|------|---------------------|---------------|-----------------|-----------|-------------------|----------------------|---------------------------------------------------------------------------------------------------------|
|                    |                        |               |      |      |                     | P             | M               | K         | N                 | S                    |                                                                                                         |
|                    |                        |               |      |      |                     | Steel         | Stainless Steel | Cast Iron | Non-ferrous Metal | Heat Resistant Alloy |                                                                                                         |
| For Small Diameter | DVAS...X02             | φ1.0<br>-φ2.9 | 0.1  | 20   | 2                   | ◎             | ◎               | ○         | ○                 | ◎                    | Pilot drill etc.<br> |
|                    | DVAS...X07             | φ1.0<br>-φ2.9 | 0.1  | 20   | 7                   | ◎             | ◎               | ○         | ○                 | ◎                    |                      |
|                    | DVAS...X12             | φ1.0<br>-φ2.9 | 0.1  | 20   | 12                  | ◎             | ◎               | ○         | ○                 | ◎                    |                      |
|                    | DVAS...X20 Coming Soon | φ1.0<br>-φ2.9 | 0.1  | 20   | 20                  | ◎             | ◎               | ○         | ○                 | ◎                    |                      |
|                    | DVAS...X25 Coming Soon | φ1.0<br>-φ2.9 | 0.1  | 20   | 25                  | ◎             | ◎               | ○         | ○                 | ◎                    |                      |
|                    | DVAS...X30 Coming Soon | φ1.0<br>-φ2.9 | 0.1  | 20   | 30                  | ◎             | ◎               | ○         | ○                 | ◎                    |                      |
|                    | DVAS...X40 Coming Soon | φ1.0<br>-φ2.9 | 0.1  | 20   | 40                  | ◎             | ◎               | ○         | ○                 | ◎                    |                     |
|                    | DVAS...X50 Coming Soon | φ1.0<br>-φ2.5 | 0.5  | 4    | 50                  | ◎             | ◎               | ○         | ○                 | ◎                    |                     |

## IDENTIFICATION

| DVA                   | S                    | 0100                           | X50                         | S040                      |
|-----------------------|----------------------|--------------------------------|-----------------------------|---------------------------|
| <b>Applications</b>   | <b>Coolant</b>       | <b>Diameter</b>                | <b>L/D</b>                  | <b>Type of Shank</b>      |
| DVA : General-purpose | S : Internal Coolant | 0100 → φ1.0mm<br>0290 → φ2.9mm | X50 : L/D=50<br>X02 : L/D=2 | S040 : Shank Diameter 4mm |

P M K N S H

Internal Coolant



|        |
|--------|
| DC<3   |
| 0.006  |
| -0.004 |
| DCON=4 |
| 0      |
| -0.008 |

| DC  | Hole Depth<br>(L/D) | DP1120 | Order Number    | LU  | LUX | LCF  | LH   | OAL  | LF   | PL  | DCON | Type |
|-----|---------------------|--------|-----------------|-----|-----|------|------|------|------|-----|------|------|
| 1.0 | 2                   | ●      | DVAS0100X02S040 | 2.2 | 3.2 | 8.6  | 8.8  | 50.0 | 49.8 | 0.2 | 4    | 1    |
| 1.1 | 2                   | ●      | DVAS0110X02S040 | 2.4 | 3.5 | 9.0  | 8.9  | 50.0 | 49.8 | 0.2 | 4    | 1    |
| 1.2 | 2                   | ●      | DVAS0120X02S040 | 2.6 | 3.9 | 9.4  | 9.0  | 50.0 | 49.8 | 0.2 | 4    | 1    |
| 1.3 | 2                   | ●      | DVAS0130X02S040 | 2.8 | 4.2 | 9.9  | 9.2  | 50.0 | 49.8 | 0.2 | 4    | 1    |
| 1.4 | 2                   | ●      | DVAS0140X02S040 | 3.0 | 4.5 | 10.3 | 9.3  | 50.0 | 49.8 | 0.2 | 4    | 1    |
| 1.5 | 2                   | ●      | DVAS0150X02S040 | 3.3 | 4.8 | 10.7 | 9.4  | 50.0 | 49.7 | 0.3 | 4    | 1    |
| 1.6 | 2                   | ●      | DVAS0160X02S040 | 3.5 | 5.1 | 11.1 | 9.6  | 50.0 | 49.7 | 0.3 | 4    | 1    |
| 1.7 | 2                   | ●      | DVAS0170X02S040 | 3.7 | 5.5 | 11.6 | 9.7  | 50.0 | 49.7 | 0.3 | 4    | 1    |
| 1.8 | 2                   | ●      | DVAS0180X02S040 | 3.9 | 5.8 | 12.0 | 9.8  | 50.0 | 49.7 | 0.3 | 4    | 1    |
| 1.9 | 2                   | ●      | DVAS0190X02S040 | 4.1 | 6.1 | 12.4 | 10.0 | 50.0 | 49.7 | 0.3 | 4    | 1    |
| 2.0 | 2                   | ●      | DVAS0200X02S040 | 4.4 | 6.4 | 12.9 | 10.1 | 50.0 | 49.6 | 0.4 | 4    | 1    |
| 2.1 | 2                   | ●      | DVAS0210X02S040 | 4.6 | 6.7 | 13.3 | 10.2 | 50.0 | 49.6 | 0.4 | 4    | 1    |
| 2.2 | 2                   | ●      | DVAS0220X02S040 | 4.8 | 7.0 | 13.7 | 10.3 | 50.0 | 49.6 | 0.4 | 4    | 1    |
| 2.3 | 2                   | ●      | DVAS0230X02S040 | 5.0 | 7.4 | 14.1 | 10.5 | 55.0 | 54.6 | 0.4 | 4    | 1    |
| 2.4 | 2                   | ●      | DVAS0240X02S040 | 5.2 | 7.7 | 14.6 | 10.6 | 55.0 | 54.6 | 0.4 | 4    | 1    |
| 2.5 | 2                   | ●      | DVAS0250X02S040 | 5.5 | 8.0 | 15.0 | 10.7 | 55.0 | 54.6 | 0.4 | 4    | 1    |
| 2.6 | 2                   | ●      | DVAS0260X02S040 | 5.7 | 8.3 | 15.4 | 10.9 | 55.0 | 54.5 | 0.5 | 4    | 1    |
| 2.7 | 2                   | ●      | DVAS0270X02S040 | 5.9 | 8.6 | 15.8 | 11.0 | 55.0 | 54.5 | 0.5 | 4    | 1    |
| 2.8 | 2                   | ●      | DVAS0280X02S040 | 6.1 | 8.9 | 16.3 | 11.1 | 55.0 | 54.5 | 0.5 | 4    | 1    |
| 2.9 | 2                   | ●      | DVAS0290X02S040 | 6.3 | 9.3 | 16.7 | 11.3 | 55.0 | 54.5 | 0.5 | 4    | 1    |

DC = Cutting Diameter  
LU = Usable Length  
LUX = Max. Usable Length

LCF = Length Chip Flute  
LH = Neck Length  
OAL = Overall Length

LF = Functional Length  
PL = Point Length  
DCON = Connection Diameter

● : Inventory maintained in Japan.

# Solid Carbide TRISTAR Drill Series

**DVAS**  
TRISTAR Drills

Mini Size

NEW



P M K N S H

Internal Coolant



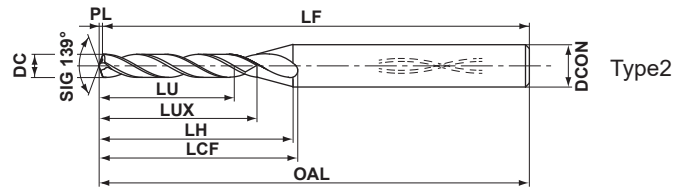
DC<3

0  
-0.010

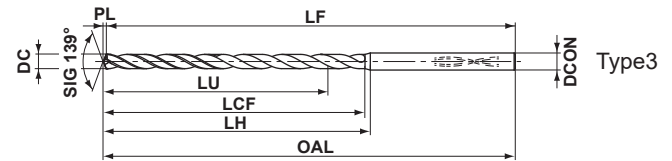


DCON=4

0  
-0.008



Type2



Type3

(mm)

| DC  | Hole Depth<br>(L/D) | DP1120 | Order Number    | LU   | LUX  | LCF  | LH   | OAL   | LF    | PL  | DCON | Type |
|-----|---------------------|--------|-----------------|------|------|------|------|-------|-------|-----|------|------|
| 1.0 | 7                   | ●      | DVAS0100X07S040 | 7.2  | 8.2  | 13.6 | 13.8 | 55.0  | 54.8  | 0.2 | 4    | 2    |
| 1.0 | 12                  | ●      | DVAS0100X12S040 | 12.2 | 13.2 | 18.6 | 18.8 | 58.0  | 57.8  | 0.2 | 4    | 2    |
| 1.0 | 20                  | ●      | DVAS0100X20S040 | 20.2 | —    | 23.2 | 28.8 | 67.0  | 66.8  | 0.2 | 4    | 3    |
| 1.0 | 25                  | ●      | DVAS0100X25S040 | 25.2 | —    | 28.2 | 33.8 | 73.0  | 72.8  | 0.2 | 4    | 3    |
| 1.0 | 30                  | ●      | DVAS0100X30S040 | 30.2 | —    | 33.2 | 38.8 | 79.0  | 78.8  | 0.2 | 4    | 3    |
| 1.0 | 40                  | ●      | DVAS0100X40S040 | 40.2 | —    | 43.2 | 48.8 | 90.0  | 89.8  | 0.2 | 4    | 3    |
| 1.0 | 50                  | ●      | DVAS0100X50S040 | 50.2 | —    | 53.2 | 58.8 | 102.0 | 101.8 | 0.2 | 4    | 3    |
| 1.1 | 7                   | ●      | DVAS0110X07S040 | 7.9  | 9.1  | 14.5 | 14.4 | 55.0  | 54.8  | 0.2 | 4    | 2    |
| 1.1 | 12                  | ●      | DVAS0110X12S040 | 13.4 | 14.6 | 20.0 | 19.9 | 58.0  | 57.8  | 0.2 | 4    | 2    |
| 1.1 | 20                  | ●      | DVAS0110X20S040 | 22.2 | —    | 25.5 | 30.9 | 67.0  | 66.8  | 0.2 | 4    | 3    |
| 1.1 | 25                  | ●      | DVAS0110X25S040 | 27.7 | —    | 31.0 | 36.4 | 73.0  | 72.8  | 0.2 | 4    | 3    |
| 1.1 | 30                  | ●      | DVAS0110X30S040 | 33.2 | —    | 36.5 | 41.9 | 79.0  | 78.8  | 0.2 | 4    | 3    |
| 1.1 | 40                  | ●      | DVAS0110X40S040 | 44.2 | —    | 47.5 | 52.9 | 90.0  | 89.8  | 0.2 | 4    | 3    |
| 1.2 | 7                   | ●      | DVAS0120X07S040 | 8.6  | 9.9  | 15.4 | 15.0 | 55.0  | 54.8  | 0.2 | 4    | 2    |
| 1.2 | 12                  | ●      | DVAS0120X12S040 | 14.6 | 15.9 | 21.4 | 21.0 | 60.0  | 59.8  | 0.2 | 4    | 2    |
| 1.2 | 20                  | ●      | DVAS0120X20S040 | 24.2 | —    | 27.8 | 33.0 | 71.0  | 70.8  | 0.2 | 4    | 3    |
| 1.2 | 25                  | ●      | DVAS0120X25S040 | 30.2 | —    | 33.8 | 39.0 | 77.0  | 76.8  | 0.2 | 4    | 3    |
| 1.2 | 30                  | ●      | DVAS0120X30S040 | 36.2 | —    | 39.8 | 45.0 | 84.0  | 83.8  | 0.2 | 4    | 3    |
| 1.2 | 40                  | ●      | DVAS0120X40S040 | 48.2 | —    | 51.8 | 57.0 | 97.0  | 96.8  | 0.2 | 4    | 3    |
| 1.3 | 7                   | ●      | DVAS0130X07S040 | 9.3  | 10.7 | 16.4 | 15.7 | 55.0  | 54.8  | 0.2 | 4    | 2    |
| 1.3 | 12                  | ●      | DVAS0130X12S040 | 15.8 | 17.2 | 22.9 | 22.2 | 60.0  | 59.8  | 0.2 | 4    | 2    |
| 1.3 | 20                  | ●      | DVAS0130X20S040 | 26.2 | —    | 30.1 | 35.2 | 71.0  | 70.8  | 0.2 | 4    | 3    |
| 1.3 | 25                  | ●      | DVAS0130X25S040 | 32.7 | —    | 36.6 | 41.7 | 77.0  | 76.8  | 0.2 | 4    | 3    |
| 1.3 | 30                  | ●      | DVAS0130X30S040 | 39.2 | —    | 43.1 | 48.2 | 84.0  | 83.8  | 0.2 | 4    | 3    |
| 1.3 | 40                  | ●      | DVAS0130X40S040 | 52.2 | —    | 56.1 | 61.2 | 97.0  | 96.8  | 0.2 | 4    | 3    |
| 1.4 | 7                   | ●      | DVAS0140X07S040 | 10.1 | 11.5 | 17.3 | 16.3 | 55.0  | 54.7  | 0.3 | 4    | 2    |
| 1.4 | 12                  | ●      | DVAS0140X12S040 | 17.1 | 18.5 | 24.3 | 23.3 | 63.0  | 62.7  | 0.3 | 4    | 2    |
| 1.4 | 20                  | ●      | DVAS0140X20S040 | 28.3 | —    | 32.5 | 37.3 | 75.0  | 74.7  | 0.3 | 4    | 3    |
| 1.4 | 25                  | ●      | DVAS0140X25S040 | 35.3 | —    | 39.5 | 44.3 | 82.0  | 81.7  | 0.3 | 4    | 3    |
| 1.4 | 30                  | ●      | DVAS0140X30S040 | 42.3 | —    | 46.5 | 51.3 | 90.0  | 89.7  | 0.3 | 4    | 3    |
| 1.4 | 40                  | ●      | DVAS0140X40S040 | 56.3 | —    | 60.5 | 65.3 | 105.0 | 104.7 | 0.3 | 4    | 3    |
| 1.5 | 7                   | ●      | DVAS0150X07S040 | 10.8 | 12.3 | 18.2 | 16.9 | 55.0  | 54.7  | 0.3 | 4    | 2    |
| 1.5 | 12                  | ●      | DVAS0150X12S040 | 18.3 | 19.8 | 25.7 | 24.4 | 63.0  | 62.7  | 0.3 | 4    | 2    |
| 1.5 | 20                  | ●      | DVAS0150X20S040 | 30.3 | —    | 34.8 | 39.4 | 75.0  | 74.7  | 0.3 | 4    | 3    |
| 1.5 | 25                  | ●      | DVAS0150X25S040 | 37.8 | —    | 42.3 | 46.9 | 82.0  | 81.7  | 0.3 | 4    | 3    |
| 1.5 | 30                  | ●      | DVAS0150X30S040 | 45.3 | —    | 49.8 | 54.4 | 90.0  | 89.7  | 0.3 | 4    | 3    |

● : Inventory maintained in Japan.

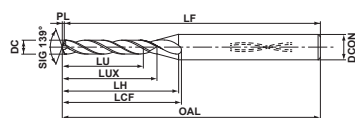
| (mm) |                     |        |                 |       |      |       |       |       |       |     |      |      |
|------|---------------------|--------|-----------------|-------|------|-------|-------|-------|-------|-----|------|------|
| DC   | Hole Depth<br>(L/D) | DP1120 | Order Number    | LU    | LUX  | LCF   | LH    | OAL   | LF    | PL  | DCON | Type |
| 1.5  | 40                  | ●      | DVAS0150X40S040 | 60.3  | —    | 64.8  | 69.4  | 105.0 | 104.7 | 0.3 | 4    | 3    |
| 1.5  | 50                  | ●      | DVAS0150X50S040 | 75.3  | —    | 79.8  | 84.4  | 120.0 | 119.7 | 0.3 | 4    | 3    |
| 1.6  | 7                   | ●      | DVAS0160X07S040 | 11.5  | 13.1 | 19.2  | 17.6  | 57.0  | 56.7  | 0.3 | 4    | 2    |
| 1.6  | 12                  | ●      | DVAS0160X12S040 | 19.5  | 21.1 | 27.2  | 25.6  | 66.0  | 65.7  | 0.3 | 4    | 2    |
| 1.6  | 20                  | ●      | DVAS0160X20S040 | 32.3  | —    | 37.1  | 41.6  | 79.0  | 78.7  | 0.3 | 4    | 3    |
| 1.6  | 25                  | ●      | DVAS0160X25S040 | 40.3  | —    | 45.1  | 49.6  | 88.0  | 87.7  | 0.3 | 4    | 3    |
| 1.6  | 30                  | ●      | DVAS0160X30S040 | 48.3  | —    | 53.1  | 57.6  | 99.0  | 98.7  | 0.3 | 4    | 3    |
| 1.6  | 40                  | ●      | DVAS0160X40S040 | 64.3  | —    | 69.1  | 73.6  | 113.0 | 112.7 | 0.3 | 4    | 3    |
| 1.7  | 7                   | ●      | DVAS0170X07S040 | 12.2  | 14.0 | 20.1  | 18.2  | 57.0  | 56.7  | 0.3 | 4    | 2    |
| 1.7  | 12                  | ●      | DVAS0170X12S040 | 20.7  | 22.5 | 28.6  | 26.7  | 66.0  | 65.7  | 0.3 | 4    | 2    |
| 1.7  | 20                  | ●      | DVAS0170X20S040 | 34.3  | —    | 39.4  | 43.7  | 79.0  | 78.7  | 0.3 | 4    | 3    |
| 1.7  | 25                  | ●      | DVAS0170X25S040 | 42.8  | —    | 47.9  | 52.2  | 88.0  | 87.7  | 0.3 | 4    | 3    |
| 1.7  | 30                  | ●      | DVAS0170X30S040 | 51.3  | —    | 56.4  | 60.7  | 99.0  | 98.7  | 0.3 | 4    | 3    |
| 1.7  | 40                  | ●      | DVAS0170X40S040 | 68.3  | —    | 73.4  | 77.7  | 113.0 | 112.7 | 0.3 | 4    | 3    |
| 1.8  | 7                   | ●      | DVAS0180X07S040 | 12.9  | 14.8 | 21.0  | 18.8  | 59.0  | 58.7  | 0.3 | 4    | 2    |
| 1.8  | 12                  | ●      | DVAS0180X12S040 | 21.9  | 23.8 | 30.0  | 27.8  | 69.0  | 68.7  | 0.3 | 4    | 2    |
| 1.8  | 20                  | ●      | DVAS0180X20S040 | 36.3  | —    | 41.7  | 45.8  | 84.0  | 83.7  | 0.3 | 4    | 3    |
| 1.8  | 25                  | ●      | DVAS0180X25S040 | 45.3  | —    | 50.7  | 54.8  | 94.0  | 93.7  | 0.3 | 4    | 3    |
| 1.8  | 30                  | ●      | DVAS0180X30S040 | 54.3  | —    | 59.7  | 63.8  | 104.0 | 103.7 | 0.3 | 4    | 3    |
| 1.8  | 40                  | ●      | DVAS0180X40S040 | 72.3  | —    | 77.7  | 81.8  | 123.0 | 122.7 | 0.3 | 4    | 3    |
| 1.9  | 7                   | ●      | DVAS0190X07S040 | 13.7  | 15.6 | 21.9  | 19.5  | 59.0  | 58.6  | 0.4 | 4    | 2    |
| 1.9  | 12                  | ●      | DVAS0190X12S040 | 23.2  | 25.1 | 31.4  | 29.0  | 69.0  | 68.6  | 0.4 | 4    | 2    |
| 1.9  | 20                  | ●      | DVAS0190X20S040 | 38.4  | —    | 44.1  | 48.0  | 84.0  | 83.6  | 0.4 | 4    | 3    |
| 1.9  | 25                  | ●      | DVAS0190X25S040 | 47.9  | —    | 53.6  | 57.5  | 94.0  | 93.6  | 0.4 | 4    | 3    |
| 1.9  | 30                  | ●      | DVAS0190X30S040 | 57.4  | —    | 63.1  | 67.0  | 104.0 | 103.6 | 0.4 | 4    | 3    |
| 1.9  | 40                  | ●      | DVAS0190X40S040 | 76.4  | —    | 82.1  | 86.0  | 123.0 | 122.6 | 0.4 | 4    | 3    |
| 2.0  | 7                   | ●      | DVAS0200X07S040 | 14.4  | 16.4 | 22.9  | 20.1  | 62.0  | 61.6  | 0.4 | 4    | 2    |
| 2.0  | 12                  | ●      | DVAS0200X12S040 | 24.4  | 26.4 | 32.9  | 30.1  | 73.0  | 72.6  | 0.4 | 4    | 2    |
| 2.0  | 20                  | ●      | DVAS0200X20S040 | 40.4  | —    | 46.4  | 50.1  | 91.0  | 90.6  | 0.4 | 4    | 3    |
| 2.0  | 25                  | ●      | DVAS0200X25S040 | 50.4  | —    | 56.4  | 60.1  | 102.0 | 101.6 | 0.4 | 4    | 3    |
| 2.0  | 30                  | ●      | DVAS0200X30S040 | 60.4  | —    | 66.4  | 70.1  | 113.0 | 112.6 | 0.4 | 4    | 3    |
| 2.0  | 40                  | ●      | DVAS0200X40S040 | 80.4  | —    | 86.4  | 90.1  | 136.0 | 135.6 | 0.4 | 4    | 3    |
| 2.0  | 50                  | ●      | DVAS0200X50S040 | 100.4 | —    | 106.4 | 110.1 | 158.0 | 157.6 | 0.4 | 4    | 3    |
| 2.1  | 7                   | ●      | DVAS0210X07S040 | 15.1  | 17.2 | 23.8  | 20.7  | 62.0  | 61.6  | 0.4 | 4    | 2    |
| 2.1  | 12                  | ●      | DVAS0210X12S040 | 25.6  | 27.7 | 34.3  | 31.2  | 73.0  | 72.6  | 0.4 | 4    | 2    |
| 2.1  | 20                  | ●      | DVAS0210X20S040 | 42.4  | —    | 48.7  | 52.2  | 91.0  | 90.6  | 0.4 | 4    | 3    |
| 2.1  | 25                  | ●      | DVAS0210X25S040 | 52.9  | —    | 59.2  | 62.7  | 102.0 | 101.6 | 0.4 | 4    | 3    |
| 2.1  | 30                  | ●      | DVAS0210X30S040 | 63.4  | —    | 69.7  | 73.2  | 113.0 | 112.6 | 0.4 | 4    | 3    |
| 2.1  | 40                  | ●      | DVAS0210X40S040 | 84.4  | —    | 90.7  | 94.2  | 136.0 | 135.6 | 0.4 | 4    | 3    |
| 2.2  | 7                   | ●      | DVAS0220X07S040 | 15.8  | 18.1 | 24.7  | 21.4  | 62.0  | 61.6  | 0.4 | 4    | 2    |
| 2.2  | 12                  | ●      | DVAS0220X12S040 | 26.8  | 29.1 | 35.7  | 32.4  | 73.0  | 72.6  | 0.4 | 4    | 2    |
| 2.2  | 20                  | ●      | DVAS0220X20S040 | 44.4  | —    | 51.0  | 54.4  | 91.0  | 90.6  | 0.4 | 4    | 3    |
| 2.2  | 25                  | ●      | DVAS0220X25S040 | 55.4  | —    | 62.0  | 65.4  | 102.0 | 101.6 | 0.4 | 4    | 3    |
| 2.2  | 30                  | ●      | DVAS0220X30S040 | 66.4  | —    | 73.0  | 76.4  | 113.0 | 112.6 | 0.4 | 4    | 3    |
| 2.2  | 40                  | ●      | DVAS0220X40S040 | 88.4  | —    | 95.0  | 98.4  | 136.0 | 135.6 | 0.4 | 4    | 3    |
| 2.3  | 7                   | ●      | DVAS0230X07S040 | 16.5  | 18.9 | 25.7  | 22.0  | 65.0  | 64.6  | 0.4 | 4    | 2    |
| 2.3  | 12                  | ●      | DVAS0230X12S040 | 28.0  | 30.4 | 37.2  | 33.5  | 78.0  | 77.6  | 0.4 | 4    | 2    |
| 2.3  | 20                  | ●      | DVAS0230X20S040 | 46.4  | —    | 53.3  | 56.5  | 98.0  | 97.6  | 0.4 | 4    | 3    |

**DC** = Cutting Diameter  
**LU** = Usable Length  
**LUX** = Max. Usable Length

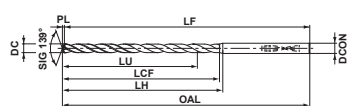
**LCF** = Length Chip Flute  
**LH** = Neck Length  
**OAL** = Overall Length

**LF** = Functional Length  
**PL** = Point Length  
**DCON** = Connection Diameter

# Solid Carbide TRISTAR Drill Series



Type2



Type3

(mm)

| DC  | Hole Depth<br>(L/D) | DP1120 | Order Number    | LU    | LUX  | LCF   | LH    | OAL   | LF    | PL  | DCON | Type |
|-----|---------------------|--------|-----------------|-------|------|-------|-------|-------|-------|-----|------|------|
| 2.3 | 25                  | ●      | DVAS0230X25S040 | 57.9  | —    | 64.8  | 68.0  | 111.0 | 110.6 | 0.4 | 4    | 3    |
| 2.3 | 30                  | ●      | DVAS0230X30S040 | 69.4  | —    | 76.3  | 79.5  | 124.0 | 123.6 | 0.4 | 4    | 3    |
| 2.3 | 40                  | ●      | DVAS0230X40S040 | 92.4  | —    | 99.3  | 102.5 | 150.0 | 149.6 | 0.4 | 4    | 3    |
| 2.4 | 7                   | ●      | DVAS0240X07S040 | 17.2  | 19.7 | 26.6  | 22.6  | 65.0  | 64.6  | 0.4 | 4    | 2    |
| 2.4 | 12                  | ●      | DVAS0240X12S040 | 29.2  | 31.7 | 38.6  | 34.6  | 78.0  | 77.6  | 0.4 | 4    | 2    |
| 2.4 | 20                  | ●      | DVAS0240X20S040 | 48.4  | —    | 55.6  | 58.6  | 98.0  | 97.6  | 0.4 | 4    | 3    |
| 2.4 | 25                  | ●      | DVAS0240X25S040 | 60.4  | —    | 67.6  | 70.6  | 111.0 | 110.6 | 0.4 | 4    | 3    |
| 2.4 | 30                  | ●      | DVAS0240X30S040 | 72.4  | —    | 79.6  | 82.6  | 124.0 | 123.6 | 0.4 | 4    | 3    |
| 2.4 | 40                  | ●      | DVAS0240X40S040 | 96.4  | —    | 103.6 | 106.6 | 150.0 | 149.6 | 0.4 | 4    | 3    |
| 2.5 | 7                   | ●      | DVAS0250X07S040 | 18.0  | 20.5 | 27.5  | 23.3  | 65.0  | 64.5  | 0.5 | 4    | 2    |
| 2.5 | 12                  | ●      | DVAS0250X12S040 | 30.5  | 33.0 | 40.0  | 35.8  | 78.0  | 77.5  | 0.5 | 4    | 2    |
| 2.5 | 20                  | ●      | DVAS0250X20S040 | 50.5  | —    | 58.0  | 60.8  | 98.0  | 97.5  | 0.5 | 4    | 3    |
| 2.5 | 25                  | ●      | DVAS0250X25S040 | 63.0  | —    | 70.5  | 73.3  | 111.0 | 110.5 | 0.5 | 4    | 3    |
| 2.5 | 30                  | ●      | DVAS0250X30S040 | 75.5  | —    | 83.0  | 85.8  | 124.0 | 123.5 | 0.5 | 4    | 3    |
| 2.5 | 40                  | ●      | DVAS0250X40S040 | 100.5 | —    | 108.0 | 110.8 | 150.0 | 149.5 | 0.5 | 4    | 3    |
| 2.5 | 50                  | ●      | DVAS0250X50S040 | 125.5 | —    | 133.0 | 135.8 | 176.0 | 175.5 | 0.5 | 4    | 3    |
| 2.6 | 7                   | ●      | DVAS0260X07S040 | 18.7  | 21.3 | 28.4  | 23.9  | 65.0  | 64.5  | 0.5 | 4    | 2    |
| 2.6 | 12                  | ●      | DVAS0260X12S040 | 31.7  | 34.3 | 41.4  | 36.9  | 78.0  | 77.5  | 0.5 | 4    | 2    |
| 2.6 | 20                  | ●      | DVAS0260X20S040 | 52.5  | —    | 60.3  | 62.9  | 98.0  | 97.5  | 0.5 | 4    | 3    |
| 2.6 | 25                  | ●      | DVAS0260X25S040 | 65.5  | —    | 73.3  | 75.9  | 111.0 | 110.5 | 0.5 | 4    | 3    |
| 2.6 | 30                  | ●      | DVAS0260X30S040 | 78.5  | —    | 86.3  | 88.9  | 124.0 | 123.5 | 0.5 | 4    | 3    |
| 2.6 | 40                  | ●      | DVAS0260X40S040 | 104.5 | —    | 112.3 | 114.9 | 150.0 | 149.5 | 0.5 | 4    | 3    |
| 2.7 | 7                   | ●      | DVAS0270X07S040 | 19.4  | 22.2 | 29.4  | 24.5  | 68.0  | 67.5  | 0.5 | 4    | 2    |
| 2.7 | 12                  | ●      | DVAS0270X12S040 | 32.9  | 35.7 | 42.9  | 38.0  | 83.0  | 82.5  | 0.5 | 4    | 2    |
| 2.7 | 20                  | ●      | DVAS0270X20S040 | 54.5  | —    | 62.6  | 65.0  | 107.0 | 106.5 | 0.5 | 4    | 3    |
| 2.7 | 25                  | ●      | DVAS0270X25S040 | 68.0  | —    | 76.1  | 78.5  | 122.0 | 121.5 | 0.5 | 4    | 3    |
| 2.7 | 30                  | ●      | DVAS0270X30S040 | 81.5  | —    | 89.6  | 92.0  | 137.0 | 136.5 | 0.5 | 4    | 3    |
| 2.7 | 40                  | ●      | DVAS0270X40S040 | 108.5 | —    | 116.6 | 119.0 | 167.0 | 166.5 | 0.5 | 4    | 3    |
| 2.8 | 7                   | ●      | DVAS0280X07S040 | 20.1  | 23.0 | 30.3  | 25.2  | 68.0  | 67.5  | 0.5 | 4    | 2    |
| 2.8 | 12                  | ●      | DVAS0280X12S040 | 34.1  | 37.0 | 44.3  | 39.2  | 83.0  | 82.5  | 0.5 | 4    | 2    |
| 2.8 | 20                  | ●      | DVAS0280X20S040 | 56.5  | —    | 64.9  | 67.2  | 107.0 | 106.5 | 0.5 | 4    | 3    |
| 2.8 | 25                  | ●      | DVAS0280X25S040 | 70.5  | —    | 78.9  | 81.2  | 122.0 | 121.5 | 0.5 | 4    | 3    |
| 2.8 | 30                  | ●      | DVAS0280X30S040 | 84.5  | —    | 92.9  | 95.2  | 137.0 | 136.5 | 0.5 | 4    | 3    |
| 2.8 | 40                  | ●      | DVAS0280X40S040 | 112.5 | —    | 120.9 | 123.2 | 167.0 | 166.5 | 0.5 | 4    | 3    |
| 2.9 | 7                   | ●      | DVAS0290X07S040 | 20.8  | 23.8 | 31.2  | 25.8  | 68.0  | 67.5  | 0.5 | 4    | 2    |
| 2.9 | 12                  | ●      | DVAS0290X12S040 | 35.3  | 38.3 | 45.7  | 40.3  | 83.0  | 82.5  | 0.5 | 4    | 2    |
| 2.9 | 20                  | ●      | DVAS0290X20S040 | 58.5  | —    | 67.2  | 69.3  | 107.0 | 106.5 | 0.5 | 4    | 3    |
| 2.9 | 25                  | ●      | DVAS0290X25S040 | 73.0  | —    | 81.7  | 83.8  | 122.0 | 121.5 | 0.5 | 4    | 3    |
| 2.9 | 30                  | ●      | DVAS0290X30S040 | 87.5  | —    | 96.2  | 98.3  | 137.0 | 136.5 | 0.5 | 4    | 3    |
| 2.9 | 40                  | ●      | DVAS0290X40S040 | 116.5 | —    | 125.2 | 127.3 | 167.0 | 166.5 | 0.5 | 4    | 3    |

DC = Cutting Diameter  
LU = Usable Length  
LUX = Max. Usable Length

LCF = Length Chip Flute  
LH = Neck Length  
OAL = Overall Length

LF = Functional Length  
PL = Point Length  
DCON = Connection Diameter

● : Inventory maintained in Japan.

## Recommended Cutting Conditions

(mm)

| Workpiece Material |                   | Mild Steels<br>Carbon Steels, Alloy Steels<br>JIS SS400, S10C, S45C, SCM440 etc |                                             |                                            | Austenitic Stainless Steels, Ferritic Stainless Steels<br>Ferritic and Martensitic Stainless Steels<br>Precipitation Hardening Stainless Steels<br>JIS SUS410, SUS420J2, SUS304, SUS316, SUS630 etc |                                             |                                            |
|--------------------|-------------------|---------------------------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|--------------------------------------------|
| DC                 | Hole Depth<br>L/D | Cutting Speed <b>vc</b><br>(Min.—Max.)<br>(m/min)                               | Revolution<br><b>n</b> (min <sup>-1</sup> ) | Feed <b>fr</b><br>(Min.—Max.)<br>(mm/rev.) | Cutting Speed <b>vc</b><br>(Min.—Max.)<br>(m/min)                                                                                                                                                   | Revolution<br><b>n</b> (min <sup>-1</sup> ) | Feed <b>fr</b><br>(Min.—Max.)<br>(mm/rev.) |
| <b>1.0</b>         | <b>2-30</b>       | 65(30—100)                                                                      | 20700                                       | 0.035(0.020—0.050)                         | 60(20—100)                                                                                                                                                                                          | 19100                                       | 0.025(0.010—0.040)                         |
| <b>1.0</b>         | <b>40, 50</b>     | 65(30—100)                                                                      | 20700                                       | 0.030(0.020—0.040)                         | 60(20—100)                                                                                                                                                                                          | 19100                                       | 0.020(0.010—0.030)                         |
| <b>1.5</b>         | <b>2-30</b>       | 65(30—100)                                                                      | 13800                                       | 0.053(0.030—0.075)                         | 60(20—100)                                                                                                                                                                                          | 12700                                       | 0.038(0.015—0.060)                         |
| <b>1.5</b>         | <b>40, 50</b>     | 65(30—100)                                                                      | 13800                                       | 0.045(0.030—0.060)                         | 60(20—100)                                                                                                                                                                                          | 12700                                       | 0.030(0.015—0.045)                         |
| <b>2.0</b>         | <b>2-30</b>       | 70(40—100)                                                                      | 11100                                       | 0.070(0.040—0.100)                         | 60(20—100)                                                                                                                                                                                          | 9500                                        | 0.050(0.020—0.080)                         |
| <b>2.0</b>         | <b>40, 50</b>     | 70(40—100)                                                                      | 11100                                       | 0.060(0.040—0.080)                         | 60(20—100)                                                                                                                                                                                          | 9500                                        | 0.040(0.020—0.060)                         |
| <b>2.5</b>         | <b>2-30</b>       | 70(40—100)                                                                      | 8900                                        | 0.088(0.050—0.125)                         | 60(20—100)                                                                                                                                                                                          | 7600                                        | 0.063(0.025—0.100)                         |
| <b>2.5</b>         | <b>40, 50</b>     | 70(40—100)                                                                      | 8900                                        | 0.075(0.050—0.100)                         | 60(20—100)                                                                                                                                                                                          | 7600                                        | 0.050(0.025—0.075)                         |
| <b>2.9</b>         | <b>2-30</b>       | 70(40—100)                                                                      | 7700                                        | 0.102(0.058—0.145)                         | 60(20—100)                                                                                                                                                                                          | 6600                                        | 0.073(0.029—0.116)                         |
| <b>2.9</b>         | <b>40, 50</b>     | 70(40—100)                                                                      | 7700                                        | 0.087(0.058—0.116)                         | 60(20—100)                                                                                                                                                                                          | 6600                                        | 0.058(0.029—0.087)                         |

| Workpiece Material |                   | Cast Irons<br>Ductile Cast Irons<br>JIS FC300, FCD450 etc |                                             |                                            | Aluminium Alloys<br>JIS A5052, A6061, A7075       |                                             |                                            |
|--------------------|-------------------|-----------------------------------------------------------|---------------------------------------------|--------------------------------------------|---------------------------------------------------|---------------------------------------------|--------------------------------------------|
| DC                 | Hole Depth<br>L/D | Cutting Speed <b>vc</b><br>(Min.—Max.)<br>(m/min)         | Revolution<br><b>n</b> (min <sup>-1</sup> ) | Feed <b>fr</b><br>(Min.—Max.)<br>(mm/rev.) | Cutting Speed <b>vc</b><br>(Min.—Max.)<br>(m/min) | Revolution<br><b>n</b> (min <sup>-1</sup> ) | Feed <b>fr</b><br>(Min.—Max.)<br>(mm/rev.) |
| <b>1.0</b>         | <b>2-30</b>       | 70(40—100)                                                | 22300                                       | 0.035(0.020—0.050)                         | 140(100—180)                                      | 31800                                       | 0.040(0.020—0.060)                         |
| <b>1.0</b>         | <b>40, 50</b>     | 70(40—100)                                                | 22300                                       | 0.030(0.020—0.040)                         | 140(100—180)                                      | 31800                                       | 0.035(0.020—0.050)                         |
| <b>1.5</b>         | <b>2-30</b>       | 70(40—100)                                                | 14900                                       | 0.053(0.030—0.075)                         | 140(100—180)                                      | 21200                                       | 0.060(0.030—0.090)                         |
| <b>1.5</b>         | <b>40, 50</b>     | 70(40—100)                                                | 14900                                       | 0.045(0.030—0.060)                         | 140(100—180)                                      | 21200                                       | 0.053(0.030—0.075)                         |
| <b>2.0</b>         | <b>2-30</b>       | 70(40—100)                                                | 11100                                       | 0.070(0.040—0.100)                         | 140(100—180)                                      | 15900                                       | 0.080(0.040—0.120)                         |
| <b>2.0</b>         | <b>40, 50</b>     | 70(40—100)                                                | 11100                                       | 0.060(0.040—0.080)                         | 140(100—180)                                      | 15900                                       | 0.070(0.040—0.100)                         |
| <b>2.5</b>         | <b>2-30</b>       | 70(40—100)                                                | 8900                                        | 0.088(0.050—0.125)                         | 140(100—180)                                      | 12700                                       | 0.100(0.050—0.150)                         |
| <b>2.5</b>         | <b>40, 50</b>     | 70(40—100)                                                | 8900                                        | 0.075(0.050—0.100)                         | 140(100—180)                                      | 12700                                       | 0.088(0.050—0.125)                         |
| <b>2.9</b>         | <b>2-30</b>       | 70(40—100)                                                | 7700                                        | 0.102(0.058—0.145)                         | 140(100—180)                                      | 11000                                       | 0.116(0.058—0.174)                         |
| <b>2.9</b>         | <b>40, 50</b>     | 70(40—100)                                                | 7700                                        | 0.087(0.058—0.116)                         | 140(100—180)                                      | 11000                                       | 0.102(0.058—0.145)                         |

| Workpiece Material |                   | Heat Resistant Alloys<br>Inconel718 etc           |                                             |                                            | Titanium Alloys<br>Ti-6Al-4V etc                  |                                             |                                            |
|--------------------|-------------------|---------------------------------------------------|---------------------------------------------|--------------------------------------------|---------------------------------------------------|---------------------------------------------|--------------------------------------------|
| DC                 | Hole Depth<br>L/D | Cutting Speed <b>vc</b><br>(Min.—Max.)<br>(m/min) | Revolution<br><b>n</b> (min <sup>-1</sup> ) | Feed <b>fr</b><br>(Min.—Max.)<br>(mm/rev.) | Cutting Speed <b>vc</b><br>(Min.—Max.)<br>(m/min) | Revolution<br><b>n</b> (min <sup>-1</sup> ) | Feed <b>fr</b><br>(Min.—Max.)<br>(mm/rev.) |
| <b>1.0</b>         | <b>2-30</b>       | 30(10—50)                                         | 9500                                        | 0.015(0.010—0.020)                         | 30(20—40)                                         | 9500                                        | 0.020(0.010—0.030)                         |
| <b>1.0</b>         | <b>40, 50</b>     | 30(10—50)                                         | 9500                                        | 0.015(0.010—0.020)                         | 30(20—40)                                         | 9500                                        | 0.020(0.010—0.030)                         |
| <b>1.5</b>         | <b>2-30</b>       | 30(10—50)                                         | 6400                                        | 0.023(0.015—0.030)                         | 30(20—40)                                         | 6400                                        | 0.030(0.015—0.045)                         |
| <b>1.5</b>         | <b>40, 50</b>     | 30(10—50)                                         | 6400                                        | 0.023(0.015—0.030)                         | 30(20—40)                                         | 6400                                        | 0.030(0.015—0.045)                         |
| <b>2.0</b>         | <b>2-30</b>       | 30(10—50)                                         | 4800                                        | 0.030(0.020—0.040)                         | 30(20—40)                                         | 4800                                        | 0.040(0.020—0.060)                         |
| <b>2.0</b>         | <b>40, 50</b>     | 30(10—50)                                         | 4800                                        | 0.030(0.020—0.040)                         | 30(20—40)                                         | 4800                                        | 0.040(0.020—0.060)                         |
| <b>2.5</b>         | <b>2-30</b>       | 30(10—50)                                         | 3800                                        | 0.038(0.025—0.050)                         | 30(20—40)                                         | 3800                                        | 0.050(0.025—0.075)                         |
| <b>2.5</b>         | <b>40, 50</b>     | 30(10—50)                                         | 3800                                        | 0.038(0.025—0.050)                         | 30(20—40)                                         | 3800                                        | 0.050(0.025—0.075)                         |
| <b>2.9</b>         | <b>2-30</b>       | 30(10—50)                                         | 3300                                        | 0.044(0.029—0.058)                         | 30(20—40)                                         | 3300                                        | 0.058(0.029—0.087)                         |
| <b>2.9</b>         | <b>40, 50</b>     | 30(10—50)                                         | 3300                                        | 0.044(0.029—0.058)                         | 30(20—40)                                         | 3300                                        | 0.058(0.029—0.087)                         |

| Workpiece Material |                   | Cobalt Chrome Alloys<br>T7402-2, ASTM F1537, F799 etc |                                             |                                            |
|--------------------|-------------------|-------------------------------------------------------|---------------------------------------------|--------------------------------------------|
| DC                 | Hole Depth<br>L/D | Cutting Speed <b>vc</b><br>(Min.—Max.)<br>(m/min)     | Revolution<br><b>n</b> (min <sup>-1</sup> ) | Feed <b>fr</b><br>(Min.—Max.)<br>(mm/rev.) |
| <b>1.0</b>         | <b>2-30</b>       | 60(30—90)                                             | 19100                                       | 0.020(0.010—0.030)                         |
| <b>1.0</b>         | <b>40, 50</b>     | 60(30—90)                                             | 19100                                       | 0.020(0.010—0.030)                         |
| <b>1.5</b>         | <b>2-30</b>       | 60(30—90)                                             | 12700                                       | 0.030(0.015—0.045)                         |
| <b>1.5</b>         | <b>40, 50</b>     | 60(30—90)                                             | 12700                                       | 0.030(0.015—0.045)                         |
| <b>2.0</b>         | <b>2-30</b>       | 60(30—90)                                             | 9500                                        | 0.040(0.020—0.060)                         |
| <b>2.0</b>         | <b>40, 50</b>     | 60(30—90)                                             | 9500                                        | 0.040(0.020—0.060)                         |
| <b>2.5</b>         | <b>2-30</b>       | 60(30—90)                                             | 7600                                        | 0.050(0.025—0.075)                         |
| <b>2.5</b>         | <b>40, 50</b>     | 60(30—90)                                             | 7600                                        | 0.050(0.025—0.075)                         |
| <b>2.9</b>         | <b>2-30</b>       | 60(30—90)                                             | 6600                                        | 0.058(0.029—0.087)                         |
| <b>2.9</b>         | <b>40, 50</b>     | 60(30—90)                                             | 6600                                        | 0.058(0.029—0.087)                         |

Note 1) This recommended condition is only when using internal coolant.

Note 2) Check the condition of chips and perform step machining if necessary. \* Reference of step length: 0.2 to 1.0 DC

Note 3) Adjust the cutting conditions according to machine tool and workpiece clamp rigidity and machining geometry, etc.

Note 4) Machining depths exceeding flute length (LU) are not recommend.

Note 5) Clamp the drill so that the drill runout is within 0.003mm.

Note 6) Do not clamp the flute part of the drill.

## Operational Guidance

### ■ Operational Guidance for the DVAS L/D=2–40

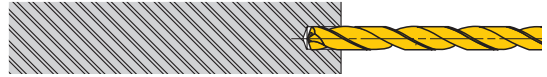
#### Flat Face Drilling ●Drilling a Blind Hole

##### 1. Drilling a Pilot Hole



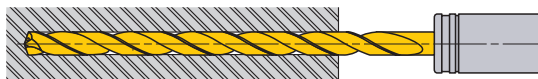
- ① Use a drill with a larger (flatter) point angle than the super long type. Use the shortest flute possible.  
A DVAS drill with L/D = 2 can be machined up to L/D = 3 when drilling pilot holes.
- ② Ensure a high precision hole is drilled for the guide.
- ③ Drill depth : Approx DC×3.  
(Adjust the pilot hole depth according to the length of the long type drill.)

##### 2. Initial Cutting with the Long Type Drill



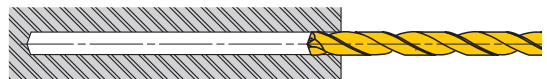
- ① Penetrate the guide hole at low revolution. (Revolution 500–1000min<sup>-1</sup>, feed rate 1000–2000mm/min)
- ② Stop the long type drill 1–3mm short of the guide hole bottom.

##### 3. Drill the Deep Hole



- ① Start cutting at the recommended speed and feed with a non-peck (continuous feed) cycle.

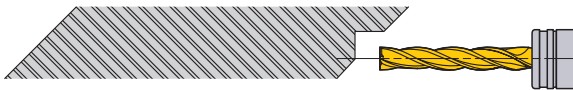
##### 4. Drill Retraction



- ① After drilling, lower the cutting revolution about 0.5–1mm short of the hole end. (Revolution of around 500–1000min<sup>-1</sup>)
- ② Retract the drill to the pilot hole depth starting point at a feed rate of 1000–2000mm/min.
- ③ Finally, clear the hole at a cutting speed of 20–30m/min and feed rate of 0.2–0.3mm/rev.

#### Interrupted Drilling ●Drilling and Breaking Through on Irregular Faces or Angles

##### 1. Spot Facing



- ① Machine a flat or the irregular face by using an end mill or slot drill capable of spot facing. Make the spot face diameter the same size as the required deep hole diameter.

##### 2. Drilling a Pilot Hole



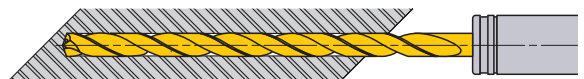
- ① Use a drill with a larger (flatter) point angle than the super long type. Use the shortest flute possible.
- ② Ensure a high precision hole is drilled for the guide.
- ③ Drill depth : Approx DC×2.  
(Adjust the pilot hole depth according to the length of the long type drill.)

##### 3. Initial Cutting with the Long Type Drill



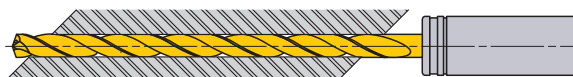
- ① Penetrate the guide hole at a low revolution. (Revolution 500–1000min<sup>-1</sup>, feed rate 1000–2000mm/min)
- ② Stop the long type drill 0.5–1mm short of the guide hole bottom.

##### 4. Drill the Deep Hole



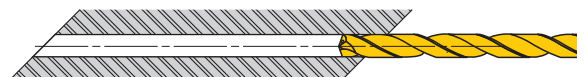
- ① Start cutting at the recommended speed and feed with a non-peck (continuous feed) cycle.

##### 5. Breaking Through



- ① When breaking through, the cutting edge can be damaged.
- ② Lower the feed rate when penetrating.

##### 6. Drill Retraction

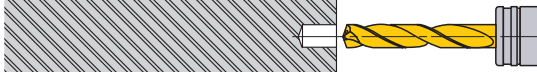


- ① Finally clear the hole at a feed rate of 0.2–0.3mm/rev. (Revolution of around 500–1000min<sup>-1</sup>)
- ② Retract the drill to the pilot hole depth starting point at a feed rate of 1000–2000mm/min.

## ■ Operational Guidance for the DVAS L/D=50

### Flat Face Drilling ●Drilling a Blind Hole

#### 1. Drilling a Pilot Hole



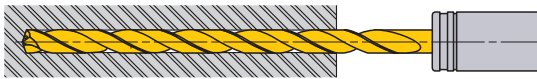
- ① Use a drill with a larger (flatter) point angle than the super long type.  
Use a DVAS drill with  $L/D = 7$ .
- ② Ensure a high precision hole is drilled for the guide.
- ③ Drill depth : Approx  $DC \times 7$ .  
(Adjust the pilot hole depth according to the length of the long type drill.)

#### 2. Initial Cutting with the Long Type Drill



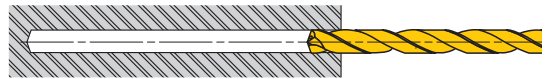
- ① Penetrate the guide hole at low revolution. (Revolution  $500-1000\text{min}^{-1}$ , feed rate  $1000-2000\text{mm/min}$ )
- ② Stop the long type drill 1—3mm short of the guide hole bottom.

#### 3. Drill the Deep Hole



- ① Start cutting at the recommended speed and feed with a non-peck (continuous feed) cycle.

#### 4. Drill Retraction



- ① After drilling, lower the cutting revolution about 0.5—1mm short of the hole end. (Revolution of around  $500-1000\text{min}^{-1}$ )
- ② Retract the drill to the pilot hole depth starting point at a feed rate of  $1000-2000\text{mm/min}$ .
- ③ Finally, clear the hole at a cutting speed of  $20-30\text{m/min}$  and feed rate of  $0.2-0.3\text{mm/rev}$ .

### Interrupted Drilling ●Drilling and Breaking Through on Irregular Faces or Angles

#### 1. Spot Facing



- ① Machine a flat or the irregular face by using an end mill or slot drill capable of spot facing. Make the spot face diameter the same size as the required deep hole diameter.

#### 2. Drilling a Pilot Hole



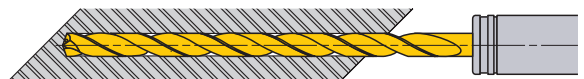
- ① Use a drill with a larger (flatter) point angle than the super long type.  
Use a DVAS drill with  $L/D = 7$ .
- ② Ensure a high precision hole is drilled for the guide.
- ③ Drill depth : Approx  $DC \times 7$ .  
(Adjust the pilot hole depth according to the length of the long type drill.)

#### 3. Initial Cutting with the Long Type Drill



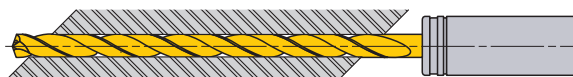
- ① Penetrate the guide hole at a low revolution. (Revolution  $500-1000\text{min}^{-1}$ , feed rate  $1000-2000\text{mm/min}$ )
- ② Stop the long type drill 0.5—1mm short of the guide hole bottom.

#### 4. Drill the Deep Hole



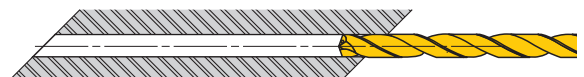
- ① Start cutting at the recommended speed and feed with a non-peck (continuous feed) cycle.

#### 5. Breaking Through



- ① When breaking through, the cutting edge can be damaged.
- ② Lower the feed rate when penetrating.

#### 6. Drill Retraction



- ① Finally clear the hole at a feed rate of  $0.2-0.3\text{mm/rev}$ . (Revolution of around  $500-1000\text{min}^{-1}$ )
- ② Retract the drill to the pilot hole depth starting point at a feed rate of  $1000-2000\text{mm/min}$ .

A technical cross-section diagram of the adjusting screw mechanism. A yellow rod with a threaded section at the bottom is inserted into a grey housing. A nut is threaded onto the rod, and a conical washer is positioned between the nut and the housing. A label 'Adjusting Screw' with a leader line points to the nut.

$A \geq DC \times 2$

A technical cross-section drawing of a drill bit assembly. The assembly consists of a yellow drill bit with a double-flute design, mounted within a grey-colored housing. The housing has a central bore through which the drill bit passes. The drill bit is secured at the top by a clamping mechanism. The housing features a flange at the bottom with two mounting holes. The drawing is a black and white line drawing with the drill bit highlighted in yellow.

Adjust the coolant pressure according to the type and concentration of coolant.

| Drii Dia.<br>DC | Water-soluble | Water-insoluble |
|-----------------|---------------|-----------------|
| DC<2mm          | ≥ 3MPa        | ≥ 7MPa          |
| DC<3mm          | ≥ 2MPa        | ≥ 5MPa          |

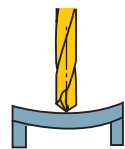


Diagram illustrating the DCx7 probe tip, showing a vertical probe with a double-flute design and a depth measurement of 7 inches.

Use DVAS0000X07S040

| Drill Dia.<br>DC | Fine Mesh Filter |
|------------------|------------------|
| DC<2mm           | ≤ 10μm           |
| DC<3mm           | ≤ 20μm           |

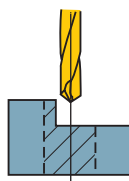
Support  
the Workpiece  
**OK**



If Bending Occurs  
**NG**

OK

① Lower the feed when drilling the interrupted part.



Requires Prior  
Machining

①Spot face with an end mill prior to drilling.

A cross-sectional diagram of a butt joint. Two plates are joined by a V-groove weld. The weld metal is shaded with diagonal lines. A vertical centerline is shown.

- ① Divide the two processes.
- ② Drill the larger hole first.
- \*A tool for machining both chamfer and spot face can be produced to order.

A diagram showing a rectangular cross-section of a material. A central vertical line divides the rectangle into two halves. The material is represented by a light blue color. Two red circles are drawn at the bottom corners of the rectangle, highlighting the sharp edges or potential stress concentrations.

- ① Lower the feed rate by 50% at the end of through cutting.
- ② Change the point angle.

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## Tips for drilling a deep hole exceeding $L/D = 40$

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### Workpiece rotation method: small lathes, automatic lathes, etc.

- (1) Face countersink (DLE drill is recommended)



- (2) Drill the guide hole to a depth of approx. 3D (DVAS drill is recommended)



- (3) Drill the deep hole using DVAS  X50S040.



### Tool rotation method: Machining centres, composite machines, etc.

- (1) Drill the guide hole to a depth of approx. 3D (DVAS drill is recommended)



- (2) Drill the guide hole deeper to a approx. 7D

If more stability is required, drill a guide hole deeper than 7D.



- (3) Drill the deep hole using DVAS  X50S040.



## Cutting Example

### Comparison of Drilling Efficiency on Automatic Lathe

Drilling efficiency is 10 times higher compared to gun drills.

It provides highly efficient and stable machining even with alloy steels and stainless steels.

### Drilling for SCM435

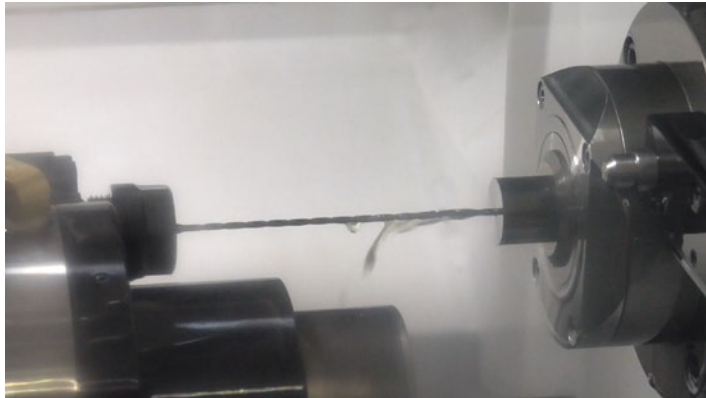
#### General Cutting Conditions for Gun Drills

<Cutting Conditions>

Tool : DC=ø2mm, L/D=50  
Cutting Speed : vc= 50m/min  
Feed per Rev. : fr= 0.007 mm/rev.  
Hole Depth : 100mm  
Cutting Mode : Wet Cutting, Oil, 15MPa

**Cutting Time 107.8 sec./hole**

#### DVAS Drill Turning Video



#### DVAS Cutting Conditions

<Cutting Conditions>

Tool : DC=ø2mm, L/D=50  
Cutting Speed : vc= 50m/min  
Feed per Rev. : fr= 0.07 mm/rev.  
Hole Depth : 100mm  
Cutting Mode : Wet Cutting, Oil, 15MPa

**Cutting Time 10.8 sec./hole**



YouTube

### Drilling for SUS304

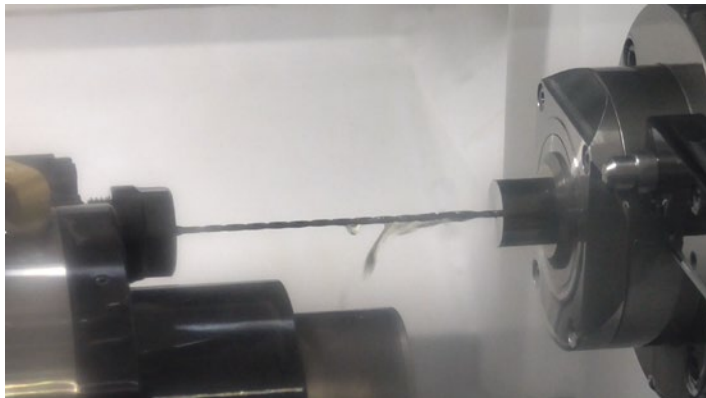
#### General Cutting Conditions for Gun Drills

<Cutting Conditions>

Tool : DC=ø2mm, L/D=50  
Cutting Speed : vc= 40m/min  
Feed per Rev. : fr= 0.005 mm/rev.  
Hole Depth : 100mm  
Cutting Mode : Wet Cutting, Oil, 15MPa

**Cutting Time 188.4 sec./hole**

#### DVAS Drill Turning Video



#### DVAS Cutting Conditions

<Cutting Conditions>

Tool : DC=ø2mm, L/D=50  
Cutting Speed : vc= 40m/min  
Feed per Rev. : fr= 0.05 mm/rev.  
Hole Depth : 100mm  
Cutting Mode : Wet Cutting, Oil, 15MPa

**Cutting Time 18.8 sec./hole**



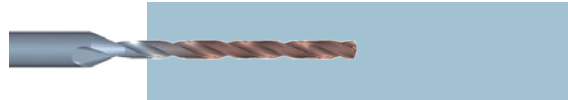
YouTube

## Example of Improved Drilling Efficiency on Automatic Lathe

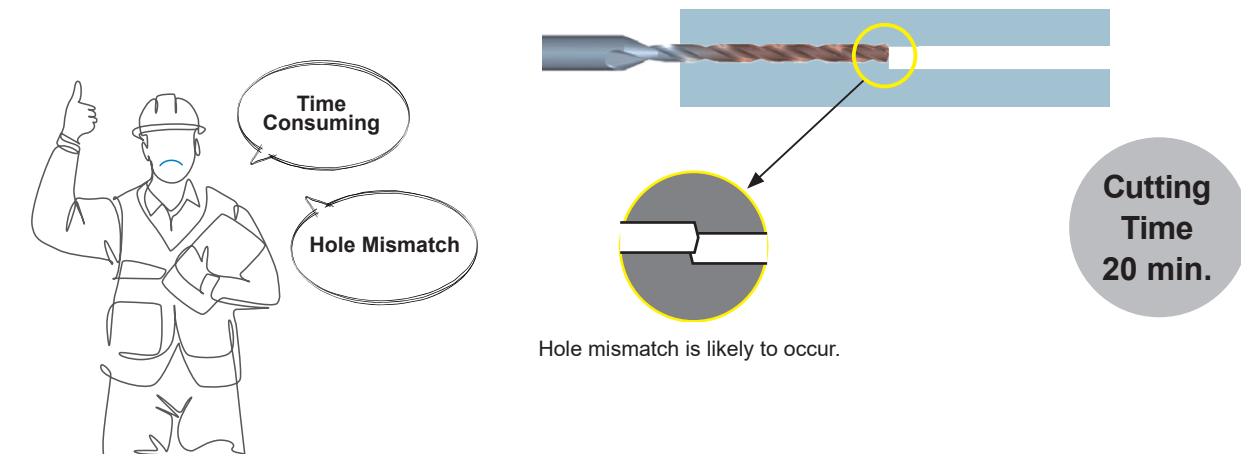
**DVAS** significantly reduces cycle times and ensures consistent drilling.

### Drilling process of Both ends machining

First step: One side drilled with blind hole.

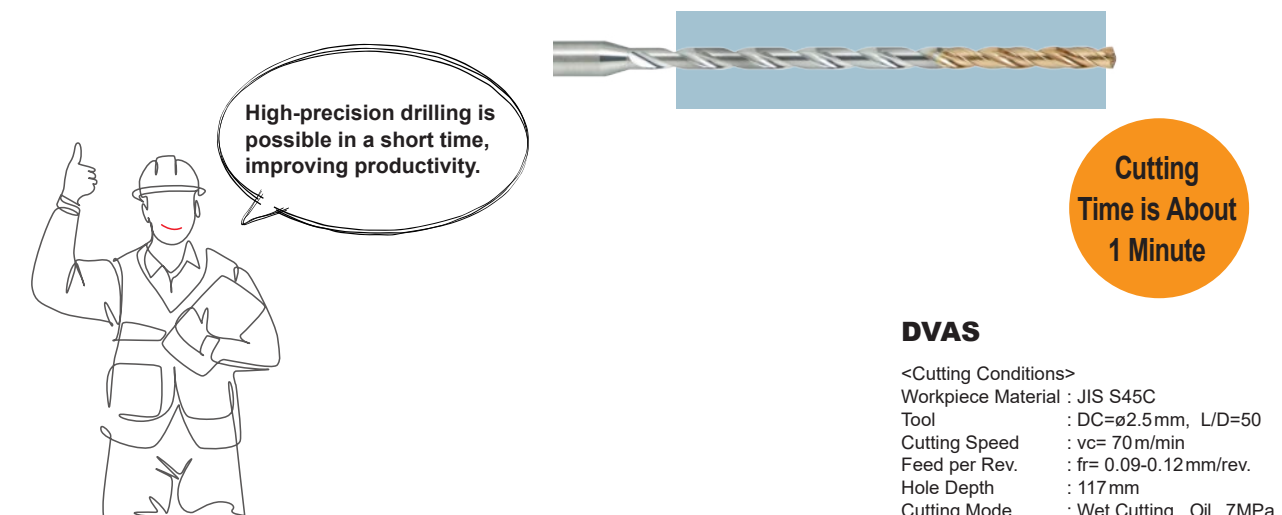


Second step: Workpiece is inverted for a through hole.



### Drilling Process with **DVAS** drill

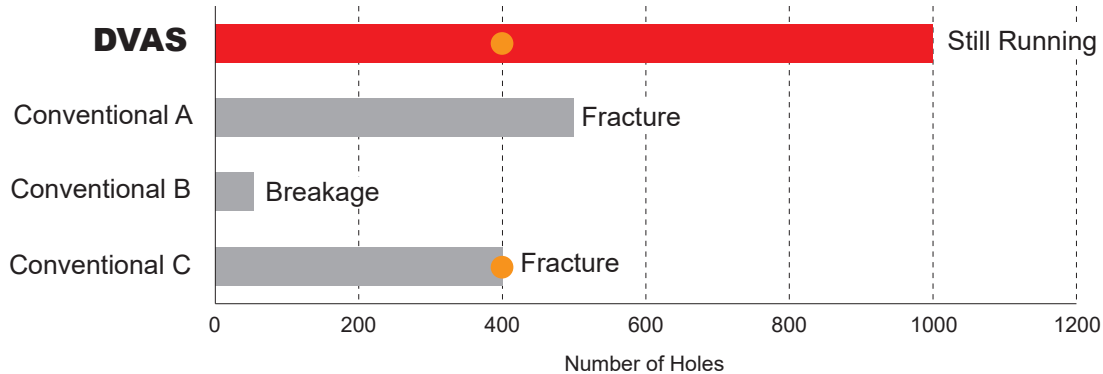
First step: Drilling a through hole from one side at a time.



## Cutting Performance

### SCM440 Comparison of Fracture Resistance

**DVAS** has excellent fracture resistance and double tool life compared to conventional products.



After 400 Holes



**DVAS**

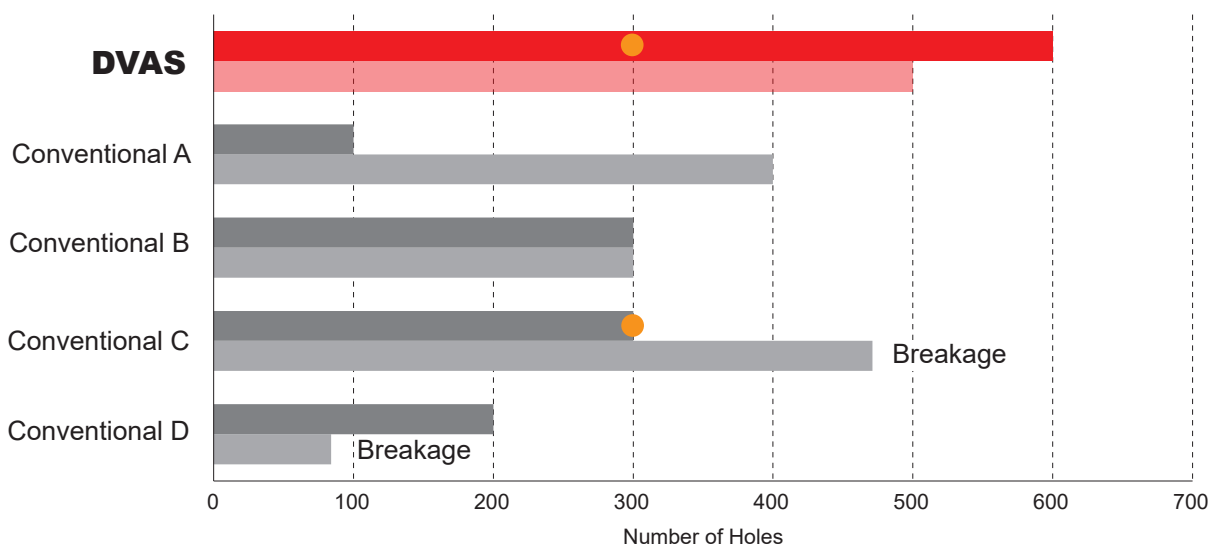


Conventional C

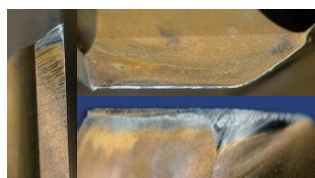
<Cutting Conditions>  
 Workpiece Material : JIS SCM440  
 Tool : DC=ø2mm, L/D=20  
 Cutting Speed : vc= 50m/min  
 Feed per Rev. : fr= 0.06mm/rev.  
 Hole Depth : 40mm  
 Cutting Mode : Wet Cutting  
 Water-soluble Coolants, 2MPa  
 Pilot Drills : DC=ø2mm L/D=2  
 Hole Depth 4mm/holes

### SCM440 Comparison of Fracture Resistance in High-efficiency Cutting

**DVAS** drill is highly stable even under high-efficiency cutting conditions.



After 300 Holes



**DVAS**



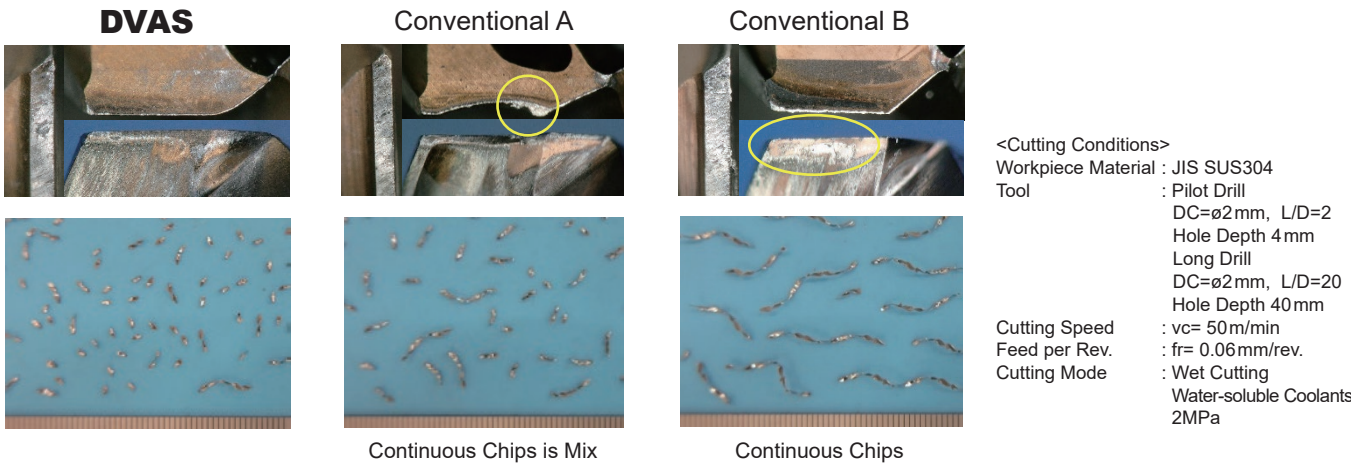
Conventional C

<Cutting Conditions>  
 Workpiece Material : JIS SCM440  
 Tool : DC=ø2mm, L/D=20  
 Cutting Speed : vc= 70m/min  
 Feed per Rev. : fr= 0.07mm/rev.  
 Hole Depth : 40mm  
 Cutting Mode : Wet Cutting  
 Water-soluble Coolants, 2MPa  
 Pilot Drills : DC=ø2mm, L/D=2  
 Hole Depth 4mm/holes

## SUS304 Comparison of Welding Resistance and Chip Disposal under High-efficiency Cutting

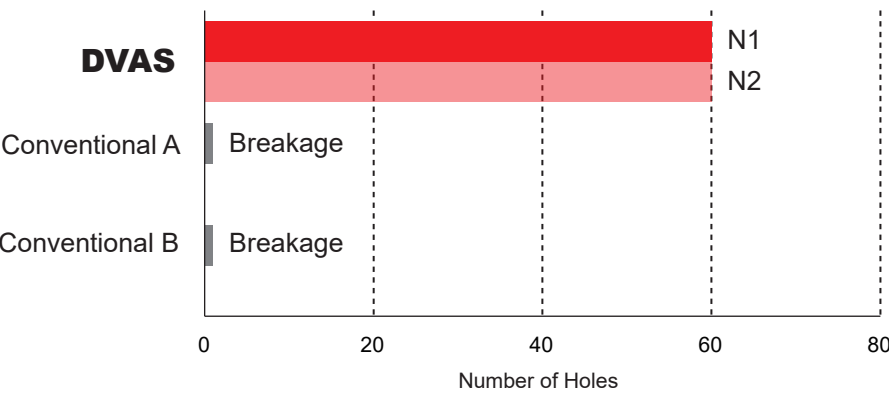
It achieves excellent welding resistance and chip control for drilling stainless steels.

After 1200 Holes

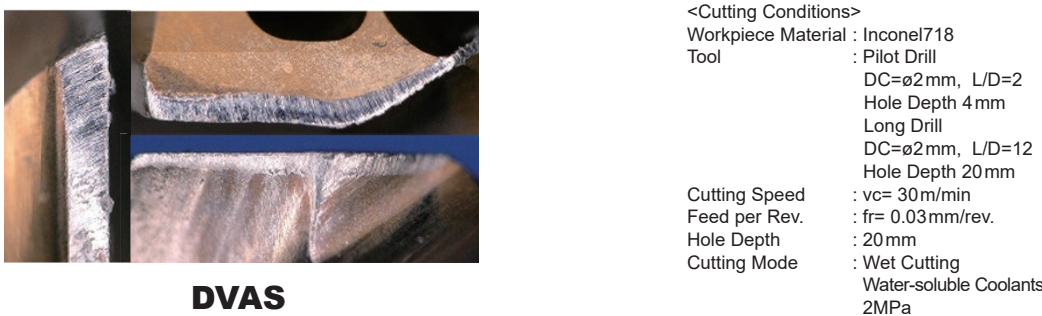


## Inconel718 Comparison of Breakage Resistance

Increased coolant discharge rate achieves stable machining of heat-resistant alloys as compared to conventional products.



After 60 Holes

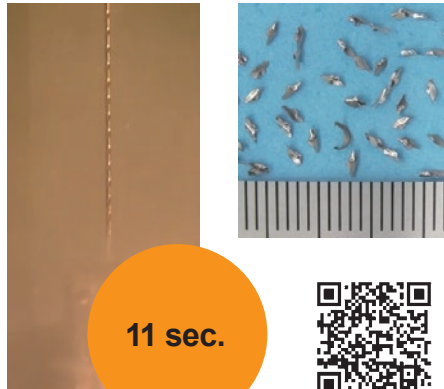


## Cutting Performance

### SUS304 L/D =50 High-efficiency Cutting Example

Achieves excellent chip disposal and high efficiency in deep hole drilling of stainless steels.

Cutting Speed :  $vc= 60\text{m/min}$   
Feed per Rev. :  $fr= 0.05\text{mm/rev.}$

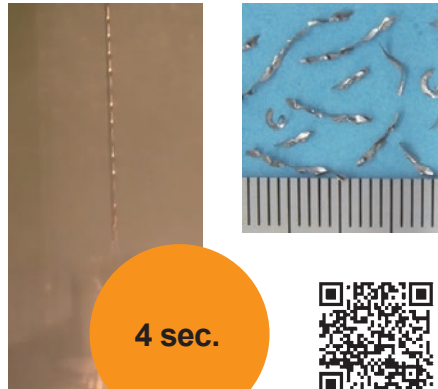


11 sec.



YouTube

Cutting Speed :  $vc= 100\text{m/min}$   
Feed per Rev. :  $fr= 0.08\text{mm/rev.}$



4 sec.



YouTube

<Cutting Conditions>

Workpiece Material : JIS SUS304

Tool : Pilot Drill

DC=ø2mm, L/D=2

Hole Depth 6mm

Short Drill

DC=ø2mm, L/D=7

Hole Depth 14mm

Long Drill

DC=ø2mm, L/D=12

Hole Depth 100mm

Cutting Mode

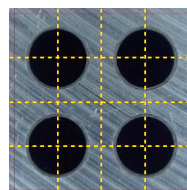
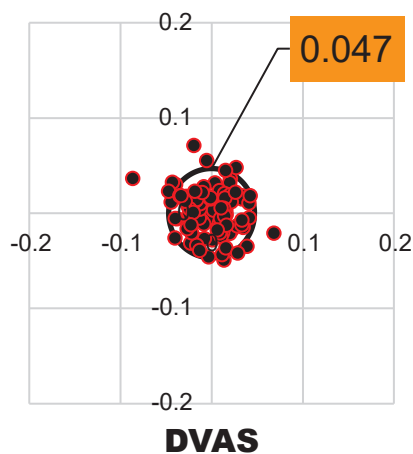
: Wet Cutting

Water-soluble Coolants

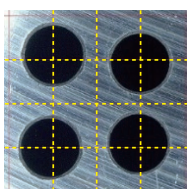
7Mpa

### SCM440 L/D=40 Comparison of True Straightness

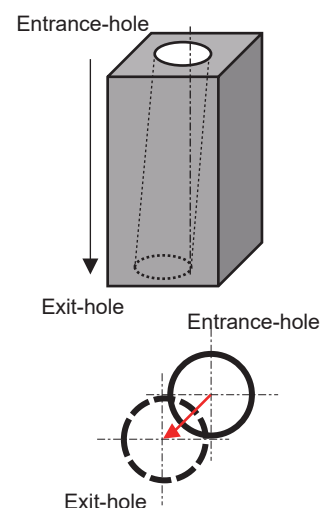
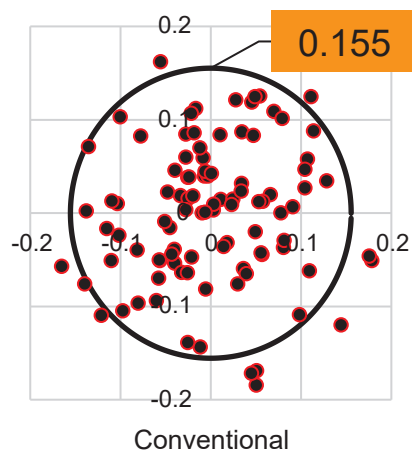
Hole wandering is greatly reduced when compared to conventional products.



**DVAS**



Conventional



<Cutting Conditions>

Workpiece Material : JIS SCM440

Tool : Pilot Drill

DC=ø2mm, L/D=2

Hole Depth 6mm

Long Drill

DC=ø2mm, L/D=40

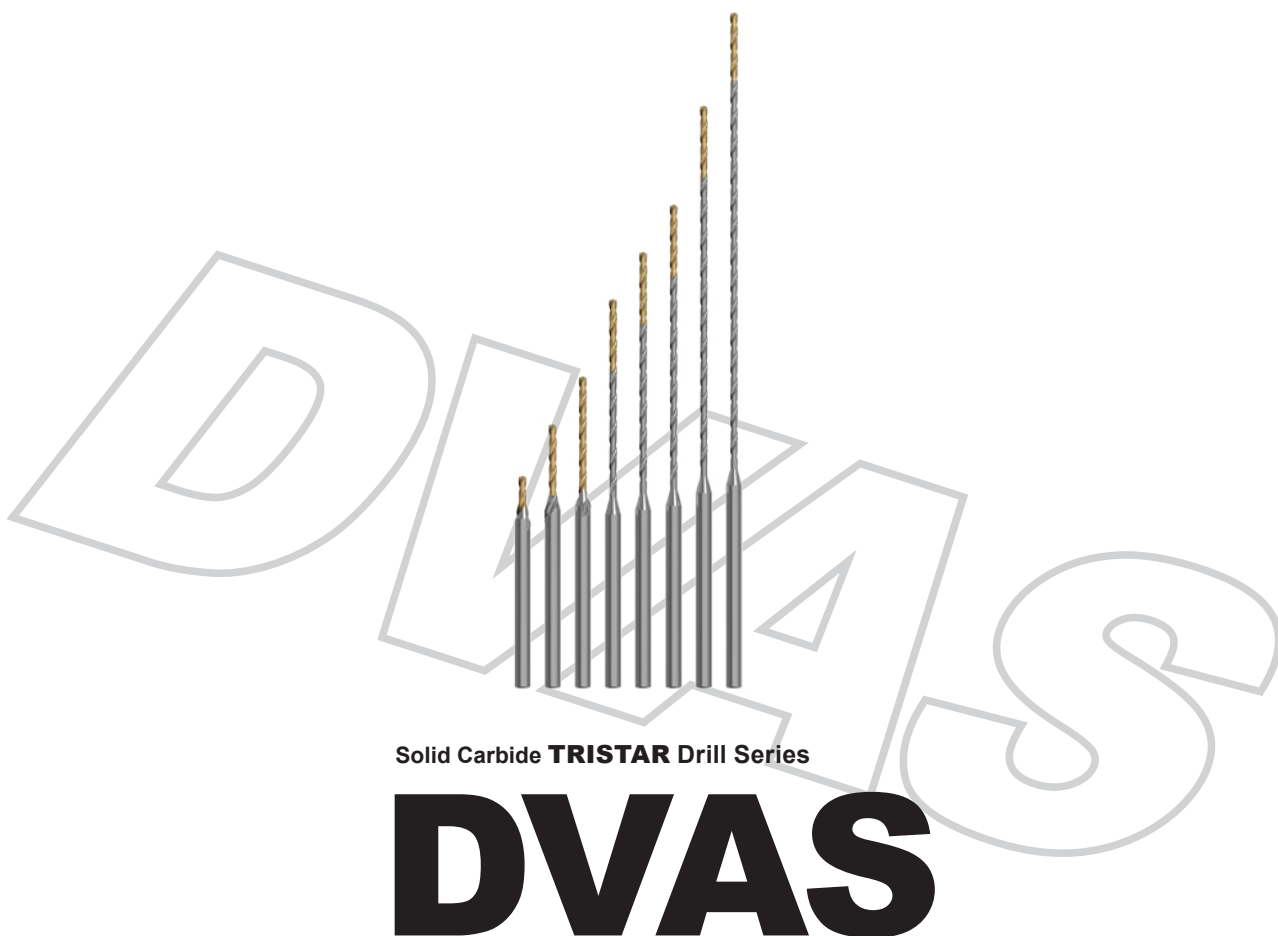
Hole Depth 80mm

Feed per Rev.:  $fr= 0.07\text{mm/rev.}$

Cutting Mode : Wet Cutting

Water-soluble Coolants, 7Mpa

[illegible]



Solid Carbide **TRISTAR** Drill Series

# DVAS

**For Your Safety**

●Don't handle inserts and chips without gloves. ●Please machine within the recommended application range and exchange expired tools with new ones in advance of breakage. ●Please use safety covers and wear safety glasses. ●When using compounded cutting oils, please take fire precautions. ●When using rotating tools, please make a trial run to check run-out, vibration and abnormal sounds etc. ●Grinding or heating of cutting tools produces dust and mist. Inhaling large amount of dust or contacting with eyes and skins may harm your body.

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(Tools specifications subject to change without notice.)

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