



## Guidance

|                                                    |       |
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| ■ Designation system for TAC Drilling Inserts..... | 11-24 |
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# 11 Drilling Tools

## Products

### ■ Indexable drills

|                                        |                  |               |       |
|----------------------------------------|------------------|---------------|-------|
| ● TungdrillTwisted                     | L/D = 2, 3, 4, 5 | ø12.5 ~ ø54.0 | 11-8  |
| ● TungDrillBig                         | L/D = 2.5        | ø55.0 ~ ø80.0 | 11-12 |
| ● TAC inserts for TungDrill            |                  |               | 11-13 |
| ● TungSix-Drill                        | L/D = 2, 3       | ø28.0 ~ ø54.0 | 11-16 |
| ● TungHold tooling system: TungBore    |                  |               | 11-19 |
| ● Chamfering ring for indexable drills |                  |               | 11-20 |
| ● EZ Sleeve                            |                  |               | 11-22 |

|                        |       |
|------------------------|-------|
| ■ TAC Drilling inserts | 11-26 |
|------------------------|-------|

### ■ Indexable head drills

|                                    |         |               |       |
|------------------------------------|---------|---------------|-------|
| ● DrillMeister                     | L/D = 3 | ø10.0 ~ ø19.5 | 11-28 |
| ● Chamfering ring for DrillMeister |         |               | 11-29 |

### ■ Solid drills

|                      |                 |              |       |
|----------------------|-----------------|--------------|-------|
| ● DSW SoridDrill     | L/D = 3, 5, 8   | ø3.0 ~ ø16.0 | 11-32 |
| ● DSX GigaJetDrills  | L/D = 3, 5, 8   | ø3.0 ~ ø20.0 | 11-40 |
| ● DSM GigaMiniDrills | L/D = 5, 10, 15 | ø0.1 ~ ø3.0  | 11-45 |

### ■ Gun drills

|                                                              |       |
|--------------------------------------------------------------|-------|
| ● TungGun / For deep hole drilling indexable head gun drills | 11-48 |
|--------------------------------------------------------------|-------|

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# List of Drilling Tools

Notes : • Shaded bands in drill diameter ranges show stocked ranges.  
• White bands in drill diameter ranges show unstocked ranges.

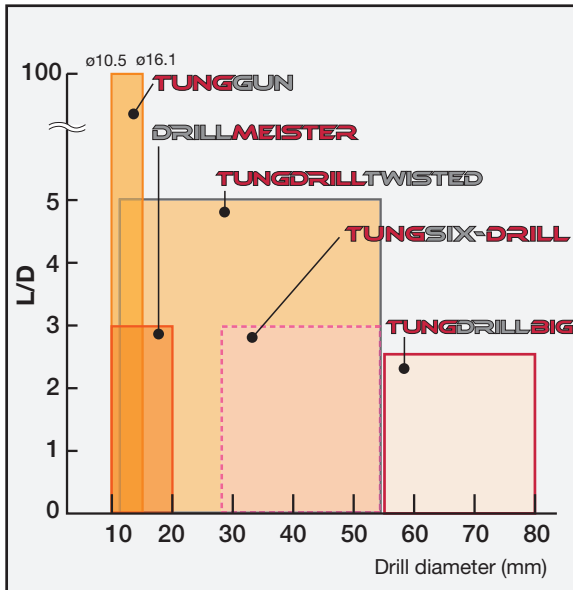
| Operation          | Tool name                                                           | Type                       | Appearance                                                                                                    | Work materials |        |                      |                  |                            |            |                    |                  |                    |          | Machinable<br>L/D ratio | Drill diameter range (mm) |                                                                                       |     |     |    |    |    |    |    |     |       |                                                                                       |                                                                                     |     |
|--------------------|---------------------------------------------------------------------|----------------------------|---------------------------------------------------------------------------------------------------------------|----------------|--------|----------------------|------------------|----------------------------|------------|--------------------|------------------|--------------------|----------|-------------------------|---------------------------|---------------------------------------------------------------------------------------|-----|-----|----|----|----|----|----|-----|-------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-----|
|                    |                                                                     |                            |                                                                                                               | Mild steels    | Steels | High hardened steels | Stainless steels | Difficult-to-cut Materials | Cast irons | Ductile cast irons | Aluminium alloys | Non-ferrous metals | 0.4      |                         | 1.0                       | 2.0                                                                                   | 3.0 | 5.0 | 10 | 15 | 20 | 30 | 50 | 100 |       |                                                                                       |                                                                                     |     |
| General drilling   | Large diameter TAC drills                                           | <b>NEW</b><br><b>TDX</b>   | <b>TUNGDRILL TWISTED</b><br> | ○              | ○      | ○                    | ○                | ○                          | ○          | ○                  | ○                | ○                  | 2,3, 4,5 |                         |                           |                                                                                       |     |     |    |    |    |    |    |     | ø12.5 |    | ø54                                                                                 |     |
|                    | Indexable large diameter drill with cartridge                       | <b>NEW</b><br><b>TDX</b>   | <b>TUNGDRILL BIG</b><br>     | ○              | ○      | ○                    | ○                | ○                          | ○          | ○                  | ○                | ○                  | 2.5      |                         |                           |                                                                                       |     |     |    |    |    |    |    |     |       | ø55                                                                                   |  | ø80 |
|                    | Large diameter TAC drills                                           | <b>NEW</b><br><b>TDS</b>   | <b>TUNG SIX-DRILL</b><br>    | ○              | ○      | ○                    | ○                | ○                          | ○          | ○                  | ○                | ○                  | 2,3      |                         |                           |                                                                                       |     |     |    |    |    |    |    |     | ø28   |    | ø54                                                                                 |     |
|                    | Indexable head drills                                               | <b>NEW</b><br><b>TIDC</b>  | <b>DRILLMEISTER</b><br>      | ○              | ○      | ○                    | ○                | ○                          | ○          | ○                  | ○                | ○                  | 3        |                         |                           |                                                                                       |     |     |    |    |    |    |    |     | ø10.3 |    | ø19.5                                                                               |     |
|                    | Coated or uncoated solid carbide drills for small diameter drilling | <b>NEW</b><br><b>DSW</b>   | <b>SOLIDDRILL</b><br>      | ○              | ○      | ○                    | ○                | ○                          | ○          | ○                  | ○                | ○                  | 3,5, 8   |                         |                           |                                                                                       |     |     |    |    |    |    |    |     | ø3.0  |  | ø16                                                                                 |     |
|                    | For Steels Giga Mini Drills                                         | <b>DSM</b>                 |                            | ○              | ○      | ○                    | ○                | ○                          | ○          | ○                  | ○                | ○                  | 5, 10    |                         | ø0.1                      |  |     |     |    |    |    |    |    |     |       | ø3.0                                                                                  |                                                                                     |     |
| Deep hole drilling | Indexable head gun drills                                           | <b>NEW</b><br><b>GNSTG</b> | <b>TUNG GUN</b><br>        | ○              | ○      | ○                    | ○                | ○                          | ○          | ○                  | ○                | ○                  | ※        |                         |                           |                                                                                       |     |     |    |    |    |    |    |     | ø10.5 |  | ø16.1                                                                               |     |

|  | Type                                                        | Type of coolant supply | IT class | Attainable surface roughness (RzJIS) | Features                                                                                                                                                                                                                                                                          | Page  |
|--|-------------------------------------------------------------|------------------------|----------|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
|  | <small>TUNGDRILLTWISTED</small><br><b>NEW</b><br><b>TDX</b> | Internal               | 11 ~     | 12 ~                                 | <ul style="list-style-type: none"> <li>• Indexable insert type drills</li> <li>• Four corner insert design for economical drilling</li> <li>• Excellent chip evacuation</li> </ul>                                                                                                | 11-8  |
|  | <small>TUNGDRILLSIG</small><br><b>NEW</b><br><b>TDX</b>     | Internal               | 11 ~     | 12 ~                                 | <ul style="list-style-type: none"> <li>• Indexable large diameter drill with cartridge. Highly rigid body provides stable machining. Cartridge protects the drill body from damage and prolongs the tool life. Drill diameter can be adjusted by using setting plates.</li> </ul> | 11-12 |
|  | <small>TUNGDRILLDRILL</small><br><b>NEW</b><br><b>TDS</b>   | Internal               | 11 ~     | 12 ~                                 | <ul style="list-style-type: none"> <li>• Indexable drill with 6 cornered insert offers high economical advantage.</li> <li>• New insert grade with improved adhesion and chipping resistance demonstrates stable and long tool life.</li> </ul>                                   | 11-16 |
|  | <small>DRILLMASTER</small><br><b>NEW</b><br><b>TIDC</b>     | Internal               | 9 ~ 10   | 6.3 ~ 25                             | <ul style="list-style-type: none"> <li>• Head indexable drill. High reliable clamping system provides secure head clamp and easy operation. Unique designed cutting edges and rigid body offers stable drilling.</li> </ul>                                                       | 11-28 |
|  | <small>SOLIDDRILL</small><br><b>NEW</b><br><b>DSW</b>       | Internal<br>External   | 9 ~ 10   | 6.3 ~ 25                             | <ul style="list-style-type: none"> <li>• Highly versatile coated solid carbide drill.</li> <li>• Newly developed grade and cutting edge shape provides excellent chip control and long tool life due to wear and fracture resistance.</li> </ul>                                  | 11-32 |
|  | <b>DSM</b>                                                  | External               | 9 ~ 10   | —                                    | <ul style="list-style-type: none"> <li>• Coated solid drills with ø3 mm shank.</li> <li>• Applicable for very small diameter drilling from ø0.1 mm</li> </ul>                                                                                                                     | 11-45 |
|  | <small>TUNGDRILL</small><br><b>NEW</b><br><b>GNSTG</b>      | Internal               | 8 ~ 9    | 6.3 ~ 25                             | <ul style="list-style-type: none"> <li>• Head indexable GunDrill</li> <li>• Unique clamping system allows easy operation on the machine and significantly reduces tool changing time.</li> </ul>                                                                                  | 11-48 |

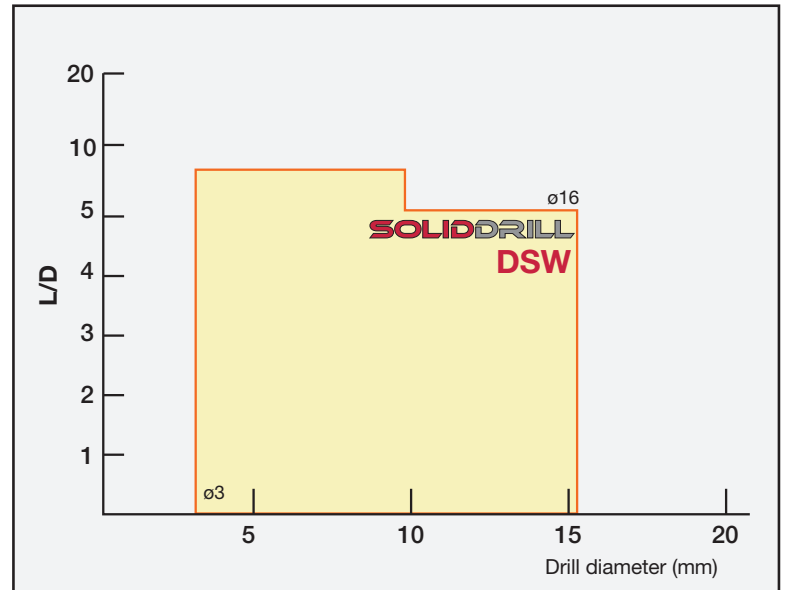
# Basic Selection of Drilling Tools

## Application ranges of drilling tools

Indexable drill



Solid drill, Brazed carbide drills



## Large diameter drilling

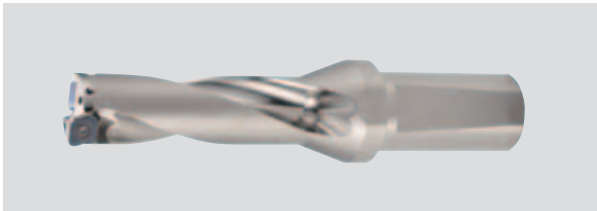
**TUNGDRILLTWISTED**

11-8

Applicable work materials



**NEW TDX**



| Structure           | Coolant supply method | Coating        | Helix angle | Shank                                            | Point angle |
|---------------------|-----------------------|----------------|-------------|--------------------------------------------------|-------------|
| Indexable           | Internal              | ○              | —           | —                                                | —           |
| Hole depth          |                       | Drill diameter |             | Approximate accuracy                             |             |
| < 5 x tool diameter |                       | ø12.5 ~ ø54.0  |             | Hole diameter (IT) 11~<br>Roughness (RzJIS): 12~ |             |

● **Stabilization of spindle power**  
New TDX type

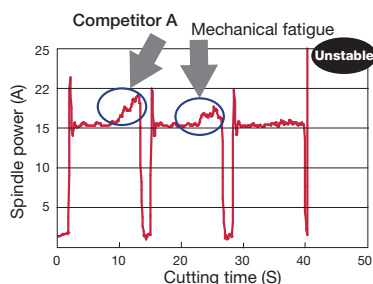
### Features

**Excellent surface finish and stable chip evacuation with newly developed drill body!**

- Highly economic = TDX concept.
- Excellent chip evacuation!
- Applicable to various machining applications.
- Ideally-balanced with a strong and rigid design = TDX concept.
- Improved drilling durability!

**The new AH725 PVD coated grade now offers new chipbreakers! PREMIUMTEC**

- Flat and smooth coated surface by adopting "Triple Force Technology".
- Significantly improved resistance to chip welding and insert edge chipping.



Workpiece : SCM440 (JIS)  
Drill : ø22 mm,  
L/D = 3  
Cutting speed :  $V_c = 180$  m/min  
Feed :  $f = 0.13$  mm/rev  
Drilling depth : 3D (Blind)  
Machine : Vertical machining center  
Cutting fluid : Water soluble type



## Large diameter drilling

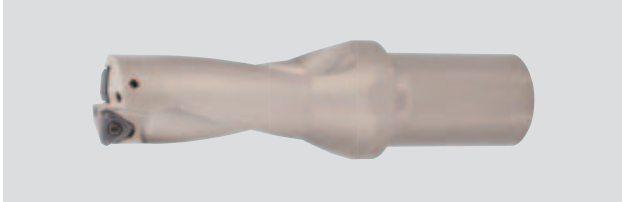
### TUNG SIX-DRILL

11-16

Applicable work materials



NEW TDS



#### Features

##### The only drill available with 6 cornered inserts

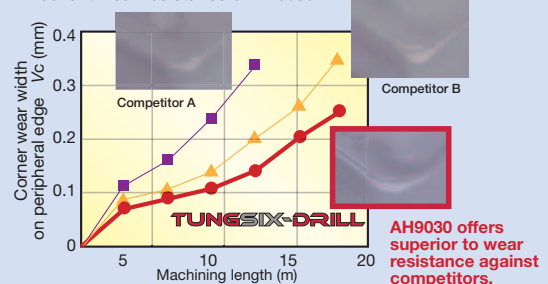
- 6 cornered insert provides economical advantage.
- Only one type of insert is required for peripheral and central edge.
- Enhanced corner shape on central insert edge allows incredible fracture resistance.
- Newly designed insert pocket prevents incorrect insert clamping

##### New PVD coated AH9030 grade with PremiumTec

- Special surface technology "PremiumTec" is applied
- Significantly improved adhesion and chipping resistance
- DJ chipbreaker can be applied for improved versatility and reduced cutting forces

| Structure           | Coolant supply method | Coating        | Helix angle | Shank                                            | Point angle |
|---------------------|-----------------------|----------------|-------------|--------------------------------------------------|-------------|
| Indexable           | External              | ○              | —           | Same as drill dia.                               | —           |
| Hole depth          |                       | Drill diameter |             | Approximate accuracy                             |             |
| < 3 x tool diameter |                       | ø28 ~ ø54      |             | Hole diameter (IT) 11~<br>Roughness (RzJIS): 12~ |             |

##### ■ Excellent wear resistance of AH9030



|               |                     |               |                         |
|---------------|---------------------|---------------|-------------------------|
| Drill         | : TDS280W32-3       | Feed          | : $f = 0.1$ mm/rev      |
| Insert        | : WWMU08X408R-DJ    | Hole diameter | : ø28 mm                |
| Grade         | : AH9030            | Hole depth    | : H = 84 mm             |
| Work material | : S55C / C55        | Machine       | : Horizontal M/C, BT40  |
| Cutting speed | : $V_c = 140$ m/min | Coolant       | : Wet (Internal supply) |

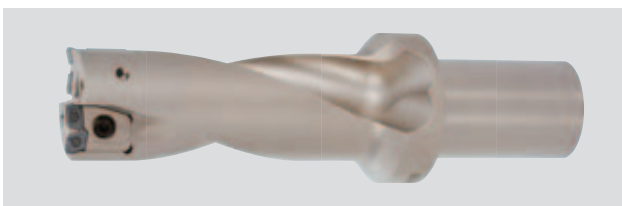
### TUNG DRILL BIG

11-12

Applicable work materials



NEW TDX



#### Features

##### Adjustable large diameter drill with cartridge

- Drill diameter can be adjusted by changing setting plates.
- The same inserts as the TungdrillTwisted can be used. This simplifies inventory control.
- By exchanging cartridges, the drill body maintains a long tool life even if the insert seat is damaged.

##### Highly rigid body and optimized insert position

- Provides well balanced cutting forces and stable machining conditions for highly accurate hole making.
- Creates small chips and allows excellent chip evacuation.

| Structure           | Coolant supply method | Coating        | Helix angle | Shank                                            | Point angle |
|---------------------|-----------------------|----------------|-------------|--------------------------------------------------|-------------|
| Indexable           | External              | ○              | —           | Same drill dia.                                  | —           |
| Hole depth          |                       | Drill diameter |             | Approximate accuracy                             |             |
| < 3 x tool diameter |                       | ø55 ~ ø80      |             | Hole diameter (IT) 11~<br>Roughness (RzJIS): 12~ |             |

##### Chip control

Chips are well controlled and shortened.

| Tool diameter<br>øDc (mm) | ø57 (without setting plate)                                                         |                                                                                       | ø62 (with setting plate)                                                              |                                                                                       |
|---------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                           | Feed<br>f (mm/rev)                                                                  | 0.08                                                                                  | 0.13                                                                                  | 0.08                                                                                  |
| SCM440                    |  |  |  |  |
| S45C                      |  |  |  |  |

► No chip control difference with or without setting plates. This ensures stable machining in each diameter range.

|         |                      |               |                     |
|---------|----------------------|---------------|---------------------|
| Drill   | : TDX57-62F50-2.5    | Cutting speed | : $V_c = 160$ m/min |
| Insert  | : XPMT08T308R-DJ     | Hole depth    | : H = 70 mm         |
| Grade   | : AH725              | Coolant       | : Wet (Internal)    |
| Machine | : Vertical M/C, BT50 |               |                     |

11

Drilling Tools

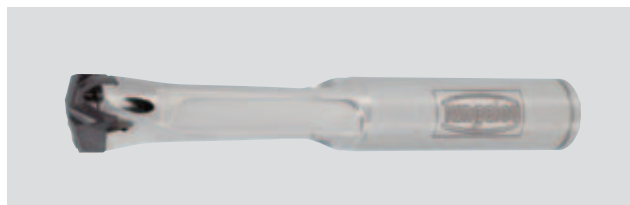
# Basic Selection of Drilling Tools



## General drilling

**DRILLMEISTER** 11-28

**NEW** TIDC + DMP



### Features

#### Clamping system for secure and easy operation

- Drill head can be changed easily even on the machine.
- High clamping force and accurate clamp system provides stable machining.

With exclusive chamfering adaptor, DrillMeister allows both drilling and chamfering in one operation.

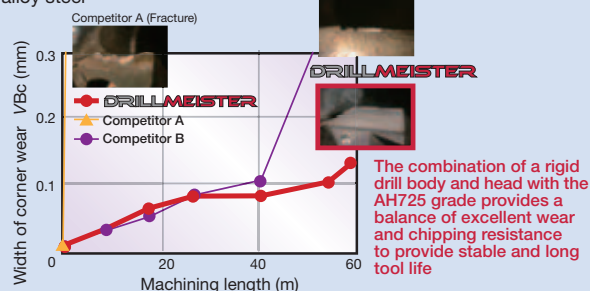
- 3 kinds of chamfering angle can be selected and the chamfering adaptor is freely adjustable.

Applicable work materials

**P** **M** **K** **N** **S**  
Steel Stainless Cast Iron Non-ferrous Superalloys

| Structure           | Coolant supply method | Coating        | Helix angle | Shank                                                    | Point angle |
|---------------------|-----------------------|----------------|-------------|----------------------------------------------------------|-------------|
| Indexable           | Internal              | ○              | -           | 10, 12, 14, 15, 17, 19                                   | 140°        |
| Hole depth          |                       | Drill diameter |             | Approximate accuracy                                     |             |
| < 3 x tool diameter |                       | ø10.3 ~ ø19.5  |             | Hole diameter (IT) 9 ~ 10<br>Roughness (RzJIS): 6.3 ~ 25 |             |

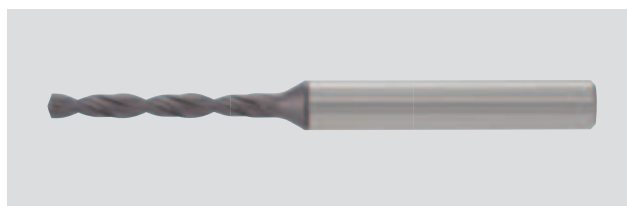
■ Comparison of tool life when drilling alloy steel



Drill diameter : øDc = ø12 mm  
Work material : SCM440  
Cutting speed : Vc = 100 m/min  
Feed : f = 0.25 mm/rev  
Hole depth : H = 36 mm (blind hole)  
Coolant : Wet  
Machine : Vertical M/C

**SOLIDDRILL** 11-32

**NEW** DSW



### Features

#### The newly developed cutting edge with a new PVD grade delivers high wear resistance

- Allows stable and long tool life for a wide range of work materials.
- Improved adhesion strength of coating layer prevents the edge from chipping

The newly developed flute breaks chips into smaller pieces, resulting in excellent chip control

Worldwide standard shank style - Standardized with DIN6535-Form HA

- Only 6 sizes of shank diameter available, - ø6, ø8, ø10, ø12, ø14, ø16 mm.
- This reduces the number of collets required.

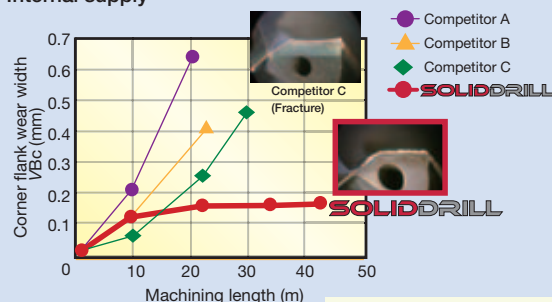
Applicable work materials

**P** **M** **K** **N** **H**  
Steel Stainless Cast Iron Non-ferrous Hard Materials

| Structure           | Coolant supply method | Coating        | Helix angle | Shank                                                    | Point angle |
|---------------------|-----------------------|----------------|-------------|----------------------------------------------------------|-------------|
| Solid               | Internal              | ○              | -           | 6, 8, 10, 12, 14, 16                                     | 140°        |
| Hole depth          |                       | Drill diameter |             | Approximate accuracy                                     |             |
| < 3 x tool diameter |                       | ø3.0 ~ ø16.0   |             | Hole diameter (IT) 9 ~ 10<br>Roughness (RzJIS): 6.3 ~ 25 |             |

#### Drilling of carbon steel, S45C / C45 (220HB)

■ Internal supply



Excellent adhesion strength reduces sudden chipping on the corner and decreases flank wear. The adhesion strength of the coating is essential when drilling carbon steel.

Drill : øDc = ø8 mm  
Cutting speed : Vc = 80 m/min  
Feed : f = 0.2 mm/rev  
Drilling depth : H = 40 mm (Blind)  
Coolant : Wet  
Machine : Vertical M/C

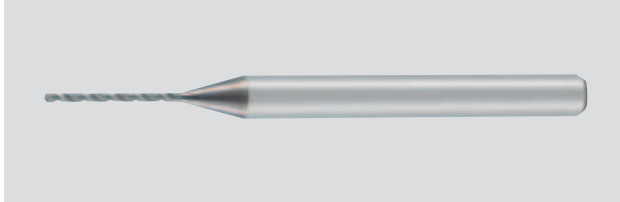


## Small diameter drilling

**DSM**

▶ 11-45

### Giga Mini Drills



#### Features

##### Highly tough tool material and rigid tool geometry

- Allows stable drilling for extra small diameter ( $\phi 0.1$  to  $\phi 3.0$  mm) where tool breakage is likely to occur.
- Web thinning in spite of small diameter drills assures accurate hole positioning.

##### Dedicated coating for small diameter drilling

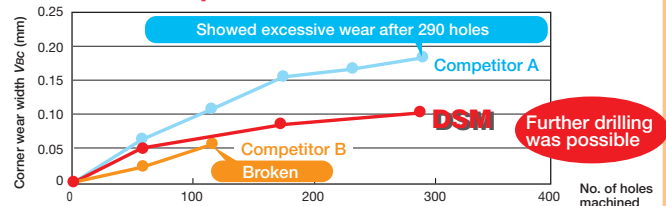
- Machinable number of holes is 1.5 to 2 times higher than competitor drills.
- Tool life improvements when machining stainless steel and Kovar.

Applicable work materials



| Structure              | Coolant supply method | Coating                    | Helix angle | Shank                   | Point angle |
|------------------------|-----------------------|----------------------------|-------------|-------------------------|-------------|
| Solid                  | External              | ○                          | 30°         | 3 mm                    | 140°        |
| Hole depth             |                       | Drill diameter             |             | Approximate accuracy    |             |
| < 3-15 X tool diameter |                       | $\phi 0.10 \sim \phi 3.00$ |             | Hole diameter (IT) 9-10 |             |

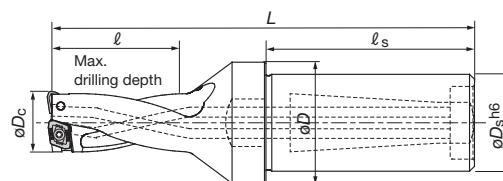
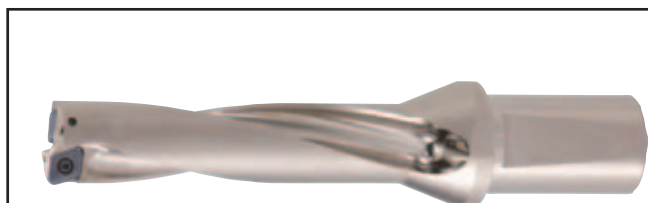
#### ● Tool life comparison



##### ● Cutting conditions

|                                         |                                     |
|-----------------------------------------|-------------------------------------|
| Drill diameter : $\phi 3.0$ mm          | Cutting speed : $V_c = 52$ m/min    |
| Work material : Carbon steel (JIS S45C) | Feed : $f = 0.06$ mm/rev            |
| Machine : Vertical machining center     | Step length : 0.75 mm               |
| Coolant : Water soluble type            | Drilling depth : 15 mm (blind hole) |

**The DSM drill showed less wear and could continue further drilling.**



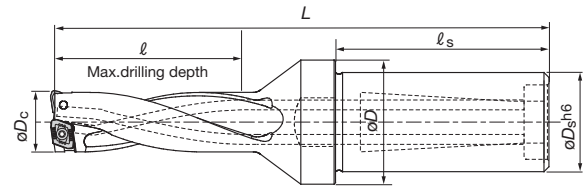
Please take note that the new TDX type differs from the older TDX type in the total length (L) of drill.

**L/D = 2**

| Drill dia.<br>$\phi D_c$ | Cat. No.    | Stock | Dimensions (mm) |          |     |       |       | Max<br>offset | Applicable inserts | Clamping screw<br> | Torx driver<br> |
|--------------------------|-------------|-------|-----------------|----------|-----|-------|-------|---------------|--------------------|--------------------|-----------------|
|                          |             |       | $\phi D_s$      | $\phi D$ | $l$ | $l_s$ | $L$   |               |                    |                    |                 |
| 12.5                     | TDX125W20-2 | ●     | 20              | 25       | 25  | 43    | 87.5  | 0.8           | XPMT040104R-D*     | CSTB-2             | T-6D            |
| 13.0                     | TDX130W20-2 | ●     |                 |          | 26  |       | 89.0  | 0.7           |                    |                    |                 |
| 13.5                     | TDX135W20-2 | ●     |                 |          | 27  |       | 90.5  | 0.5           |                    |                    |                 |
| 14.0                     | TDX140W20-2 | ●     |                 |          | 28  |       | 92.0  | 0.4           |                    |                    |                 |
| 14.5                     | TDX145W20-2 | ●     |                 |          | 29  |       | 93.5  | 0.3           |                    |                    |                 |
| 15.0                     | TDX150W20-2 | ●     |                 |          | 30  |       | 95.0  | 0.9           |                    |                    |                 |
| 15.5                     | TDX155W20-2 | ●     |                 |          | 31  |       | 96.5  | 0.8           |                    |                    |                 |
| 16.0                     | TDX160W20-2 | ●     | 20              | 25       | 32  | 43    | 98.0  | 0.6           | XPMT050204R-D*     | CSTB-2L040         | T-6D            |
| 16.5                     | TDX165W20-2 | ●     |                 |          | 33  |       | 99.5  | 0.5           |                    |                    |                 |
| 17.0                     | TDX170W20-2 | ●     |                 |          | 34  |       | 101.0 | 0.4           |                    |                    |                 |
| 17.5                     | TDX175W25-2 | ●     |                 |          | 35  | 50    | 109.5 | 1.2           | XPMT06X308R-D*     | CSTB-2.2R          | T-7D            |
| 18.0                     | TDX180W25-2 | ●     |                 |          | 36  |       | 111.0 | 1.1           |                    |                    |                 |
| 18.5                     | TDX185W25-2 | ●     |                 |          | 37  |       | 112.5 | 0.9           |                    |                    |                 |
| 19.0                     | TDX190W25-2 | ●     |                 |          | 38  |       | 114.0 | 0.8           |                    |                    |                 |
| 19.5                     | TDX195W25-2 | ●     |                 |          | 39  |       | 115.5 | 0.7           |                    |                    |                 |
| 20.0                     | TDX200W25-2 | ●     |                 |          | 40  |       | 117.0 | 0.5           |                    |                    |                 |
| 20.5                     | TDX205W25-2 | ●     |                 |          | 41  |       | 118.5 | 0.4           |                    |                    |                 |
| 21.0                     | TDX210W25-2 | ●     | 25              | 32       | 42  | 50    | 120.0 | 0.3           | XPMT07H308R-D*     | CSTB-2.5           | T-8D            |
| 21.5                     | TDX215W25-2 | ●     |                 |          | 43  |       | 121.5 | 0.2           |                    |                    |                 |
| 22.0                     | TDX220W25-2 | ●     |                 |          | 44  |       | 123.0 | 1.2           |                    |                    |                 |
| 22.5                     | TDX225W25-2 | ●     |                 |          | 45  |       | 124.5 | 1.1           |                    |                    |                 |
| 23.0                     | TDX230W25-2 | ●     |                 |          | 46  | 37    | 126.0 | 0.9           |                    |                    |                 |
| 23.5                     | TDX235W25-2 | ●     |                 |          | 47  |       | 127.5 | 0.8           |                    |                    |                 |
| 24.0                     | TDX240W25-2 | ●     |                 |          | 48  |       | 129.0 | 0.7           |                    |                    |                 |
| 24.5                     | TDX245W25-2 | ●     |                 |          | 49  |       | 130.5 | 0.5           |                    |                    |                 |
| 25.0                     | TDX250W25-2 | ●     |                 |          | 50  |       | 132.0 | 0.4           |                    |                    |                 |
| 25.5                     | TDX255W25-2 | ●     |                 |          | 51  |       | 133.5 | 0.3           |                    |                    |                 |
| 26.0                     | TDX260W25-2 | ●     |                 |          | 52  |       | 135.0 | 0.2           |                    |                    |                 |
| 27.0                     | TDX270W32-2 | ●     | 32              | 40       | 54  | 55    | 143.0 | 1.5           | XPMT08T308R-D*     | CSTB-3             | T-9D            |
| 28.0                     | TDX280W32-2 | ●     |                 |          | 56  |       | 146.0 | 1.2           |                    |                    |                 |
| 29.0                     | TDX290W32-2 | ●     |                 |          | 58  |       | 149.0 | 1.0           |                    |                    |                 |
| 30.0                     | TDX300W32-2 | ●     |                 |          | 60  |       | 152.0 | 0.7           |                    |                    |                 |
| 31.0                     | TDX310W32-2 | ●     |                 |          | 62  |       | 155.0 | 0.4           |                    |                    |                 |
| 32.0                     | TDX320W32-2 | ●     |                 |          | 64  |       | 158.0 | 0.2           |                    |                    |                 |
| 33.0                     | TDX330W40-2 | ●     | 40              | 50       | 66  | 65    | 171.0 | 2.3           | XPMT110412R-D*     | CSTB-4             | T-15D           |
| 34.0                     | TDX340W40-2 | ●     |                 |          | 68  |       | 174.0 | 2.1           |                    |                    |                 |
| 35.0                     | TDX350W40-2 | ●     |                 |          | 70  |       | 177.0 | 1.8           |                    |                    |                 |
| 36.0                     | TDX360W40-2 | ●     |                 |          | 72  |       | 180.0 | 1.5           |                    |                    |                 |
| 37.0                     | TDX370W40-2 | ●     |                 |          | 74  |       | 183.0 | 1.3           |                    |                    |                 |
| 38.0                     | TDX380W40-2 | ●     |                 |          | 76  |       | 186.0 | 1.0           |                    |                    |                 |
| 39.0                     | TDX390W40-2 | ●     |                 |          | 78  |       | 189.0 | 0.7           |                    |                    |                 |
| 40.0                     | TDX400W40-2 | ●     | 40              | 50       | 80  | 65    | 192.0 | 0.5           | XPMT150512R-D*     | CSTB-5             | T-20D           |
| 41.0                     | TDX410W40-2 | ●     |                 |          | 82  |       | 195.0 | 0.2           |                    |                    |                 |
| 42.0                     | TDX420W40-2 | ●     |                 |          | 84  |       | 198.0 | 3.1           |                    |                    |                 |
| 43.0                     | TDX430W40-2 | ●     |                 |          | 86  |       | 201.0 | 2.9           |                    |                    |                 |
| 44.0                     | TDX440W40-2 | ●     |                 |          | 88  |       | 204.0 | 2.6           |                    |                    |                 |
| 45.0                     | TDX450W40-2 | ●     |                 |          | 90  |       | 207.0 | 2.3           |                    |                    |                 |
| 46.0                     | TDX460W40-2 | ●     |                 |          | 92  |       | 210.0 | 2.1           |                    |                    |                 |
| 47.0                     | TDX470W40-2 | ●     | 40              | 55       | 94  |       | 213.0 | 1.8           |                    |                    |                 |
| 48.0                     | TDX480W40-2 | ●     |                 |          | 96  |       | 216.0 | 1.5           |                    |                    |                 |
| 49.0                     | TDX490W40-2 | ●     |                 |          | 98  |       | 219.0 | 1.3           |                    |                    |                 |
| 50.0                     | TDX500W40-2 | ●     |                 |          | 100 |       | 222.0 | 1.0           |                    |                    |                 |
| 51.0                     | TDX510W40-2 | ●     |                 |          | 102 |       | 225.0 | 0.7           |                    |                    |                 |
| 52.0                     | TDX520W40-2 | ●     |                 |          | 104 |       | 228.0 | 0.5           |                    |                    |                 |
| 53.0                     | TDX530W40-2 | ●     |                 |          | 106 |       | 231.0 | -             |                    |                    |                 |
| 54.0                     | TDX540W40-2 | ●     |                 |          | 108 |       | 234.0 | -             |                    |                    |                 |

Note: L/D = Hole depth / Drill diameter

● : Stocked items.



Please take note that new TDX type differs from old TDX type in the total length (L) of drill

**L/D = 3**

| Drill dia.<br>øDc | Cat. No.    | Stock | Dimensions (mm) |    |      |    |     | Max<br>offset | Applicable inserts | Clamping screw<br> | Torx driver<br> |
|-------------------|-------------|-------|-----------------|----|------|----|-----|---------------|--------------------|-------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
|                   |             |       | øDs             | øD | ℓ    | ℓs | L   |               |                    |                                                                                                       |                                                                                                    |
| 12.5              | TDX125W20-3 | ●     | 20              | 25 | 37.5 | 43 | 100 | 0.8           | XPMT040104R-D*     | CSTB-2                                                                                                | T-6D                                                                                               |
| 13.0              | TDX130W20-3 | ●     |                 |    | 39   |    | 102 | 0.7           |                    |                                                                                                       |                                                                                                    |
| 13.5              | TDX135W20-3 | ●     |                 |    | 40.5 |    | 104 | 0.5           |                    |                                                                                                       |                                                                                                    |
| 14.0              | TDX140W20-3 | ●     |                 |    | 42   |    | 106 | 0.4           |                    |                                                                                                       |                                                                                                    |
| 14.5              | TDX145W20-3 | ●     |                 |    | 43.5 |    | 108 | 0.3           |                    |                                                                                                       |                                                                                                    |
| 15.0              | TDX150W20-3 | ●     |                 | 25 | 45   |    | 110 | 0.9           | XPMT050204R-D*     | CSTB-2L040                                                                                            | T-6D                                                                                               |
| 15.5              | TDX155W20-3 | ●     |                 |    | 46.5 |    | 112 | 0.8           |                    |                                                                                                       |                                                                                                    |
| 16.0              | TDX160W20-3 | ●     |                 |    | 48   |    | 114 | 0.6           |                    |                                                                                                       |                                                                                                    |
| 16.5              | TDX165W20-3 | ●     |                 |    | 49.5 |    | 116 | 0.5           |                    |                                                                                                       |                                                                                                    |
| 17.0              | TDX170W20-3 | ●     |                 |    | 51   |    | 118 | 0.4           |                    |                                                                                                       |                                                                                                    |
| 17.5              | TDX175W25-3 | ●     | 25              | 32 | 52.5 | 50 | 127 | 1.2           | XPMT06X308R-D*     | CSTB-2.2R                                                                                             | T-7D                                                                                               |
| 18.0              | TDX180W25-3 | ●     |                 |    | 54   |    | 129 | 1.1           |                    |                                                                                                       |                                                                                                    |
| 18.5              | TDX185W25-3 | ●     |                 |    | 55.5 |    | 131 | 0.9           |                    |                                                                                                       |                                                                                                    |
| 19.0              | TDX190W25-3 | ●     |                 |    | 57   |    | 133 | 0.8           |                    |                                                                                                       |                                                                                                    |
| 19.5              | TDX195W25-3 | ●     |                 |    | 58.5 |    | 135 | 0.7           |                    |                                                                                                       |                                                                                                    |
| 20.0              | TDX200W25-3 | ●     |                 |    | 60   |    | 137 | 0.5           |                    |                                                                                                       |                                                                                                    |
| 20.5              | TDX205W25-3 | ●     |                 |    | 61.5 |    | 139 | 0.4           |                    |                                                                                                       |                                                                                                    |
| 21.0              | TDX210W25-3 | ●     |                 |    | 63   |    | 141 | 0.3           |                    |                                                                                                       |                                                                                                    |
| 21.5              | TDX215W25-3 | ●     |                 |    | 64.5 |    | 143 | 0.2           |                    |                                                                                                       |                                                                                                    |
| 22.0              | TDX220W25-3 | ●     |                 | 37 | 66   |    | 145 | 1.2           | XPMT07H308R-D*     | CSTB-2.5                                                                                              | T-8D                                                                                               |
| 22.5              | TDX225W25-3 | ●     |                 |    | 67.5 |    | 147 | 1.1           |                    |                                                                                                       |                                                                                                    |
| 23.0              | TDX230W25-3 | ●     |                 |    | 69   |    | 149 | 0.9           |                    |                                                                                                       |                                                                                                    |
| 23.5              | TDX235W25-3 | ●     |                 |    | 70.5 |    | 151 | 0.8           |                    |                                                                                                       |                                                                                                    |
| 24.0              | TDX240W25-3 | ●     |                 |    | 72   |    | 153 | 0.7           |                    |                                                                                                       |                                                                                                    |
| 24.5              | TDX245W25-3 | ●     |                 |    | 73.5 |    | 155 | 0.5           |                    |                                                                                                       |                                                                                                    |
| 25.0              | TDX250W25-3 | ●     |                 |    | 75   |    | 157 | 0.4           |                    |                                                                                                       |                                                                                                    |
| 25.5              | TDX255W25-3 | ●     |                 |    | 76.5 |    | 159 | 0.3           |                    |                                                                                                       |                                                                                                    |
| 26.0              | TDX260W25-3 | ●     |                 |    | 78   |    | 161 | 0.2           |                    |                                                                                                       |                                                                                                    |
| 27.0              | TDX270W32-3 | ●     | 32              | 40 | 81   | 55 | 170 | 1.5           | XPMT08T308R-D*     | CSTB-3                                                                                                | T-9D                                                                                               |
| 28.0              | TDX280W32-3 | ●     |                 |    | 84   |    | 174 | 1.2           |                    |                                                                                                       |                                                                                                    |
| 29.0              | TDX290W32-3 | ●     |                 |    | 87   |    | 178 | 1.0           |                    |                                                                                                       |                                                                                                    |
| 30.0              | TDX300W32-3 | ●     |                 |    | 90   |    | 182 | 0.7           |                    |                                                                                                       |                                                                                                    |
| 31.0              | TDX310W32-3 | ●     |                 |    | 93   |    | 186 | 0.4           |                    |                                                                                                       |                                                                                                    |
| 32.0              | TDX320W32-3 | ●     |                 |    | 96   |    | 190 | 0.2           |                    |                                                                                                       |                                                                                                    |
| 33.0              | TDX330W40-3 | ●     | 40              | 50 | 99   | 65 | 204 | 2.3           | XPMT110412R-D*     | CSTB-4                                                                                                | T-15D                                                                                              |
| 34.0              | TDX340W40-3 | ●     |                 |    | 102  |    | 208 | 2.1           |                    |                                                                                                       |                                                                                                    |
| 35.0              | TDX350W40-3 | ●     |                 |    | 105  |    | 212 | 1.8           |                    |                                                                                                       |                                                                                                    |
| 36.0              | TDX360W40-3 | ●     |                 |    | 108  |    | 216 | 1.5           |                    |                                                                                                       |                                                                                                    |
| 37.0              | TDX370W40-3 | ●     |                 |    | 111  |    | 220 | 1.3           |                    |                                                                                                       |                                                                                                    |
| 38.0              | TDX380W40-3 | ●     |                 |    | 114  |    | 224 | 1.0           |                    |                                                                                                       |                                                                                                    |
| 39.0              | TDX390W40-3 | ●     |                 |    | 117  |    | 228 | 0.7           |                    |                                                                                                       |                                                                                                    |
| 40.0              | TDX400W40-3 | ●     |                 |    | 120  |    | 232 | 0.5           |                    |                                                                                                       |                                                                                                    |
| 41.0              | TDX410W40-3 | ●     |                 |    | 123  |    | 236 | 0.2           |                    |                                                                                                       |                                                                                                    |
| 42.0              | TDX420W40-3 | ●     |                 | 55 | 126  |    | 240 | 3.1           | XPMT150512R-D*     | CSTB-5                                                                                                | T-20D                                                                                              |
| 43.0              | TDX430W40-3 | ●     |                 |    | 129  |    | 244 | 2.9           |                    |                                                                                                       |                                                                                                    |
| 44.0              | TDX440W40-3 | ●     |                 |    | 132  |    | 248 | 2.6           |                    |                                                                                                       |                                                                                                    |
| 45.0              | TDX450W40-3 | ●     |                 |    | 135  |    | 252 | 2.3           |                    |                                                                                                       |                                                                                                    |
| 46.0              | TDX460W40-3 | ●     |                 |    | 138  |    | 256 | 2.1           |                    |                                                                                                       |                                                                                                    |
| 47.0              | TDX470W40-3 | ●     |                 |    | 141  |    | 260 | 1.8           |                    |                                                                                                       |                                                                                                    |
| 48.0              | TDX480W40-3 | ●     |                 |    | 144  |    | 264 | 1.5           |                    |                                                                                                       |                                                                                                    |
| 49.0              | TDX490W40-3 | ●     |                 |    | 147  |    | 268 | 1.3           |                    |                                                                                                       |                                                                                                    |
| 50.0              | TDX500W40-3 | ●     |                 |    | 150  |    | 272 | 1.0           |                    |                                                                                                       |                                                                                                    |
| 51.0              | TDX510W40-3 | ●     |                 |    | 153  |    | 276 | 0.7           |                    |                                                                                                       |                                                                                                    |
| 52.0              | TDX520W40-3 | ●     |                 |    | 156  |    | 280 | 0.5           |                    |                                                                                                       |                                                                                                    |
| 53.0              | TDX530W40-3 | ●     |                 |    | 159  |    | 284 | -             |                    |                                                                                                       |                                                                                                    |
| 54.0              | TDX540W40-3 | ●     |                 |    | 162  |    | 288 | -             |                    |                                                                                                       |                                                                                                    |

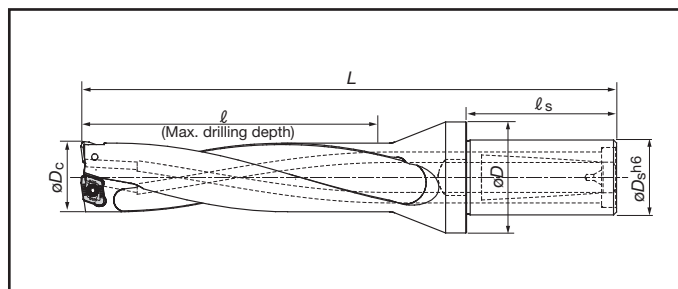
Note: L/D = Hole depth / Drill diameter

● : Stocked items.

Relating  
pages

Cutting conditions  
(11-14)

Technical reference  
(15-1)

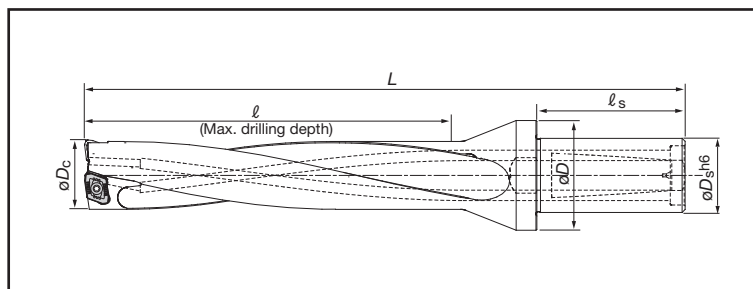


**L/D = 4**

| Drill dia.<br>øDc | Cat. No.    | Stock | Dimensions (mm) |    |     |                |     | Max<br>offset | Applicable inserts | Clamping screw | Torx driver |
|-------------------|-------------|-------|-----------------|----|-----|----------------|-----|---------------|--------------------|----------------|-------------|
|                   |             |       | øDs             | øD | l   | l <sub>s</sub> | L   |               |                    |                |             |
| 12.5              | TDX125W20-4 | ●     | 20              | 25 | 50  | 43             | 116 | 0.8           | XPMT040104R-D*     | CSTB-2         | T-6D        |
| 13.0              | TDX130W20-4 | ●     |                 |    | 52  |                | 118 | 0.7           |                    |                |             |
| 13.5              | TDX135W20-4 | ●     |                 |    | 54  |                | 121 | 0.5           |                    |                |             |
| 14.0              | TDX140W20-4 | ●     |                 |    | 56  |                | 123 | 0.4           |                    |                |             |
| 14.5              | TDX145W20-4 | ●     |                 |    | 58  |                | 125 | 0.3           |                    |                |             |
| 15.0              | TDX150W20-4 | ●     |                 |    | 60  |                | 128 | 0.9           |                    |                |             |
| 15.5              | TDX155W20-4 | ●     |                 | 32 | 62  | 50             | 130 | 0.8           | XPMT050204R-D*     | CSTB-2L040     | T-6D        |
| 16.0              | TDX160W20-4 | ●     |                 |    | 64  |                | 132 | 0.6           |                    |                |             |
| 16.5              | TDX165W20-4 | ●     |                 |    | 66  |                | 135 | 0.5           |                    |                |             |
| 17.0              | TDX170W20-4 | ●     |                 |    | 68  |                | 137 | 0.4           |                    |                |             |
| 17.5              | TDX175W25-4 | ●     | 25              | 32 | 70  | 50             | 148 | 1.2           | XPMT06X308R-D*     | CSTB-2.2R      | T-7D        |
| 18.0              | TDX180W25-4 | ●     |                 |    | 72  |                | 150 | 1.1           |                    |                |             |
| 18.5              | TDX185W25-4 | ●     |                 |    | 74  |                | 152 | 0.9           |                    |                |             |
| 19.0              | TDX190W25-4 | ●     |                 |    | 76  |                | 154 | 0.8           |                    |                |             |
| 19.5              | TDX195W25-4 | ●     |                 |    | 78  |                | 157 | 0.7           |                    |                |             |
| 20.0              | TDX200W25-4 | ●     |                 |    | 80  |                | 160 | 0.5           |                    |                |             |
| 20.5              | TDX205W25-4 | ●     |                 | 37 | 82  | 55             | 162 | 0.4           | XPMT07H308R-D*     | CSTB-2.5       | T-8D        |
| 21.0              | TDX210W25-4 | ●     |                 |    | 84  |                | 164 | 0.3           |                    |                |             |
| 21.5              | TDX215W25-4 | ●     |                 |    | 86  |                | 166 | 0.2           |                    |                |             |
| 22.0              | TDX220W25-4 | ●     |                 |    | 88  |                | 169 | 1.2           |                    |                |             |
| 22.5              | TDX225W25-4 | ●     |                 |    | 90  |                | 171 | 1.1           |                    |                |             |
| 23.0              | TDX230W25-4 | ●     |                 |    | 92  |                | 173 | 0.9           |                    |                |             |
| 23.5              | TDX235W25-4 | ●     |                 |    | 94  |                | 175 | 0.8           |                    |                |             |
| 24.0              | TDX240W25-4 | ●     |                 |    | 96  |                | 178 | 0.7           |                    |                |             |
| 24.5              | TDX245W25-4 | ●     |                 |    | 98  |                | 181 | 0.5           |                    |                |             |
| 25.0              | TDX250W25-4 | ●     | 32              | 40 | 100 | 55             | 183 | 0.4           | XPMT08T308R-D*     | CSTB-3         | T-9D        |
| 25.5              | TDX255W25-4 | ●     |                 |    | 102 |                | 185 | 0.3           |                    |                |             |
| 26.0              | TDX260W25-4 | ●     |                 |    | 104 |                | 187 | 0.2           |                    |                |             |
| 27.0              | TDX270W32-4 | ●     |                 |    | 108 |                | 198 | 1.5           |                    |                |             |
| 28.0              | TDX280W32-4 | ●     |                 |    | 112 |                | 203 | 1.2           |                    |                |             |
| 29.0              | TDX290W32-4 | ●     |                 |    | 116 |                | 208 | 1.0           |                    |                |             |
| 30.0              | TDX300W32-4 | ●     |                 | 50 | 120 | 65             | 213 | 0.7           | XPMT110412R-D*     | CSTB-4         | T-15D       |
| 31.0              | TDX310W32-4 | ●     |                 |    | 124 |                | 217 | 0.4           |                    |                |             |
| 32.0              | TDX320W32-4 | ●     |                 |    | 128 |                | 222 | 0.2           |                    |                |             |
| 33.0              | TDX330W40-4 | ●     |                 |    | 132 |                | 238 | 2.3           |                    |                |             |
| 34.0              | TDX340W40-4 | ●     |                 |    | 136 |                | 243 | 2.1           |                    |                |             |
| 35.0              | TDX350W40-4 | ●     |                 |    | 140 |                | 248 | 1.8           |                    |                |             |
| 36.0              | TDX360W40-4 | ●     |                 |    | 144 |                | 252 | 1.5           |                    |                |             |
| 37.0              | TDX370W40-4 | ●     |                 |    | 148 |                | 258 | 1.3           |                    |                |             |
| 38.0              | TDX380W40-4 | ●     | 40              | 55 | 152 | 65             | 262 | 1.0           | XPMT150512R-D*     | CSTB-5         | T-20D       |
| 39.0              | TDX390W40-4 | ●     |                 |    | 156 |                | 267 | 0.7           |                    |                |             |
| 40.0              | TDX400W40-4 | ●     |                 |    | 160 |                | 272 | 0.5           |                    |                |             |
| 41.0              | TDX410W40-4 | ●     |                 |    | 164 |                | 277 | 0.2           |                    |                |             |
| 42.0              | TDX420W40-4 | ●     |                 |    | 168 |                | 282 | 3.1           |                    |                |             |
| 43.0              | TDX430W40-4 | ●     |                 |    | 172 |                | 287 | 2.9           |                    |                |             |
| 44.0              | TDX440W40-4 | ●     |                 |    | 176 |                | 292 | 2.6           |                    |                |             |
| 45.0              | TDX450W40-4 | ●     |                 |    | 180 |                | 296 | 2.3           |                    |                |             |
| 46.0              | TDX460W40-4 | ●     |                 |    | 184 |                | 302 | 2.1           |                    |                |             |
| 47.0              | TDX470W40-4 | ●     |                 |    | 188 |                | 306 | 1.8           |                    |                |             |
| 48.0              | TDX480W40-4 | ●     |                 | 55 | 192 |                | 311 | 1.5           |                    |                |             |
| 49.0              | TDX490W40-4 | ●     |                 |    | 196 |                | 316 | 1.3           |                    |                |             |
| 50.0              | TDX500W40-4 | ●     |                 |    | 200 |                | 320 | 1.0           |                    |                |             |
| 51.0              | TDX510W40-4 | ●     |                 |    | 204 |                | 325 | 0.7           |                    |                |             |
| 52.0              | TDX520W40-4 | ●     |                 |    | 208 |                | 330 | 0.5           |                    |                |             |
| 53.0              | TDX530W40-4 | ●     |                 |    | 212 |                | 335 | -             |                    |                |             |
| 54.0              | TDX540W40-4 | ●     |                 |    | 216 |                | 339 | -             |                    |                |             |

Note: L/D = Hole depth / Drill diameter

● : Stocked items.

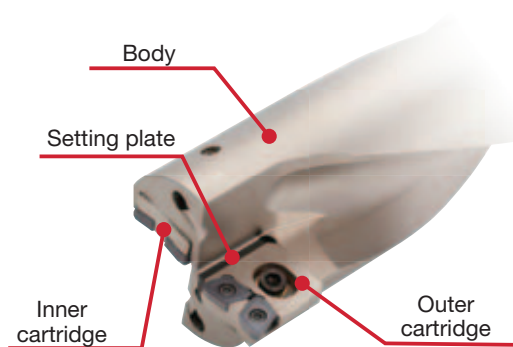
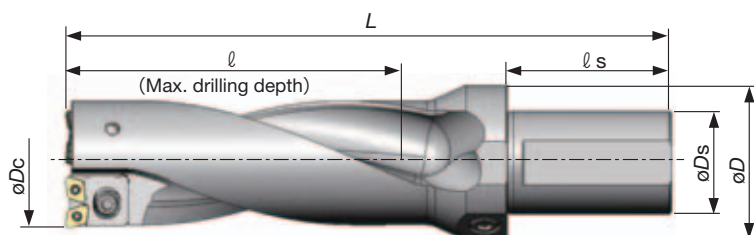
**L/D = 5**

| Drill dia.<br>øDc | Cat. No.    | Stock | Dimensions (mm) |    |       |                |     | Max<br>offset | Applicable inserts | Clamping screw<br> | Torx driver<br> |
|-------------------|-------------|-------|-----------------|----|-------|----------------|-----|---------------|--------------------|-------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
|                   |             |       | øDs             | øD | l     | l <sub>s</sub> | L   |               |                    |                                                                                                       |                                                                                                    |
| 12.5              | TDX125W20-5 | ●     | 20              | 25 | 62.5  | 43             | 128 | 0.8           | XPMT040104R-D*     | CSTB-2                                                                                                | T-6D                                                                                               |
| 13.0              | TDX130W20-5 | ●     |                 |    | 65.0  |                | 131 | 0.7           |                    |                                                                                                       |                                                                                                    |
| 13.5              | TDX135W20-5 | ●     |                 |    | 67.5  |                | 134 | 0.5           |                    |                                                                                                       |                                                                                                    |
| 14.0              | TDX140W20-5 | ●     |                 |    | 70.0  |                | 137 | 0.4           |                    |                                                                                                       |                                                                                                    |
| 14.5              | TDX145W20-5 | ●     |                 |    | 72.5  |                | 140 | 0.3           |                    |                                                                                                       |                                                                                                    |
| 15.0              | TDX150W20-5 | ●     |                 |    | 75.0  |                | 143 | 0.9           | XPMT050204R-D*     | CSTB-2L040                                                                                            | T-6D                                                                                               |
| 15.5              | TDX155W20-5 | ●     |                 |    | 77.5  |                | 146 | 0.8           |                    |                                                                                                       |                                                                                                    |
| 16.0              | TDX160W20-5 | ●     |                 |    | 80.0  |                | 148 | 0.6           |                    |                                                                                                       |                                                                                                    |
| 16.5              | TDX165W20-5 | ●     |                 |    | 82.5  |                | 152 | 0.5           |                    |                                                                                                       |                                                                                                    |
| 17.0              | TDX170W20-5 | ●     |                 |    | 85.0  |                | 154 | 0.4           |                    |                                                                                                       |                                                                                                    |
| 17.5              | TDX175W25-5 | ●     | 25              | 32 | 87.5  | 50             | 165 | 1.2           | XPMT06X308R-D*     | CSTB-2.2R                                                                                             | T-7D                                                                                               |
| 18.0              | TDX180W25-5 | ●     |                 |    | 90.0  |                | 168 | 1.1           |                    |                                                                                                       |                                                                                                    |
| 18.5              | TDX185W25-5 | ●     |                 |    | 92.5  |                | 171 | 0.9           |                    |                                                                                                       |                                                                                                    |
| 19.0              | TDX190W25-5 | ●     |                 |    | 95.0  |                | 173 | 0.8           |                    |                                                                                                       |                                                                                                    |
| 19.5              | TDX195W25-5 | ●     |                 |    | 97.5  |                | 176 | 0.7           |                    |                                                                                                       |                                                                                                    |
| 20.0              | TDX200W25-5 | ●     |                 |    | 100.0 |                | 180 | 0.5           |                    |                                                                                                       |                                                                                                    |
| 20.5              | TDX205W25-5 | ●     |                 |    | 102.5 |                | 182 | 0.4           |                    |                                                                                                       |                                                                                                    |
| 21.0              | TDX210W25-5 | ●     |                 |    | 105.0 |                | 185 | 0.3           |                    |                                                                                                       |                                                                                                    |
| 21.5              | TDX215W25-5 | ●     |                 |    | 107.5 |                | 188 | 0.2           |                    |                                                                                                       |                                                                                                    |
| 22.0              | TDX220W25-5 | ●     |                 | 37 | 110.0 |                | 191 | 1.2           | XPMT07H308R-D*     | CSTB-2.5                                                                                              | T-8D                                                                                               |
| 22.5              | TDX225W25-5 | ●     |                 |    | 112.5 |                | 193 | 1.1           |                    |                                                                                                       |                                                                                                    |
| 23.0              | TDX230W25-5 | ●     |                 |    | 115.0 |                | 196 | 0.9           |                    |                                                                                                       |                                                                                                    |
| 23.5              | TDX235W25-5 | ●     |                 |    | 117.5 |                | 199 | 0.8           |                    |                                                                                                       |                                                                                                    |
| 24.0              | TDX240W25-5 | ●     |                 |    | 120.0 |                | 202 | 0.7           |                    |                                                                                                       |                                                                                                    |
| 24.5              | TDX245W25-5 | ●     |                 |    | 122.5 |                | 205 | 0.5           |                    |                                                                                                       |                                                                                                    |
| 25.0              | TDX250W25-5 | ●     |                 |    | 125.0 |                | 208 | 0.4           |                    |                                                                                                       |                                                                                                    |
| 25.5              | TDX255W25-5 | ●     |                 |    | 127.5 |                | 211 | 0.3           |                    |                                                                                                       |                                                                                                    |
| 26.0              | TDX260W25-5 | ●     |                 |    | 130   |                | 213 | 0.2           |                    |                                                                                                       |                                                                                                    |
| 27.0              | TDX270W32-5 | ●     | 32              | 40 | 135   | 55             | 225 | 1.5           | XPMT08T308R-D*     | CSTB-3                                                                                                | T-9D                                                                                               |
| 28.0              | TDX280W32-5 | ●     |                 |    | 140   |                | 231 | 1.2           |                    |                                                                                                       |                                                                                                    |
| 29.0              | TDX290W32-5 | ●     |                 |    | 145   |                | 237 | 1.0           |                    |                                                                                                       |                                                                                                    |
| 30.0              | TDX300W32-5 | ●     |                 |    | 150   |                | 243 | 0.7           |                    |                                                                                                       |                                                                                                    |
| 31.0              | TDX310W32-5 | ●     |                 |    | 155   |                | 248 | 0.4           |                    |                                                                                                       |                                                                                                    |
| 32.0              | TDX320W32-5 | ●     |                 |    | 160   |                | 254 | 0.2           |                    |                                                                                                       |                                                                                                    |
| 33.0              | TDX330W40-5 | ●     | 40              | 50 | 165   | 65             | 271 | 2.3           | XPMT110412R-D*     | CSTB-4                                                                                                | T-15D                                                                                              |
| 34.0              | TDX340W40-5 | ●     |                 |    | 170   |                | 277 | 2.1           |                    |                                                                                                       |                                                                                                    |
| 35.0              | TDX350W40-5 | ●     |                 |    | 175   |                | 283 | 1.8           |                    |                                                                                                       |                                                                                                    |
| 36.0              | TDX360W40-5 | ●     |                 |    | 180   |                | 288 | 1.5           |                    |                                                                                                       |                                                                                                    |
| 37.0              | TDX370W40-5 | ●     |                 |    | 185   |                | 295 | 1.3           |                    |                                                                                                       |                                                                                                    |
| 38.0              | TDX380W40-5 | ●     |                 |    | 190   |                | 300 | 1.0           |                    |                                                                                                       |                                                                                                    |
| 39.0              | TDX390W40-5 | ●     |                 |    | 195   |                | 306 | 0.7           |                    |                                                                                                       |                                                                                                    |
| 40.0              | TDX400W40-5 | ●     |                 |    | 200   |                | 312 | 0.5           |                    |                                                                                                       |                                                                                                    |
| 41.0              | TDX410W40-5 | ●     |                 |    | 205   |                | 318 | 0.2           |                    |                                                                                                       |                                                                                                    |
| 42.0              | TDX420W40-5 | ●     |                 | 55 | 210   |                | 324 | 3.1           | XPMT150512R-D*     | CSTB-5                                                                                                | T-20D                                                                                              |
| 43.0              | TDX430W40-5 | ●     |                 |    | 215   |                | 330 | 2.9           |                    |                                                                                                       |                                                                                                    |
| 44.0              | TDX440W40-5 | ●     |                 |    | 220   |                | 336 | 2.6           |                    |                                                                                                       |                                                                                                    |
| 45.0              | TDX450W40-5 | ●     |                 |    | 225   |                | 341 | 2.3           |                    |                                                                                                       |                                                                                                    |
| 46.0              | TDX460W40-5 | ●     |                 |    | 230   |                | 348 | 2.1           |                    |                                                                                                       |                                                                                                    |
| 47.0              | TDX470W40-5 | ●     |                 |    | 235   |                | 353 | 1.8           |                    |                                                                                                       |                                                                                                    |
| 48.0              | TDX480W40-5 | ●     |                 |    | 240   |                | 359 | 1.5           |                    |                                                                                                       |                                                                                                    |
| 49.0              | TDX490W40-5 | ●     |                 |    | 245   |                | 365 | 1.3           |                    |                                                                                                       |                                                                                                    |
| 50.0              | TDX500W40-5 | ●     |                 |    | 250   |                | 370 | 1.0           |                    |                                                                                                       |                                                                                                    |
| 51.0              | TDX510W40-5 | ●     |                 |    | 255   |                | 376 | 0.7           |                    |                                                                                                       |                                                                                                    |
| 52.0              | TDX520W40-5 | ●     |                 |    | 260   |                | 382 | 0.5           |                    |                                                                                                       |                                                                                                    |
| 53.0              | TDX530W40-5 | ●     |                 |    | 265   |                | 388 | -             |                    |                                                                                                       |                                                                                                    |
| 54.0              | TDX540W40-5 | ●     |                 |    | 270   |                | 393 | -             |                    |                                                                                                       |                                                                                                    |

Note: L/D = Hole depth / Drill diameter

● : Stocked items.

Relating  
pagesCutting conditions  
(11-14)Technical reference  
(15-1)



| Cat. No.        | Stock | Dimensions (mm) |            |          |     |       |     | Weight (kg) | Outer cartridge | Inner cartridge | Setting plate |      | Applicable inserts |
|-----------------|-------|-----------------|------------|----------|-----|-------|-----|-------------|-----------------|-----------------|---------------|------|--------------------|
|                 |       | $\phi D_c$      | $\phi D_s$ | $\phi D$ | $l$ | $l_s$ | $L$ |             |                 |                 | Cat. No.      | (mm) |                    |
| TDX55-56F50-2.5 | ●     | 55              | 50         | 75       | 140 | 80    | 260 | 3.2         | TDX08CA-P0      | TDX08CA-C0      | -             | -    | XPMT08T308R-**     |
|                 |       | 56              |            |          |     |       |     |             |                 |                 | AP0801        | 0.5  |                    |
| TDX57-62F50-2.5 | ●     | 57              | 50         | 75       | 155 | 80    | 280 | 3.6         | TDX08CA-P1      | TDX08CA-C1      | -             | -    | XPMT08T308R-**     |
|                 |       | 58              |            |          |     |       |     |             |                 |                 | AP0801        | 0.5  |                    |
|                 |       | 59              |            |          |     |       |     |             |                 |                 | AP0802        | 1.0  |                    |
|                 |       | 60              |            |          |     |       |     |             |                 |                 | AP0803        | 1.5  |                    |
|                 |       | 61              |            |          |     |       |     |             |                 |                 | AP0804        | 2.0  |                    |
|                 |       | 62              |            |          |     |       |     |             |                 |                 | AP0805        | 2.5  |                    |
| TDX63-66F50-2.5 | ●     | 63              | 50         | 75       | 165 | 80    | 295 | 4.2         | TDX08CA-P2      | TDX08CA-C2      | -             | -    | XPMT08T308R-**     |
|                 |       | 64              |            |          |     |       |     |             |                 |                 | AP0801        | 0.5  |                    |
|                 |       | 65              |            |          |     |       |     |             |                 |                 | AP0802        | 1.0  |                    |
|                 |       | 66              |            |          |     |       |     |             |                 |                 | AP0803        | 1.5  |                    |
| TDX67-73F50-2.5 | ●     | 67              | 50         | 75       | 183 | 80    | 320 | 5.0         | TDX11CA-P1      | TDX11CA-C1      | -             | -    | XPMT110412R-**     |
|                 |       | 68              |            |          |     |       |     |             |                 |                 | AP1101        | 0.5  |                    |
|                 |       | 69              |            |          |     |       |     |             |                 |                 | AP1102        | 1.0  |                    |
|                 |       | 70              |            |          |     |       |     |             |                 |                 | AP1103        | 1.5  |                    |
|                 |       | 71              |            |          |     |       |     |             |                 |                 | AP1104        | 2.0  |                    |
|                 |       | 72              |            |          |     |       |     |             |                 |                 | AP1105        | 2.5  |                    |
|                 |       | 73              |            |          |     |       |     |             |                 |                 | AP1106        | 3.0  |                    |
| TDX74-80F50-2.5 | ●     | 74              | 50         | 75       | 200 | 80    | 330 | 5.7         | TDX11CA-P2      | TDX11CA-C2      | -             | -    | XPMT110412R-**     |
|                 |       | 75              |            |          |     |       |     |             |                 |                 | AP1101        | 0.5  |                    |
|                 |       | 76              |            |          |     |       |     |             |                 |                 | AP1102        | 1.0  |                    |
|                 |       | 77              |            |          |     |       |     |             |                 |                 | AP1103        | 1.5  |                    |
|                 |       | 78              |            |          |     |       |     |             |                 |                 | AP1104        | 2.0  |                    |
|                 |       | 79              |            |          |     |       |     |             |                 |                 | AP1105        | 2.5  |                    |
|                 |       | 80              |            |          |     |       |     |             |                 |                 | AP1106        | 3.0  |                    |

● : Stocked items

## Replacement Parts

| Cat. No.        | Screws                       |                   |            |              | Washer       | Wrenches                     |                   |            |              |  |
|-----------------|------------------------------|-------------------|------------|--------------|--------------|------------------------------|-------------------|------------|--------------|--|
|                 | For cartridge (Inner, outer) | For setting plate | For insert | For sideport |              | For cartridge (Inner, outer) | For setting plate | For insert | For sideport |  |
| TDX55-56F50-2.5 | CM5x0.8x12                   | CSTB-3            | CSTB-3     | PT1/4GN      | 5.3x10x1     | P-4                          | T-9D              | T-9D       | P-6          |  |
| TDX57-62F50-2.5 |                              |                   |            |              | 6.4x12.5x1.6 | P-5                          |                   |            |              |  |
| TDX63-66F50-2.5 | CM6x15                       |                   | CSTB-4     |              |              | T-15D                        |                   |            |              |  |
| TDX67-73F50-2.5 | CM6x16                       |                   |            |              |              |                              |                   |            |              |  |
| TDX74-80F50-2.5 | CM6x16                       |                   |            |              |              |                              |                   |            |              |  |

# Inserts

**TUNGDRILLTWISTED**  
**TUNGDRILLBIG**

| DJ chipbreaker | Cat. No.       | Stocked grades |       |   | Dimensions (mm) |      |      |          |              | Applicable drill diameters $\phi D_c$ (mm) |
|----------------|----------------|----------------|-------|---|-----------------|------|------|----------|--------------|--------------------------------------------|
|                |                |                | AH740 |   | A               | B    | T    | $\phi d$ | $r_\epsilon$ |                                            |
|                |                |                |       |   |                 |      |      |          |              |                                            |
|                | XPMT040104R-DJ | ●              | ●     | ● | 4.3             | 4.5  | 1.59 | 2.3      | 0.4          | $\phi 12.5 \sim \phi 14.5$                 |
|                | XPMT050204R-DJ | ●              | ●     | ● | 5.2             | 5.4  | 2.38 | 2.3      | 0.4          | $\phi 15.0 \sim \phi 17.0$                 |
|                | XPMT06X308R-DJ | ●              | ●     | ● | 6.0             | 7.0  | 3.00 | 2.5      | 0.8          | $\phi 17.5 \sim \phi 21.5$                 |
|                | XPMT07H308R-DJ | ●              | ●     | ● | 7.0             | 8.2  | 3.60 | 2.8      | 0.8          | $\phi 22.0 \sim \phi 26.0$                 |
|                | XPMT08T308R-DJ | ●              | ●     | ● | 8.5             | 9.9  | 3.97 | 3.4      | 0.8          | $\phi 27.0 \sim \phi 32.0$                 |
|                | XPMT110412R-DJ | ●              | ●     | ● | 11.2            | 12.5 | 4.76 | 4.4      | 1.2          | $\phi 33.0 \sim \phi 41.0$                 |
|                | XPMT150512R-DJ | ●              | ●     | ● | 15.0            | 16.1 | 5.56 | 5.5      | 1.2          | $\phi 42.0 \sim \phi 54.0$                 |

| DS chipbreaker | Cat. No.       | Stocked grades |       | Dimensions (mm) |      |      |          |              | Applicable drill diameters $\phi D_c$ (mm) |
|----------------|----------------|----------------|-------|-----------------|------|------|----------|--------------|--------------------------------------------|
|                |                |                | AH120 | A               | B    | T    | $\phi d$ | $r_\epsilon$ |                                            |
|                |                |                |       |                 |      |      |          |              |                                            |
|                | XPMT040104R-DS | ●              | ●     | 4.3             | 4.5  | 1.59 | 2.3      | 0.4          | $\phi 12.5 \sim \phi 14.5$                 |
|                | XPMT050204R-DS | ●              | ●     | 5.2             | 5.4  | 2.38 | 2.3      | 0.4          | $\phi 15.0 \sim \phi 17.0$                 |
|                | XPMT06X308R-DS | ●              | ●     | 6.0             | 7.0  | 3.00 | 2.5      | 0.8          | $\phi 17.5 \sim \phi 21.5$                 |
|                | XPMT07H308R-DS | ●              | ●     | 7.0             | 8.2  | 3.60 | 2.8      | 0.8          | $\phi 22.0 \sim \phi 26.0$                 |
|                | XPMT08T308R-DS | ●              | ●     | 8.5             | 9.9  | 3.97 | 3.4      | 0.8          | $\phi 27.0 \sim \phi 32.0$                 |
|                | XPMT110412R-DS | ●              | ●     | 11.2            | 12.5 | 4.76 | 4.4      | 1.2          | $\phi 33.0 \sim \phi 41.0$                 |
|                | XPMT150512R-DS | ●              | ●     | 15.0            | 16.1 | 5.56 | 5.5      | 1.2          | $\phi 42.0 \sim \phi 54.0$                 |

| DW chipbreaker | Cat. No.       | Stocked grades |       |       | Dimensions (mm) |      |      |          |              | Applicable drill diameters $\phi D_c$ (mm) |
|----------------|----------------|----------------|-------|-------|-----------------|------|------|----------|--------------|--------------------------------------------|
|                |                |                | AH740 | AH120 | A               | B    | T    | $\phi d$ | $r_\epsilon$ |                                            |
|                |                |                |       |       |                 |      |      |          |              |                                            |
|                | XPMT040104R-DW | ●              | ●     | ●     | 4.3             | 4.5  | 1.59 | 2.3      | 0.4          | $\phi 12.5 \sim \phi 14.5$                 |
|                | XPMT050204R-DW | ●              | ●     | ●     | 5.2             | 5.4  | 2.38 | 2.3      | 0.4          | $\phi 15.0 \sim \phi 17.0$                 |
|                | XPMT06X308R-DW | ●              | ●     | ●     | 6.0             | 7.0  | 3.00 | 2.5      | 0.8          | $\phi 17.5 \sim \phi 21.5$                 |
|                | XPMT07H308R-DW | ●              | ●     | ●     | 7.0             | 8.2  | 3.60 | 2.8      | 0.8          | $\phi 22.0 \sim \phi 26.0$                 |
|                | XPMT08T308R-DW | ●              | ●     | ●     | 8.5             | 9.9  | 3.97 | 3.4      | 0.8          | $\phi 27.0 \sim \phi 32.0$                 |
|                | XPMT110412R-DW | ●              | ●     | ●     | 11.2            | 12.5 | 4.76 | 4.4      | 1.2          | $\phi 33.0 \sim \phi 41.0$                 |
|                | XPMT150512R-DW | ●              | ●     | ●     | 15.0            | 16.1 | 5.56 | 5.5      | 1.2          | $\phi 42.0 \sim \phi 54.0$                 |

| DG chipbreaker | Cat. No.       | Stocked grade | Dimensions (mm) |      |      |          |              | Applicable drill diameters $\phi D_c$ (mm) |
|----------------|----------------|---------------|-----------------|------|------|----------|--------------|--------------------------------------------|
|                |                |               | A               | B    | T    | $\phi d$ | $r_\epsilon$ |                                            |
|                |                |               |                 |      |      |          |              |                                            |
|                | XPMT08T308R-DG | ●             | 8.5             | 9.9  | 3.97 | 3.4      | 0.8          | $\phi 27.0 \sim \phi 32.0$                 |
|                | XPMT110412R-DG | ●             | 11.2            | 12.5 | 4.76 | 4.4      | 1.2          | $\phi 33.0 \sim \phi 41.0$                 |
|                | XPMT150512R-DG | ●             | 15.0            | 16.1 | 5.56 | 5.5      | 1.2          | $\phi 42.0 \sim \phi 54.0$                 |

● : Stocked items

## Recommended inserts

Drill dia.  $\phi D_c$ :  $\phi 12.5 \sim \phi 54.0$

| Work materials                                                                                           | First choice | High feed | High speed | Troubleshooting |           |                |              |
|----------------------------------------------------------------------------------------------------------|--------------|-----------|------------|-----------------|-----------|----------------|--------------|
|                                                                                                          |              |           |            | Breakage        | Wear      | Surface finish | Chip control |
| Low carbon steels (C < 0.3)<br>SS400, SM490, S25C etc.<br>(st42-1, St52-3, C25 etc.)                     | DS, AH725    |           |            | DW, AH725       |           | DW, AH120      | DG, AH725    |
| Carbon steels (C > 0.3)<br>S45C, S55C etc. (C45, C55 etc.)                                               | DJ, AH725    | DW, AH725 | DS, AH120  | DW, AH725       | DJ, T1115 | DW, AH725      |              |
| Low alloy steels<br>SCM415 etc.                                                                          | DS, AH725    |           |            | DW, AH725       |           | DW, AH725      |              |
| Alloy steels<br>SCM440, SCr420 etc.<br>(42CrMo4, 20Cr4 etc.)                                             | DJ, AH725    | DW, AH725 | DS, AH120  | DW, AH725       | DJ, T1115 | DW, AH725      |              |
| Stainless steels (Austenitic)<br>SUS304, SUS316 etc.<br>(X5CrNi18-9, X5CrNiMo17-12-2 etc.)               | DS, AH725    |           |            | DS, AH120       |           | DW, AH120      | DG, AH725    |
| Stainless steels (Martensitic and ferritic)<br>SUS430, SUS416 etc.<br>(X5CrNi18-9, X5CrNiMo17-12-2 etc.) | DS, AH725    |           |            | DS, AH120       |           | DW, AH120      |              |
| Stainless steels (Precipitation hardening)<br>SUS630 etc. (X5CrNiCuNb16-4 etc.)                          | DS, AH725    |           |            | DS, AH120       |           | DW, AH120      |              |
| Grey cast irons<br>FC250 etc. (GG25 etc.)                                                                | DJ, T1115    | DJ, AH725 |            | DJ, AH725       |           | DW, AH740      |              |
| Ductile cast irons<br>FCD700 etc. (GGG70 etc.)                                                           | DJ, T1115    | DJ, AH725 |            | DJ, AH725       |           | DW, AH740      |              |
| Aluminium alloys<br>A2017, ADC12 etc.                                                                    | DW, AH725    |           |            |                 |           |                |              |

## Standard cutting conditions

| Work materials                                                                                           | Cutting Speed<br>$V_c$ (m/min) | Series<br>L/D | Feed: $f$ (mm/rev)         |                            |                            |                            |                            |
|----------------------------------------------------------------------------------------------------------|--------------------------------|---------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
|                                                                                                          |                                |               | $\phi 12.5 \sim \phi 14.5$ | $\phi 15.0 \sim \phi 17.0$ | $\phi 17.5 \sim \phi 26.0$ | $\phi 27.0 \sim \phi 32.0$ | $\phi 33.0 \sim \phi 54.0$ |
| Low carbon steels (C < 0.3)<br>SS400, SM490, S25C etc.<br>(st42-1, St52-3, C25 etc.)                     | 240 (160 - 320)                | 2D, 3D        | 0.04 (0.02-0.06)           | 0.04 (0.02-0.06)           | 0.07 (0.04-0.10)           | 0.07 (0.04-0.10)           | 0.07 (0.04-0.10)           |
|                                                                                                          |                                | 4D, 5D        | 0.04 (0.02-0.06)           | 0.04 (0.02-0.06)           | 0.07 (0.04-0.10)           | 0.07 (0.04-0.10)           | 0.07 (0.04-0.10)           |
| Carbon steels (C > 0.3)<br>S45C, S55C etc. (C45, C55 etc.)                                               | 140 (80 - 250)                 | 2D, 3D        | 0.07 (0.04-0.10)           | 0.08 (0.04-0.12)           | 0.10 (0.06-0.13)           | 0.11 (0.06-0.15)           | 0.13 (0.08-0.18)           |
|                                                                                                          |                                | 4D, 5D        | 0.06 (0.04-0.08)           | 0.06 (0.04-0.08)           | 0.08 (0.06-0.10)           | 0.09 (0.06-0.12)           | 0.11 (0.08-0.14)           |
| Low alloy steels<br>SCM415 etc.                                                                          | 210 (160 - 250)                | 2D, 3D        | 0.06 (0.04-0.08)           | 0.06 (0.04-0.08)           | 0.09 (0.06-0.12)           | 0.09 (0.06-0.12)           | 0.10 (0.06-0.14)           |
|                                                                                                          |                                | 4D, 5D        | 0.06 (0.04-0.08)           | 0.06 (0.04-0.08)           | 0.09 (0.06-0.12)           | 0.09 (0.06-0.12)           | 0.10 (0.06-0.14)           |
| Alloy steels<br>SCM440, SCr420 etc.<br>(42CrMo4, 20Cr4 etc.)                                             | 140 (80 - 200)                 | 2D, 3D        | 0.07 (0.04-0.10)           | 0.08 (0.04-0.12)           | 0.10 (0.06-0.13)           | 0.11 (0.06-0.15)           | 0.13 (0.08-0.18)           |
|                                                                                                          |                                | 4D, 5D        | 0.06 (0.04-0.08)           | 0.06 (0.04-0.08)           | 0.08 (0.06-0.10)           | 0.09 (0.06-0.12)           | 0.11 (0.08-0.14)           |
| Stainless steels (Austenitic)<br>SUS304, SUS316 etc.<br>(X5CrNi18-9, X5CrNiMo17-12-2 etc.)               | 150 (100 - 200)                | 2D, 3D        | 0.05 (0.02-0.08)           | 0.05 (0.02-0.08)           | 0.07 (0.04-0.10)           | 0.08 (0.04-0.12)           | 0.08 (0.04-0.12)           |
|                                                                                                          |                                | 4D, 5D        | 0.05 (0.02-0.08)           | 0.05 (0.02-0.08)           | 0.07 (0.04-0.10)           | 0.08 (0.04-0.12)           | 0.08 (0.04-0.12)           |
| Stainless steels (Martensitic and ferritic)<br>SUS430, SUS416 etc.<br>(X5CrNi18-9, X5CrNiMo17-12-2 etc.) | 160 (100 - 220)                | 2D, 3D        | 0.05 (0.02-0.08)           | 0.05 (0.02-0.08)           | 0.07 (0.04-0.10)           | 0.08 (0.04-0.12)           | 0.08 (0.04-0.12)           |
|                                                                                                          |                                | 4D, 5D        | 0.05 (0.02-0.08)           | 0.05 (0.02-0.08)           | 0.07 (0.04-0.10)           | 0.08 (0.04-0.12)           | 0.08 (0.04-0.12)           |
| Stainless steels (Precipitation hardening)<br>SUS630 etc. (X5CrNiCuNb16-4 etc.)                          | 100 (80 - 120)                 | 2D, 3D        | 0.06 (0.04-0.08)           | 0.06 (0.04-0.08)           | 0.06 (0.04-0.08)           | 0.07 (0.04-0.10)           | 0.08 (0.06-0.10)           |
|                                                                                                          |                                | 4D, 5D        | 0.06 (0.04-0.08)           | 0.06 (0.04-0.08)           | 0.06 (0.04-0.08)           | 0.07 (0.04-0.10)           | 0.08 (0.06-0.10)           |
| Grey cast irons<br>FC250 etc. (GG25 etc.)                                                                | 170 (80 - 250)                 | 2D, 3D        | 0.09 (0.06-0.12)           | 0.09 (0.06-0.12)           | 0.11 (0.06-0.15)           | 0.12 (0.06-0.18)           | 0.14 (0.08-0.20)           |
|                                                                                                          |                                | 4D, 5D        | 0.08 (0.06-0.10)           | 0.08 (0.06-0.10)           | 0.09 (0.06-0.12)           | 0.10 (0.06-0.14)           | 0.12 (0.08-0.16)           |
| Ductile cast irons<br>FCD700 etc. (GGG70 etc.)                                                           | 140 (80 - 200)                 | 2D, 3D        | 0.08 (0.04-0.12)           | 0.08 (0.04-0.12)           | 0.11 (0.06-0.15)           | 0.12 (0.06-0.18)           | 0.14 (0.08-0.20)           |
|                                                                                                          |                                | 4D, 5D        | 0.07 (0.04-0.10)           | 0.07 (0.04-0.10)           | 0.09 (0.06-0.12)           | 0.10 (0.06-0.14)           | 0.12 (0.08-0.16)           |
| Aluminium alloys<br>A2017, ADC12 etc.                                                                    | 300 (200 - 400)                | 2D, 3D        | 0.11 (0.10-0.12)           | 0.12 (0.10-0.15)           | 0.18 (0.15-0.20)           | 0.18 (0.15-0.20)           | 0.20 (0.15-0.25)           |
|                                                                                                          |                                | 4D, 5D        | 0.10 (0.08-0.12)           | 0.10 (0.08-0.12)           | 0.14 (0.12-0.16)           | 0.14 (0.12-0.16)           | 0.16 (0.12-0.20)           |

## NEW Standard cutting conditions for DG type chipbreaker

| Work materials                                                                       | Cutting Speed<br>$V_c$ (m/min) | Series<br>L/D    | Feed: $f$ (mm/rev)         |                            |
|--------------------------------------------------------------------------------------|--------------------------------|------------------|----------------------------|----------------------------|
|                                                                                      |                                |                  | $\phi 27.0 \sim \phi 32.0$ | $\phi 33.0 \sim \phi 54.0$ |
| Low carbon steels (C < 0.3)<br>SS400, SM490, S25C etc.<br>(st42-1, St52-3, C25 etc.) | 100 (60 - 180)                 | 2D, 3D<br>4D, 5D | 0.07 (0.04-0.10)           |                            |

- When using the smaller side of the diameter range, the feed rate should be set lower.
- For work materials of 40 HRC, the feed rate should be set below 50%.
- For difficult-to-cut materials (heat-resistant alloys, etc.), the cutting speed should be set 25% below that of carbon steels.
- For high-feed machining, apply a feed rate that is

- approximately 1.5 times the standard feed conditions.
- High speed machining means cutting speeds over 150 m/min.
- When using DW insert for troubleshooting, use it within the range of standard cutting conditions.
- DG type chipbreaker is suitable for heavy machines that have low-rpm spindles. If chatter occurs, a lower feed rate is recommended.

## Recommended inserts

Drill dia.  $\phi D_c$ :  $\phi 55 \sim \phi 80$

| Work materials                                                                                           | First choice | High feed | High speed | Troubleshooting |           |                |
|----------------------------------------------------------------------------------------------------------|--------------|-----------|------------|-----------------|-----------|----------------|
|                                                                                                          |              |           |            | Breakage        | Wear      | Surface finish |
| Low carbon steels (C < 0.3)<br>SS400, SM490, S25C etc.<br>(St42-1, St52-3, C25 etc.)                     | DS, AH725    |           | DJ, AH725  | DS, AH120       |           | DW, AH725      |
| Carbon steels (C > 0.3)<br>S45C, S55C etc. (C45, C55 etc.)                                               | DJ, AH725    | DW, AH725 | DJ, AH725  | DW, AH740       | DJ, T1115 | DW, AH725      |
| Low alloy steels<br>SCM415 etc. (15CrMo5 etc.)                                                           | DS, AH725    |           | DJ, AH725  | DS, AH120       |           | DW, AH725      |
| Alloy steels<br>SCM440, SCr420 etc. (42CrMo4, 20Cr4 etc.)                                                | DJ, AH725    | DW, AH725 | DJ, AH725  | DW, AH740       | DJ, T1115 | DW, AH725      |
| Stainless steels (Austenitic)<br>SUS304, SUS316 etc.<br>(X5CrNi18-9, X5CrNiMo17-12-2 etc.)               | DS, AH725    |           | DS, AH725  | DS, AH120       |           | DW, AH725      |
| Stainless steels (Martensitic and ferritic)<br>SUS430, SUS416 etc.<br>(X5CrNi18-9, X5CrNiMo17-12-2 etc.) | DS, AH725    |           | DS, AH725  | DS, AH120       |           | DW, AH725      |
| Stainless steels (Precipitation hardening)<br>SUS630 etc. (X5CrNiCuNb16-4 etc.)                          | DS, AH725    |           | DS, AH725  | DS, AH120       |           | DW, AH725      |
| Grey cast irons<br>FC250 etc. (GG25 etc.)                                                                | DJ, AH725    | DW, AH725 | DJ, T1115  | DW, AH740       | DJ, T1115 | DW, AH725      |
| Ductile cast irons<br>FCD700 etc. (GGG70 etc.)                                                           | DJ, AH725    | DW, AH725 | DJ, T1115  | DW, AH740       | DJ, T1115 | DW, AH725      |
| Aluminium alloys<br>A2017, ADC12 etc.                                                                    | DW, AH725    | DW, AH725 | DJ, AH725  | DW, AH740       |           |                |

## Standard cutting conditions

| Work materials                                                                                           | Cutting speed<br>$V_c$ (m/min) | Feed: $f$ (mm/rev)     |                        |                        |
|----------------------------------------------------------------------------------------------------------|--------------------------------|------------------------|------------------------|------------------------|
|                                                                                                          |                                | $\phi 55 \sim \phi 62$ | $\phi 63 \sim \phi 73$ | $\phi 74 \sim \phi 80$ |
| Low carbon steels (C < 0.3)<br>SS400, SM490, S25C etc.<br>(St42-1, St52-3, C25 etc.)                     | 240 (160-320)                  | 0.07 (0.04-0.10)       | 0.07 (0.04-0.10)       | 0.07 (0.04-0.10)       |
| Carbon steels (C > 0.3)<br>S45C, S55C etc. (C45, C55 etc.)                                               | 140 (80-250)                   | 0.13 (0.08-0.18)       | 0.13 (0.08-0.18)       | 0.15 (0.10-0.20)       |
| Low alloy steels<br>SCM415 etc. (15CrMo5 etc.)                                                           | 210 (160-250)                  | 0.10 (0.04-0.16)       | 0.10 (0.04-0.16)       | 0.10 (0.04-0.16)       |
| Alloy steels<br>SCM440, SCr420 etc.<br>(42CrMo4, 20Cr4 etc.)                                             | 140 (80-200)                   | 0.13 (0.08-0.18)       | 0.13 (0.08-0.18)       | 0.14 (0.08-0.20)       |
| Stainless steels (Austenitic)<br>SUS304, SUS316 etc.<br>(X5CrNi18-9, X5CrNiMo17-12-2 etc.)               | 150 (100-200)                  | 0.08 (0.04-0.12)       | 0.08 (0.04-0.12)       | 0.10 (0.06-0.14)       |
| Stainless steels (Martensitic and ferritic)<br>SUS430, SUS416 etc.<br>(X5CrNi18-9, X5CrNiMo17-12-2 etc.) | 160 (100-200)                  | 0.08 (0.04-0.12)       | 0.08 (0.04-0.12)       | 0.10 (0.06-0.14)       |
| Stainless steels (Precipitation hardening)<br>SUS630 etc. (X5CrNiCuNb16-4 etc.)                          | 100 (80-120)                   | 0.08 (0.04-0.10)       | 0.08 (0.04-0.10)       | 0.09 (0.06-0.12)       |
| Grey cast irons<br>FC250 etc. (GG25 etc.)                                                                | 170 (80-250)                   | 0.14 (0.08-0.20)       | 0.14 (0.08-0.20)       | 0.16 (0.10-0.22)       |
| Ductile cast irons<br>FCD700 etc. (GGG70 etc.)                                                           | 140 (80-200)                   | 0.14 (0.08-0.20)       | 0.14 (0.08-0.20)       | 0.16 (0.10-0.22)       |
| Aluminium alloys<br>A2017, ADC12 etc.                                                                    | 300 (200-400)                  | 0.20 (0.15-0.25)       | 0.20 (0.15-0.25)       | 0.23 (0.18-0.28)       |

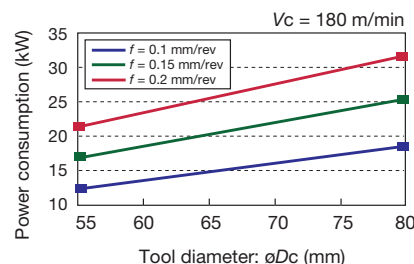
11  
Drilling Tools

## NEW Standard cutting conditions for DG chipbreaker

| Work materials                                                                       | Cutting speed<br>$V_c$ (m/min) | Feed: $f$ (mm/rev)     |
|--------------------------------------------------------------------------------------|--------------------------------|------------------------|
|                                                                                      |                                | $\phi 55 \sim \phi 80$ |
| Low carbon steels (C < 0.3)<br>SS400, SM490, S25C etc.<br>(St42-1, St52-3, C25 etc.) | 100 (60 - 180)                 | 0.07 (0.04-0.10)       |

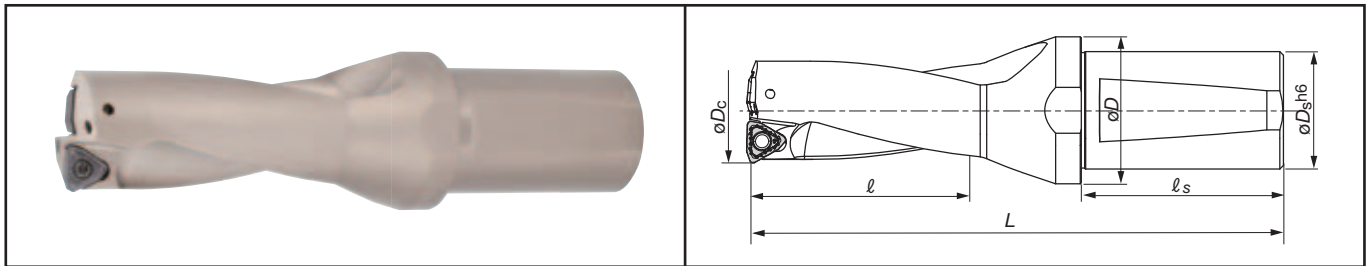
### Caution Machine

- Use drills on a fully covered machine to maintain safety.
- Use drills on a high powered machine such as a BT50.
- Figure on right shows reference of required machine power.



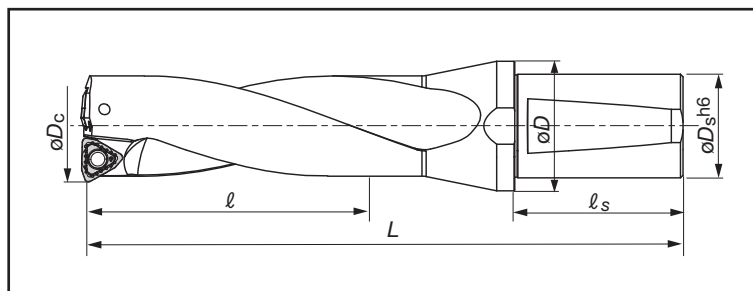
### Cutting coolant

- Use water soluble type coolant with internal supply.
- Coolant pressure higher than 1MPa is essential.


**L/D = 2**

| Cat. No     | Stock | Dimensions (mm)   |                   |                 |     |       |     | Max Offset (Radius) | Weight (kg) | Applicable inserts | Clamping screw | Torx driver |
|-------------|-------|-------------------|-------------------|-----------------|-----|-------|-----|---------------------|-------------|--------------------|----------------|-------------|
|             |       | $\varnothing D_c$ | $\varnothing D_s$ | $\varnothing D$ | $l$ | $l_s$ | L   |                     |             |                    |                |             |
| TDS280W32-2 | ●     | 28                | 32                | 40              | 56  | 55    | 145 | 1.3                 | 0.6         | WWMU08X408R-DJ     | CSTB-3         | T-9D        |
| TDS290W32-2 | ●     | 29                |                   |                 | 58  |       | 148 | 1.1                 | 0.7         |                    |                |             |
| TDS300W32-2 | ●     | 30                |                   |                 | 60  |       | 151 | 0.8                 | 0.7         |                    |                |             |
| TDS310W32-2 | ●     | 31                |                   |                 | 62  |       | 154 | 0.5                 | 0.7         |                    |                |             |
| TDS320W32-2 | ●     | 32                |                   |                 | 64  |       | 157 | 0.2                 | 0.8         |                    |                |             |
| TDS330W40-2 | ●     | 33                | 40                | 50              | 66  | 65    | 170 | 1.7                 | 1.2         | WWMU09X510R-DJ     | CSTB-4         | T-15D       |
| TDS340W40-2 | ●     | 34                |                   |                 | 68  |       | 173 | 1.4                 | 1.2         |                    |                |             |
| TDS350W40-2 | ●     | 35                |                   |                 | 70  |       | 176 | 1.2                 | 1.2         |                    |                |             |
| TDS360W40-2 | ●     | 36                |                   |                 | 72  |       | 179 | 0.9                 | 1.3         |                    |                |             |
| TDS370W40-2 | ●     | 37                |                   |                 | 74  |       | 182 | 0.7                 | 1.3         |                    |                |             |
| TDS380W40-2 | ●     | 38                |                   |                 | 76  |       | 185 | 0.4                 | 1.3         |                    |                |             |
| TDS390W40-2 | ●     | 39                | 40                | 50              | 78  | 65    | 188 | 2.2                 | 1.4         | WWMU11X512R-DJ     | CSTB-5         | T-20D       |
| TDS400W40-2 | ●     | 40                |                   |                 | 80  |       | 191 | 1.9                 | 1.4         |                    |                |             |
| TDS410W40-2 | ●     | 41                |                   |                 | 82  |       | 194 | 1.7                 | 1.5         |                    |                |             |
| TDS420W40-2 | ●     | 42                |                   | 55              | 84  |       | 197 | 1.5                 | 1.6         |                    |                |             |
| TDS430W40-2 | ●     | 43                |                   |                 | 86  |       | 200 | 1.3                 | 1.6         |                    |                |             |
| TDS440W40-2 | ●     | 44                |                   |                 | 88  |       | 203 | 1                   | 1.7         |                    |                |             |
| TDS450W40-2 | ●     | 45                |                   |                 | 90  |       | 206 | 0.7                 | 1.7         |                    |                |             |
| TDS460W40-2 | ●     | 46                |                   |                 | 92  |       | 209 | 0.4                 | 1.8         |                    |                |             |
| TDS470W40-2 | ●     | 47                | 40                | 55              | 94  | 65    | 212 | 2.6                 | 1.9         | WWMU13X512R-DJ     | CSTB-5         | T-20D       |
| TDS480W40-2 | ●     | 48                |                   |                 | 96  |       | 215 | 2.4                 | 1.9         |                    |                |             |
| TDS490W40-2 | ●     | 49                |                   |                 | 98  |       | 218 | 2.2                 | 1.9         |                    |                |             |
| TDS500W40-2 | ●     | 50                |                   |                 | 100 |       | 221 | 2                   | 2.0         |                    |                |             |
| TDS510W40-2 | ●     | 51                |                   |                 | 102 |       | 224 | 1.7                 | 2.1         |                    |                |             |
| TDS520W40-2 | ●     | 52                |                   |                 | 104 |       | 227 | 1.5                 | 2.2         |                    |                |             |
| TDS530W40-2 | ●     | 53                |                   |                 | 106 |       | 230 | 1.3                 | 2.3         |                    |                |             |
| TDS540W40-2 | ●     | 54                |                   |                 | 108 |       | 233 | 1                   | 2.4         |                    |                |             |

● : Stocked items

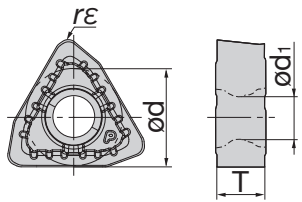


**L/D = 3**

| Cat. No     | Stock | Dimensions (mm) |            |          |        |          |     | Max Offset (Radius) | Weight (kg) | Applicable inserts | Clamping screw<br> | Torx driver<br> |
|-------------|-------|-----------------|------------|----------|--------|----------|-----|---------------------|-------------|--------------------|-------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
|             |       | $\phi D_c$      | $\phi D_s$ | $\phi D$ | $\ell$ | $\ell_s$ | L   |                     |             |                    |                                                                                                       |                                                                                                    |
| TDS280W32-3 | ●     | 28              | 32         | 40       | 84     | 55       | 173 | 1.3                 | 0.7         | WWMU08X408R-DJ     | CSTB-3                                                                                                | T-9D                                                                                               |
| TDS290W32-3 | ●     | 29              |            |          | 87     |          | 177 | 1.1                 | 0.7         |                    |                                                                                                       |                                                                                                    |
| TDS300W32-3 | ●     | 30              |            |          | 90     |          | 181 | 0.8                 | 0.8         |                    |                                                                                                       |                                                                                                    |
| TDS310W32-3 | ●     | 31              |            |          | 93     |          | 185 | 0.5                 | 0.8         |                    |                                                                                                       |                                                                                                    |
| TDS320W32-3 | ●     | 32              |            |          | 96     |          | 189 | 0.2                 | 0.9         |                    |                                                                                                       |                                                                                                    |
| TDS330W40-3 | ●     | 33              | 40         | 50       | 99     | 65       | 203 | 1.7                 | 1.3         | WWMU09X510R-DJ     | CSTB-4                                                                                                | T-15D                                                                                              |
| TDS340W40-3 | ●     | 34              |            |          | 102    |          | 207 | 1.4                 | 1.3         |                    |                                                                                                       |                                                                                                    |
| TDS350W40-3 | ●     | 35              |            |          | 105    |          | 211 | 1.2                 | 1.3         |                    |                                                                                                       |                                                                                                    |
| TDS360W40-3 | ●     | 36              |            |          | 108    |          | 215 | 0.9                 | 1.4         |                    |                                                                                                       |                                                                                                    |
| TDS370W40-3 | ●     | 37              |            |          | 111    |          | 219 | 0.7                 | 1.4         |                    |                                                                                                       |                                                                                                    |
| TDS380W40-3 | ●     | 38              |            |          | 114    |          | 223 | 0.4                 | 1.5         |                    |                                                                                                       |                                                                                                    |
| TDS390W40-3 | ●     | 39              | 40         | 50       | 117    | 65       | 227 | 2.2                 | 1.6         | WWMU11X512R-DJ     | CSTB-5                                                                                                | T-20D                                                                                              |
| TDS400W40-3 | ●     | 40              |            |          | 120    |          | 231 | 1.9                 | 1.6         |                    |                                                                                                       |                                                                                                    |
| TDS410W40-3 | ●     | 41              |            |          | 123    |          | 235 | 1.7                 | 1.7         |                    |                                                                                                       |                                                                                                    |
| TDS420W40-3 | ●     | 42              |            | 55       | 126    |          | 239 | 1.5                 | 1.8         |                    |                                                                                                       |                                                                                                    |
| TDS430W40-3 | ●     | 43              |            |          | 129    |          | 243 | 1.3                 | 1.8         |                    |                                                                                                       |                                                                                                    |
| TDS440W40-3 | ●     | 44              |            |          | 132    |          | 247 | 1                   | 1.9         |                    |                                                                                                       |                                                                                                    |
| TDS450W40-3 | ●     | 45              |            |          | 135    |          | 251 | 0.7                 | 2.0         |                    |                                                                                                       |                                                                                                    |
| TDS460W40-3 | ●     | 46              |            |          | 138    |          | 255 | 0.4                 | 2.1         |                    |                                                                                                       |                                                                                                    |
| TDS470W40-3 | ●     | 47              |            | 55       | 141    |          | 259 | 2.6                 | 2.2         |                    |                                                                                                       |                                                                                                    |
| TDS480W40-3 | ●     | 48              |            |          | 144    |          | 263 | 2.4                 | 2.3         |                    |                                                                                                       |                                                                                                    |
| TDS490W40-3 | ●     | 49              |            |          | 147    |          | 267 | 2.2                 | 2.3         |                    |                                                                                                       |                                                                                                    |
| TDS500W40-3 | ●     | 50              |            |          | 150    |          | 271 | 2                   | 2.4         |                    |                                                                                                       |                                                                                                    |
| TDS510W40-3 | ●     | 51              |            |          | 153    |          | 275 | 1.7                 | 2.5         |                    |                                                                                                       |                                                                                                    |
| TDS520W40-3 | ●     | 52              |            |          | 156    |          | 279 | 1.5                 | 2.6         |                    |                                                                                                       |                                                                                                    |
| TDS530W40-3 | ●     | 53              |            |          | 159    |          | 283 | 1.3                 | 2.7         |                    |                                                                                                       |                                                                                                    |
| TDS540W40-3 | ●     | 54              |            |          | 162    |          | 287 | 1                   | 2.9         |                    |                                                                                                       |                                                                                                    |

● : Stocked items

## Inserts



DJ chipbreaker

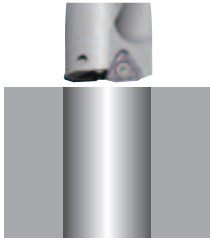
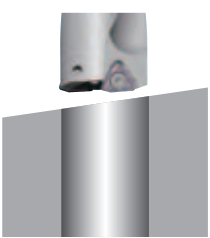
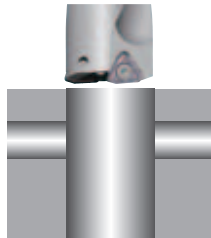
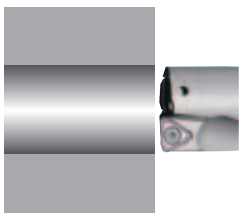
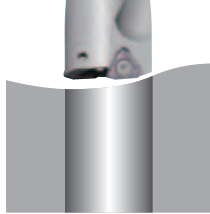
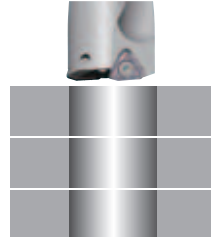
| Cat. No.       | Stocked grades | Dimensions (mm) |     |     |     | Applicable drill diameters<br>øDc (mm) |
|----------------|----------------|-----------------|-----|-----|-----|----------------------------------------|
|                | PREMIUMTEC     | ød              | T   | ød1 | rE  |                                        |
|                | NEW AH9030     |                 |     |     |     |                                        |
| WWMU08X408R-DJ | ●              | 8.0             | 3.9 | 3.4 | 0.8 | ø28.0 ~ ø32.0                          |
| WWMU09X510R-DJ | ●              | 9.7             | 4.9 | 4.4 | 1.0 | ø33.0 ~ ø38.0                          |
| WWMU11X512R-DJ | ●              | 11.3            | 5.7 | 5.5 | 1.2 | ø39.0 ~ ø46.0                          |
| WWMU13X512R-DJ | ●              | 13.0            | 5.7 | 5.5 | 1.2 | ø47.0 ~ ø54.0                          |

## Standard cutting conditions

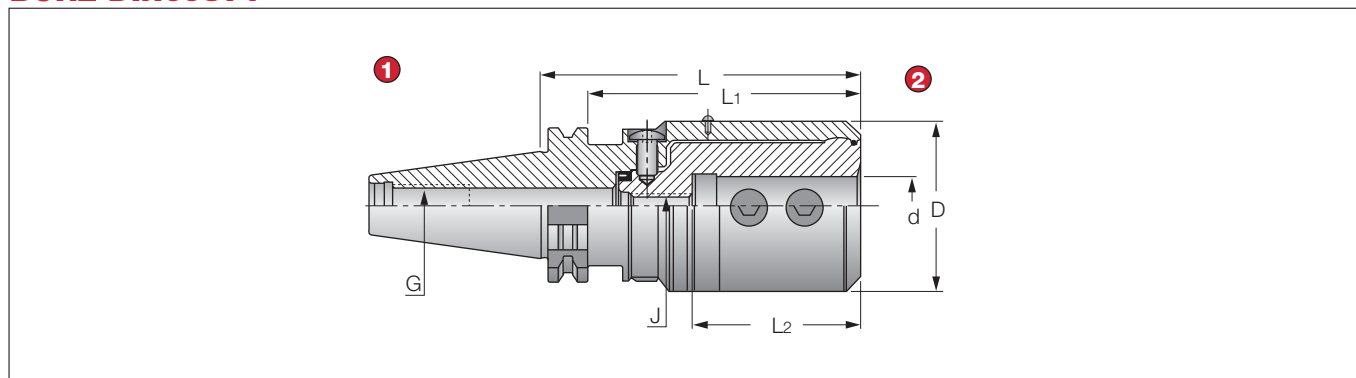
| Work materials                                                                               | Cutting Speed<br>Vc (m/min) | Feed: f (mm/rev)       |                        |
|----------------------------------------------------------------------------------------------|-----------------------------|------------------------|------------------------|
|                                                                                              |                             | $\phi D_c$ (mm)        |                        |
|                                                                                              |                             | $\phi 28 \sim \phi 32$ | $\phi 33 \sim \phi 54$ |
| Low carbon steels (C < 0.3)<br>SS400, SM490, S25C etc.<br>(St42-1, St52-3, C25 etc.)         | 160 - 320                   | 0.04 - 0.10            | 0.04 - 0.10            |
| Carbon steels (C > 0.3)<br>S45C, S55C etc. (C45, C55 etc.)                                   | 80 - 250                    | 0.06 - 0.15            | 0.08 - 0.18            |
| Low alloy steels<br>SCM415 etc.                                                              | 160 - 250                   | 0.06 - 0.12            | 0.06 - 0.14            |
| Alloy steels<br>SCM440, SCr420 etc.<br>(42CrMo4, 20Cr4 etc.)                                 | 80 - 200                    | 0.06 - 0.15            | 0.08 - 0.18            |
| Stainless steels (Austenitic)<br>SUS304, SUS316 etc.<br>(X5CrNi18-9, X5CrNiMo17-12-2 etc.)   | 100 - 200                   | 0.04 - 0.12            | 0.04 - 0.12            |
| Stainless steels (Martensitic and ferritic)<br>SUS430, SUS416 etc.<br>(X6Cr17, X20Cr13 etc.) | 100 - 200                   | 0.04 - 0.12            | 0.04 - 0.12            |
| Stainless steels (Precipitation hardening)<br>SUS630 etc. (X5CrNiCuNb16-4 etc.)              | 80 - 120                    | 0.04 - 0.10            | 0.06 - 0.10            |
| Grey cast irons<br>FC250 etc. (GG25 etc.)                                                    | 80 - 250                    | 0.06 - 0.18            | 0.08 - 0.20            |
| Ductile cast irons<br>FCD700 etc. (GGG70 etc.)                                               | 80 - 200                    | 0.06 - 0.18            | 0.08 - 0.20            |

## Application range

In case of Interrupted cutting, feed should be decreased.

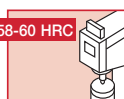
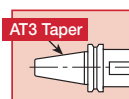
| Feed<br>f (mm/rev) | Upper table                                                                                                    | 0.05                                                                                                           | 0.05                                                                                                           | 0.05                                                                                                          |
|--------------------|----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| Application        | <b>OK</b> Plane surface<br> | <b>OK</b> Slant surface<br> | <b>OK</b> Cross hole<br>   | <b>OK</b> Plunging<br>   |
| Feed<br>f (mm/rev) | 0.1                                                                                                            | 0.05                                                                                                           | Disapprove                                                                                                     | Disapprove                                                                                                    |
| Application        | <b>OK</b> Boring<br>        | <b>OK</b> Round surface<br> | <b>✗</b> Stacked plate<br> | <b>✗</b> Back boring<br> |

## BORE DIN69871



1 BORE DIN69871 Form A/B

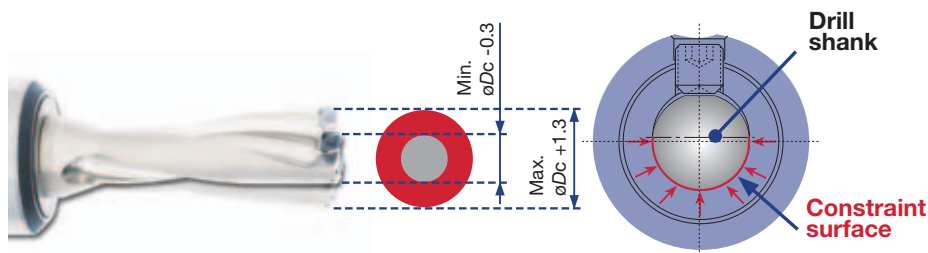
2 ISO 9766



## BORE DIN69871 Adjustable Drilling Diameter Holder

| Cat. No.               | Dimensions (mm) |          |       |       |       |     |     |
|------------------------|-----------------|----------|-------|-------|-------|-----|-----|
|                        | $\phi d$        | $\phi D$ | L     | $L_1$ | $L_2$ | J   | G   |
| TUNGBOREDIN6987140EM16 | 16              | 72       | 135.6 | 116.5 | 71    | M10 | M16 |
| TUNGBOREDIN6987140EM20 | 20              | 72       | 135.6 | 116.5 | 71    | M10 | M16 |
| TUNGBOREDIN6987140EM25 | 25              | 72       | 135.6 | 116.5 | 71    | M10 | M16 |
| TUNGBOREDIN6987140EM32 | 32              | 72       | 135.6 | 116.5 | 71    | M10 | M16 |
| TUNGBOREDIN6987140EM40 | 40              | 72       | 135.6 | 116.5 | 71    | M10 | M16 |
| TUNGBOREDIN6987150EM16 | 16              | 72       | 115.6 | 96.5  | 71    | M10 | M24 |
| TUNGBOREDIN6987150EM20 | 20              | 72       | 115.6 | 96.5  | 71    | M10 | M24 |
| TUNGBOREDIN6987150EM25 | 25              | 72       | 115.6 | 96.5  | 71    | M10 | M24 |
| TUNGBOREDIN6987150EM32 | 32              | 72       | 115.6 | 96.5  | 71    | M10 | M24 |
| TUNGBOREDIN6987150EM40 | 40              | 72       | 115.6 | 96.5  | 71    | M10 | M24 |

Add B for coolant through the flange.

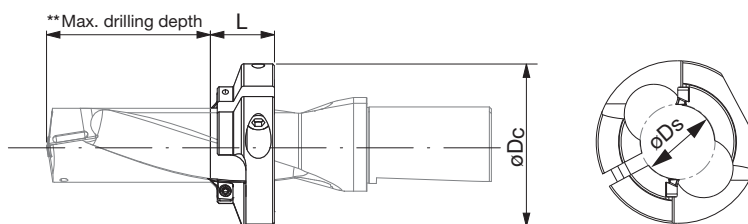


The bore section is actually made from two shifted circular sections. The clamping screw pushes the drill shank through a narrow opening, forcing elastic deformation of the holder. Contact is made around more than 180°, providing a high clamping force.

\* Adjustable range of diameter in TDX drill is different by each item.  
Therefore, please refer to the maximum offset value shown in TDX drill leaflet.

# Chamfering ring

## TDXCF



| Cat. No.    | Stock | Dimensions (mm) |     |    |           | Application drill | **Max. drilling depth (mm) |         |         |         |
|-------------|-------|-----------------|-----|----|-----------|-------------------|----------------------------|---------|---------|---------|
|             |       | øDs             | øDc | L  | Tool Dia. |                   | L/D = 2                    | L/D = 3 | L/D = 4 | L/D = 5 |
| TDXCF130L25 |       | 12.55           | 49  | 25 | 12.5      | TDX125W20-*       | 7.3                        | 19.8    | 32.3    | 44.8    |
|             |       |                 |     |    | 13.0      | TDX130W20-*       | 8.4                        | 21.4    | 34.4    | 47.4    |
| TDXCF140L25 |       | 13.25           | 49  | 25 | 13.5      | TDX135W20-*       | 9.6                        | 23.1    | 36.6    | 50.1    |
|             |       |                 |     |    | 14.0      | TDX140W20-*       | 10.7                       | 24.7    | 38.7    | 52.7    |
| TDXCF150L25 |       | 14.25           | 49  | 25 | 14.5      | TDX145W20-*       | 11.9                       | 26.4    | 40.9    | 55.4    |
|             |       |                 |     |    | 15.0      | TDX150W20-*       | 13.0                       | 28.0    | 43.0    | 58.0    |
| TDXCF160L25 |       | 15.25           | 49  | 25 | 15.5      | TDX155W20-*       | 14.2                       | 29.7    | 45.2    | 60.7    |
|             |       |                 |     |    | 16.0      | TDX160W20-*       | 15.3                       | 31.3    | 47.3    | 63.3    |
| TDXCF170L25 |       | 16.25           | 49  | 25 | 16.5      | TDX165W20-*       | 16.5                       | 33.0    | 49.5    | 66.0    |
|             |       |                 |     |    | 17.0      | TDX170W20-*       | 17.6                       | 34.6    | 51.6    | 68.6    |
| TDXCF180L25 | ●     | 17.3            | 49  | 25 | 17.5      | TDX175W25-*       | 18.8                       | 36.3    | 53.8    | 71.3    |
|             |       |                 |     |    | 18.0      | TDX180W25-*       | 19.9                       | 37.9    | 55.9    | 73.9    |
| TDXCF190L25 | ●     | 18.1            | 49  | 25 | 18.5      | TDX185W25-*       | 21.1                       | 39.6    | 58.1    | 76.6    |
|             |       |                 |     |    | 19.0      | TDX190W25-*       | 22.2                       | 41.2    | 60.2    | 79.2    |
| TDXCF200L25 | ●     | 19.1            | 49  | 25 | 19.5      | TDX195W25-*       | 23.4                       | 42.9    | 62.4    | 81.9    |
|             |       |                 |     |    | 20.0      | TDX200W25-*       | 24.5                       | 44.5    | 64.5    | 84.5    |
| TDXCF210L25 | ●     | 20.1            | 49  | 25 | 20.5      | TDX205W25-*       | 25.7                       | 46.2    | 66.7    | 87.2    |
|             |       |                 |     |    | 21.0      | TDX210W25-*       | 26.8                       | 47.8    | 68.8    | 89.8    |
| TDXCF220L25 | ●     | 21.1            | 49  | 25 | 21.5      | TDX215W25-*       | 28.0                       | 49.5    | 71.0    | 92.5    |
|             |       |                 |     |    | 22.0      | TDX220W25-*       | 29.1                       | 51.1    | 73.1    | 95.1    |
| TDXCF230L25 | ●     | 22.1            | 49  | 25 | 22.5      | TDX225W25-*       | 30.3                       | 52.8    | 75.3    | 97.8    |
|             |       |                 |     |    | 23.0      | TDX230W25-*       | 31.4                       | 54.4    | 77.4    | 100.4   |
| TDXCF240L25 | ●     | 23.1            | 49  | 25 | 23.5      | TDX235W25-*       | 32.6                       | 56.1    | 79.6    | 103.1   |
|             |       |                 |     |    | 24.0      | TDX240W25-*       | 33.7                       | 57.7    | 81.7    | 105.7   |
| TDXCF250L25 | ●     | 23.95           | 49  | 25 | 24.5      | TDX245W25-*       | 34.9                       | 59.4    | 83.9    | 108.4   |
|             |       |                 |     |    | 25.0      | TDX250W25-*       | 36.0                       | 61.0    | 86.0    | 111.0   |
| TDXCF260L30 | ●     | 24.95           | 64  | 30 | 25.5      | TDX255W25-*       | 32.2                       | 57.7    | 83.2    | 108.7   |
|             |       |                 |     |    | 26.0      | TDX260W25-*       | 33.3                       | 59.3    | 85.3    | 111.3   |
| TDXCF270L30 | ●     | 25.9            | 64  | 30 | 27.0      | TDX270W32-*       | 35.6                       | 62.6    | 89.6    | 116.6   |
| TDXCF280L30 | ●     | 26.9            | 64  | 30 | 28.0      | TD□280W32-*       | 37.9                       | 65.9    | 93.9    | 121.9   |
| TDXCF290L30 | ●     | 27.9            | 64  | 30 | 29.0      | TD□290W32-*       | 40.2                       | 69.2    | 98.2    | 127.2   |
| TDXCF300L30 | ●     | 28.9            | 64  | 30 | 30.0      | TD□300W32-*       | 42.5                       | 72.5    | 102.5   | 132.5   |
| TDXCF310L30 | ●     | 29.9            | 64  | 30 | 31.0      | TD□310W32-*       | 44.8                       | 75.8    | 106.8   | 137.8   |
| TDXCF320L30 | ●     | 30.9            | 64  | 30 | 32.0      | TD□320W32-*       | 47.1                       | 79.1    | 111.1   | 143.1   |
| TDXCF330L30 |       | 31.8            | 64  | 30 | 33.0      | TD□330W40-*       | 49.4                       | 82.4    | 115.4   | 148.4   |
| TDXCF340L30 |       | 32.8            | 64  | 30 | 34.0      | TD□340W40-*       | 51.7                       | 85.7    | 119.7   | 153.7   |
| TDXCF350L30 |       | 33.8            | 64  | 30 | 35.0      | TD□350W40-*       | 54.0                       | 89.0    | 124.0   | 159.0   |
| TDXCF360L30 |       | 34.8            | 85  | 30 | 36.0      | TD□360W40-*       | 57.3                       | 93.3    | 129.3   | 165.3   |
| TDXCF370L30 |       | 35.8            | 85  | 30 | 37.0      | TD□370W40-*       | 58.6                       | 95.6    | 132.6   | 169.6   |
| TDXCF380L30 |       | 36.8            | 85  | 30 | 38.0      | TD□380W40-*       | 60.9                       | 98.9    | 136.9   | 174.9   |
| TDXCF390L30 |       | 37.8            | 85  | 30 | 39.0      | TD□390W40-*       | 63.2                       | 102.2   | 141.2   | 180.2   |
| TDXCF400L30 |       | 38.8            | 85  | 30 | 40.0      | TD□400W40-*       | 65.5                       | 105.5   | 145.5   | 185.5   |
| TDXCF410L30 |       | 39.8            | 85  | 30 | 41.0      | TD□410W40-*       | 67.8                       | 108.8   | 149.8   | 190.8   |
| TDXCF420L30 |       | 40.6            | 85  | 30 | 42.0      | TD□420W40-*       | 70.1                       | 112.1   | 154.1   | 196.1   |
| TDXCF430L30 |       | 41.6            | 85  | 30 | 43.0      | TD□430W40-*       | 72.4                       | 115.4   | 158.4   | 201.4   |
| TDXCF440L30 |       | 42.6            | 85  | 30 | 44.0      | TD□440W40-*       | 74.7                       | 118.7   | 162.7   | 206.7   |
| TDXCF450L30 |       | 43.6            | 85  | 30 | 45.0      | TD□450W40-*       | 77.0                       | 122.0   | 167.0   | 212.0   |
| TDXCF460L30 |       | 44.6            | 85  | 30 | 46.0      | TD□460W40-*       | 80.3                       | 126.3   | 172.3   | 218.3   |
| TDXCF470L30 |       | 45.6            | 85  | 30 | 47.0      | TD□470W40-*       | 81.6                       | 128.6   | 175.6   | 222.6   |
| TDXCF480L30 |       | 46.6            | 85  | 30 | 48.0      | TD□480W40-*       | 83.9                       | 131.9   | 179.9   | 227.9   |
| TDXCF490L30 |       | 47.6            | 85  | 30 | 49.0      | TD□490W40-*       | 86.2                       | 135.2   | 184.2   | 233.2   |
| TDXCF500L30 |       | 48.6            | 85  | 30 | 50.0      | TD□500W40-*       | 88.5                       | 138.5   | 188.5   | 238.5   |
| TDXCF510L30 |       | 49.6            | 85  | 30 | 51.0      | TD□510W40-*       | 90.8                       | 141.8   | 192.8   | 243.8   |
| TDXCF520L30 |       | 50.6            | 85  | 30 | 52.0      | TD□520W40-*       | 93.1                       | 145.1   | 197.1   | 249.1   |
| TDXCF530L30 |       | 51.6            | 85  | 30 | 53.0      | TD□530W40-*       | 95.4                       | 148.4   | 201.4   | 254.4   |
| TDXCF540L30 |       | 52.6            | 85  | 30 | 54.0      | TD□540W40-*       | 97.7                       | 151.7   | 205.7   | 259.7   |

● : Stocked items

# Chamfering ring

## Chamfering tool insert & part list

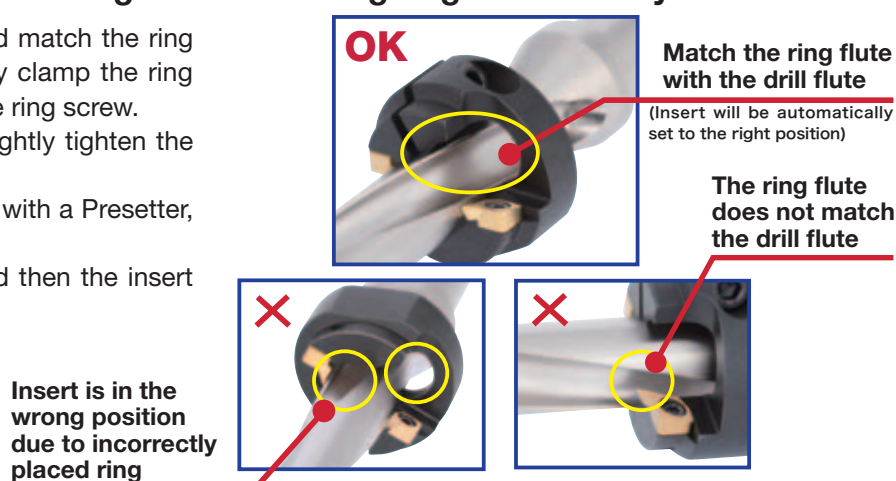
**TUNGDRILLBIG**

| Cat. No.                                                                | Insert          | Stocked grade | Insert clamping screw | Torque (N·m) | Ring clamping screw | Torque (N·m) | Wrench for insert | Wrench for ring |
|-------------------------------------------------------------------------|-----------------|---------------|-----------------------|--------------|---------------------|--------------|-------------------|-----------------|
|                                                                         |                 | GH130         |                       |              |                     |              |                   |                 |
| TDXCF130L25<br>↓<br>TDXCF250L25<br>↓<br>TDXCF260L30<br>↓<br>TDXCF540L30 | XHGX090700R-45A | ●             | CSPB-4S               | 3.5          | CM6X16              | 7.0          | T-15D             | P-5             |
|                                                                         |                 |               |                       |              | CM8 x 20            | 8.0          |                   |                 |

● : Stocked items

### Points of caution when mounting the chamfering ring on drill body

- ① Place the ring on the drill body and match the ring flute with the drill flute. Temporarily clamp the ring on the body by lightly tightening the ring screw. Place the inserts on the ring and lightly tighten the insert screws.
- ② Adjust the ring to the right position with a Presetter, height gauge or Vernier caliper.
- ③ Securely tighten the ring screw and then the insert screw.



### Cautious points for TDX and TDS

#### Using TungdrillTwisted

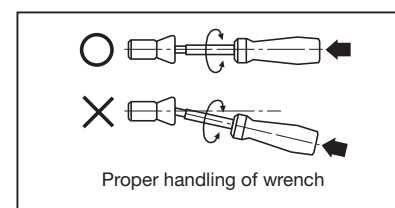
- Ensure that the drilling machine to be used has sufficient rigidity and motor output.
- Not recommended for drilling stacked plates.
- Be sure to carry out proper alignment when drilling is to be performed on a rotating workpiece.

#### Cutting fluid

- Be sure to supply cutting fluid through the tool.
- A water soluble emulsifiable type cutting fluid should be used.
- Fluid pressure of 1 MPa or higher and fluid quantity of 7R/min or more are essential. For 4D and 5D type, a fluid pressure of 1.5 MPa or higher and fluid quantity of 10R/min or more is recommended.

#### Cautionary points for setting inserts

- Before installing the insert in the drill body, remove all foreign matter from the insert pocket.
- When clamping and unclamping the insert, the center-line of the wrench should be aligned with the center-line of the screw. Misalignment may result in deformation of the socket of the screw head or the tip of the wrench.
- When installing the insert, eliminate all play between the insert pocket and the bottom face of the insert.
- Replace the screw before it will be excessively deformed or worn out by long term use.



# EZ Sleeve

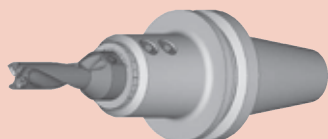
## Use EZ sleeves for the following purposes

### Hole diameter adjustment on the milling machine

#### Adjusting the finishing diameter when milling

Adjusting the finishing diameter in tool-rotating applications such as on machining centres and milling machines:

By using **EZ sleeve**, the finishing diameter can be adjusted in the range from **+0.6 mm to -0.2 mm**.



Scale for adjusting finishing diameter in milling (Periphery of sleeve)

### Adjusting cutting edge height on lathe

Adjusting of the cutting edge height in work rotating applications such as on lathes:

By using **EZ sleeve**, the cutting edge height can be adjusted in the range from **+0.3 mm to -0.2 mm**. It results in eliminating troubles caused by improper cutting-edge height.

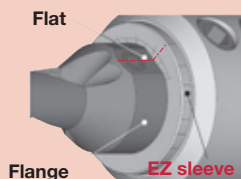


Scale for adjusting cutting edge height in turning (Front face of sleeve)

## Setting of EZ sleeve

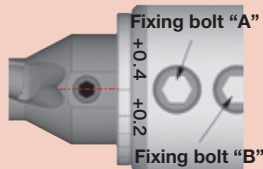
### Adjusting finishing diameter in milling

As shown in the Figure below, set the EZ sleeve between the drill shank and the toolholder.



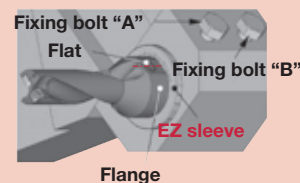
Align the graduated scale on the periphery of the EZ sleeve with the center of the flat of the drill flange.

In the Figure shown below, the sleeve is set so that the finishing diameter will be increased by 0.4 mm.



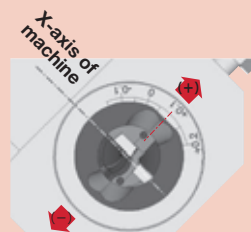
### Adjusting cutting edge height on lathe

As shown in the Figure below, set the EZ sleeve between the drill shank and the toolblock.



Align the graduated scale on the front face of the Esleeve with the center of the flat of the drill flange.

In the Figure shown below, the sleeve is set so that the center of the drill will shift by 0.1 mm to the plus (+) direction.



When rotating the EZ sleeve, insert the wrench into the hole at the flange periphery and rotate the EZ sleeve.

Screws A + B have to be loosened.

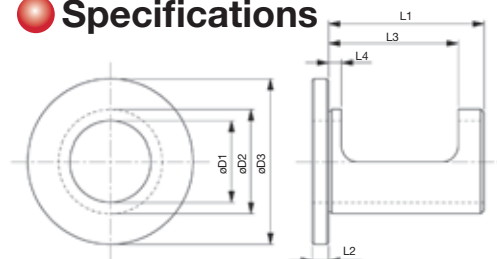
Secure the drill by screw A. Secure the EZ sleeve by lightly tightening screw B.

Tighten screw B only lightly otherwise EZ sleeve can be damaged!

### Cautious points

- Can not be used for collect chuck holders.
- Over L/D 4 or bigger adjustment, please reduce feed.
- For smaller adjustment, the drill itself will interfere with the hole diameter. It is recommended that hole diameter should be adjusted to a larger diameter than the drill diameter.

## Specifications



| Sleeve Cat. No. | Stock | øD1 | øD2 | øD3 | L1 | L2 | L3   | L4 | Adjusting range of finishing diameter | Adjusting range of cutting edge height |
|-----------------|-------|-----|-----|-----|----|----|------|----|---------------------------------------|----------------------------------------|
| <b>EZ2025</b>   | ●     | 20  | 25  | 46  | 49 | 5  | 32.5 | 4  | +0.4 ~ - 0.2                          | +0.2 ~ - 0.15                          |
| <b>EZ2532</b>   | ●     | 25  | 32  | 51  | 52 | 5  | 38   | 4  | +0.4 ~ - 0.2                          | +0.2 ~ - 0.15                          |
| <b>EZ3240</b>   | ●     | 32  | 40  | 54  | 62 | 5  | 43   | 4  | +0.4 ~ - 0.2                          | +0.2 ~ - 0.15                          |
| <b>EZ4050</b>   | ●     | 40  | 50  | 69  | 63 | 5  | 55   | 4  | +0.6 ~ - 0.2                          | +0.3 ~ - 0.2                           |

Note: Select the sleeve so that the D1 of the sleeve will be same as the diameter of the drill shank.



# Designation System for TAC Drilling Inserts

| Symbol | Shape                                 | Included angle (degree) | Outlined figure |
|--------|---------------------------------------|-------------------------|-----------------|
| H      | Hexagonal                             | 120°                    |                 |
| S      | Square                                | 90°                     |                 |
| T      | Triangular                            | 60°                     |                 |
| C      | Rhombic                               | 80°                     |                 |
| E      |                                       | 75°                     |                 |
| G      |                                       | 70°                     |                 |
| L      | Rectangular                           | 90°                     |                 |
| A      | Parallelogram                         | 85°                     |                 |
| R      | Round                                 |                         |                 |
| W      | Trigon                                | 80°                     |                 |
| X      | Special                               | Others angle            |                 |
| Y      | Special                               |                         |                 |
| Z      | Special shape for ball endmills, etc. |                         |                 |

① Shape

| Symbol | Relief angle (degree) |
|--------|-----------------------|
| D      | 15°                   |
| E      | 20°                   |
| F      | 25°                   |
| G      | 30°                   |
| N      | 0°                    |
| P      | 11°                   |
| O      |                       |
| S      | Others                |
| W      | Others                |
| X      | Others                |

② Relief angle

| Inscribed circle dia. | Tolerance on inscribed circle (ød) |           | Tolerance on corner height (mm) |          |
|-----------------------|------------------------------------|-----------|---------------------------------|----------|
|                       | J,K,L,M,N (class)                  | U (class) | M,N(class)                      | U(class) |
| 6.35                  | ±0.05                              | ±0.08     | ±0.08                           | ±0.13    |
| 9.525                 |                                    |           |                                 |          |
| 12.7                  | ±0.08                              | ±0.13     | ±0.13                           | ±0.2     |
| 15.875                | ±0.1                               | ±0.18     | ±0.15                           | ±0.27    |
| 19.05                 |                                    |           |                                 |          |
| 25.4                  | ±0.13                              | ±0.25     | ±0.18                           | ±0.38    |

| Symbol | Tolerance on corner height | Tolerance on thickness | Tolerance on inscribed circle |
|--------|----------------------------|------------------------|-------------------------------|
| A      | ±0.005                     | ±0.025                 | ±0.025                        |
| C      | ±0.013                     | ±0.025                 | ±0.025                        |
| E      | ±0.025                     | ±0.025                 | ±0.025                        |
| G      | ±0.025                     | ±0.13                  | ±0.025                        |
| H      | ±0.013                     | ±0.025                 | ±0.013                        |
| K      | ±0.013                     | ±0.025                 | ±0.05 ~ ±0.13                 |
| M      | ±0.08 ~ ±0.18              | ±0.13                  | ±0.05 ~ ±0.13                 |
| N      | ±0.08 ~ ±0.18              | ±0.025                 | ±0.05 ~ ±0.13                 |

③ Tolerance class (mm)

Example

Metric system



| ④ Insert type |         |                                                             |               |               |
|---------------|---------|-------------------------------------------------------------|---------------|---------------|
| Symbol        | Hole    | Hole shape                                                  | Chip groove   | Section shape |
| N             | Without | -                                                           | Without       |               |
| R             |         |                                                             | On one side   |               |
| F             |         |                                                             | On both sides |               |
| W             | With    | Partially cylindrical hole with 40°~60° mouth on one side   | Without       |               |
| T             |         |                                                             | On one side   |               |
| Q             |         |                                                             | On both sides |               |
| U             |         | Partially cylindrical hole with 40°~60° mouth on both sides | Without       |               |
| B             |         |                                                             | On both sides |               |
| H             |         | Partially cylindrical hole with 70°~90° mouth on one side   | Without       |               |
| C             |         |                                                             | On one side   |               |
| J             |         | Partially cylindrical hole with 70°~90° mouth on both sides | Without       |               |
| X             |         |                                                             | On both sides |               |

| ⑤ Cutting edge length |                         |
|-----------------------|-------------------------|
| Symbol                | Cutting edge length (ℓ) |
| S                     |                         |
| T                     |                         |
| R                     |                         |
| H                     |                         |
| A                     |                         |

Example



| 6 Thickness |                    |
|-------------|--------------------|
| Symbol      | Thickness.<br>(mm) |
| 01          | 1.59               |
| 02          | 2.38               |
| X3          | 3.00               |
| 03          | 3.18               |
| H3          | 3.60               |
| T3          | 3.97               |
| 04          | 4.76               |
| 05          | 5.56               |

| 7 Corner radius |                                      |
|-----------------|--------------------------------------|
|                 |                                      |
| Symbol          | Corner radius<br>$r_{\epsilon}$ (mm) |
| 04              | 0.4                                  |
| 08              | 0.8                                  |
| 12              | 1.2                                  |
| 16              | 1.6                                  |
| 20              | 2.0                                  |
| 24              | 2.4                                  |

| 8 Cutting edge condition |                          |       |
|--------------------------|--------------------------|-------|
| Symbol                   | Condition                | Shape |
| F                        | Sharp edge               |       |
| E                        | Round honing             |       |
| T                        | Chamfer honing           |       |
| S                        | Combination honing       |       |
| P                        | Combination round honing |       |

| 9 Hand of insert |         |
|------------------|---------|
| Symbol           | Hand    |
| R                | Right   |
| L                | Left    |
| N                | Neutral |

| 10 Special feature |                     |
|--------------------|---------------------|
| D                  | For Drilling        |
| D2                 | For Drilling        |
| D4                 | For Drilling        |
| DC                 | For Drilling        |
| DG                 | For mild steel      |
| DJ                 | For general         |
| DS                 | For stainless steel |
| DW                 | Wiper               |

# TAC Inserts for TAC Drills

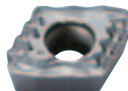
## ● WWMU□□□□□R-DJ

**TUNG**SIX-DRILL

| Shape                                                                             | Cat. No.       |  | Accuracy | Honing | Stocked grades |  |  |  | Applicable drill diameters | Applicable TAC drills (Page)                                                                                |
|-----------------------------------------------------------------------------------|----------------|--|----------|--------|----------------|--|--|--|----------------------------|-------------------------------------------------------------------------------------------------------------|
|                                                                                   |                |  |          |        | Coated         |  |  |  |                            |                                                                                                             |
|                                                                                   |                |  |          |        | NEW            |  |  |  |                            |                                                                                                             |
|                                                                                   |                |  |          |        | AH9030         |  |  |  |                            |                                                                                                             |
|  | WWMU08X408R-DJ |  | M        | With   | ●              |  |  |  | ø28.0 ~ ø32.0              | NEW<br>TAC drill TDS<br> |
|                                                                                   | WWMU09X510R-DJ |  |          |        | ●              |  |  |  | ø33.0 ~ ø38.0              |                                                                                                             |
|                                                                                   | WWMU11X512R-DJ |  |          |        | ●              |  |  |  | ø39.0 ~ ø46.0              |                                                                                                             |
|                                                                                   | WWMU13X512R-DJ |  |          |        | ●              |  |  |  | ø47.0 ~ ø54.0              |                                                                                                             |

## ● XPMT□□□□□R-DG

**TUNG**DRILLTWISTED  
**TUNG**DRILLBIG

| Shape                                                                               | Cat. No.       |  | Accuracy | Honing | Stocked grades |  |  |  | Applicable drill diameters | Applicable TAC drills (Page) |
|-------------------------------------------------------------------------------------|----------------|--|----------|--------|----------------|--|--|--|----------------------------|------------------------------|
|                                                                                     |                |  |          |        | Coated         |  |  |  |                            |                              |
|                                                                                     |                |  |          |        | NEW            |  |  |  |                            |                              |
|                                                                                     |                |  |          | AH725  |                |  |  |  |                            |                              |
|  | XPMT08T308R-DG |  | M        | With   | ●              |  |  |  | ø27.0 ~ ø32.0              | NEW                          |
|                                                                                     | XPMT110412R-DG |  |          |        | ●              |  |  |  | ø33.0 ~ ø41.0              | TAC drill TDX                |
|                                                                                     | XPMT150512R-DG |  |          |        | ●              |  |  |  | ø42.0 ~ ø54.0              |                              |

## ● XPMT□□□□□R-DJ

**TUNG**DRILLTWISTED  
**TUNG**DRILLBIG

| Shape                                                                               | Cat. No.       |  | Accuracy | Honing | Stocked grades |              |       |  |  | Applicable drill diameters | Applicable TAC drills (Page)              |
|-------------------------------------------------------------------------------------|----------------|--|----------|--------|----------------|--------------|-------|--|--|----------------------------|-------------------------------------------|
|                                                                                     |                |  |          |        | Coated         |              |       |  |  |                            |                                           |
|                                                                                     |                |  |          |        | NEW<br>AH725   | NEW<br>AH740 | T1115 |  |  |                            |                                           |
|  | XPMT040104R-DJ |  | M        | With   | ●              | ●            | ●     |  |  | ø12.5 ~ ø14.5              | NEW<br>TAC drill TDX<br><div>▶ 11-8</div> |
|                                                                                     | XPMT050204R-DJ |  |          |        | ●              | ●            | ●     |  |  | ø15.0 ~ ø17.0              |                                           |
|                                                                                     | XPMT06X308R-DJ |  |          |        | ●              | ●            | ●     |  |  | ø17.5 ~ ø21.5              |                                           |
|                                                                                     | XPMT07H308R-DJ |  |          |        | ●              | ●            | ●     |  |  | ø22.0 ~ ø26.0              |                                           |
|                                                                                     | XPMT08T308R-DJ |  |          |        | ●              | ●            | ●     |  |  | ø26.5 ~ ø32.0              |                                           |
|                                                                                     | XPMT110412R-DJ |  |          |        | ●              | ●            | ●     |  |  | ø33.0 ~ ø41.0              |                                           |
|                                                                                     | XPMT150512R-DJ |  |          |        | ●              | ●            | ●     |  |  | ø42.0 ~ ø54.0              |                                           |

● : Stocked items

## ● XPMT□□□□□R-DS

| Shape                                                                             | Cat. No.       |  | Accuracy | Honing | Stocked grades |       |  |  |  | Applicable drill diameters | Applicable TAC drills (Page)       |
|-----------------------------------------------------------------------------------|----------------|--|----------|--------|----------------|-------|--|--|--|----------------------------|------------------------------------|
|                                                                                   |                |  |          |        | Coated         |       |  |  |  |                            |                                    |
|                                                                                   |                |  |          |        | NEW<br>AH725   | AH120 |  |  |  |                            |                                    |
|  | XPMT040104R-DS |  | M        | With   | ●              | ●     |  |  |  | ø12.5 ~ ø14.5              | NEW<br>TAC drill TDX<br><br>▶ 11-8 |
|                                                                                   | XPMT050204R-DS |  |          |        | ●              | ●     |  |  |  | ø15.0 ~ ø17.0              |                                    |
|                                                                                   | XPMT06X308R-DS |  |          |        | ●              | ●     |  |  |  | ø17.5 ~ ø21.5              |                                    |
|                                                                                   | XPMT07H308R-DS |  |          |        | ●              | ●     |  |  |  | ø22.0 ~ ø26.0              |                                    |
|                                                                                   | XPMT08T308R-DS |  |          |        | ●              | ●     |  |  |  | ø26.5 ~ ø32.0              |                                    |
|                                                                                   | XPMT110412R-DS |  |          |        | ●              | ●     |  |  |  | ø33.0 ~ ø41.0              |                                    |
|                                                                                   | XPMT150512R-DS |  |          |        | ●              | ●     |  |  |  | ø42.0 ~ ø54.0              |                                    |

## ● XPMT□□□□□R-DW

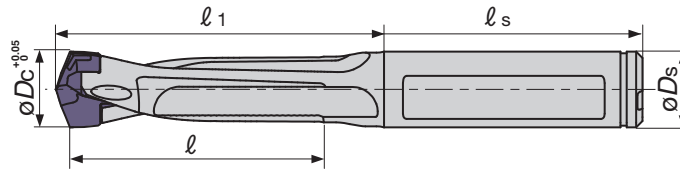
| Shape                                                                               | Cat. No.       |  | Accuracy | Honing | Stocked grades |       |       |  |  | Applicable drill diameters | Applicable TAC drills (Page)                                                                                  |
|-------------------------------------------------------------------------------------|----------------|--|----------|--------|----------------|-------|-------|--|--|----------------------------|---------------------------------------------------------------------------------------------------------------|
|                                                                                     |                |  |          |        | Coated         |       |       |  |  |                            |                                                                                                               |
|                                                                                     |                |  |          |        | NEW<br>AH725   | AH120 | AH740 |  |  |                            |                                                                                                               |
|  | XPMT040104R-DW |  | M        | With   | ●              | ●     | ●     |  |  | ø12.5 ~ ø14.5              | NEW<br>TAC drill TDX<br> |
|                                                                                     | XPMT050204R-DW |  |          |        | ●              | ●     | ●     |  |  | ø15.0 ~ ø17.0              |                                                                                                               |
|                                                                                     | XPMT06X308R-DW |  |          |        | ●              | ●     | ●     |  |  | ø17.5 ~ ø21.5              |                                                                                                               |
|                                                                                     | XPMT07H308R-DW |  |          |        | ●              | ●     | ●     |  |  | ø22.0 ~ ø26.0              |                                                                                                               |
|                                                                                     | XPMT08T308R-DW |  |          |        | ●              | ●     | ●     |  |  | ø26.5 ~ ø32.0              |                                                                                                               |
|                                                                                     | XPMT110412R-DW |  |          |        | ●              | ●     | ●     |  |  | ø33.0 ~ ø41.0              |                                                                                                               |
|                                                                                     | XPMT150512R-DW |  |          |        | ●              | ●     | ●     |  |  | ø42.0 ~ ø54.0              |                                                                                                               |

● : Stocked items

**3**  
L/D

**140°**  
Point angle

## Drill body

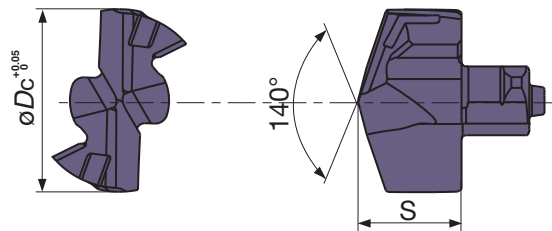


| Cat. No.     | Stock | Dimensions (mm) |           |     |       |       | Pocket size | Lamping key (included) | Applicable head        |
|--------------|-------|-----------------|-----------|-----|-------|-------|-------------|------------------------|------------------------|
|              |       | $\phi Dc$       | $\phi Ds$ | $l$ | $l_1$ | $l_s$ |             |                        |                        |
| TIDC100C10-3 | ●     | 10 ~ 10.4       | 10        | 30  | 45.2  | 41    | 10          | K-TID10-19.99          | DMP103                 |
| TIDC120C12-3 | ●     | 12 ~ 12.4       | 12        | 36  | 52    | 41    | 12          |                        | DMP120, DMP121         |
| TIDC140C14-3 | ●     | 14 ~ 14.4       | 14        | 42  | 59.2  | 44    | 14          |                        | DMP140, DMP141         |
| TIDC150C15-3 | ●     | 15 ~ 15.9       | 15        | 45  | 62.7  | 45    | 15          |                        | DMP150, DMP155, DMP156 |
| TIDC170C17-3 | ●     | 17 ~ 17.9       | 17        | 51  | 71.9  | 48    | 17          |                        | DMP175                 |
| TIDC190C19-3 | ●     | 19 ~ 19.9       | 19        | 57  | 78.6  | 54    | 19          |                        | DMP195                 |

• Please select the drill head which diameter must be bigger than drill body. (Applicable drill head with diameter  $\phi Dc$  shown in above table.)

• Machined hole diameter may change depend on the rigidity of machine or cutting condition.

## Drill head



| Cat. No. | Stock | Dimensions (mm) |      | Pocket size | Applicable drill body | Applicable screw size |
|----------|-------|-----------------|------|-------------|-----------------------|-----------------------|
|          | AH725 | $\phi Dc$       | S    |             |                       |                       |
| DMP103   | ●     | 10.3            | 6.2  | 10          | TIDC100C10-3          | M12x1.75              |
| DMP120   | ●     | 12.0            | 7.0  | 12          | TIDC120C12-3          | M14x2                 |
| DMP121   | ●     | 12.1            | 7.0  | 12          |                       | (M14x2)               |
| DMP140   | ●     | 14.0            | 8.15 | 14          | TIDC140C14-3          | M16x2                 |
| DMP141   | ●     | 14.1            | 8.15 | 14          |                       | (M16x2)               |
| DMP150   | ●     | 15.0            | 8.73 | 15          | TIDC150C15-3          | M16x1.0               |
| DMP155   | ●     | 15.5            | 8.73 | 15          |                       | M18x2.5               |
| DMP156   | ●     | 15.6            | 8.73 | 15          |                       | (M18x2.5)             |
| DMP175   | ●     | 17.5            | 9.9  | 17          | TIDC170C17-3          | M20x2.5               |
| DMP195   | ●     | 19.5            | 11.0 | 19          | TIDC190C19-3          | M22x2.5               |

Packing Quantity = 2 pcs.

● : Stocked items

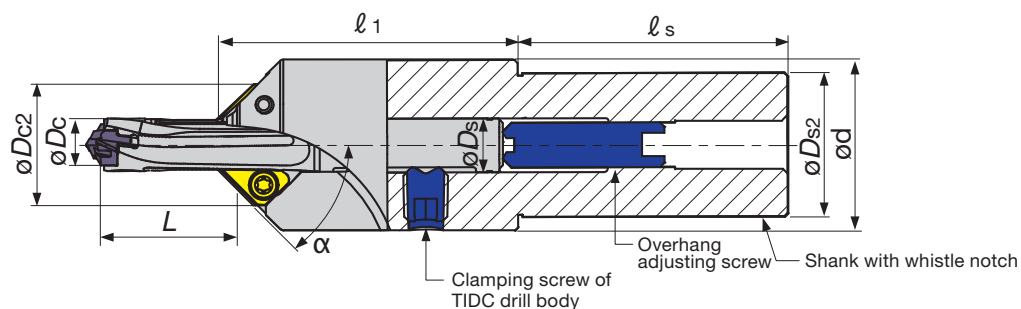
## Standard cutting condition

| Work material                                                                         | Cutting speed<br>$V_c$ (m/min) | Feed: $f$ (mm/rev)    |                       |                       |                       |                       |
|---------------------------------------------------------------------------------------|--------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|                                                                                       |                                | $\phi Dc$ (mm)        |                       |                       |                       |                       |
|                                                                                       |                                | $\phi 10 - \phi 11.9$ | $\phi 12 - \phi 13.9$ | $\phi 14 - \phi 15.9$ | $\phi 16 - \phi 19.9$ | $\phi 20 - \phi 25.9$ |
| Low carbon steels ( $C < 0.3$ )<br>SS400, SM490, S25C etc. (St42-1, St52-3, C25 etc.) | 80 - 140                       | 0.15 - 0.28           | 0.18 - 0.30           | 0.20 - 0.35           | 0.25 - 0.45           | 0.25 - 0.45           |
| Carbon steels ( $C > 0.3$ )<br>S45C, S55C etc. (C45, C55 etc.)                        | 70 - 120                       | 0.15 - 0.28           | 0.18 - 0.30           | 0.20 - 0.35           | 0.25 - 0.45           | 0.25 - 0.45           |
| Low alloy steels<br>SCM415 etc.                                                       | 70 - 120                       | 0.14 - 0.28           | 0.16 - 0.32           | 0.18 - 0.35           | 0.23 - 0.40           | 0.25 - 0.45           |
| Alloy steels<br>SCM440, SCr420 etc. (42CrMo4, 20Cr4 etc.)                             | 40 - 90                        | 0.14 - 0.28           | 0.16 - 0.32           | 0.18 - 0.35           | 0.23 - 0.40           | 0.25 - 0.45           |
| Stainless steels SUS304, SUS316 etc.<br>(X5CrNi18-9, X5CrNiMo17-12-2 etc.)            | 30 - 70                        | 0.12 - 0.18           | 0.14 - 0.20           | 0.16 - 0.24           | 0.16 - 0.26           | 0.18 - 0.30           |
| Grey cast irons<br>FC250 etc. (GG25 etc.)                                             | 80 - 180                       | 0.20 - 0.35           | 0.25 - 0.40           | 0.30 - 0.45           | 0.35 - 0.55           | 0.35 - 0.60           |
| Ductile cast irons<br>FCD700 etc. (GGG70 etc.)                                        | 80 - 140                       | 0.20 - 0.35           | 0.25 - 0.40           | 0.30 - 0.45           | 0.35 - 0.55           | 0.35 - 0.60           |
| Aluminium alloys<br>ADC12 etc.                                                        | 80 - 220                       | 0.25 - 0.40           | 0.30 - 0.45           | 0.35 - 0.50           | 0.40 - 0.60           | 0.50 - 0.75           |
| Titanium alloys<br>Ti-6Al-4V etc.                                                     | 20 - 50                        | 0.08 - 0.15           | 0.10 - 0.28           | 0.12 - 0.20           | 0.14 - 0.22           | 0.18 - 0.27           |
| Nickel-based alloys                                                                   | 20 - 50                        | 0.08 - 0.13           | 0.10 - 0.15           | 0.12 - 0.18           | 0.12 - 0.22           | 0.14 - 0.22           |

• Cutting conditions in above table shows the general condition

• Cutting conditions should be changed depend on the rigidity and power of the machine and the workpiece material.

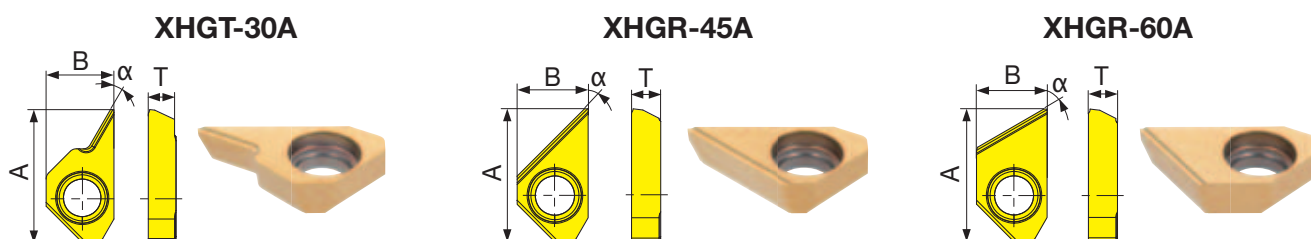
## Chamfering adaptor TIDCF type



| Cat. No.     | Stock | Dimensions (mm) |             |          |             |          |          |             | Applicable drill body |                |
|--------------|-------|-----------------|-------------|----------|-------------|----------|----------|-------------|-----------------------|----------------|
|              |       | $\phi Dc$       | $\phi Ds_2$ | $\phi d$ | $\phi Dc_2$ | $\ell_1$ | $\ell_s$ | $L$         | Cat. No.              | $\phi Ds$ (mm) |
| TIDCF100-W32 | ●     | 10.0 ~ 10.4     | 32          | 38       | 24.9        | 67.3     | 60       | 14.5 ~ 31.8 | TIDC100C10-3          | 10             |
| TIDCF120-W32 | ●     | 12.0 ~ 12.4     | 32          | 38       | 26.9        | 67.3     | 60       | 16.5 ~ 37.7 | TIDC120C12-3          | 12             |
| TIDCF140-W32 | ●     | 14.0 ~ 14.4     | 32          | 38       | 28.4        | 67.3     | 60       | 18.1 ~ 45.0 | TIDC140C14-3          | 14             |
| TIDCF150-W32 | ●     | 15.0 ~ 15.9     | 32          | 38       | 29.4        | 67.3     | 60       | 19.7 ~ 47.4 | TIDC150C15-3          | 15             |
| TIDCF170-W32 | ●     | 17.0 ~ 17.9     | 32          | 38       | 31.4        | 67.3     | 60       | 21.4 ~ 54.9 | TIDC170C17-3          | 17             |
| TIDCF190-W32 | ●     | 19.0 ~ 19.9     | 32          | 38       | 33.4        | 75       | 60       | 28.5 ~ 62.3 | TIDC190C19-3          | 19             |

• Chamfering angle  $\alpha$  should be depend on chamfering insert

## Chamfering insert



| Cat. No.       | Stock | Dimensions (mm) |     |     | Chamfering angle<br>$\alpha$ | Maximum width<br>of chamfer |
|----------------|-------|-----------------|-----|-----|------------------------------|-----------------------------|
|                | GH730 | A               | B   | T   |                              |                             |
| XHGT090300-30A | ●     | 16              | 8.8 | 3.3 | 30°                          | 1.5                         |
| XHGR090300-45A | ●     | 16              | 8.8 | 3.3 | 45°                          | 6.0                         |
| XHGR090300-60A | ●     | 16              | 8.8 | 3.3 | 60°                          | 3.5                         |

Note: Chamfering insert must be clamped after fixing the TIDC drill body in adaptor.

## Replacement parts

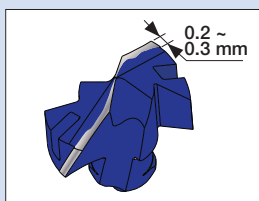
| Clamping screw of<br>TIDC drill body | Overhang<br>adjusting screw | Wrench | Clamping screw<br>of insert | Wrench    |        |
|--------------------------------------|-----------------------------|--------|-----------------------------|-----------|--------|
|                                      |                             |        |                             | Torx bit  | Grip   |
| SCREWM10X1.5SPECIAL                  | SRM10X10DIN916              | HW5.0  | SR14-544/S                  | BLDT15/S7 | SW6-SD |

●: Stocked items  
Packing Quantity = 2 pcs

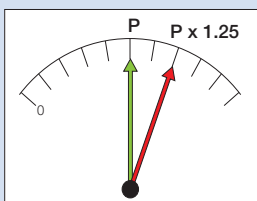
## Notice when using

### ● Criteria for head change (Criteria of tool life)

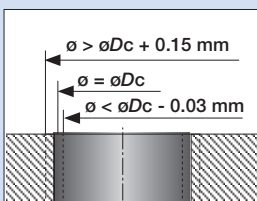
The followings are the general criteria of tool life



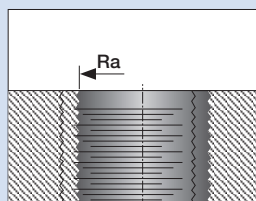
Width of corner wear:  
0.2 - 0.3 mm



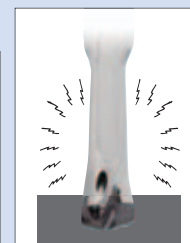
Spindle load: Increased  
by 25% higher than load  
of beginning



Hole diameter: 0.15 mm  
bigger, or 0.03 mm smaller  
than drill diameter



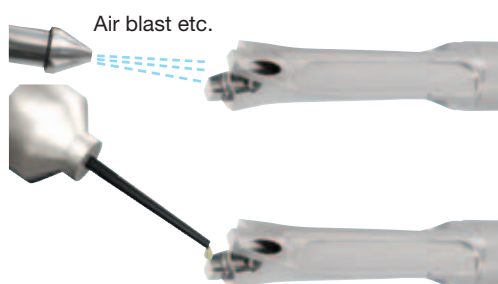
Surface finish: Rougher  
than the beginning



Abnormal noise, or  
vibration

### ● How to clamp the drill head

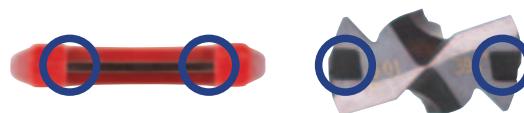
#### ① Cleaning the pocket and oiling



#### ② Set the drill head in the pocket



#### ③ Set the clamping key on the drill head



#### ④ Clamp



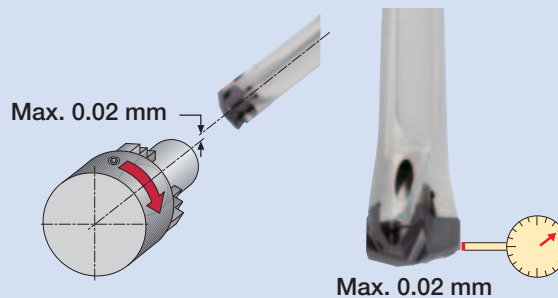
### ● Coolant supply

Internal supply should be recommended.

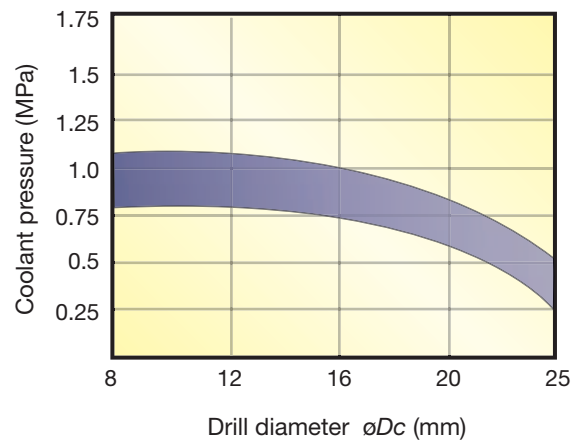
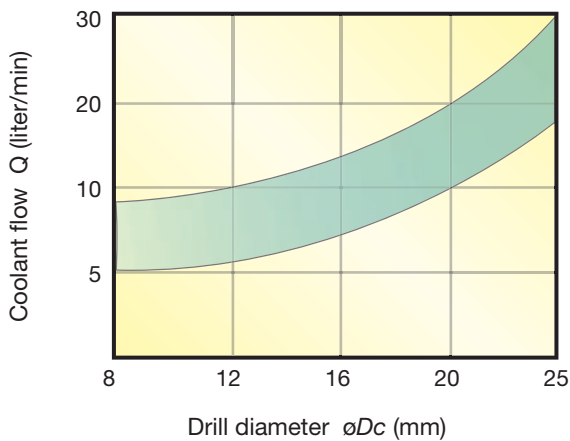


### ● Run out

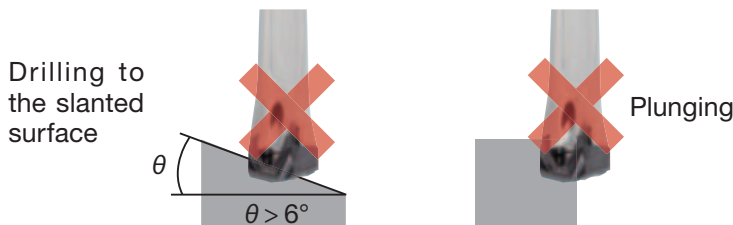
Run out less than 0.02 mm should be recommended.



### ■ The coolant flow and pressure required

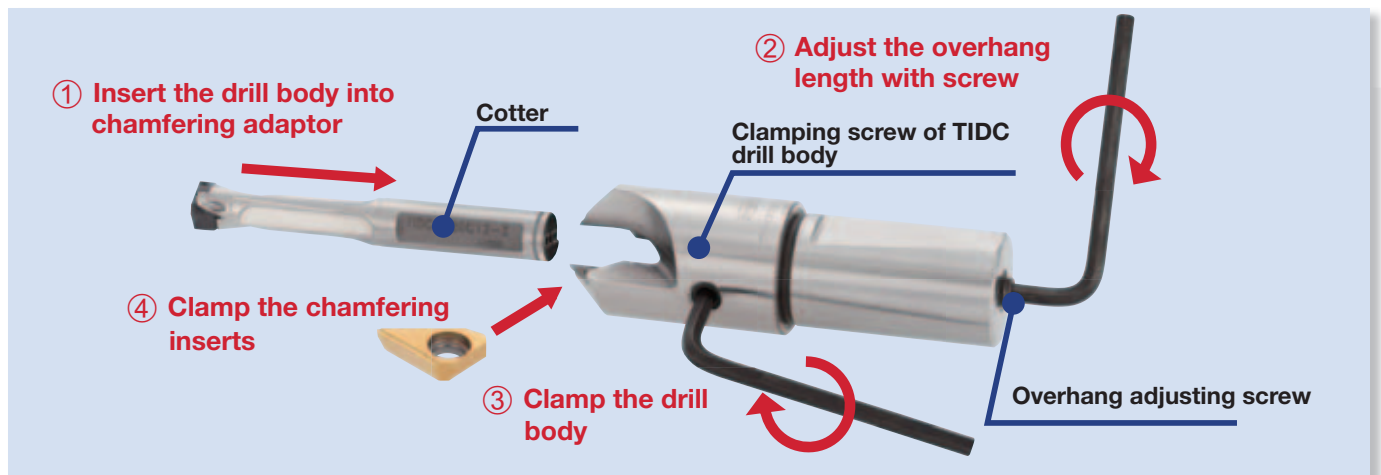


### ■ Not-recommended application



## How to mount the drill body into the chamfering adaptor

The overhang length of drill can be changed by the adjusting screw at the bottom of adaptor. Drill body must contact to the adjusting screw. This screw supports the drill against thrust force when drilling.



### Procedure

- ① Insert the TIDC drill body into the chamfering adaptor without clamping chamfering inserts.
- ② Adjust the overhang length of drill body with adjusting screw from the bottom of adaptor.
- ③ Tighten the clamping screw of drill body and fix. When tightening, the screw must contact to the cotter. When screw contacts to the cotter, the flutes of TIDC drill body fit the position of chamfering inserts.

- ④ Clamp the chamfering inserts. When tightening the screw, insert must fit to the seat.

#### Notice

Before removing the drill body from adaptor, chamfering inserts must be removed.

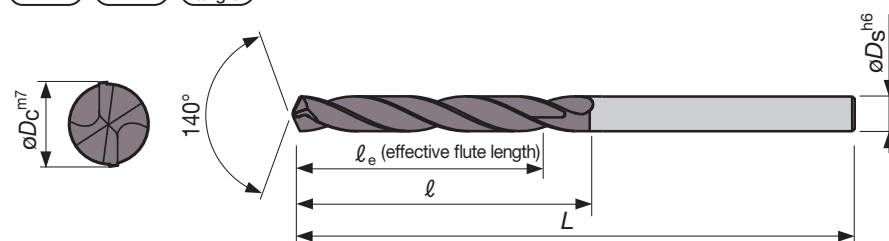
The overhang adjusting screw can operate from the top of adaptor with flat-blade screwdriver. Once the adaptor sets on holder, overhang length of drill body can be adjusted by operating the screw from the top of adaptor.

25°~30°  
Helix

3/5/8  
L/D

140°  
Point angle

## For High Efficient Drilling of Steels Coated Solid Carbide Drills



| Drill dia. $\phi D_c$ (mm) | Tolerance m7 (mm) |
|----------------------------|-------------------|
| 3.00 ~ 6                   | 0.004 ~ 0.016     |
| 6.01 ~ 10                  | 0.006 ~ 0.021     |
| 10.01 ~ 16                 | 0.007 ~ 0.025     |

| Drill dia.<br>$\phi D_c$ | Drilling depth<br>L/D | Coolant Supply | Cat. No.         | Stock* | Dimensions (mm) |       |     |     |
|--------------------------|-----------------------|----------------|------------------|--------|-----------------|-------|-----|-----|
|                          |                       |                |                  |        | $\phi D_s$      | $l_e$ | $l$ | $L$ |
| 3.0                      | 3                     | Ext.           | DSW030-014-06DE3 |        | 6               | 14    | 20  | 62  |
|                          | 5                     | Ext.           | DSW030-023-06DE5 |        | 6               | 23    | 28  | 66  |
|                          | 5                     | Int.           | DSW030-023-06DI5 |        | 6               | 23    | 28  | 66  |
|                          | 8                     | Int.           | DSW030-029-06DI8 |        | 6               | 29    | 34  | 72  |
| 3.1                      | 3                     | Ext.           | DSW031-014-06DE3 |        | 6               | 14    | 20  | 62  |
|                          | 5                     | Ext.           | DSW031-023-06DE5 |        | 6               | 23    | 28  | 66  |
|                          | 5                     | Int.           | DSW031-023-06DI5 |        | 6               | 23    | 28  | 66  |
|                          | 8                     | Int.           | DSW031-029-06DI8 |        | 6               | 29    | 34  | 72  |
| 3.2                      | 3                     | Ext.           | DSW032-014-06DE3 |        | 6               | 14    | 20  | 62  |
|                          | 5                     | Ext.           | DSW032-023-06DE5 |        | 6               | 23    | 28  | 66  |
|                          | 5                     | Int.           | DSW032-023-06DI5 |        | 6               | 23    | 28  | 66  |
|                          | 8                     | Int.           | DSW032-029-06DI8 |        | 6               | 29    | 34  | 72  |
| 3.3                      | 3                     | Ext.           | DSW033-014-06DE3 |        | 6               | 14    | 20  | 62  |
|                          | 5                     | Ext.           | DSW033-023-06DE5 |        | 6               | 23    | 28  | 66  |
|                          | 5                     | Int.           | DSW033-023-06DI5 |        | 6               | 23    | 28  | 66  |
|                          | 8                     | Int.           | DSW033-029-06DI8 |        | 6               | 29    | 34  | 72  |
| 3.4                      | 3                     | Ext.           | DSW034-014-06DE3 |        | 6               | 14    | 20  | 62  |
|                          | 5                     | Ext.           | DSW034-023-06DE5 |        | 6               | 23    | 28  | 66  |
|                          | 5                     | Int.           | DSW034-023-06DI5 |        | 6               | 23    | 28  | 66  |
|                          | 8                     | Int.           | DSW034-029-06DI8 |        | 6               | 29    | 34  | 72  |
| 3.5                      | 3                     | Ext.           | DSW035-014-06DE3 |        | 6               | 14    | 20  | 62  |
|                          | 5                     | Ext.           | DSW035-023-06DE5 |        | 6               | 23    | 28  | 66  |
|                          | 5                     | Int.           | DSW035-023-06DI5 |        | 6               | 23    | 28  | 66  |
|                          | 8                     | Int.           | DSW035-029-06DI8 |        | 6               | 29    | 34  | 72  |
| 3.6                      | 3                     | Ext.           | DSW036-014-06DE3 |        | 6               | 14    | 20  | 62  |
|                          | 5                     | Ext.           | DSW036-023-06DE5 |        | 6               | 23    | 28  | 66  |
|                          | 5                     | Int.           | DSW036-023-06DI5 |        | 6               | 23    | 28  | 66  |
|                          | 8                     | Int.           | DSW036-029-06DI8 |        | 6               | 29    | 34  | 72  |
| 3.7                      | 3                     | Ext.           | DSW037-014-06DE3 |        | 6               | 14    | 20  | 62  |
|                          | 5                     | Ext.           | DSW037-023-06DE5 |        | 6               | 23    | 28  | 66  |
|                          | 5                     | Int.           | DSW037-023-06DI5 |        | 6               | 23    | 28  | 66  |
|                          | 8                     | Int.           | DSW037-029-06DI8 |        | 6               | 29    | 34  | 72  |
| 3.8                      | 3                     | Ext.           | DSW038-017-06DE3 |        | 6               | 17    | 24  | 66  |
|                          | 5                     | Ext.           | DSW038-029-06DE5 |        | 6               | 29    | 36  | 74  |
|                          | 5                     | Int.           | DSW038-029-06DI5 |        | 6               | 29    | 36  | 74  |
|                          | 8                     | Int.           | DSW038-036-06DI8 |        | 6               | 36    | 43  | 81  |
| 3.9                      | 3                     | Ext.           | DSW039-017-06DE3 |        | 6               | 17    | 24  | 66  |
|                          | 5                     | Ext.           | DSW039-029-06DE5 |        | 6               | 29    | 36  | 74  |
|                          | 5                     | Int.           | DSW039-029-06DI5 |        | 6               | 29    | 36  | 74  |
|                          | 8                     | Int.           | DSW039-036-06DI8 |        | 6               | 36    | 43  | 81  |

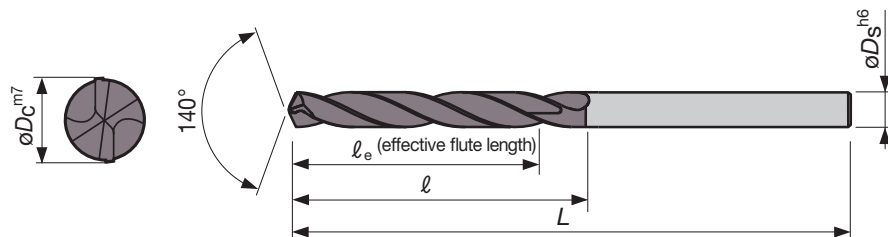
| Drill dia.<br>$\phi D_c$ | Drilling depth<br>L/D | Coolant Supply | Cat. No.         | Stock* | Dimensions (mm) |       |     |     |
|--------------------------|-----------------------|----------------|------------------|--------|-----------------|-------|-----|-----|
|                          |                       |                |                  |        | $\phi D_s$      | $l_e$ | $l$ | $L$ |
| 4.0                      | 3                     | Ext.           | DSW040-017-06DE3 |        | 6               | 17    | 24  | 66  |
|                          | 5                     | Ext.           | DSW040-029-06DE5 |        | 6               | 29    | 36  | 74  |
|                          | 5                     | Int.           | DSW040-029-06DI5 |        | 6               | 29    | 36  | 74  |
|                          | 8                     | Int.           | DSW040-036-06DI8 |        | 6               | 36    | 43  | 81  |
| 4.1                      | 3                     | Ext.           | DSW041-017-06DE3 |        | 6               | 17    | 24  | 66  |
|                          | 5                     | Ext.           | DSW041-029-06DE5 |        | 6               | 29    | 36  | 74  |
|                          | 5                     | Int.           | DSW041-029-06DI5 |        | 6               | 29    | 36  | 74  |
|                          | 8                     | Int.           | DSW041-036-06DI8 |        | 6               | 36    | 43  | 81  |
| 4.2                      | 3                     | Ext.           | DSW042-017-06DE3 |        | 6               | 17    | 24  | 66  |
|                          | 5                     | Ext.           | DSW042-029-06DE5 |        | 6               | 29    | 36  | 74  |
|                          | 5                     | Int.           | DSW042-029-06DI5 |        | 6               | 29    | 36  | 74  |
|                          | 8                     | Int.           | DSW042-036-06DI8 |        | 6               | 36    | 43  | 81  |
| 4.3                      | 3                     | Ext.           | DSW043-017-06DE3 |        | 6               | 17    | 24  | 66  |
|                          | 5                     | Ext.           | DSW043-029-06DE5 |        | 6               | 29    | 36  | 74  |
|                          | 5                     | Int.           | DSW043-029-06DI5 |        | 6               | 29    | 36  | 74  |
|                          | 8                     | Int.           | DSW043-036-06DI8 |        | 6               | 36    | 43  | 81  |
| 4.4                      | 3                     | Ext.           | DSW044-017-06DE3 |        | 6               | 17    | 24  | 66  |
|                          | 5                     | Ext.           | DSW044-029-06DE5 |        | 6               | 29    | 36  | 74  |
|                          | 5                     | Int.           | DSW044-029-06DI5 |        | 6               | 29    | 36  | 74  |
|                          | 8                     | Int.           | DSW044-036-06DI8 |        | 6               | 36    | 43  | 81  |
| 4.5                      | 3                     | Ext.           | DSW045-017-06DE3 |        | 6               | 17    | 24  | 66  |
|                          | 5                     | Ext.           | DSW045-029-06DE5 |        | 6               | 29    | 36  | 74  |
|                          | 5                     | Int.           | DSW045-029-06DI5 |        | 6               | 29    | 36  | 74  |
|                          | 8                     | Int.           | DSW045-036-06DI8 |        | 6               | 36    | 43  | 81  |
| 4.6                      | 3                     | Ext.           | DSW046-017-06DE3 |        | 6               | 17    | 24  | 66  |
|                          | 5                     | Ext.           | DSW046-029-06DE5 |        | 6               | 29    | 36  | 74  |
|                          | 5                     | Int.           | DSW046-029-06DI5 |        | 6               | 29    | 36  | 74  |
|                          | 8                     | Int.           | DSW046-036-06DI8 |        | 6               | 36    | 43  | 81  |
| 4.7                      | 3                     | Ext.           | DSW047-017-06DE3 |        | 6               | 17    | 24  | 66  |
|                          | 5                     | Ext.           | DSW047-029-06DE5 |        | 6               | 29    | 36  | 74  |
|                          | 5                     | Int.           | DSW047-029-06DI5 |        | 6               | 29    | 36  | 74  |
|                          | 8                     | Int.           | DSW047-036-06DI8 |        | 6               | 36    | 43  | 81  |
| 4.8                      | 3                     | Ext.           | DSW048-020-06DE3 |        | 6               | 20    | 28  | 66  |
|                          | 5                     | Ext.           | DSW048-035-06DE5 |        | 6               | 35    | 44  | 82  |
|                          | 5                     | Int.           | DSW048-035-06DI5 |        | 6               | 35    | 44  | 82  |
|                          | 8                     | Int.           | DSW048-048-06DI8 |        | 6               | 48    | 57  | 95  |
| 4.9                      | 3                     | Ext.           | DSW049-020-06DE3 |        | 6               | 20    | 28  | 66  |
|                          | 5                     | Ext.           | DSW049-035-06DE5 |        | 6               | 35    | 44  | 82  |
|                          | 5                     | Int.           | DSW049-035-06DI5 |        | 6               | 35    | 44  | 82  |
|                          | 8                     | Int.           | DSW049-048-06DI8 |        | 6               | 48    | 57  | 95  |

\*For inquiry on DSW stock, please contact the local office.

| Drill dia.<br>øDc | Drilling depth<br>L/D | Coolant Supply | Cat. No.         | Stock* | Dimensions (mm) |                |    |     |
|-------------------|-----------------------|----------------|------------------|--------|-----------------|----------------|----|-----|
|                   |                       |                |                  |        | øDs             | ℓ <sub>e</sub> | ℓ  | L   |
| 5.0               | 3                     | Ext.           | DSW050-020-06DE3 |        | 6               | 20             | 28 | 66  |
|                   | 5                     | Ext.           | DSW050-035-06DE5 |        | 6               | 35             | 44 | 82  |
|                   | 5                     | Int.           | DSW050-035-06DI5 |        | 6               | 35             | 44 | 82  |
|                   | 8                     | Int.           | DSW050-048-06DI8 |        | 6               | 48             | 57 | 95  |
| 5.1               | 3                     | Ext.           | DSW051-020-06DE3 |        | 6               | 20             | 28 | 66  |
|                   | 5                     | Ext.           | DSW051-035-06DE5 |        | 6               | 35             | 44 | 82  |
|                   | 5                     | Int.           | DSW051-035-06DI5 |        | 6               | 35             | 44 | 82  |
|                   | 8                     | Int.           | DSW051-048-06DI8 |        | 6               | 48             | 57 | 95  |
| 5.2               | 3                     | Ext.           | DSW052-020-06DE3 |        | 6               | 20             | 28 | 66  |
|                   | 5                     | Ext.           | DSW052-035-06DE5 |        | 6               | 35             | 44 | 82  |
|                   | 5                     | Int.           | DSW052-035-06DI5 |        | 6               | 35             | 44 | 82  |
|                   | 8                     | Int.           | DSW052-048-06DI8 |        | 6               | 48             | 57 | 95  |
| 5.3               | 3                     | Ext.           | DSW053-020-06DE3 |        | 6               | 20             | 28 | 66  |
|                   | 5                     | Ext.           | DSW053-035-06DE5 |        | 6               | 35             | 44 | 82  |
|                   | 5                     | Int.           | DSW053-035-06DI5 |        | 6               | 35             | 44 | 82  |
|                   | 8                     | Int.           | DSW053-048-06DI8 |        | 6               | 48             | 57 | 95  |
| 5.4               | 3                     | Ext.           | DSW054-020-06DE3 |        | 6               | 20             | 28 | 66  |
|                   | 5                     | Ext.           | DSW054-035-06DE5 |        | 6               | 35             | 44 | 82  |
|                   | 5                     | Int.           | DSW054-035-06DI5 |        | 6               | 35             | 44 | 82  |
|                   | 8                     | Int.           | DSW054-048-06DI8 |        | 6               | 48             | 57 | 95  |
| 5.5               | 3                     | Ext.           | DSW055-020-06DE3 |        | 6               | 20             | 28 | 66  |
|                   | 5                     | Ext.           | DSW055-035-06DE5 |        | 6               | 35             | 44 | 82  |
|                   | 5                     | Int.           | DSW055-035-06DI5 |        | 6               | 35             | 44 | 82  |
|                   | 8                     | Int.           | DSW055-048-06DI8 |        | 6               | 48             | 57 | 95  |
| 5.6               | 3                     | Ext.           | DSW056-020-06DE3 |        | 6               | 20             | 28 | 66  |
|                   | 5                     | Ext.           | DSW056-035-06DE5 |        | 6               | 35             | 44 | 82  |
|                   | 5                     | Int.           | DSW056-035-06DI5 |        | 6               | 35             | 44 | 82  |
|                   | 8                     | Int.           | DSW056-048-06DI8 |        | 6               | 48             | 57 | 95  |
| 5.7               | 3                     | Ext.           | DSW057-020-06DE3 |        | 6               | 20             | 28 | 66  |
|                   | 5                     | Ext.           | DSW057-035-06DE5 |        | 6               | 35             | 44 | 82  |
|                   | 5                     | Int.           | DSW057-035-06DI5 |        | 6               | 35             | 44 | 82  |
|                   | 8                     | Int.           | DSW057-048-06DI8 |        | 6               | 48             | 57 | 95  |
| 5.8               | 3                     | Ext.           | DSW058-020-06DE3 |        | 6               | 20             | 28 | 66  |
|                   | 5                     | Ext.           | DSW058-035-06DE5 |        | 6               | 35             | 44 | 82  |
|                   | 5                     | Int.           | DSW058-035-06DI5 |        | 6               | 35             | 44 | 82  |
|                   | 8                     | Int.           | DSW058-048-06DI8 |        | 6               | 48             | 57 | 95  |
| 5.9               | 3                     | Ext.           | DSW059-020-06DE3 |        | 6               | 20             | 28 | 66  |
|                   | 5                     | Ext.           | DSW059-035-06DE5 |        | 6               | 35             | 44 | 82  |
|                   | 5                     | Int.           | DSW059-035-06DI5 |        | 6               | 35             | 44 | 82  |
|                   | 8                     | Int.           | DSW059-048-06DI8 |        | 6               | 48             | 57 | 95  |
| 6.0               | 3                     | Ext.           | DSW060-020-06DE3 |        | 6               | 20             | 28 | 66  |
|                   | 5                     | Ext.           | DSW060-035-06DE5 |        | 6               | 35             | 44 | 82  |
|                   | 5                     | Int.           | DSW060-035-06DI5 |        | 6               | 35             | 44 | 82  |
|                   | 8                     | Int.           | DSW060-048-06DI8 |        | 6               | 48             | 57 | 95  |
| 6.1               | 3                     | Ext.           | DSW061-024-08DE3 |        | 8               | 24             | 34 | 79  |
|                   | 5                     | Ext.           | DSW061-043-08DE5 |        | 8               | 43             | 53 | 91  |
|                   | 5                     | Int.           | DSW061-043-08DI5 |        | 8               | 43             | 53 | 91  |
|                   | 8                     | Int.           | DSW061-064-08DI8 |        | 8               | 64             | 76 | 114 |

| Drill dia.<br>øDc | Drilling depth<br>L/D | Coolant Supply | Cat. No.         | Stock* | Dimensions (mm) |                |    |     |
|-------------------|-----------------------|----------------|------------------|--------|-----------------|----------------|----|-----|
|                   |                       |                |                  |        | øDs             | ℓ <sub>e</sub> | ℓ  | L   |
| 6.2               | 3                     | Ext.           | DSW062-024-08DE3 |        | 8               | 24             | 34 | 79  |
|                   | 5                     | Ext.           | DSW062-043-08DE5 |        | 8               | 43             | 53 | 91  |
|                   | 5                     | Int.           | DSW062-043-08DI5 |        | 8               | 43             | 53 | 91  |
|                   | 8                     | Int.           | DSW062-064-08DI8 |        | 8               | 64             | 76 | 114 |
| 6.3               | 3                     | Ext.           | DSW063-024-08DE3 |        | 8               | 24             | 34 | 79  |
|                   | 5                     | Ext.           | DSW063-043-08DE5 |        | 8               | 43             | 53 | 91  |
|                   | 5                     | Int.           | DSW063-043-08DI5 |        | 8               | 43             | 53 | 91  |
|                   | 8                     | Int.           | DSW063-064-08DI8 |        | 8               | 64             | 76 | 114 |
| 6.4               | 3                     | Ext.           | DSW064-024-08DE3 |        | 8               | 24             | 34 | 79  |
|                   | 5                     | Ext.           | DSW064-043-08DE5 |        | 8               | 43             | 53 | 91  |
|                   | 5                     | Int.           | DSW064-043-08DI5 |        | 8               | 43             | 53 | 91  |
|                   | 8                     | Int.           | DSW064-064-08DI8 |        | 8               | 64             | 76 | 114 |
| 6.5               | 3                     | Ext.           | DSW065-024-08DE3 |        | 8               | 24             | 34 | 79  |
|                   | 5                     | Ext.           | DSW065-043-08DE5 |        | 8               | 43             | 53 | 91  |
|                   | 5                     | Int.           | DSW065-043-08DI5 |        | 8               | 43             | 53 | 91  |
|                   | 8                     | Int.           | DSW065-064-08DI8 |        | 8               | 64             | 76 | 114 |
| 6.6               | 3                     | Ext.           | DSW066-024-08DE3 |        | 8               | 24             | 34 | 79  |
|                   | 5                     | Ext.           | DSW066-043-08DE5 |        | 8               | 43             | 53 | 91  |
|                   | 5                     | Int.           | DSW066-043-08DI5 |        | 8               | 43             | 53 | 91  |
|                   | 8                     | Int.           | DSW066-064-08DI8 |        | 8               | 64             | 76 | 114 |
| 6.7               | 3                     | Ext.           | DSW067-024-08DE3 |        | 8               | 24             | 34 | 79  |
|                   | 5                     | Ext.           | DSW067-043-08DE5 |        | 8               | 43             | 53 | 91  |
|                   | 5                     | Int.           | DSW067-043-08DI5 |        | 8               | 43             | 53 | 91  |
|                   | 8                     | Int.           | DSW067-064-08DI8 |        | 8               | 64             | 76 | 114 |
| 6.8               | 3                     | Ext.           | DSW068-024-08DE3 |        | 8               | 24             | 34 | 79  |
|                   | 5                     | Ext.           | DSW068-043-08DE5 |        | 8               | 43             | 53 | 91  |
|                   | 5                     | Int.           | DSW068-043-08DI5 |        | 8               | 43             | 53 | 91  |
|                   | 8                     | Int.           | DSW068-064-08DI8 |        | 8               | 64             | 76 | 114 |
| 6.9               | 3                     | Ext.           | DSW069-024-08DE3 |        | 8               | 24             | 34 | 79  |
|                   | 5                     | Ext.           | DSW069-043-08DE5 |        | 8               | 43             | 53 | 91  |
|                   | 5                     | Int.           | DSW069-043-08DI5 |        | 8               | 43             | 53 | 91  |
|                   | 8                     | Int.           | DSW069-064-08DI8 |        | 8               | 64             | 76 | 114 |
| 7.0               | 3                     | Ext.           | DSW070-024-08DE3 |        | 8               | 24             | 34 | 79  |
|                   | 5                     | Ext.           | DSW070-043-08DE5 |        | 8               | 43             | 53 | 91  |
|                   | 5                     | Int.           | DSW070-043-08DI5 |        | 8               | 43             | 53 | 91  |
|                   | 8                     | Int.           | DSW070-064-08DI8 |        | 8               | 64             | 76 | 114 |
| 7.1               | 3                     | Ext.           | DSW071-029-08DE3 |        | 8               | 29             | 41 | 79  |
|                   | 5                     | Ext.           | DSW071-043-08DE5 |        | 8               | 43             | 53 | 91  |
|                   | 5                     | Int.           | DSW071-043-08DI5 |        | 8               | 43             | 53 | 91  |
|                   | 8                     | Int.           | DSW071-064-08DI8 |        | 8               | 64             | 76 | 114 |
| 7.2               | 3                     | Ext.           | DSW072-029-08DE3 |        | 8               | 29             | 41 | 79  |
|                   | 5                     | Ext.           | DSW072-043-08DE5 |        | 8               | 43             | 53 | 91  |
|                   | 5                     | Int.           | DSW072-043-08DI5 |        | 8               | 43             | 53 | 91  |
|                   | 8                     | Int.           | DSW072-064-08DI8 |        | 8               | 64             | 76 | 114 |
| 7.3               | 3                     | Ext.           | DSW073-029-08DE3 |        | 8               | 29             | 41 | 79  |
|                   | 5                     | Ext.           | DSW073-043-08DE5 |        | 8               | 43             | 53 | 91  |
|                   | 5                     | Int.           | DSW073-043-08DI5 |        | 8               | 43             | 53 | 91  |
|                   | 8                     | Int.           | DSW073-064-08DI8 |        | 8               | 64             | 76 | 114 |

\*For inquiry on DSW stock, please contact the local office.



| Drill dia. $\phi D_c$ (mm) | Tolerance m7 (mm) |
|----------------------------|-------------------|
| 3.00 ~ 6                   | 0.004 ~ 0.016     |
| 6.01 ~ 10                  | 0.006 ~ 0.021     |
| 10.01 ~ 16                 | 0.007 ~ 0.025     |

| Drill dia.<br>$\phi D_c$ | Drilling depth<br>L/D | Coolant Supply | Cat. No.         | Stock* | Dimensions (mm) |          |        |     |
|--------------------------|-----------------------|----------------|------------------|--------|-----------------|----------|--------|-----|
|                          |                       |                |                  |        | $\phi D_s$      | $\ell_e$ | $\ell$ | L   |
| 7.4                      | 3                     | Ext.           | DSW074-029-08DE3 |        | 8               | 29       | 41     | 79  |
|                          | 5                     | Ext.           | DSW074-043-08DE5 |        | 8               | 43       | 53     | 91  |
|                          | 5                     | Int.           | DSW074-043-08DI5 |        | 8               | 43       | 53     | 91  |
|                          | 8                     | Int.           | DSW074-064-08DI8 |        | 8               | 64       | 76     | 114 |
| 7.5                      | 3                     | Ext.           | DSW075-029-08DE3 |        | 8               | 29       | 41     | 79  |
|                          | 5                     | Ext.           | DSW075-043-08DE5 |        | 8               | 43       | 53     | 91  |
|                          | 5                     | Int.           | DSW075-043-08DI5 |        | 8               | 43       | 53     | 91  |
|                          | 8                     | Int.           | DSW075-064-08DI8 |        | 8               | 64       | 76     | 114 |
| 7.6                      | 3                     | Ext.           | DSW076-029-08DE3 |        | 8               | 29       | 41     | 79  |
|                          | 5                     | Ext.           | DSW076-043-08DE5 |        | 8               | 43       | 53     | 91  |
|                          | 5                     | Int.           | DSW076-043-08DI5 |        | 8               | 43       | 53     | 91  |
|                          | 8                     | Int.           | DSW076-064-08DI8 |        | 8               | 64       | 76     | 114 |
| 7.7                      | 3                     | Ext.           | DSW077-029-08DE3 |        | 8               | 29       | 41     | 79  |
|                          | 5                     | Ext.           | DSW077-043-08DE5 |        | 8               | 43       | 53     | 91  |
|                          | 5                     | Int.           | DSW077-043-08DI5 |        | 8               | 43       | 53     | 91  |
|                          | 8                     | Int.           | DSW077-064-08DI8 |        | 8               | 64       | 76     | 114 |
| 7.8                      | 3                     | Ext.           | DSW078-029-08DE3 |        | 8               | 29       | 41     | 79  |
|                          | 5                     | Ext.           | DSW078-043-08DE5 |        | 8               | 43       | 53     | 91  |
|                          | 5                     | Int.           | DSW078-043-08DI5 |        | 8               | 43       | 53     | 91  |
|                          | 8                     | Int.           | DSW078-064-08DI8 |        | 8               | 64       | 76     | 114 |
| 7.9                      | 3                     | Ext.           | DSW079-029-08DE3 |        | 8               | 29       | 41     | 79  |
|                          | 5                     | Ext.           | DSW079-043-08DE5 |        | 8               | 43       | 53     | 91  |
|                          | 5                     | Int.           | DSW079-043-08DI5 |        | 8               | 43       | 53     | 91  |
|                          | 8                     | Int.           | DSW079-064-08DI8 |        | 8               | 64       | 76     | 114 |
| 8.0                      | 3                     | Ext.           | DSW080-029-08DE3 |        | 8               | 29       | 41     | 79  |
|                          | 5                     | Ext.           | DSW080-043-08DE5 |        | 8               | 43       | 53     | 91  |
|                          | 5                     | Int.           | DSW080-043-08DI5 |        | 8               | 43       | 53     | 91  |
|                          | 8                     | Int.           | DSW080-064-08DI8 |        | 8               | 64       | 76     | 114 |
| 8.1                      | 3                     | Ext.           | DSW081-035-10DE3 |        | 10              | 35       | 47     | 89  |
|                          | 5                     | Ext.           | DSW081-049-10DE5 |        | 10              | 49       | 61     | 103 |
|                          | 5                     | Int.           | DSW081-049-10DI5 |        | 10              | 49       | 61     | 103 |
|                          | 8                     | Int.           | DSW081-080-10DI8 |        | 10              | 80       | 95     | 142 |
| 8.2                      | 3                     | Ext.           | DSW082-035-10DE3 |        | 10              | 35       | 47     | 89  |
|                          | 5                     | Ext.           | DSW082-049-10DE5 |        | 10              | 49       | 61     | 103 |
|                          | 5                     | Int.           | DSW082-049-10DI5 |        | 10              | 49       | 61     | 103 |
|                          | 8                     | Int.           | DSW082-080-10DI8 |        | 10              | 80       | 95     | 142 |
| 8.3                      | 3                     | Ext.           | DSW083-035-10DE3 |        | 10              | 35       | 47     | 89  |
|                          | 5                     | Ext.           | DSW083-049-10DE5 |        | 10              | 49       | 61     | 103 |
|                          | 5                     | Int.           | DSW083-049-10DI5 |        | 10              | 49       | 61     | 103 |
|                          | 8                     | Int.           | DSW083-080-10DI8 |        | 10              | 80       | 95     | 142 |

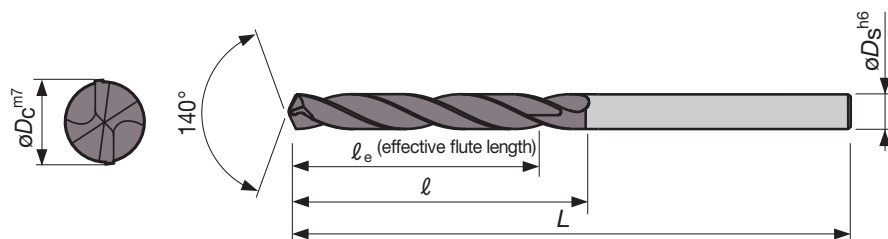
| Drill dia.<br>$\phi D_c$ | Drilling depth<br>L/D | Coolant Supply | Cat. No.         | Stock* | Dimensions (mm) |          |        |     |
|--------------------------|-----------------------|----------------|------------------|--------|-----------------|----------|--------|-----|
|                          |                       |                |                  |        | $\phi D_s$      | $\ell_e$ | $\ell$ | L   |
| 8.4                      | 3                     | Ext.           | DSW084-035-10DE3 |        | 10              | 35       | 47     | 89  |
|                          | 5                     | Ext.           | DSW084-049-10DE5 |        | 10              | 49       | 61     | 103 |
|                          | 5                     | Int.           | DSW084-049-10DI5 |        | 10              | 49       | 61     | 103 |
|                          | 8                     | Int.           | DSW084-080-10DI8 |        | 10              | 80       | 95     | 142 |
| 8.5                      | 3                     | Ext.           | DSW085-035-10DE3 |        | 10              | 35       | 47     | 89  |
|                          | 5                     | Ext.           | DSW085-049-10DE5 |        | 10              | 49       | 61     | 103 |
|                          | 5                     | Int.           | DSW085-049-10DI5 |        | 10              | 49       | 61     | 103 |
|                          | 8                     | Int.           | DSW085-080-10DI8 |        | 10              | 80       | 95     | 142 |
| 8.6                      | 3                     | Ext.           | DSW086-035-10DE3 |        | 10              | 35       | 47     | 89  |
|                          | 5                     | Ext.           | DSW086-049-10DE5 |        | 10              | 49       | 61     | 103 |
|                          | 5                     | Int.           | DSW086-049-10DI5 |        | 10              | 49       | 61     | 103 |
|                          | 8                     | Int.           | DSW086-080-10DI8 |        | 10              | 80       | 95     | 142 |
| 8.7                      | 3                     | Ext.           | DSW087-035-10DE3 |        | 10              | 35       | 47     | 89  |
|                          | 5                     | Ext.           | DSW087-049-10DE5 |        | 10              | 49       | 61     | 103 |
|                          | 5                     | Int.           | DSW087-049-10DI5 |        | 10              | 49       | 61     | 103 |
|                          | 8                     | Int.           | DSW087-080-10DI8 |        | 10              | 80       | 95     | 142 |
| 8.8                      | 3                     | Ext.           | DSW088-035-10DE3 |        | 10              | 35       | 47     | 89  |
|                          | 5                     | Ext.           | DSW088-049-10DE5 |        | 10              | 49       | 61     | 103 |
|                          | 5                     | Int.           | DSW088-049-10DI5 |        | 10              | 49       | 61     | 103 |
|                          | 8                     | Int.           | DSW088-080-10DI8 |        | 10              | 80       | 95     | 142 |
| 8.9                      | 3                     | Ext.           | DSW089-035-10DE3 |        | 10              | 35       | 47     | 89  |
|                          | 5                     | Ext.           | DSW089-049-10DE5 |        | 10              | 49       | 61     | 103 |
|                          | 5                     | Int.           | DSW089-049-10DI5 |        | 10              | 49       | 61     | 103 |
|                          | 8                     | Int.           | DSW089-080-10DI8 |        | 10              | 80       | 95     | 142 |
| 9.0                      | 3                     | Ext.           | DSW090-035-10DE3 |        | 10              | 35       | 47     | 89  |
|                          | 5                     | Ext.           | DSW090-049-10DE5 |        | 10              | 49       | 61     | 103 |
|                          | 5                     | Int.           | DSW090-049-10DI5 |        | 10              | 49       | 61     | 103 |
|                          | 8                     | Int.           | DSW090-080-10DI8 |        | 10              | 80       | 95     | 142 |
| 9.1                      | 3                     | Ext.           | DSW091-035-10DE3 |        | 10              | 35       | 47     | 89  |
|                          | 5                     | Ext.           | DSW091-049-10DE5 |        | 10              | 49       | 61     | 103 |
|                          | 5                     | Int.           | DSW091-049-10DI5 |        | 10              | 49       | 61     | 103 |
|                          | 8                     | Int.           | DSW091-080-10DI8 |        | 10              | 80       | 95     | 142 |
| 9.2                      | 3                     | Ext.           | DSW092-035-10DE3 |        | 10              | 35       | 47     | 89  |
|                          | 5                     | Ext.           | DSW092-049-10DE5 |        | 10              | 49       | 61     | 103 |
|                          | 5                     | Int.           | DSW092-049-10DI5 |        | 10              | 49       | 61     | 103 |
|                          | 8                     | Int.           | DSW092-080-10DI8 |        | 10              | 80       | 95     | 142 |
| 9.3                      | 3                     | Ext.           | DSW093-035-10DE3 |        | 10              | 35       | 47     | 89  |
|                          | 5                     | Ext.           | DSW093-049-10DE5 |        | 10              | 49       | 61     | 103 |
|                          | 5                     | Int.           | DSW093-049-10DI5 |        | 10              | 49       | 61     | 103 |
|                          | 8                     | Int.           | DSW093-080-10DI8 |        | 10              | 80       | 95     | 142 |

\*For inquiry on DSW stock, please contact the local office.

| Drill dia.<br>øDc | Drilling depth<br>L/D | Coolant Supply | Cat. No.         | Stock* | Dimensions (mm) |                |    |     |
|-------------------|-----------------------|----------------|------------------|--------|-----------------|----------------|----|-----|
|                   |                       |                |                  |        | øDs             | ℓ <sub>e</sub> | ℓ  | L   |
| 9.4               | 3                     | Ext.           | DSW094-035-10DE3 |        | 10              | 35             | 47 | 89  |
|                   | 5                     | Ext.           | DSW094-049-10DE5 |        | 10              | 49             | 61 | 103 |
|                   | 5                     | Int.           | DSW094-049-10DI5 |        | 10              | 49             | 61 | 103 |
|                   | 8                     | Int.           | DSW094-080-10DI8 |        | 10              | 80             | 95 | 142 |
| 9.5               | 3                     | Ext.           | DSW095-035-10DE3 |        | 10              | 35             | 47 | 89  |
|                   | 5                     | Ext.           | DSW095-049-10DE5 |        | 10              | 49             | 61 | 103 |
|                   | 5                     | Int.           | DSW095-049-10DI5 |        | 10              | 49             | 61 | 103 |
|                   | 8                     | Int.           | DSW095-080-10DI8 |        | 10              | 80             | 95 | 142 |
| 9.6               | 3                     | Ext.           | DSW096-035-10DE3 |        | 10              | 35             | 47 | 89  |
|                   | 5                     | Ext.           | DSW096-049-10DE5 |        | 10              | 49             | 61 | 103 |
|                   | 5                     | Int.           | DSW096-049-10DI5 |        | 10              | 49             | 61 | 103 |
|                   | 8                     | Int.           | DSW096-080-10DI8 |        | 10              | 80             | 95 | 142 |
| 9.7               | 3                     | Ext.           | DSW097-035-10DE3 |        | 10              | 35             | 47 | 89  |
|                   | 5                     | Ext.           | DSW097-049-10DE5 |        | 10              | 49             | 61 | 103 |
|                   | 5                     | Int.           | DSW097-049-10DI5 |        | 10              | 49             | 61 | 103 |
|                   | 8                     | Int.           | DSW097-080-10DI8 |        | 10              | 80             | 95 | 142 |
| 9.8               | 3                     | Ext.           | DSW098-035-10DE3 |        | 10              | 35             | 47 | 89  |
|                   | 5                     | Ext.           | DSW098-049-10DE5 |        | 10              | 49             | 61 | 103 |
|                   | 5                     | Int.           | DSW098-049-10DI5 |        | 10              | 49             | 61 | 103 |
|                   | 8                     | Int.           | DSW098-080-10DI8 |        | 10              | 80             | 95 | 142 |
| 9.9               | 3                     | Ext.           | DSW099-035-10DE3 |        | 10              | 35             | 47 | 89  |
|                   | 5                     | Ext.           | DSW099-049-10DE5 |        | 10              | 49             | 61 | 103 |
|                   | 5                     | Int.           | DSW099-049-10DI5 |        | 10              | 49             | 61 | 103 |
|                   | 8                     | Int.           | DSW099-080-10DI8 |        | 10              | 80             | 95 | 142 |
| 10.0              | 3                     | Ext.           | DSW100-035-10DE3 |        | 10              | 35             | 47 | 89  |
|                   | 5                     | Ext.           | DSW100-049-10DE5 |        | 10              | 49             | 61 | 103 |
|                   | 5                     | Int.           | DSW100-049-10DI5 |        | 10              | 49             | 61 | 103 |
|                   | 8                     | Int.           | DSW100-080-10DI8 |        | 10              | 80             | 95 | 142 |
| 10.1              | 3                     | Ext.           | DSW101-040-12DE3 |        | 12              | 40             | 55 | 102 |
|                   | 5                     | Ext.           | DSW101-056-12DE5 |        | 12              | 56             | 71 | 118 |
|                   | 5                     | Int.           | DSW101-056-12DI5 |        | 12              | 56             | 71 | 118 |
| 10.2              | 3                     | Ext.           | DSW102-040-12DE3 |        | 12              | 40             | 55 | 102 |
|                   | 5                     | Ext.           | DSW102-056-12DE5 |        | 12              | 56             | 71 | 118 |
|                   | 5                     | Int.           | DSW102-056-12DI5 |        | 12              | 56             | 71 | 118 |
| 10.3              | 3                     | Ext.           | DSW103-040-12DE3 |        | 12              | 40             | 55 | 102 |
|                   | 5                     | Ext.           | DSW103-056-12DE5 |        | 12              | 56             | 71 | 118 |
|                   | 5                     | Int.           | DSW103-056-12DI5 |        | 12              | 56             | 71 | 118 |
| 10.4              | 3                     | Ext.           | DSW104-040-12DE3 |        | 12              | 40             | 55 | 102 |
|                   | 5                     | Ext.           | DSW104-056-12DE5 |        | 12              | 56             | 71 | 118 |
|                   | 5                     | Int.           | DSW104-056-12DI5 |        | 12              | 56             | 71 | 118 |
| 10.5              | 3                     | Ext.           | DSW105-040-12DE3 |        | 12              | 40             | 55 | 102 |
|                   | 5                     | Ext.           | DSW105-056-12DE5 |        | 12              | 56             | 71 | 118 |
|                   | 5                     | Int.           | DSW105-056-12DI5 |        | 12              | 56             | 71 | 118 |
| 10.6              | 3                     | Ext.           | DSW106-040-12DE3 |        | 12              | 40             | 55 | 102 |
|                   | 5                     | Ext.           | DSW106-056-12DE5 |        | 12              | 56             | 71 | 118 |
|                   | 5                     | Int.           | DSW106-056-12DI5 |        | 12              | 56             | 71 | 118 |
| 10.7              | 3                     | Ext.           | DSW107-040-12DE3 |        | 12              | 40             | 55 | 102 |
|                   | 5                     | Ext.           | DSW107-056-12DE5 |        | 12              | 56             | 71 | 118 |
|                   | 5                     | Int.           | DSW107-056-12DI5 |        | 12              | 56             | 71 | 118 |

| Drill dia.<br>øDc | Drilling depth<br>L/D | Coolant Supply | Cat. No.         | Stock* | Dimensions (mm) |                |    |     |
|-------------------|-----------------------|----------------|------------------|--------|-----------------|----------------|----|-----|
|                   |                       |                |                  |        | øDs             | ℓ <sub>e</sub> | ℓ  | L   |
| 10.8              | 3                     | Ext.           | DSW108-040-12DE3 |        | 12              | 40             | 55 | 102 |
|                   | 5                     | Ext.           | DSW108-056-12DE5 |        | 12              | 56             | 71 | 118 |
|                   | 5                     | Int.           | DSW108-056-12DI5 |        | 12              | 56             | 71 | 118 |
| 10.9              | 3                     | Ext.           | DSW109-040-12DE3 |        | 12              | 40             | 55 | 102 |
|                   | 5                     | Ext.           | DSW109-056-12DE5 |        | 12              | 56             | 71 | 118 |
|                   | 5                     | Int.           | DSW109-056-12DI5 |        | 12              | 56             | 71 | 118 |
| 11.0              | 3                     | Ext.           | DSW110-040-12DE3 |        | 12              | 40             | 55 | 102 |
|                   | 5                     | Ext.           | DSW110-056-12DE5 |        | 12              | 56             | 71 | 118 |
|                   | 5                     | Int.           | DSW110-056-12DI5 |        | 12              | 56             | 71 | 118 |
| 11.1              | 3                     | Ext.           | DSW111-040-12DE3 |        | 12              | 40             | 55 | 102 |
|                   | 5                     | Ext.           | DSW111-056-12DE5 |        | 12              | 56             | 71 | 118 |
|                   | 5                     | Int.           | DSW111-056-12DI5 |        | 12              | 56             | 71 | 118 |
| 11.2              | 3                     | Ext.           | DSW112-040-12DE3 |        | 12              | 40             | 55 | 102 |
|                   | 5                     | Ext.           | DSW112-056-12DE5 |        | 12              | 56             | 71 | 118 |
|                   | 5                     | Int.           | DSW112-056-12DI5 |        | 12              | 56             | 71 | 118 |
| 11.3              | 3                     | Ext.           | DSW113-040-12DE3 |        | 12              | 40             | 55 | 102 |
|                   | 5                     | Ext.           | DSW113-056-12DE5 |        | 12              | 56             | 71 | 118 |
|                   | 5                     | Int.           | DSW113-056-12DI5 |        | 12              | 56             | 71 | 118 |
| 11.4              | 3                     | Ext.           | DSW114-040-12DE3 |        | 12              | 40             | 55 | 102 |
|                   | 5                     | Ext.           | DSW114-056-12DE5 |        | 12              | 56             | 71 | 118 |
|                   | 5                     | Int.           | DSW114-056-12DI5 |        | 12              | 56             | 71 | 118 |
| 11.5              | 3                     | Ext.           | DSW115-040-12DE3 |        | 12              | 40             | 55 | 102 |
|                   | 5                     | Ext.           | DSW115-056-12DE5 |        | 12              | 56             | 71 | 118 |
|                   | 5                     | Int.           | DSW115-056-12DI5 |        | 12              | 56             | 71 | 118 |
| 11.6              | 3                     | Ext.           | DSW116-040-12DE3 |        | 12              | 40             | 55 | 102 |
|                   | 5                     | Ext.           | DSW116-056-12DE5 |        | 12              | 56             | 71 | 118 |
|                   | 5                     | Int.           | DSW116-056-12DI5 |        | 12              | 56             | 71 | 118 |
| 11.7              | 3                     | Ext.           | DSW117-040-12DE3 |        | 12              | 40             | 55 | 102 |
|                   | 5                     | Ext.           | DSW117-056-12DE5 |        | 12              | 56             | 71 | 118 |
|                   | 5                     | Int.           | DSW117-056-12DI5 |        | 12              | 56             | 71 | 118 |
| 11.8              | 3                     | Ext.           | DSW118-040-12DE3 |        | 12              | 40             | 55 | 102 |
|                   | 5                     | Ext.           | DSW118-056-12DE5 |        | 12              | 56             | 71 | 118 |
|                   | 5                     | Int.           | DSW118-056-12DI5 |        | 12              | 56             | 71 | 118 |
| 11.9              | 3                     | Ext.           | DSW119-040-12DE3 |        | 12              | 40             | 55 | 102 |
|                   | 5                     | Ext.           | DSW119-056-12DE5 |        | 12              | 56             | 71 | 118 |
|                   | 5                     | Int.           | DSW119-056-12DI5 |        | 12              | 56             | 71 | 118 |
| 12.0              | 3                     | Ext.           | DSW120-040-12DE3 |        | 12              | 40             | 55 | 102 |
|                   | 5                     | Ext.           | DSW120-056-12DE5 |        | 12              | 56             | 71 | 118 |
|                   | 5                     | Int.           | DSW120-056-12DI5 |        | 12              | 56             | 71 | 118 |
| 12.1              | 3                     | Ext.           | DSW121-043-14DE3 |        | 14              | 43             | 60 | 107 |
|                   | 5                     | Ext.           | DSW121-060-14DE5 |        | 14              | 60             | 77 | 124 |
|                   | 5                     | Int.           | DSW121-060-14DI5 |        | 14              | 60             | 77 | 124 |
| 12.2              | 3                     | Ext.           | DSW122-043-14DE3 |        | 14              | 43             | 60 | 107 |
|                   | 5                     | Ext.           | DSW122-060-14DE5 |        | 14              | 60             | 77 | 124 |
|                   | 5                     | Int.           | DSW122-060-14DI5 |        | 14              | 60             | 77 | 124 |
| 12.3              | 3                     | Ext.           | DSW123-043-14DE3 |        | 14              | 43             | 60 | 107 |
|                   | 5                     | Ext.           | DSW123-060-14DE5 |        | 14              | 60             | 77 | 124 |
|                   | 5                     | Int.           | DSW123-060-14DI5 |        | 14              | 60             | 77 | 124 |

\*For inquiry on DSW stock, please contact the local office.



| Drill dia. $\phi D_c$ (mm) | Tolerance m7 (mm) |
|----------------------------|-------------------|
| 3.00 ~ 6                   | 0.004 ~ 0.016     |
| 6.01 ~ 10                  | 0.006 ~ 0.021     |
| 10.01 ~ 16                 | 0.007 ~ 0.025     |

| Drill dia.<br>$\phi D_c$ | Drilling depth<br>L/D | Coolant Supply | Cat. No.         | Stock* | Dimensions (mm) |          |        |     |
|--------------------------|-----------------------|----------------|------------------|--------|-----------------|----------|--------|-----|
|                          |                       |                |                  |        | $\phi D_s$      | $\ell_e$ | $\ell$ | L   |
| 12.4                     | 3                     | Ext.           | DSW124-043-14DE3 |        | 14              | 43       | 60     | 107 |
|                          | 5                     | Ext.           | DSW124-060-14DE5 |        | 14              | 60       | 77     | 124 |
|                          | 5                     | Int.           | DSW124-060-14DI5 |        | 14              | 60       | 77     | 124 |
| 12.5                     | 3                     | Ext.           | DSW125-043-14DE3 |        | 14              | 43       | 60     | 107 |
|                          | 5                     | Ext.           | DSW125-060-14DE5 |        | 14              | 60       | 77     | 124 |
|                          | 5                     | Int.           | DSW125-060-14DI5 |        | 14              | 60       | 77     | 124 |
| 12.6                     | 3                     | Ext.           | DSW126-043-14DE3 |        | 14              | 43       | 60     | 107 |
|                          | 5                     | Ext.           | DSW126-060-14DE5 |        | 14              | 60       | 77     | 124 |
|                          | 5                     | Int.           | DSW126-060-14DI5 |        | 14              | 60       | 77     | 124 |
| 12.7                     | 3                     | Ext.           | DSW127-043-14DE3 |        | 14              | 43       | 60     | 107 |
|                          | 5                     | Ext.           | DSW127-060-14DE5 |        | 14              | 60       | 77     | 124 |
|                          | 5                     | Int.           | DSW127-060-14DI5 |        | 14              | 60       | 77     | 124 |
| 12.8                     | 3                     | Ext.           | DSW128-043-14DE3 |        | 14              | 43       | 60     | 107 |
|                          | 5                     | Ext.           | DSW128-060-14DE5 |        | 14              | 60       | 77     | 124 |
|                          | 5                     | Int.           | DSW128-060-14DI5 |        | 14              | 60       | 77     | 124 |
| 12.9                     | 3                     | Ext.           | DSW129-043-14DE3 |        | 14              | 43       | 60     | 107 |
|                          | 5                     | Ext.           | DSW129-060-14DE5 |        | 14              | 60       | 77     | 124 |
|                          | 5                     | Int.           | DSW129-060-14DI5 |        | 14              | 60       | 77     | 124 |
| 13.0                     | 3                     | Ext.           | DSW130-043-14DE3 |        | 14              | 43       | 60     | 107 |
|                          | 5                     | Ext.           | DSW130-060-14DE5 |        | 14              | 60       | 77     | 124 |
|                          | 5                     | Int.           | DSW130-060-14DI5 |        | 14              | 60       | 77     | 124 |
| 13.1                     | 3                     | Ext.           | DSW131-043-14DE3 |        | 14              | 43       | 60     | 107 |
|                          | 5                     | Ext.           | DSW131-060-14DE5 |        | 14              | 60       | 77     | 124 |
|                          | 5                     | Int.           | DSW131-060-14DI5 |        | 14              | 60       | 77     | 124 |
| 13.2                     | 3                     | Ext.           | DSW132-043-14DE3 |        | 14              | 43       | 60     | 107 |
|                          | 5                     | Ext.           | DSW132-060-14DE5 |        | 14              | 60       | 77     | 124 |
|                          | 5                     | Int.           | DSW132-060-14DI5 |        | 14              | 60       | 77     | 124 |
| 13.3                     | 3                     | Ext.           | DSW133-043-14DE3 |        | 14              | 43       | 60     | 107 |
|                          | 5                     | Ext.           | DSW133-060-14DE5 |        | 14              | 60       | 77     | 124 |
|                          | 5                     | Int.           | DSW133-060-14DI5 |        | 14              | 60       | 77     | 124 |
| 13.4                     | 3                     | Ext.           | DSW134-043-14DE3 |        | 14              | 43       | 60     | 107 |
|                          | 5                     | Ext.           | DSW134-060-14DE5 |        | 14              | 60       | 77     | 124 |
|                          | 5                     | Int.           | DSW134-060-14DI5 |        | 14              | 60       | 77     | 124 |
| 13.5                     | 3                     | Ext.           | DSW135-043-14DE3 |        | 14              | 43       | 60     | 107 |
|                          | 5                     | Ext.           | DSW135-060-14DE5 |        | 14              | 60       | 77     | 124 |
|                          | 5                     | Int.           | DSW135-060-14DI5 |        | 14              | 60       | 77     | 124 |
| 13.6                     | 3                     | Ext.           | DSW136-043-14DE3 |        | 14              | 43       | 60     | 107 |
|                          | 5                     | Ext.           | DSW136-060-14DE5 |        | 14              | 60       | 77     | 124 |
|                          | 5                     | Int.           | DSW136-060-14DI5 |        | 14              | 60       | 77     | 124 |

| Drill dia.<br>$\phi D_c$ | Drilling depth<br>L/D | Coolant Supply | Cat. No.         | Stock* | Dimensions (mm) |          |        |     |
|--------------------------|-----------------------|----------------|------------------|--------|-----------------|----------|--------|-----|
|                          |                       |                |                  |        | $\phi D_s$      | $\ell_e$ | $\ell$ | L   |
| 13.7                     | 3                     | Ext.           | DSW137-043-14DE3 |        | 14              | 43       | 60     | 107 |
|                          | 5                     | Ext.           | DSW137-060-14DE5 |        | 14              | 60       | 77     | 124 |
|                          | 5                     | Int.           | DSW137-060-14DI5 |        | 14              | 60       | 77     | 124 |
| 13.8                     | 3                     | Ext.           | DSW138-043-14DE3 |        | 14              | 43       | 60     | 107 |
|                          | 5                     | Ext.           | DSW138-060-14DE5 |        | 14              | 60       | 77     | 124 |
|                          | 5                     | Int.           | DSW138-060-14DI5 |        | 14              | 60       | 77     | 124 |
| 13.9                     | 3                     | Ext.           | DSW139-043-14DE3 |        | 14              | 43       | 60     | 107 |
|                          | 5                     | Ext.           | DSW139-060-14DE5 |        | 14              | 60       | 77     | 124 |
|                          | 5                     | Int.           | DSW139-060-14DI5 |        | 14              | 60       | 77     | 124 |
| 14.0                     | 3                     | Ext.           | DSW140-043-14DE3 |        | 14              | 43       | 60     | 107 |
|                          | 5                     | Ext.           | DSW140-060-14DE5 |        | 14              | 60       | 77     | 124 |
|                          | 5                     | Int.           | DSW140-060-14DI5 |        | 14              | 60       | 77     | 124 |
| 14.1                     | 3                     | Ext.           | DSW141-045-16DE3 |        | 16              | 45       | 65     | 115 |
|                          | 5                     | Ext.           | DSW141-063-16DE5 |        | 16              | 63       | 83     | 133 |
|                          | 5                     | Int.           | DSW141-063-16DI5 |        | 16              | 63       | 83     | 133 |
| 14.2                     | 3                     | Ext.           | DSW142-045-16DE3 |        | 16              | 45       | 65     | 115 |
|                          | 5                     | Ext.           | DSW142-063-16DE5 |        | 16              | 63       | 83     | 133 |
|                          | 5                     | Int.           | DSW142-063-16DI5 |        | 16              | 63       | 83     | 133 |
| 14.3                     | 3                     | Ext.           | DSW143-045-16DE3 |        | 16              | 45       | 65     | 115 |
|                          | 5                     | Ext.           | DSW143-063-16DE5 |        | 16              | 63       | 83     | 133 |
|                          | 5                     | Int.           | DSW143-063-16DI5 |        | 16              | 63       | 83     | 133 |
| 14.4                     | 3                     | Ext.           | DSW144-045-16DE3 |        | 16              | 45       | 65     | 115 |
|                          | 5                     | Ext.           | DSW144-063-16DE5 |        | 16              | 63       | 83     | 133 |
|                          | 5                     | Int.           | DSW144-063-16DI5 |        | 16              | 63       | 83     | 133 |
| 14.5                     | 3                     | Ext.           | DSW145-045-16DE3 |        | 16              | 45       | 65     | 115 |
|                          | 5                     | Ext.           | DSW145-063-16DE5 |        | 16              | 63       | 83     | 133 |
|                          | 5                     | Int.           | DSW145-063-16DI5 |        | 16              | 63       | 83     | 133 |
| 14.6                     | 3                     | Ext.           | DSW146-045-16DE3 |        | 16              | 45       | 65     | 115 |
|                          | 5                     | Ext.           | DSW146-063-16DE5 |        | 16              | 63       | 83     | 133 |
|                          | 5                     | Int.           | DSW146-063-16DI5 |        | 16              | 63       | 83     | 133 |
| 14.7                     | 3                     | Ext.           | DSW147-045-16DE3 |        | 16              | 45       | 65     | 115 |
|                          | 5                     | Ext.           | DSW147-063-16DE5 |        | 16              | 63       | 83     | 133 |
|                          | 5                     | Int.           | DSW147-063-16DI5 |        | 16              | 63       | 83     | 133 |
| 14.8                     | 3                     | Ext.           | DSW148-045-16DE3 |        | 16              | 45       | 65     | 115 |
|                          | 5                     | Ext.           | DSW148-063-16DE5 |        | 16              | 63       | 83     | 133 |
|                          | 5                     | Int.           | DSW148-063-16DI5 |        | 16              | 63       | 83     | 133 |
| 14.9                     | 3                     | Ext.           | DSW149-045-16DE3 |        | 16              | 45       | 65     | 115 |
|                          | 5                     | Ext.           | DSW149-063-16DE5 |        | 16              | 63       | 83     | 133 |
|                          | 5                     | Int.           | DSW149-063-16DI5 |        | 16              | 63       | 83     | 133 |

\*For inquiry on DSW stock, please contact the local office.

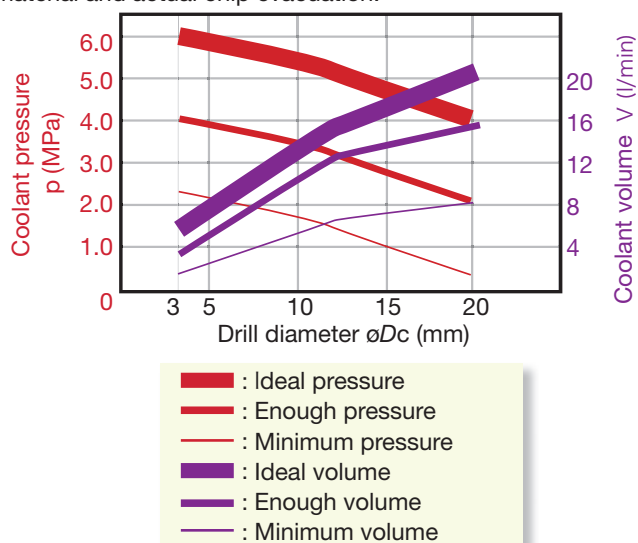
| Drill dia.<br>$\phi D_c$ | Drilling depth<br>L/D | Coolant Supply | Cat. No.         | Stock* | Dimensions (mm) |          |        |     |
|--------------------------|-----------------------|----------------|------------------|--------|-----------------|----------|--------|-----|
|                          |                       |                |                  |        | $\phi D_s$      | $\ell_e$ | $\ell$ | L   |
| 15.0                     | 3                     | Ext.           | DSW150-045-16DE3 |        | 16              | 45       | 65     | 115 |
|                          | 5                     | Ext.           | DSW150-063-16DE5 |        | 16              | 63       | 83     | 133 |
|                          | 5                     | Int.           | DSW150-063-16DI5 |        | 16              | 63       | 83     | 133 |
| 15.1                     | 3                     | Ext.           | DSW151-045-16DE3 |        | 16              | 45       | 65     | 115 |
|                          | 5                     | Ext.           | DSW151-063-16DE5 |        | 16              | 63       | 83     | 133 |
|                          | 5                     | Int.           | DSW151-063-16DI5 |        | 16              | 63       | 83     | 133 |
| 15.2                     | 3                     | Ext.           | DSW152-045-16DE3 |        | 16              | 45       | 65     | 115 |
|                          | 5                     | Ext.           | DSW152-063-16DE5 |        | 16              | 63       | 83     | 133 |
|                          | 5                     | Int.           | DSW152-063-16DI5 |        | 16              | 63       | 83     | 133 |
| 15.3                     | 3                     | Ext.           | DSW153-045-16DE3 |        | 16              | 45       | 65     | 115 |
|                          | 5                     | Ext.           | DSW153-063-16DE5 |        | 16              | 63       | 83     | 133 |
|                          | 5                     | Int.           | DSW153-063-16DI5 |        | 16              | 63       | 83     | 133 |
| 15.4                     | 3                     | Ext.           | DSW154-045-16DE3 |        | 16              | 45       | 65     | 115 |
|                          | 5                     | Ext.           | DSW154-063-16DE5 |        | 16              | 63       | 83     | 133 |
|                          | 5                     | Int.           | DSW154-063-16DI5 |        | 16              | 63       | 83     | 133 |
| 15.5                     | 3                     | Ext.           | DSW155-045-16DE3 |        | 16              | 45       | 65     | 115 |
|                          | 5                     | Ext.           | DSW155-063-16DE5 |        | 16              | 63       | 83     | 133 |
|                          | 5                     | Int.           | DSW155-063-16DI5 |        | 16              | 63       | 83     | 133 |

| Drill dia.<br>$\phi D_c$ | Drilling depth<br>L/D | Coolant Supply | Cat. No.         | Stock* | Dimensions (mm) |          |        |     |
|--------------------------|-----------------------|----------------|------------------|--------|-----------------|----------|--------|-----|
|                          |                       |                |                  |        | $\phi D_s$      | $\ell_e$ | $\ell$ | L   |
| 15.6                     | 3                     | Ext.           | DSW156-045-16DE3 |        | 16              | 45       | 65     | 115 |
|                          | 5                     | Ext.           | DSW156-063-16DE5 |        | 16              | 63       | 83     | 133 |
|                          | 5                     | Int.           | DSW156-063-16DI5 |        | 16              | 63       | 83     | 133 |
| 15.7                     | 3                     | Ext.           | DSW157-045-16DE3 |        | 16              | 45       | 65     | 115 |
|                          | 5                     | Ext.           | DSW157-063-16DE5 |        | 16              | 63       | 83     | 133 |
|                          | 5                     | Int.           | DSW157-063-16DI5 |        | 16              | 63       | 83     | 133 |
| 15.8                     | 3                     | Ext.           | DSW158-045-16DE3 |        | 16              | 45       | 65     | 115 |
|                          | 5                     | Ext.           | DSW158-063-16DE5 |        | 16              | 63       | 83     | 133 |
|                          | 5                     | Int.           | DSW158-063-16DI5 |        | 16              | 63       | 83     | 133 |
| 15.9                     | 3                     | Ext.           | DSW159-045-16DE3 |        | 16              | 45       | 65     | 115 |
|                          | 5                     | Ext.           | DSW159-063-16DE5 |        | 16              | 63       | 83     | 133 |
|                          | 5                     | Int.           | DSW159-063-16DI5 |        | 16              | 63       | 83     | 133 |
| 16.0                     | 3                     | Ext.           | DSW160-045-16DE3 |        | 16              | 45       | 65     | 115 |
|                          | 5                     | Ext.           | DSW160-063-16DE5 |        | 16              | 63       | 83     | 133 |
|                          | 5                     | Int.           | DSW160-063-16DI5 |        | 16              | 63       | 83     | 133 |

\*For inquiry on DSW stock, please contact the local office.

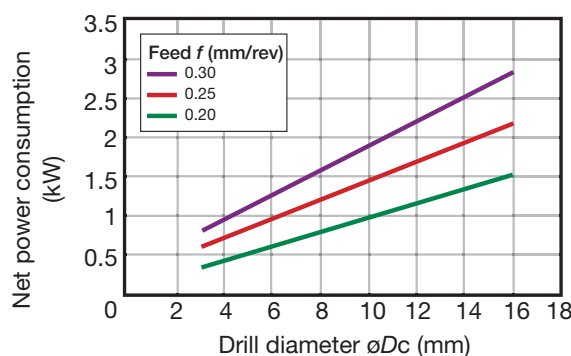
### ■ Recommended coolant pressure and volume for internal coolant supply:

The following graph is a reference guide for pressure and volume. Values should be adjusted according to work material and actual chip evacuation.



### ■ Reference for required spindle power:

The required spindle power may vary depending on the type of work material or hardness. A spindle with sufficient power should be used when referring to the below graph.



Work material : Alloy steel (SNCM439)  
Cutting speed :  $V_c = 100$  m/min

## ● Designation system

The designation for the new solid drill series includes tool dimensions for easy product identification.

|            |            |          |            |          |           |          |          |          |          |
|------------|------------|----------|------------|----------|-----------|----------|----------|----------|----------|
| <b>DSW</b> | <b>088</b> | <b>-</b> | <b>035</b> | <b>-</b> | <b>10</b> | <b>-</b> | <b>D</b> | <b>E</b> | <b>3</b> |
| 1          | 2          |          | 3          |          | 4         |          | 5        | 6        | 7        |

|                 |                            |
|-----------------|----------------------------|
| <b>1 Series</b> |                            |
| <b>DSW</b>      | Series name of solid drill |

|                                                |            |
|------------------------------------------------|------------|
| <b>2 Drill dia. <math>\phi D_c</math> (mm)</b> |            |
| <b>088</b>                                     | $\phi 8.8$ |

|                                                          |    |
|----------------------------------------------------------|----|
| <b>3 Effective flute length <math>\ell_e</math> (mm)</b> |    |
| <b>035</b>                                               | 35 |

|                                                    |           |
|----------------------------------------------------|-----------|
| <b>4 Shank diameter <math>\phi D_s</math> (mm)</b> |           |
| <b>10</b>                                          | $\phi 10$ |

|                             |  |
|-----------------------------|--|
| <b>5 DIN 6535 - Form HA</b> |  |
|-----------------------------|--|

|                         |                                 |
|-------------------------|---------------------------------|
| <b>6 Coolant Supply</b> |                                 |
| <b>E</b>                | External (without coolant hole) |
| <b>I</b>                | Internal (with coolant hole)    |

|                                                                                                  |  |
|--------------------------------------------------------------------------------------------------|--|
| <b>7 Drilling depth</b>                                                                          |  |
| <b>Approximate value of L/D ratio.</b>                                                           |  |
| Caution: Code may be different from the actual length. This is dependent upon the tool diameter. |  |

Caution: "Effective flute length" shows the maximum flute length for effective chip evacuation. The actual drilling depth may be shorter than described depending on the work material or cutting conditions.

## ● Standard cutting conditions

### ■ DSW-DE (External supply)

| Work materials                                                                       | Brinell hardness (HB) | Cutting Speed: Vc (m/min) |          |           | Feed: f (mm/rev) |             |             |
|--------------------------------------------------------------------------------------|-----------------------|---------------------------|----------|-----------|------------------|-------------|-------------|
|                                                                                      |                       | ø3 ~ ø6                   | ø6 ~ ø10 | ø10 ~ ø16 | ø3 ~ ø6          | ø6 ~ ø10    | ø10 ~ ø16   |
| Low carbon steels (C < 0.3)<br>SS400, SM490, S25C etc.<br>(St42-1, St52-3, C25 etc.) | ~ 180                 | 40 - 100                  | 60 - 120 | 60 - 130  | 0.15 - 0.30      | 0.15 - 0.35 | 0.20 - 0.50 |
| Carbon steels (C > 0.3)<br>S45C, S55C etc. (C45, C55 etc.)                           | 180 ~ 300             | 40 - 90                   | 50 - 120 | 60 - 130  | 0.15 - 0.30      | 0.15 - 0.35 | 0.20 - 0.40 |
| High alloy steels<br>SCM440 etc. (42CrMo4 etc.)                                      | 250 ~ 350             | 40 - 80                   | 50 - 100 | 50 - 100  | 0.10 - 0.20      | 0.15 - 0.20 | 0.15 - 0.35 |
| Stainless steels<br>SUS304 etc. (X5CrNi18-9 etc.)                                    | ~ 200                 | 10 - 20                   | 10 - 20  | 10 - 20   | 0.05 - 0.15      | 0.05 - 0.15 | 0.05 - 0.15 |
| Grey cast irons<br>FC300 etc. (GG30 etc.)                                            | ~ 200                 | 40 - 90                   | 50 - 95  | 50 - 100  | 0.15 - 0.30      | 0.20 - 0.40 | 0.20 - 0.50 |
| Ductile cast irons<br>FCD450 etc. (GGG45 etc.)                                       | ~ 300                 | 30 - 80                   | 40 - 90  | 45 - 90   | 0.10 - 0.30      | 0.20 - 0.40 | 0.20 - 0.40 |
| Aluminium alloys<br>ADC12 etc.                                                       | -                     | 40 - 90                   | 50 - 100 | 50 - 100  | 0.15 - 0.30      | 0.20 - 0.40 | 0.20 - 0.50 |
| Titanium alloys<br>Ti-6Al-4V etc.                                                    | -                     | 20 - 40                   | 20 - 40  | 20 - 40   | 0.10 - 0.20      | 0.15 - 0.25 | 0.15 - 0.40 |
| Heat-resistant alloys, Inconel<br>Inconel 718 etc.                                   | 250 ~                 | 10 - 30                   | 10 - 30  | 10 - 30   | 0.03 - 0.07      | 0.05 - 0.10 | 0.07 - 0.12 |
| High hardened steels<br>SKD11 etc.                                                   | ~ 40HRC               | 10 - 30                   | 10 - 30  | 10 - 30   | 0.05 - 0.15      | 0.05 - 0.15 | 0.05 - 0.20 |

- The cutting parameters shown in the table are merely a starting guideline for general machining. Values should be varied depending on the power or rigidity of the machine to be used. Optimum conditions should be selected depending on the actual chip control or damage on edges.
- When using the smaller diameter tools in each range, set the feed "f" to the lower recommended values.

to the lower recommended values.

- The coolant supply is critical for the provision of stable machining conditions and enhanced tool life. A large coolant volume should be supplied, especially when drilling difficult-to-cut materials.
- When drilling stainless steel with low machinability such as austenitic stainless steel with a depth deeper than L/D = 3, a pecking cycle or internal coolant supply is recommended.

### ■ DSW-DI (Internal supply)

| Work materials                                                                       | Brinell hardness (HB) | Cutting Speed: Vc (m/min) |          |           | Feed: f (mm/rev) |             |             |
|--------------------------------------------------------------------------------------|-----------------------|---------------------------|----------|-----------|------------------|-------------|-------------|
|                                                                                      |                       | ø3 ~ ø6                   | ø6 ~ ø10 | ø10 ~ ø16 | ø3 ~ ø6          | ø6 ~ ø10    | ø10 ~ ø16   |
| Low carbon steels (C < 0.3)<br>SS400, SM490, S25C etc.<br>(St42-1, St52-3, C25 etc.) | ~ 180                 | 70 - 140                  | 80 - 160 | 90 - 190  | 0.15 - 0.30      | 0.15 - 0.35 | 0.20 - 0.50 |
| Carbon steels (C > 0.3)<br>S45C, S55C etc. (C45, C55 etc.)                           | 180 ~ 300             | 40 - 90                   | 40 - 90  | 60 - 130  | 0.15 - 0.30      | 0.15 - 0.35 | 0.20 - 0.40 |
| High alloy steels<br>SCM440 etc. (42CrMo4 etc.)                                      | 250 ~ 350             | 40 - 80                   | 50 - 100 | 50 - 100  | 0.10 - 0.20      | 0.15 - 0.20 | 0.15 - 0.35 |
| Stainless steels<br>SUS304 etc. (X5CrNi18-9 etc.)                                    | ~ 200                 | 25 - 75                   | 25 - 75  | 25 - 75   | 0.05 - 0.15      | 0.05 - 0.15 | 0.10 - 0.30 |
| Grey cast irons<br>FC300 etc. (GG30 etc.)                                            | ~ 200                 | 70 - 90                   | 70 - 90  | 70 - 90   | 0.15 - 0.30      | 0.20 - 0.40 | 0.20 - 0.50 |
| Ductile cast irons<br>FCD450 etc. (GGG45 etc.)                                       | ~ 300                 | 40 - 90                   | 40 - 90  | 40 - 90   | 0.10 - 0.30      | 0.20 - 0.40 | 0.20 - 0.40 |
| Aluminium alloys<br>ADC12 etc.                                                       | -                     | 60 - 200                  | 60 - 200 | 60 - 200  | 0.15 - 0.30      | 0.20 - 0.40 | 0.20 - 0.50 |
| Titanium alloys<br>Ti-6Al-4V etc.                                                    | -                     | 20 - 40                   | 20 - 40  | 20 - 40   | 0.10 - 0.20      | 0.15 - 0.25 | 0.15 - 0.40 |
| Heat-resistant alloys, Inconel<br>Inconel 718 etc.                                   | 250 ~                 | 10 - 30                   | 10 - 30  | 10 - 30   | 0.03 - 0.07      | 0.05 - 0.10 | 0.07 - 0.12 |
| High hardened steels<br>SKD11 etc.                                                   | ~ 40HRC               | 10 - 30                   | 10 - 30  | 10 - 30   | 0.05 - 0.15      | 0.05 - 0.15 | 0.05 - 0.20 |

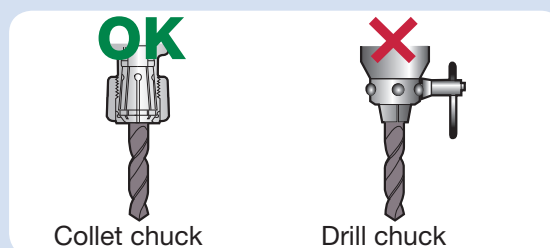
- The cutting parameters shown in the table are merely a starting guideline for general machining. Values should be varied depending on the power or rigidity of the machine to be used. Optimum conditions should be selected depending on the actual chip control or damage on edges.

- When using the smaller diameter tools in each range, set the feed "f" to the lower recommended values.
- Oil holes that become blocked may cause drill breakages. A filter to prevent the circulation of chips must be used on the coolant supply system.

## ● Guidelines for correct usage of carbide drills

### ● Holders for solid carbide drills:

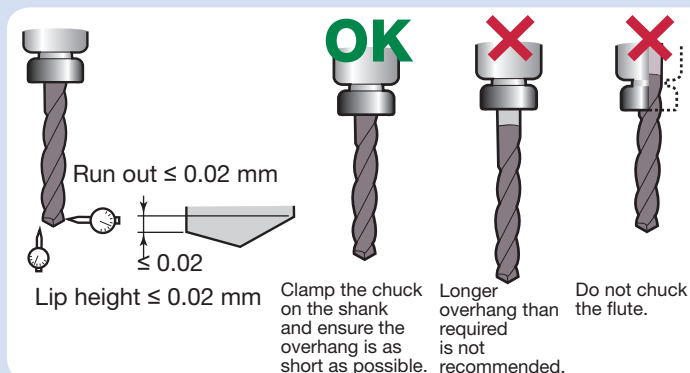
A collet chuck holder is recommended for use with carbide drills. When using a milling chuck holder, a collet chuck with a straight shank or straight collet should be used.



### ● Chucking drills:

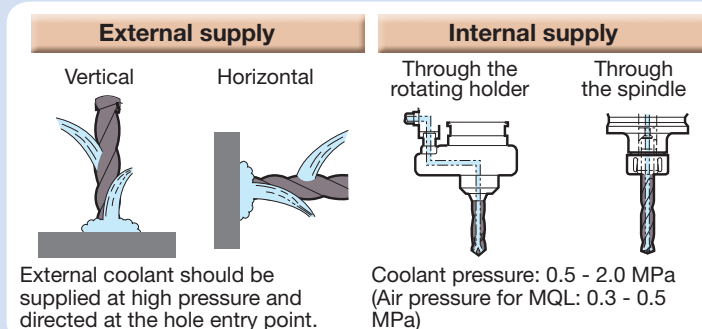
■ Radial run out and lip height should be less than 0.02mm. If run out or lip height is larger (close to 0.05mm), machining is possible. However, less accurate holes or short tool life may be a result.

■ Overhang length should be as short as possible.



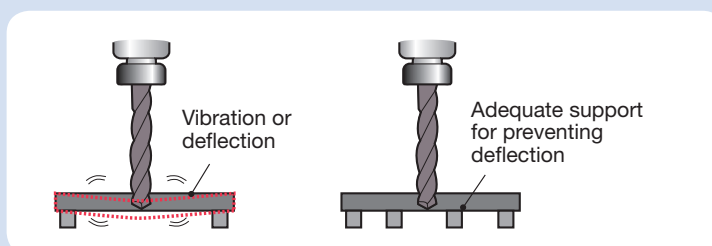
### ● Coolant Supply:

When using a drill without a coolant hole, such as the DSW-DE type, coolant should always be directed to the entrance of the hole. Maintaining this supplying is very important for stable drilling performance.



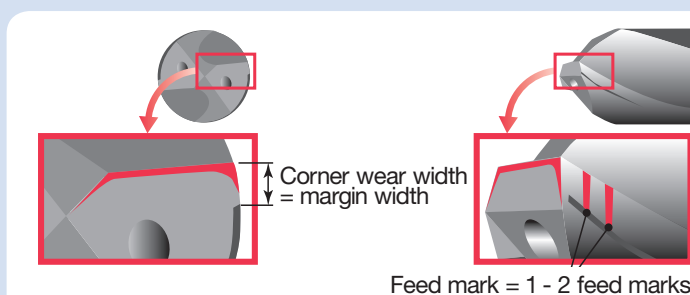
### ● Clamping workpieces:

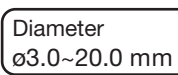
As solid carbide drills have a higher thrust force, machining with low rigidity or inadequate support can cause fractures or breakages through vibration. It is important the workpiece is rigidly clamped and has adequate support.



### ● The criteria of tool life:

- Corner wear width: equal to margin width
- Feed mark: 1 - 2 feed marks on the margin
- Spindle load increase: 30% higher than starting level
- Irregular situation: worse chip control, hole diameter change, worse surface finish, larger burrs, bigger sound.



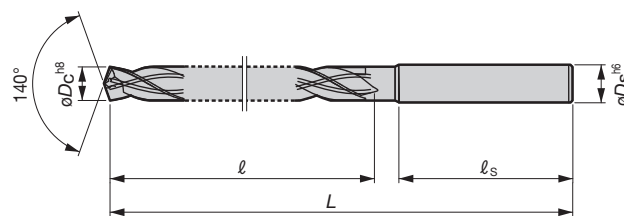


For High Speed and efficient Deep Hole Drilling of Steels  
Coated solid carbide drills with spiral oil holes

Internal coolant supply



| Drill Dia.<br>$\phi D_c$ | $\phi D_c \leq 3.0$ | $3.0 < \phi D_c \leq 6.0$ | $6.0 < \phi D_c \leq 10.0$ | $10.0 < \phi D_c \leq 18.0$ | $18.0 < \phi D_c \leq 20.0$ |
|--------------------------|---------------------|---------------------------|----------------------------|-----------------------------|-----------------------------|
| Tolerances               | 0<br>-0.014         | 0<br>-0.018               | 0<br>-0.022                | 0<br>-0.027                 | 0<br>-0.033                 |



**L/D = 3**

| Drill dia.<br>$\phi D_c$ | Cat. No.   | Stock | Dimensions (mm) |        |          |     |
|--------------------------|------------|-------|-----------------|--------|----------|-----|
|                          |            |       | $\phi D_s$      | $\ell$ | $\ell_s$ | $L$ |
| 3.0                      | DSX0300F03 | ▲     | 3.0             | 15     |          | 68  |
| 3.1                      | DSX0310F03 | ▲     |                 |        |          |     |
| 3.2                      | DSX0320F03 | ▲     |                 |        |          |     |
| 3.3                      | DSX0330F03 | ▲     |                 |        |          |     |
| 3.4                      | DSX0340F03 | ▲     |                 |        |          |     |
| 3.5                      | DSX0350F03 | ▲     |                 |        |          |     |
| 3.6                      | DSX0360F03 | ▲     |                 |        |          |     |
| 3.7                      | DSX0370F03 | ▲     |                 |        |          |     |
| 3.8                      | DSX0380F03 | ▲     |                 |        |          |     |
| 3.9                      | DSX0390F03 | ▲     |                 |        |          |     |
| 4.0                      | DSX0400F03 | ▲     |                 |        |          |     |
| 4.1                      | DSX0410F03 | ▲     |                 |        |          |     |
| 4.2                      | DSX0420F03 | ▲     |                 |        |          |     |
| 4.3                      | DSX0430F03 | ▲     |                 |        |          |     |
| 4.4                      | DSX0440F03 | ▲     |                 |        |          |     |
| 4.5                      | DSX0450F03 | ▲     |                 |        |          |     |
| 4.6                      | DSX0460F03 | ▲     |                 |        |          |     |
| 4.7                      | DSX0470F03 | ▲     |                 |        |          |     |
| 4.8                      | DSX0480F03 | ▲     |                 |        |          |     |
| 4.9                      | DSX0490F03 | ▲     |                 |        |          |     |
| 5.0                      | DSX0500F03 | ▲     |                 |        |          |     |
| 5.1                      | DSX0510F03 | ▲     |                 |        |          |     |
| 5.2                      | DSX0520F03 | ▲     |                 |        |          |     |
| 5.3                      | DSX0530F03 | ▲     |                 |        |          |     |
| 5.4                      | DSX0540F03 | ▲     |                 |        |          |     |
| 5.5                      | DSX0550F03 | ▲     |                 |        |          |     |
| 5.6                      | DSX0560F03 | ▲     |                 |        |          |     |
| 5.7                      | DSX0570F03 | ▲     |                 |        |          |     |
| 5.8                      | DSX0580F03 | ▲     |                 |        |          |     |
| 5.9                      | DSX0590F03 | ▲     |                 |        |          |     |
| 6.0                      | DSX0600F03 | ▲     |                 |        |          |     |
| 6.1                      | DSX0610F03 | ▲     |                 |        |          |     |
| 6.2                      | DSX0620F03 | ▲     |                 |        |          |     |
| 6.3                      | DSX0630F03 | ▲     |                 |        |          |     |
| 6.4                      | DSX0640F03 | ▲     |                 |        |          |     |
| 6.5                      | DSX0650F03 | ▲     |                 |        |          |     |
| 6.6                      | DSX0660F03 | ▲     |                 |        |          |     |
| 6.7                      | DSX0670F03 | ▲     |                 |        |          |     |
| 6.8                      | DSX0680F03 | ▲     |                 |        |          |     |
| 6.9                      | DSX0690F03 | ▲     |                 |        |          |     |
| 7.0                      | DSX0700F03 | ▲     |                 |        |          |     |
| 7.1                      | DSX0710F03 | ▲     |                 |        |          |     |
| 7.2                      | DSX0720F03 | ▲     |                 |        |          |     |
| 7.3                      | DSX0730F03 | ▲     |                 |        |          |     |
| 7.4                      | DSX0740F03 | ▲     |                 |        |          |     |

| Drill dia.<br>$\phi D_c$ | Cat. No.   | Stock | Dimensions (mm) |        |          |     |
|--------------------------|------------|-------|-----------------|--------|----------|-----|
|                          |            |       | $\phi D_s$      | $\ell$ | $\ell_s$ | $L$ |
| 7.5                      | DSX0750F03 | ▲     |                 |        |          |     |
| 7.6                      | DSX0760F03 | ▲     |                 |        |          |     |
| 7.7                      | DSX0770F03 | ▲     |                 |        |          |     |
| 7.8                      | DSX0780F03 | ▲     |                 |        |          |     |
| 7.9                      | DSX0790F03 | ▲     |                 |        |          |     |
| 8.0                      | DSX0800F03 | ▲     |                 |        |          |     |
| 8.1                      | DSX0810F03 | ▲     |                 |        |          |     |
| 8.2                      | DSX0820F03 | ▲     |                 |        |          |     |
| 8.3                      | DSX0830F03 | ▲     |                 |        |          |     |
| 8.4                      | DSX0840F03 | ▲     |                 |        |          |     |
| 8.5                      | DSX0850F03 | ▲     |                 |        |          |     |
| 8.6                      | DSX0860F03 | ▲     |                 |        |          |     |
| 8.7                      | DSX0870F03 | ▲     |                 |        |          |     |
| 8.8                      | DSX0880F03 | ▲     |                 |        |          |     |
| 8.9                      | DSX0890F03 | ▲     |                 |        |          |     |
| 9.0                      | DSX0900F03 | ▲     |                 |        |          |     |
| 9.1                      | DSX0910F03 | ▲     |                 |        |          |     |
| 9.2                      | DSX0920F03 | ▲     |                 |        |          |     |
| 9.3                      | DSX0930F03 | ▲     |                 |        |          |     |
| 9.4                      | DSX0940F03 | ▲     |                 |        |          |     |
| 9.5                      | DSX0950F03 | ▲     |                 |        |          |     |
| 9.6                      | DSX0960F03 | ▲     |                 |        |          |     |
| 9.7                      | DSX0970F03 | ▲     |                 |        |          |     |
| 9.8                      | DSX0980F03 | ▲     |                 |        |          |     |
| 9.9                      | DSX0990F03 | ▲     |                 |        |          |     |
| 10.0                     | DSX1000F03 | ▲     |                 |        |          |     |
| 10.1                     | DSX1010F03 | ▲     |                 |        |          |     |
| 10.2                     | DSX1020F03 | ▲     |                 |        |          |     |
| 10.3                     | DSX1030F03 | ▲     |                 |        |          |     |
| 10.4                     | DSX1040F03 | ▲     |                 |        |          |     |
| 10.5                     | DSX1050F03 | ▲     |                 |        |          |     |
| 10.6                     | DSX1060F03 | ▲     |                 |        |          |     |
| 10.7                     | DSX1070F03 | ▲     |                 |        |          |     |
| 10.8                     | DSX1080F03 | ▲     |                 |        |          |     |
| 10.9                     | DSX1090F03 | ▲     |                 |        |          |     |
| 11.0                     | DSX1100F03 | ▲     |                 |        |          |     |
| 11.1                     | DSX1110F03 | ▲     |                 |        |          |     |
| 11.2                     | DSX1120F03 | ▲     |                 |        |          |     |
| 11.3                     | DSX1130F03 | ▲     |                 |        |          |     |
| 11.4                     | DSX1140F03 | ▲     |                 |        |          |     |
| 11.5                     | DSX1150F03 | ▲     |                 |        |          |     |
| 11.6                     | DSX1160F03 | ▲     |                 |        |          |     |
| 11.7                     | DSX1170F03 | ▲     |                 |        |          |     |
| 11.8                     | DSX1180F03 | ▲     |                 |        |          |     |
| 11.9                     | DSX1190F03 | ▲     |                 |        |          |     |

▲ : Discontinued items

## ■ L/D = 5

| Drill dia.<br>øD <sub>C</sub> | Cat. No.   | Stock | Dimensions (mm) |     |                |     |
|-------------------------------|------------|-------|-----------------|-----|----------------|-----|
|                               |            |       | øD <sub>S</sub> | ℓ   | ℓ <sub>S</sub> | L   |
| 12.0                          | DSX1200F03 | ▲     | 12.0            | 60  | 62             | 122 |
| 12.1                          | DSX1210F03 | ▲     | 13.0            | 65  | 63             | 128 |
| 12.2                          | DSX1220F03 | ▲     |                 |     |                |     |
| 12.3                          | DSX1230F03 | ▲     |                 |     |                |     |
| 12.4                          | DSX1240F03 | ▲     |                 |     |                |     |
| 12.5                          | DSX1250F03 | ▲     |                 |     |                |     |
| 12.6                          | DSX1260F03 | ▲     |                 |     |                |     |
| 12.7                          | DSX1270F03 | ▲     |                 |     |                |     |
| 12.8                          | DSX1280F03 | ▲     |                 |     |                |     |
| 12.9                          | DSX1290F03 | ▲     |                 |     |                |     |
| 13.0                          | DSX1300F03 | ▲     |                 |     |                |     |
| 13.1                          | DSX1310F03 | ▲     | 14.0            | 70  | 64             | 134 |
| 13.2                          | DSX1320F03 | ▲     |                 |     |                |     |
| 13.3                          | DSX1330F03 | ▲     |                 |     |                |     |
| 13.4                          | DSX1340F03 | ▲     |                 |     |                |     |
| 13.5                          | DSX1350F03 | ▲     |                 |     |                |     |
| 13.6                          | DSX1360F03 | ▲     |                 |     |                |     |
| 13.7                          | DSX1370F03 | ▲     |                 |     |                |     |
| 13.8                          | DSX1380F03 | ▲     |                 |     |                |     |
| 13.9                          | DSX1390F03 | ▲     |                 |     |                |     |
| 14.0                          | DSX1400F03 | ▲     |                 |     |                |     |
| 14.1                          | DSX1410F03 | ▲     | 15.0            | 75  | 65             | 140 |
| 14.2                          | DSX1420F03 | ▲     |                 |     |                |     |
| 14.3                          | DSX1430F03 | ▲     |                 |     |                |     |
| 14.4                          | DSX1440F03 | ▲     |                 |     |                |     |
| 14.5                          | DSX1450F03 | ▲     |                 |     |                |     |
| 14.6                          | DSX1460F03 | ▲     |                 |     |                |     |
| 14.7                          | DSX1470F03 | ▲     |                 |     |                |     |
| 14.8                          | DSX1480F03 | ▲     |                 |     |                |     |
| 14.9                          | DSX1490F03 | ▲     |                 |     |                |     |
| 15.0                          | DSX1500F03 | ▲     |                 |     |                |     |
| 15.1                          | DSX1510F03 | ▲     | 16.0            | 80  | 66             | 146 |
| 15.2                          | DSX1520F03 | ▲     |                 |     |                |     |
| 15.3                          | DSX1530F03 | ▲     |                 |     |                |     |
| 15.4                          | DSX1540F03 | ▲     |                 |     |                |     |
| 15.5                          | DSX1550F03 | ▲     |                 |     |                |     |
| 15.6                          | DSX1560F03 | ▲     |                 |     |                |     |
| 15.7                          | DSX1570F03 | ▲     |                 |     |                |     |
| 15.8                          | DSX1580F03 | ▲     |                 |     |                |     |
| 15.9                          | DSX1590F03 | ▲     |                 |     |                |     |
| 16.0                          | DSX1600F03 | ▲     |                 |     |                |     |
| 16.5                          | DSX1650F03 | ▲     | 17.0            | 85  | 67             | 152 |
| 17.0                          | DSX1700F03 | ▲     |                 |     |                |     |
| 17.5                          | DSX1750F03 | ▲     |                 |     |                |     |
| 18.0                          | DSX1800F03 | ▲     | 18.0            | 90  | 68             | 158 |
| 18.5                          | DSX1850F03 | ▲     | 19.0            | 95  | 69             | 164 |
| 19.0                          | DSX1900F03 | ▲     |                 |     |                |     |
| 19.5                          | DSX1950F03 | ▲     | 20.0            | 100 | 70             | 170 |
| 20.0                          | DSX2000F03 | ▲     |                 |     |                |     |

Note: L/D = Hole depth / Drill diameter

| Drill dia.<br>$\varnothing D_c$ | Cat. No.   | Stock | Dimensions (mm)   |        |          |    |
|---------------------------------|------------|-------|-------------------|--------|----------|----|
|                                 |            |       | $\varnothing D_s$ | $\ell$ | $\ell_s$ | L  |
| 3.0                             | DSX0300F05 | ▲     | 3.0               | 24     | 48       | 77 |
| 3.1                             | DSX0310F05 | ▲     | 4.0               | 28     |          | 81 |
| 3.2                             | DSX0320F05 | ▲     |                   |        |          |    |
| 3.3                             | DSX0330F05 | ▲     |                   |        |          |    |
| 3.4                             | DSX0340F05 | ▲     |                   |        |          |    |
| 3.5                             | DSX0350F05 | ▲     |                   |        |          |    |
| 3.6                             | DSX0360F05 | ▲     |                   | 32     |          | 85 |
| 3.7                             | DSX0370F05 | ▲     |                   |        |          |    |
| 3.8                             | DSX0380F05 | ▲     |                   |        |          |    |
| 3.9                             | DSX0390F05 | ▲     |                   |        |          |    |
| 4.0                             | DSX0400F05 | ▲     |                   |        |          |    |
| 4.1                             | DSX0410F05 | ▲     | 5.0               | 36     | 91       |    |
| 4.2                             | DSX0420F05 | ▲     |                   |        |          |    |
| 4.3                             | DSX0430F05 | ▲     |                   |        |          |    |
| 4.4                             | DSX0440F05 | ▲     |                   |        |          |    |
| 4.5                             | DSX0450F05 | ▲     |                   |        |          |    |
| 4.6                             | DSX0460F05 | ▲     |                   | 40     | 94       |    |
| 4.7                             | DSX0470F05 | ▲     |                   |        |          |    |
| 4.8                             | DSX0480F05 | ▲     |                   |        |          |    |
| 4.9                             | DSX0490F05 | ▲     |                   |        |          |    |
| 5.0                             | DSX0500F05 | ▲     |                   |        |          |    |
| 5.1                             | DSX0510F05 | ▲     | 6.0               | 44     | 96       |    |
| 5.2                             | DSX0520F05 | ▲     |                   |        |          |    |
| 5.3                             | DSX0530F05 | ▲     |                   |        |          |    |
| 5.4                             | DSX0540F05 | ▲     |                   |        |          |    |
| 5.5                             | DSX0550F05 | ▲     |                   |        |          |    |
| 5.6                             | DSX0560F05 | ▲     |                   | 48     | 100      |    |
| 5.7                             | DSX0570F05 | ▲     |                   |        |          |    |
| 5.8                             | DSX0580F05 | ▲     |                   |        |          |    |
| 5.9                             | DSX0590F05 | ▲     |                   |        |          |    |
| 6.0                             | DSX0600F05 | ▲     |                   |        |          |    |
| 6.1                             | DSX0610F05 | ▲     | 7.0               | 52     | 105      |    |
| 6.2                             | DSX0620F05 | ▲     |                   |        |          |    |
| 6.3                             | DSX0630F05 | ▲     |                   |        |          |    |
| 6.4                             | DSX0640F05 | ▲     |                   |        |          |    |
| 6.5                             | DSX0650F05 | ▲     |                   |        |          |    |
| 6.6                             | DSX0660F05 | ▲     |                   | 56     | 109      |    |
| 6.7                             | DSX0670F05 | ▲     |                   |        |          |    |
| 6.8                             | DSX0680F05 | ▲     |                   |        |          |    |
| 6.9                             | DSX0690F05 | ▲     |                   |        |          |    |
| 7.0                             | DSX0700F05 | ▲     |                   |        |          |    |
| 7.1                             | DSX0710F05 | ▲     | 8.0               | 60     | 114      |    |
| 7.2                             | DSX0720F05 | ▲     |                   |        |          |    |
| 7.3                             | DSX0730F05 | ▲     |                   |        |          |    |
| 7.4                             | DSX0740F05 | ▲     |                   |        |          |    |
| 7.5                             | DSX0750F05 | ▲     |                   |        |          |    |
| 7.6                             | DSX0760F05 | ▲     |                   | 64     | 118      |    |
| 7.7                             | DSX0770F05 | ▲     |                   |        |          |    |
| 7.8                             | DSX0780F05 | ▲     |                   |        |          |    |
| 7.9                             | DSX0790F05 | ▲     |                   |        |          |    |
| 8.0                             | DSX0800F05 | ▲     |                   |        |          |    |
| 8.1                             | DSX0810F05 | ▲     | 9.0               | 68     | 127      |    |
| 8.2                             | DSX0820F05 | ▲     |                   |        |          |    |
| 8.3                             | DSX0830F05 | ▲     |                   |        |          |    |
| 8.4                             | DSX0840F05 | ▲     |                   |        |          |    |
| 8.5                             | DSX0850F05 | ▲     |                   |        |          |    |
| 8.6                             | DSX0860F05 | ▲     |                   | 72     |          |    |
| 8.7                             | DSX0870F05 | ▲     |                   |        |          |    |
| 8.8                             | DSX0880F05 | ▲     |                   |        |          |    |
| 8.9                             | DSX0890F05 | ▲     |                   |        |          |    |

▲ : Discontinued items

(Ti, Al) N  
CoatedDiameter  
ø3.0~20.0 mmIT9~10  
IT class

K Cast Iron

N Non-ferrous

S Superalloys

H Hard Materials

| Drill dia.<br>øD <sub>c</sub> | Cat. No.   | Stock | Dimensions (mm) |     |                |     |
|-------------------------------|------------|-------|-----------------|-----|----------------|-----|
|                               |            |       | øD <sub>s</sub> | ℓ   | ℓ <sub>s</sub> | L   |
| 9.0                           | DSX0900F05 | ▲     | 9.0             | 72  | 55             | 127 |
| 9.1                           | DSX0910F05 | ▲     | 10.0            | 76  | 56             | 136 |
| 9.2                           | DSX0920F05 | ▲     |                 |     |                |     |
| 9.3                           | DSX0930F05 | ▲     |                 |     |                |     |
| 9.4                           | DSX0940F05 | ▲     |                 |     |                |     |
| 9.5                           | DSX0950F05 | ▲     |                 |     |                |     |
| 9.6                           | DSX0960F05 | ▲     |                 | 80  |                |     |
| 9.7                           | DSX0970F05 | ▲     |                 |     |                |     |
| 9.8                           | DSX0980F05 | ▲     |                 |     |                |     |
| 9.9                           | DSX0990F05 | ▲     |                 |     |                |     |
| 10.0                          | DSX1000F05 | ▲     |                 |     |                |     |
| 10.1                          | DSX1010F05 | ▲     | 11.0            | 84  | 61             | 149 |
| 10.2                          | DSX1020F05 | ▲     |                 |     |                |     |
| 10.3                          | DSX1030F05 | ▲     |                 |     |                |     |
| 10.4                          | DSX1040F05 | ▲     |                 |     |                |     |
| 10.5                          | DSX1050F05 | ▲     |                 |     |                |     |
| 10.6                          | DSX1060F05 | ▲     |                 | 88  |                |     |
| 10.7                          | DSX1070F05 | ▲     |                 |     |                |     |
| 10.8                          | DSX1080F05 | ▲     |                 |     |                |     |
| 10.9                          | DSX1090F05 | ▲     |                 |     |                |     |
| 11.0                          | DSX1100F05 | ▲     |                 |     |                |     |
| 11.1                          | DSX1110F05 | ▲     | 12.0            | 92  | 62             | 158 |
| 11.2                          | DSX1120F05 | ▲     |                 |     |                |     |
| 11.3                          | DSX1130F05 | ▲     |                 |     |                |     |
| 11.4                          | DSX1140F05 | ▲     |                 |     |                |     |
| 11.5                          | DSX1150F05 | ▲     |                 |     |                |     |
| 11.6                          | DSX1160F05 | ▲     |                 | 96  |                |     |
| 11.7                          | DSX1170F05 | ▲     |                 |     |                |     |
| 11.8                          | DSX1180F05 | ▲     |                 |     |                |     |
| 11.9                          | DSX1190F05 | ▲     |                 |     |                |     |
| 12.0                          | DSX1200F05 | ▲     |                 |     |                |     |
| 12.1                          | DSX1210F05 | ▲     | 13.0            | 104 | 63             | 167 |
| 12.2                          | DSX1220F05 | ▲     |                 |     |                |     |
| 12.3                          | DSX1230F05 | ▲     |                 |     |                |     |
| 12.4                          | DSX1240F05 | ▲     |                 |     |                |     |
| 12.5                          | DSX1250F05 | ▲     |                 |     |                |     |
| 12.6                          | DSX1260F05 | ▲     |                 |     |                |     |
| 12.7                          | DSX1270F05 | ▲     |                 |     |                |     |
| 12.8                          | DSX1280F05 | ▲     |                 |     |                |     |
| 12.9                          | DSX1290F05 | ▲     |                 |     |                |     |
| 13.0                          | DSX1300F05 | ▲     |                 |     |                |     |
| 13.1                          | DSX1310F05 | ▲     | 14.0            | 112 | 64             | 176 |
| 13.2                          | DSX1320F05 | ▲     |                 |     |                |     |
| 13.3                          | DSX1330F05 | ▲     |                 |     |                |     |
| 13.4                          | DSX1340F05 | ▲     |                 |     |                |     |
| 13.5                          | DSX1350F05 | ▲     |                 |     |                |     |
| 13.6                          | DSX1360F05 | ▲     |                 |     |                |     |
| 13.7                          | DSX1370F05 | ▲     |                 |     |                |     |
| 13.8                          | DSX1380F05 | ▲     |                 |     |                |     |
| 13.9                          | DSX1390F05 | ▲     |                 |     |                |     |
| 14.0                          | DSX1400F05 | ▲     |                 |     |                |     |
| 14.1                          | DSX1410F05 | ▲     | 15.0            | 120 | 65             | 185 |
| 14.2                          | DSX1420F05 | ▲     |                 |     |                |     |
| 14.3                          | DSX1430F05 | ▲     |                 |     |                |     |
| 14.4                          | DSX1440F05 | ▲     |                 |     |                |     |
| 14.5                          | DSX1450F05 | ▲     |                 |     |                |     |
| 14.6                          | DSX1460F05 | ▲     |                 |     |                |     |
| 14.7                          | DSX1470F05 | ▲     |                 |     |                |     |
| 14.8                          | DSX1480F05 | ▲     |                 |     |                |     |
| 14.9                          | DSX1490F05 | ▲     |                 |     |                |     |

| Drill dia.<br>øD <sub>c</sub> | Cat. No.   | Stock | Dimensions (mm) |     |                |     |
|-------------------------------|------------|-------|-----------------|-----|----------------|-----|
|                               |            |       | øD <sub>s</sub> | ℓ   | ℓ <sub>s</sub> | L   |
| 15.0                          | DSX1500F05 | ▲     | 15.0            | 120 | 65             | 185 |
| 15.1                          | DSX1510F05 | ▲     | 16.0            | 128 | 66             | 194 |
| 15.2                          | DSX1520F05 | ▲     |                 |     |                |     |
| 15.3                          | DSX1530F05 | ▲     |                 |     |                |     |
| 15.4                          | DSX1540F05 | ▲     |                 |     |                |     |
| 15.5                          | DSX1550F05 | ▲     |                 |     |                |     |
| 15.6                          | DSX1560F05 | ▲     |                 |     |                |     |
| 15.7                          | DSX1570F05 | ▲     |                 |     |                |     |
| 15.8                          | DSX1580F05 | ▲     |                 |     |                |     |
| 15.9                          | DSX1590F05 | ▲     |                 |     |                |     |
| 16.0                          | DSX1600F05 | ▲     |                 |     |                |     |
| 16.5                          | DSX1650F05 | ▲     | 17.0            | 136 | 67             | 203 |
| 17.0                          | DSX1700F05 | ▲     |                 |     |                |     |
| 17.5                          | DSX1750F05 | ▲     | 18.0            | 144 | 68             | 212 |
| 18.0                          | DSX1800F05 | ▲     |                 |     |                |     |
| 18.5                          | DSX1850F05 | ▲     | 19.0            | 152 | 69             | 221 |
| 19.0                          | DSX1900F05 | ▲     |                 |     |                |     |
| 19.5                          | DSX1950F05 | ▲     | 20.0            | 160 | 70             | 230 |
| 20.0                          | DSX2000F05 | ▲     |                 |     |                |     |

Note: L/D = Hole depth / Drill diameter

▲ : Discontinued items

## ■ L/D = 8

| Drill dia.<br>øD <sub>C</sub> | Cat. No.   | Stock | Dimensions (mm) |    |                |     |
|-------------------------------|------------|-------|-----------------|----|----------------|-----|
|                               |            |       | øD <sub>S</sub> | ℓ  | ℓ <sub>S</sub> | L   |
| 3.0                           | DSX0300F08 | ▲     | 3.0             | 33 | 48             | 86  |
| 3.1                           | DSX0310F08 |       | 4.0             | 39 | 48             | 92  |
| 3.2                           | DSX0320F08 |       |                 |    |                |     |
| 3.3                           | DSX0330F08 |       |                 |    |                |     |
| 3.4                           | DSX0340F08 |       |                 |    |                |     |
| 3.5                           | DSX0350F08 | ▲     |                 |    |                |     |
| 3.6                           | DSX0360F08 |       |                 | 44 | 48             | 97  |
| 3.7                           | DSX0370F08 |       |                 |    |                |     |
| 3.8                           | DSX0380F08 |       |                 |    |                |     |
| 3.9                           | DSX0390F08 |       |                 |    |                |     |
| 4.0                           | DSX0400F08 | ▲     |                 |    |                |     |
| 4.1                           | DSX0410F08 |       | 5.0             | 50 | 50             | 105 |
| 4.2                           | DSX0420F08 |       |                 |    |                |     |
| 4.3                           | DSX0430F08 |       |                 |    |                |     |
| 4.4                           | DSX0440F08 |       |                 |    |                |     |
| 4.5                           | DSX0450F08 | ▲     |                 |    |                |     |
| 4.6                           | DSX0460F08 |       |                 | 55 | 50             | 110 |
| 4.7                           | DSX0470F08 |       |                 |    |                |     |
| 4.8                           | DSX0480F08 |       |                 |    |                |     |
| 4.9                           | DSX0490F08 |       |                 |    |                |     |
| 5.0                           | DSX0500F08 | ▲     |                 |    |                |     |
| 5.1                           | DSX0510F08 |       | 6.0             | 61 | 52             | 113 |
| 5.2                           | DSX0520F08 |       |                 |    |                |     |
| 5.3                           | DSX0530F08 |       |                 |    |                |     |
| 5.4                           | DSX0540F08 |       |                 |    |                |     |
| 5.5                           | DSX0550F08 | ▲     |                 |    |                |     |
| 5.6                           | DSX0560F08 |       |                 | 66 | 52             | 118 |
| 5.7                           | DSX0570F08 |       |                 |    |                |     |
| 5.8                           | DSX0580F08 |       |                 |    |                |     |
| 5.9                           | DSX0590F08 |       |                 |    |                |     |
| 6.0                           | DSX0600F08 | ▲     |                 |    |                |     |
| 6.1                           | DSX0610F08 |       | 7.0             | 72 | 53             | 125 |
| 6.2                           | DSX0620F08 |       |                 |    |                |     |
| 6.3                           | DSX0630F08 |       |                 |    |                |     |
| 6.4                           | DSX0640F08 |       |                 |    |                |     |
| 6.5                           | DSX0650F08 | ▲     |                 |    |                |     |
| 6.6                           | DSX0660F08 |       |                 | 77 | 53             | 130 |
| 6.7                           | DSX0670F08 |       |                 |    |                |     |
| 6.8                           | DSX0680F08 |       |                 |    |                |     |
| 6.9                           | DSX0690F08 |       |                 |    |                |     |
| 7.0                           | DSX0700F08 | ▲     |                 |    |                |     |
| 7.1                           | DSX0710F08 |       | 8.0             | 83 | 54             | 137 |
| 7.2                           | DSX0720F08 |       |                 |    |                |     |
| 7.3                           | DSX0730F08 |       |                 |    |                |     |
| 7.4                           | DSX0740F08 |       |                 |    |                |     |
| 7.5                           | DSX0750F08 | ▲     |                 |    |                |     |
| 7.6                           | DSX0760F08 |       |                 | 88 | 54             | 142 |
| 7.7                           | DSX0770F08 |       |                 |    |                |     |
| 7.8                           | DSX0780F08 |       |                 |    |                |     |
| 7.9                           | DSX0790F08 |       |                 |    |                |     |
| 8.0                           | DSX0800F08 | ▲     |                 |    |                |     |

| Drill dia.<br>øD <sub>C</sub> | Cat. No.   | Stock | Dimensions (mm) |     |                |     |
|-------------------------------|------------|-------|-----------------|-----|----------------|-----|
|                               |            |       | øD <sub>S</sub> | ℓ   | ℓ <sub>S</sub> | L   |
| 8.1                           | DSX0810F08 |       | 9.0             | 94  | 55             | 154 |
| 8.2                           | DSX0820F08 |       |                 |     |                |     |
| 8.3                           | DSX0830F08 |       |                 |     |                |     |
| 8.4                           | DSX0840F08 |       |                 |     |                |     |
| 8.5                           | DSX0850F08 | ▲     |                 | 99  | 55             | 154 |
| 8.6                           | DSX0860F08 |       |                 |     |                |     |
| 8.7                           | DSX0870F08 |       |                 |     |                |     |
| 8.8                           | DSX0880F08 |       |                 |     |                |     |
| 8.9                           | DSX0890F08 |       |                 |     |                |     |
| 9.0                           | DSX0900F08 | ▲     |                 |     |                |     |
| 9.1                           | DSX0910F08 |       | 10.0            | 105 | 56             | 166 |
| 9.2                           | DSX0920F08 |       |                 |     |                |     |
| 9.3                           | DSX0930F08 |       |                 |     |                |     |
| 9.4                           | DSX0940F08 |       |                 | 110 | 56             | 166 |
| 9.5                           | DSX0950F08 | ▲     |                 |     |                |     |
| 9.6                           | DSX0960F08 |       |                 |     |                |     |
| 9.7                           | DSX0970F08 |       |                 |     |                |     |
| 9.8                           | DSX0980F08 |       |                 |     |                |     |
| 9.9                           | DSX0990F08 |       |                 |     |                |     |
| 10.0                          | DSX1000F08 | ▲     |                 |     |                |     |
| 10.1                          | DSX1010F08 |       | 11.0            | 116 | 61             | 182 |
| 10.2                          | DSX1020F08 |       |                 |     |                |     |
| 10.3                          | DSX1030F08 |       |                 |     |                |     |
| 10.4                          | DSX1040F08 |       |                 | 121 | 61             | 182 |
| 10.5                          | DSX1050F08 | ▲     |                 |     |                |     |
| 10.6                          | DSX1060F08 |       |                 |     |                |     |
| 10.7                          | DSX1070F08 |       |                 |     |                |     |
| 10.8                          | DSX1080F08 |       |                 |     |                |     |
| 10.9                          | DSX1090F08 |       |                 |     |                |     |
| 11.0                          | DSX1100F08 | ▲     |                 |     |                |     |
| 11.1                          | DSX1110F08 |       | 12.0            | 127 | 62             | 194 |
| 11.2                          | DSX1120F08 |       |                 |     |                |     |
| 11.3                          | DSX1130F08 |       |                 | 132 | 62             | 194 |
| 11.4                          | DSX1140F08 |       |                 |     |                |     |
| 11.5                          | DSX1150F08 | ▲     |                 |     |                |     |
| 11.6                          | DSX1160F08 |       |                 |     |                |     |
| 11.7                          | DSX1170F08 |       |                 |     |                |     |
| 11.8                          | DSX1180F08 |       |                 |     |                |     |
| 11.9                          | DSX1190F08 |       |                 |     |                |     |
| 12.0                          | DSX1200F08 | ▲     |                 |     |                |     |
| 12.1                          | DSX1210F08 |       | 13.0            | 143 | 63             | 206 |
| 12.2                          | DSX1220F08 |       |                 |     |                |     |
| 12.3                          | DSX1230F08 |       |                 |     |                |     |
| 12.4                          | DSX1240F08 |       |                 |     |                |     |
| 12.5                          | DSX1250F08 | ▲     |                 |     |                |     |
| 12.6                          | DSX1260F08 |       |                 | 143 | 63             | 206 |
| 12.7                          | DSX1270F08 |       |                 |     |                |     |
| 12.8                          | DSX1280F08 |       |                 |     |                |     |
| 12.9                          | DSX1290F08 |       |                 |     |                |     |
| 13.0                          | DSX1300F08 | ▲     |                 |     |                |     |
| 13.1                          | DSX1310F08 |       | 14.0            | 154 | 64             | 218 |

- No. of revolutions (min<sup>-1</sup>) = Cutting speed × 1000 ÷ 3.14 ÷ Tool diameter
- Table feed (mm / min) = No. of revolutions × Feed per revolution

▲ : Discontinued items

(Ti,Al)N  
CoatedDiameter  
ø3.0~20.0 mmIT9~10  
IT class

| Drill dia.<br>øD <sub>c</sub> | Cat. No.   | Stock | Dimensions (mm) |     |                |     |
|-------------------------------|------------|-------|-----------------|-----|----------------|-----|
|                               |            |       | øD <sub>s</sub> | ℓ   | ℓ <sub>s</sub> | L   |
| 13.2                          | DSX1320F08 |       | 14.0            | 154 | 64             | 218 |
| 13.3                          | DSX1330F08 |       |                 |     |                |     |
| 13.4                          | DSX1340F08 |       |                 |     |                |     |
| 13.5                          | DSX1350F08 | ▲     |                 |     |                |     |
| 13.6                          | DSX1360F08 |       |                 |     |                |     |
| 13.7                          | DSX1370F08 |       |                 |     |                |     |
| 13.8                          | DSX1380F08 |       |                 |     |                |     |
| 13.9                          | DSX1390F08 |       |                 |     |                |     |
| 14.0                          | DSX1400F08 | ▲     | 15.0            | 165 | 65             | 230 |
| 14.1                          | DSX1410F08 |       |                 |     |                |     |
| 14.2                          | DSX1420F08 |       |                 |     |                |     |
| 14.3                          | DSX1430F08 |       |                 |     |                |     |
| 14.4                          | DSX1440F08 |       |                 |     |                |     |
| 14.5                          | DSX1450F08 | ▲     |                 |     |                |     |
| 14.6                          | DSX1460F08 |       |                 |     |                |     |
| 14.7                          | DSX1470F08 |       |                 |     |                |     |
| 14.8                          | DSX1480F08 |       | 16.0            | 176 | 66             | 242 |
| 14.9                          | DSX1490F08 |       |                 |     |                |     |
| 15.0                          | DSX1500F08 | ▲     |                 |     |                |     |
| 15.1                          | DSX1510F08 |       |                 |     |                |     |
| 15.2                          | DSX1520F08 |       |                 |     |                |     |
| 15.3                          | DSX1530F08 |       |                 |     |                |     |
| 15.4                          | DSX1540F08 |       |                 |     |                |     |
| 15.5                          | DSX1550F08 | ▲     |                 |     |                |     |
| 15.6                          | DSX1560F08 |       |                 |     |                |     |
| 15.7                          | DSX1570F08 |       |                 |     |                |     |
| 15.8                          | DSX1580F08 |       |                 |     |                |     |
| 15.9                          | DSX1590F08 |       |                 |     |                |     |
| 16.0                          | DSX1600F08 | ▲     |                 |     |                |     |

## Standard cutting conditions

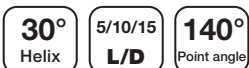
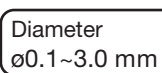
| Work materials                 | Examples (JIS) | Hardness    | Cutting speed: V <sub>c</sub> (m/min) |                 |                 | Feed: f (mm/rev)   |                    |                    |
|--------------------------------|----------------|-------------|---------------------------------------|-----------------|-----------------|--------------------|--------------------|--------------------|
|                                |                |             | ø3 ~ ø6                               | ø6 ~ ø10        | ø10 ~ ø20       | ø3 ~ ø6            | ø6 ~ ø10           | ø10 ~ ø20          |
| Mild steels, Low carbon steels | USt.42-2, Ck25 | < 180HB     | 70 - 120 - 140                        | 80 - 130 - 160  | 90 - 160 - 190  | 0.15 - 0.20 - 0.25 | 0.20 - 0.30 - 0.35 | 0.25 - 0.30 - 0.40 |
| Carbon steels, Alloy steels    | CK45, 42CrMo4  | 180 ~ 300HB | 50 - 100 - 130                        | 70 - 120 - 160  | 80 - 140 - 170  | 0.15 - 0.20 - 0.25 | 0.20 - 0.30 - 0.35 | 0.25 - 0.30 - 0.40 |
| High alloy steels etc.         | 42CrMoS4       | 250 ~ 350HB | 40 - 80 - 100                         | 60 - 90 - 140   | 60 - 100 - 160  | 0.10 - 0.15 - 0.20 | 0.15 - 0.25 - 0.30 | 0.15 - 0.25 - 0.30 |
| Stainless steels               | X5CrNi18-10    | < 200HB     | 30 - 60 - 70                          | 50 - 80 - 100   | 50 - 90 - 120   | 0.10 - 0.15 - 0.20 | 0.10 - 0.20 - 0.25 | 0.15 - 0.25 - 0.35 |
| Grey cast irons                | GG25           | < 200HB     | 80 - 110 - 140                        | 100 - 140 - 160 | 100 - 160 - 180 | 0.15 - 0.25 - 0.35 | 0.20 - 0.35 - 0.40 | 0.25 - 0.40 - 0.50 |
| Ductile cast irons             | GGG70          | < 300HB     | 70 - 100 - 140                        | 80 - 120 - 150  | 80 - 140 - 170  | 0.15 - 0.25 - 0.35 | 0.20 - 0.30 - 0.40 | 0.25 - 0.35 - 0.45 |
| Aluminium alloys               | ADC12          | -           | 80 - 130 - 160                        | 100 - 160 - 180 | 100 - 170 - 190 | 0.15 - 0.25 - 0.35 | 0.20 - 0.30 - 0.45 | 0.25 - 0.40 - 0.60 |
| Titanium alloys                | Ti-6Al-4V      | -           | 25 - 40 - 60                          | 30 - 60 - 80    | 30 - 60 - 80    | 0.10 - 0.15 - 0.20 | 0.10 - 0.20 - 0.25 | 0.15 - 0.25 - 0.35 |
| Heat-resistant alloys          | Inconel        | 250HB <     | 10 - 20 - 30                          | 10 - 30 - 40    | 10 - 30 - 40    | 0.02 - 0.04 - 0.10 | 0.05 - 0.10 - 0.15 | 0.10 - 0.15 - 0.25 |
| Hard materials                 | (SKD11)        | < 40HRC     | 20 - 30 - 50                          | 30 - 40 - 60    | 30 - 40 - 60    | 0.08 - 0.09 - 0.10 | 0.10 - 0.12 - 0.15 | 0.12 - 0.14 - 0.20 |

Note: • The cutting parameters shown in the table are merely a starting guideline for general machining.  
 • Values should be varied depending on the power or rigidity of the machine to be used. For the smaller side of drill diameters, select lower feeds.

• Chip packing in the oil holes may cause drill breakage. A filter preventing the circulation of chips should be used on coolant supply.  
 • Inconel is trademark of Huntington Alloys, Inc.

• No. of revolutions (min<sup>-1</sup>) = Cutting speed × 1000 ÷ 3.14 ÷ Tool diameter  
 • Table feed (mm/min) = No. of revolutions × Feed per revolution

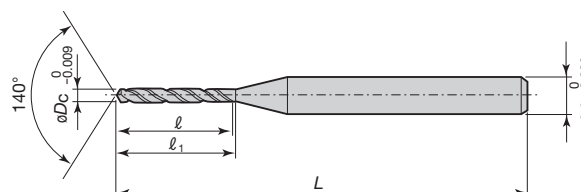
▲ : Discontinued items



For Steels

Coated solid carbide drills

External coolant supply



| Drill dia.<br>øDc | L/D        | Cat. No.   | Stock      | Dimensions (mm) |            |                | Drill dia.<br>øDc | L/D        | Cat. No.   | Stock      | Dimensions (mm) |      |                | Drill dia.<br>øDc | L/D | Cat. No.   | Stock | Dimensions (mm) |      |                |            |
|-------------------|------------|------------|------------|-----------------|------------|----------------|-------------------|------------|------------|------------|-----------------|------|----------------|-------------------|-----|------------|-------|-----------------|------|----------------|------------|
|                   |            |            |            | L               | ℓ          | ℓ <sub>1</sub> |                   |            |            |            | L               | ℓ    | ℓ <sub>1</sub> |                   |     |            |       | L               | ℓ    | ℓ <sub>1</sub> |            |
| 0.10              | 10         | DSM0010G10 | ●          | 38              | 1.15       | 1.4            | 0.59              | 10         | DSM0059G10 |            | 38              | 7.3  | 7.9            | 1.08              | 5   | DSM0108G05 |       | 38              | 8.0  | 8.6            |            |
| 0.11              |            | DSM0011G10 | ●          |                 | 1.25       | 1.5            | 0.60              |            | DSM0060G10 | ●          |                 | 1.09 | DSM0109G05     |                   |     |            |       |                 |      |                |            |
| 0.12              |            | DSM0012G10 | ●          |                 | 1.35       | 1.6            | 0.61              |            | DSM0061G10 |            |                 | 1.10 | DSM0110G05     | ●                 |     |            |       |                 |      |                |            |
| 0.13              |            | DSM0013G10 | ●          |                 | 1.55       | 1.8            | 0.62              |            | DSM0062G10 |            |                 | 1.11 | DSM0111G05     |                   |     |            |       |                 |      |                |            |
| 0.14              |            | DSM0014G10 | ●          |                 | 1.65       | 1.9            | 0.63              |            | DSM0063G10 |            |                 | 1.12 | DSM0112G05     |                   |     |            |       |                 |      |                |            |
| 0.15              |            | DSM0015G10 | ●          |                 | 1.75       | 2.0            | 0.64              |            | DSM0064G10 |            |                 | 1.13 | DSM0113G05     |                   |     |            |       |                 |      |                |            |
| 0.16              |            | DSM0016G10 | ●          |                 | 1.85       | 2.1            | 0.65              |            | DSM0065G10 | ●          |                 | 1.14 | DSM0114G05     |                   |     |            |       |                 |      |                |            |
| 0.17              |            | DSM0017G10 | ●          |                 | 1.95       | 2.2            | 0.66              |            | DSM0066G10 |            |                 | 1.15 | DSM0115G05     |                   |     |            |       |                 |      |                |            |
| 0.18              |            | DSM0018G10 | ●          |                 | 2.15       | 2.4            | 0.67              |            | DSM0067G10 |            |                 | 1.16 | DSM0116G05     |                   |     |            |       |                 |      |                |            |
| 0.19              |            | DSM0019G10 | ●          |                 | 2.25       | 2.5            | 0.68              |            | DSM0068G10 |            |                 | 1.17 | DSM0117G05     |                   |     |            |       |                 |      |                |            |
| 0.20              |            | DSM0020G10 | ●          |                 | 2.35       | 2.6            | 0.69              |            | DSM0069G10 |            |                 | 1.18 | DSM0118G05     |                   |     |            |       |                 |      |                |            |
| 0.21              | 10         | DSM0021G10 | ●          | 38              | 2.45       | 2.7            | 0.70              | 10         | DSM0070G10 | ●          | 38              | 9.2  | 9.8            | 1.19              | 5   | DSM0119G05 |       | 38              | 8.9  | 9.5            |            |
| 0.22              |            | DSM0022G10 | ●          |                 | 2.55       | 2.8            | 0.71              |            | DSM0071G10 |            |                 | 1.20 | DSM0120G05     | ●                 |     |            |       |                 |      |                |            |
| 0.23              |            | DSM0023G10 | ●          |                 | 2.75       | 3.0            | 0.72              |            | DSM0072G10 |            |                 | 1.21 | DSM0121G05     |                   |     |            |       |                 |      |                |            |
| 0.24              |            | DSM0024G10 | ●          |                 | 2.85       | 3.1            | 0.73              |            | DSM0073G10 |            |                 | 1.22 | DSM0122G05     |                   |     |            |       |                 |      |                |            |
| 0.25              |            | DSM0025G10 | ●          |                 | 3.0        | 3.3            | 0.74              |            | DSM0074G10 |            |                 | 1.23 | DSM0123G05     |                   |     |            |       |                 |      |                |            |
| 0.26              |            | DSM0026G10 | ●          |                 | 3.1        | 3.4            | 0.75              |            | DSM0075G10 | ●          |                 | 1.24 | DSM0124G05     |                   |     |            |       |                 |      |                |            |
| 0.27              |            | DSM0027G10 | ●          |                 | 3.2        | 3.5            | 0.76              |            | DSM0076G10 |            |                 | 1.25 | DSM0125G05     |                   |     |            |       |                 |      |                |            |
| 0.28              |            | DSM0028G10 | ●          |                 | 3.4        | 3.7            | 0.77              |            | DSM0077G10 |            |                 | 1.26 | DSM0126G05     |                   |     |            |       |                 |      |                |            |
| 0.29              |            | DSM0029G10 | ●          |                 | 3.5        | 3.8            | 0.78              |            | DSM0078G10 |            |                 | 1.27 | DSM0127G05     |                   |     |            |       |                 |      |                |            |
| 0.30              |            | DSM0030G10 | ●          |                 | 3.9        | 4.2            | 0.79              |            | DSM0079G10 |            |                 | 1.28 | DSM0128G05     |                   |     |            |       |                 |      |                |            |
| 0.31              |            | 15         | DSM0031G15 |                 | ●          | 38             | 5.6               |            | 5.9        | 0.80       |                 | 10   | DSM0080G10     | ●                 |     | 38         | 10.5  |                 |      |                | 11.1       |
| 0.32              | DSM0032G15 |            | ●          | 0.81            | DSM0081G10 |                |                   |            |            | 1.30       | DSM0130G05      |      | ●              |                   |     |            |       |                 |      |                |            |
| 0.33              | DSM0033G15 |            | ●          | 0.82            | DSM0082G10 |                |                   |            |            | 1.31       | DSM0131G05      |      |                |                   |     |            |       |                 |      |                |            |
| 0.34              | DSM0034G15 |            | ●          | 0.83            | DSM0083G10 |                |                   |            |            | 1.32       | DSM0132G05      |      |                |                   |     |            |       |                 |      |                |            |
| 0.35              | DSM0035G15 |            | ●          | 0.84            | DSM0084G10 |                |                   |            |            | 1.33       | DSM0133G05      |      |                |                   |     |            |       |                 |      |                |            |
| 0.36              | DSM0036G15 |            | ●          | 6.5             | 6.8        |                | 0.85              | 10         | DSM0085G10 |            | 1.34            |      | DSM0134G05     |                   |     |            |       |                 |      |                |            |
| 0.37              | DSM0037G15 |            | ●          |                 |            |                | 0.86              |            | DSM0086G10 |            | 1.35            |      | DSM0135G05     |                   |     |            |       |                 |      |                |            |
| 0.38              | DSM0038G15 |            | ●          |                 |            |                | 0.87              |            | DSM0087G10 |            | 1.36            |      | DSM0136G05     |                   |     |            |       |                 |      |                |            |
| 0.39              | DSM0039G15 |            | ●          |                 |            |                | 0.88              |            | DSM0088G10 |            | 1.37            |      | DSM0137G05     |                   |     |            |       |                 |      |                |            |
| 0.40              | DSM0040G15 |            | ●          |                 |            |                | 0.89              |            | DSM0089G10 |            | 1.38            |      | DSM0138G05     |                   |     |            |       |                 |      |                |            |
| 0.41              | 15         |            | DSM0041G15 | ●               | 38         |                | 7.4               |            | 7.7        | 0.90       | 10              |      | DSM0090G10     | ●                 | 38  |            | 10.5  | 11.1            | 1.39 | 5              | DSM0139G05 |
| 0.42              |            | DSM0042G15 | ●          | 0.91            |            | DSM0091G10     |                   |            |            |            |                 | 1.40 | DSM0140G05     | ●                 |     |            |       |                 |      |                |            |
| 0.43              |            | DSM0043G15 | ●          | 0.92            |            | DSM0092G10     |                   |            |            |            |                 | 1.41 | DSM0141G05     |                   |     |            |       |                 |      |                |            |
| 0.44              |            | DSM0044G15 | ●          | 0.93            |            | DSM0093G10     |                   |            |            |            |                 | 1.42 | DSM0142G05     |                   |     |            |       |                 |      |                |            |
| 0.45              |            | DSM0045G15 | ●          | 0.94            |            | DSM0094G10     |                   |            |            |            |                 | 1.43 | DSM0143G05     |                   |     |            |       |                 |      |                |            |
| 0.46              |            | DSM0046G15 | ●          | 8.1             |            | 8.7            | 0.95              |            | 10         | DSM0095G10 |                 |      | 1.44           | DSM0144G05        |     |            |       |                 |      |                |            |
| 0.47              |            | DSM0047G15 | ●          |                 |            |                | 0.96              | DSM0096G10 |            |            |                 | 1.45 | DSM0145G05     | ●                 |     |            |       |                 |      |                |            |
| 0.48              |            | DSM0048G15 | ●          |                 |            |                | 0.97              | DSM0097G10 |            |            |                 | 1.46 | DSM0146G05     |                   |     |            |       |                 |      |                |            |
| 0.49              |            | DSM0049G15 | ●          |                 |            |                | 0.98              | DSM0098G10 |            |            |                 | 1.47 | DSM0147G05     |                   |     |            |       |                 |      |                |            |
| 0.50              |            | DSM0050G15 | ●          |                 |            |                | 0.99              | DSM0099G10 |            |            |                 | 1.48 | DSM0148G05     |                   |     |            |       |                 |      |                |            |
| 0.51              |            | 10         | DSM0051G10 |                 |            | 38             | 6.6               | 7.2        |            | 1.00       |                 | 10   | DSM0100G10     | ●                 |     | 38         | 11.5  | 12.1            | 1.49 |                | 5          |
| 0.52              | DSM0052G10 |            |            | 1.01            | DSM0101G05 |                |                   |            |            |            | 1.50            |      | DSM0150G05     | ●                 |     |            |       |                 |      |                |            |
| 0.53              | DSM0053G10 |            |            | 1.02            | DSM0102G05 |                |                   |            |            |            | 1.51            |      | DSM0151G05     |                   |     |            |       |                 |      |                |            |
| 0.54              | DSM0054G10 |            |            | 1.03            | DSM0103G05 |                |                   |            |            |            | 1.52            |      | DSM0152G05     |                   |     |            |       |                 |      |                |            |
| 0.55              | DSM0055G10 |            | ●          | 7.3             | 7.9        |                | 1.04              | 5          |            | DSM0104G05 |                 |      | 1.53           | DSM0153G05        |     |            |       |                 |      |                |            |
| 0.56              | DSM0056G10 |            |            |                 |            |                | 1.05              |            |            | DSM0105G05 | ●               |      | 1.54           | DSM0154G05        |     |            |       |                 |      |                |            |
| 0.57              | DSM0057G10 |            |            |                 |            |                | 1.06              |            | DSM0106G05 |            | 1.55            |      | DSM0155G05     | ●                 |     |            |       |                 |      |                |            |
| 0.58              | DSM0058G10 |            |            |                 |            |                | 1.07              |            | DSM0107G05 |            | 1.56            |      | DSM0156G05     |                   |     |            |       |                 |      |                |            |

● : Stocked items

Relating  
pagesCutting conditions  
(11-46)Technical reference  
(15-1)

Ti (C,N)  
CoatedDiameter  
ø0.1~3.0 mmIT9~10  
IT class

| Drill dia.<br>øD <sub>c</sub> | L/D | Cat. No.   | Stock | Dimensions (mm) |      |                | Drill dia.<br>øD <sub>c</sub> | L/D | Cat. No.   | Stock | Dimensions (mm) |      |                | Drill dia.<br>øD <sub>c</sub> | L/D | Cat. No.   | Stock | Dimensions (mm) |      |                |
|-------------------------------|-----|------------|-------|-----------------|------|----------------|-------------------------------|-----|------------|-------|-----------------|------|----------------|-------------------------------|-----|------------|-------|-----------------|------|----------------|
|                               |     |            |       | L               | ℓ    | ℓ <sub>1</sub> |                               |     |            |       | L               | ℓ    | ℓ <sub>1</sub> |                               |     |            |       | L               | ℓ    | ℓ <sub>1</sub> |
| 1.57                          | 5   | DSM0157G05 |       | 45              | 12.1 | 12.7           | 2.06                          | 5   | DSM0206G05 |       | 45              | 16.1 | 16.7           | 2.55                          | 5   | DSM0255G05 |       | 55              | 20.1 | 20.7           |
| 1.58                          |     | DSM0158G05 |       |                 |      |                | 2.07                          |     | DSM0207G05 |       |                 |      |                | 2.56                          |     | DSM0256G05 |       |                 |      |                |
| 1.59                          |     | DSM0159G05 |       |                 |      |                | 2.08                          |     | DSM0208G05 |       |                 |      |                | 2.57                          |     | DSM0257G05 |       |                 |      |                |
| 1.60                          |     | DSM0160G05 | ●     |                 |      |                | 2.09                          |     | DSM0209G05 |       |                 |      |                | 2.58                          |     | DSM0258G05 |       |                 |      |                |
| 1.61                          | 5   | DSM0161G05 |       | 45              | 12.9 | 13.6           | 2.10                          | 5   | DSM0210G05 | ●     | 45              | 16.9 | 17.5           | 2.59                          | 5   | DSM0259G05 |       | 55              | 20.9 | 21.5           |
| 1.62                          |     | DSM0162G05 |       |                 |      |                | 2.11                          |     | DSM0211G05 |       |                 |      |                | 2.60                          |     | DSM0260G05 | ●     |                 |      |                |
| 1.63                          |     | DSM0163G05 |       |                 |      |                | 2.12                          |     | DSM0212G05 |       |                 |      |                | 2.61                          |     | DSM0261G05 |       |                 |      |                |
| 1.64                          |     | DSM0164G05 |       |                 |      |                | 2.13                          |     | DSM0213G05 |       |                 |      |                | 2.62                          |     | DSM0262G05 |       |                 |      |                |
| 1.65                          |     | DSM0165G05 | ●     |                 |      |                | 2.14                          |     | DSM0214G05 |       |                 |      |                | 2.63                          |     | DSM0263G05 |       |                 |      |                |
| 1.66                          |     | DSM0166G05 |       |                 |      |                | 2.15                          |     | DSM0215G05 |       |                 |      |                | 2.64                          |     | DSM0264G05 |       |                 |      |                |
| 1.67                          |     | DSM0167G05 |       |                 |      |                | 2.16                          |     | DSM0216G05 |       |                 |      |                | 2.65                          |     | DSM0265G05 |       |                 |      |                |
| 1.68                          |     | DSM0168G05 |       |                 |      |                | 2.17                          |     | DSM0217G05 |       |                 |      |                | 2.66                          |     | DSM0266G05 |       |                 |      |                |
| 1.69                          | 5   | DSM0169G05 |       | 45              | 13.7 | 14.3           | 2.18                          | 5   | DSM0218G05 |       | 45              | 17.7 | 18.3           | 2.67                          | 5   | DSM0267G05 |       | 55              | 21.7 | 22.3           |
| 1.70                          |     | DSM0170G05 | ●     |                 |      |                | 2.19                          |     | DSM0219G05 |       |                 |      |                | 2.68                          |     | DSM0268G05 |       |                 |      |                |
| 1.71                          |     | DSM0171G05 |       |                 |      |                | 2.20                          |     | DSM0220G05 | ●     |                 |      |                | 2.69                          |     | DSM0269G05 |       |                 |      |                |
| 1.72                          |     | DSM0172G05 |       |                 |      |                | 2.21                          |     | DSM0221G05 |       |                 |      |                | 2.70                          |     | DSM0270G05 | ●     |                 |      |                |
| 1.73                          |     | DSM0173G05 |       |                 |      |                | 2.22                          |     | DSM0222G05 |       |                 |      |                | 2.71                          |     | DSM0271G05 |       |                 |      |                |
| 1.74                          |     | DSM0174G05 |       |                 |      |                | 2.23                          |     | DSM0223G05 |       |                 |      |                | 2.72                          |     | DSM0272G05 |       |                 |      |                |
| 1.75                          |     | DSM0175G05 |       |                 |      |                | 2.24                          |     | DSM0224G05 |       |                 |      |                | 2.73                          |     | DSM0273G05 |       |                 |      |                |
| 1.76                          |     | DSM0176G05 |       |                 |      |                | 2.25                          |     | DSM0225G05 |       |                 |      |                | 2.74                          |     | DSM0274G05 |       |                 |      |                |
| 1.77                          |     | DSM0177G05 |       |                 |      |                | 2.26                          |     | DSM0226G05 |       |                 |      |                | 2.75                          |     | DSM0275G05 |       |                 |      |                |
| 1.78                          |     | DSM0178G05 |       |                 |      |                | 2.27                          |     | DSM0227G05 |       |                 |      |                | 2.76                          |     | DSM0276G05 |       |                 |      |                |
| 1.79                          | 5   | DSM0179G05 |       | 45              | 14.5 | 15.1           | 2.28                          | 5   | DSM0228G05 |       | 55              | 18.5 | 19.1           | 2.77                          | 5   | DSM0277G05 |       | 55              | 22.5 | 23.1           |
| 1.80                          |     | DSM0180G05 | ●     |                 |      |                | 2.29                          |     | DSM0229G05 |       |                 |      |                | 2.78                          |     | DSM0278G05 |       |                 |      |                |
| 1.81                          |     | DSM0181G05 |       |                 |      |                | 2.30                          |     | DSM0230G05 | ●     |                 |      |                | 2.79                          |     | DSM0279G05 |       |                 |      |                |
| 1.82                          |     | DSM0182G05 | ●     |                 |      |                | 2.31                          |     | DSM0231G05 |       |                 |      |                | 2.80                          |     | DSM0280G05 | ●     |                 |      |                |
| 1.83                          |     | DSM0183G05 |       |                 |      |                | 2.32                          |     | DSM0232G05 |       |                 |      |                | 2.81                          |     | DSM0281G05 |       |                 |      |                |
| 1.84                          |     | DSM0184G05 |       |                 |      |                | 2.33                          |     | DSM0233G05 |       |                 |      |                | 2.82                          |     | DSM0282G05 |       |                 |      |                |
| 1.85                          |     | DSM0185G05 |       |                 |      |                | 2.34                          |     | DSM0234G05 |       |                 |      |                | 2.83                          |     | DSM0283G05 |       |                 |      |                |
| 1.86                          |     | DSM0186G05 |       |                 |      |                | 2.35                          |     | DSM0235G05 |       |                 |      |                | 2.84                          |     | DSM0284G05 |       |                 |      |                |
| 1.87                          |     | DSM0187G05 |       |                 |      |                | 2.36                          |     | DSM0236G05 |       |                 |      |                | 2.85                          |     | DSM0285G05 |       |                 |      |                |
| 1.88                          |     | DSM0188G05 |       |                 |      |                | 2.37                          |     | DSM0237G05 |       |                 |      |                | 2.86                          |     | DSM0286G05 |       |                 |      |                |
| 1.89                          | 5   | DSM0189G05 |       | 45              | 15.3 | 15.9           | 2.38                          | 5   | DSM0238G05 |       | 55              | 19.3 | 19.9           | 2.87                          | 5   | DSM0287G05 |       | 55              | 23.3 | 23.9           |
| 1.90                          |     | DSM0190G05 | ●     |                 |      |                | 2.39                          |     | DSM0239G05 |       |                 |      |                | 2.88                          |     | DSM0288G05 |       |                 |      |                |
| 1.91                          |     | DSM0191G05 |       |                 |      |                | 2.40                          |     | DSM0240G05 | ●     |                 |      |                | 2.89                          |     | DSM0289G05 |       |                 |      |                |
| 1.92                          |     | DSM0192G05 |       |                 |      |                | 2.41                          |     | DSM0241G05 |       |                 |      |                | 2.90                          |     | DSM0290G05 | ●     |                 |      |                |
| 1.93                          |     | DSM0193G05 |       |                 |      |                | 2.42                          |     | DSM0242G05 |       |                 |      |                | 2.91                          |     | DSM0291G05 |       |                 |      |                |
| 1.94                          |     | DSM0194G05 |       |                 |      |                | 2.43                          |     | DSM0243G05 |       |                 |      |                | 2.92                          |     | DSM0292G05 |       |                 |      |                |
| 1.95                          |     | DSM0195G05 | ●     |                 |      |                | 2.44                          |     | DSM0244G05 |       |                 |      |                | 2.93                          |     | DSM0293G05 |       |                 |      |                |
| 1.96                          |     | DSM0196G05 |       |                 |      |                | 2.45                          |     | DSM0245G05 |       |                 |      |                | 2.94                          |     | DSM0294G05 |       |                 |      |                |
| 1.97                          |     | DSM0197G05 |       |                 |      |                | 2.46                          |     | DSM0246G05 |       |                 |      |                | 2.95                          |     | DSM0295G05 |       |                 |      |                |
| 1.98                          |     | DSM0198G05 |       |                 |      |                | 2.47                          |     | DSM0247G05 |       |                 |      |                | 2.96                          |     | DSM0296G05 |       |                 |      |                |
| 1.99                          | 5   | DSM0199G05 |       | 45              | 16.1 | 16.7           | 2.48                          | 5   | DSM0248G05 |       | 55              | 20.1 | 20.7           | 2.97                          | 5   | DSM0297G05 |       | 55              | 23.3 | 23.9           |
| 2.00                          |     | DSM0200G05 | ●     |                 |      |                | 2.49                          |     | DSM0249G05 |       |                 |      |                | 2.98                          |     | DSM0298G05 |       |                 |      |                |
| 2.01                          |     | DSM0201G05 |       |                 |      |                | 2.50                          |     | DSM0250G05 | ●     |                 |      |                | 2.99                          |     | DSM0299G05 |       |                 |      |                |
| 2.02                          |     | DSM0202G05 |       |                 |      |                | 2.51                          |     | DSM0251G05 |       |                 |      |                | 3.00                          |     | DSM0300G05 | ●     |                 |      |                |
| 2.03                          |     | DSM0203G05 |       |                 |      |                | 2.52                          |     | DSM0252G05 |       |                 |      |                |                               |     |            |       |                 |      |                |
| 2.04                          |     | DSM0204G05 |       |                 |      |                | 2.53                          |     | DSM0253G05 |       |                 |      |                |                               |     |            |       |                 |      |                |
| 2.05                          |     | DSM0205G05 |       |                 |      |                | 2.54                          |     | DSM0254G05 |       |                 |      |                |                               |     |            |       |                 |      |                |

Note: L/D = Hole depth / Drill diameter

● : Stocked items

## Standard cutting conditions

| Work materials          | Cutting speed: V <sub>c</sub> (m/min) |              |              | Feed: f (mm/rev)       |                       |                       |                       |                    |  |
|-------------------------|---------------------------------------|--------------|--------------|------------------------|-----------------------|-----------------------|-----------------------|--------------------|--|
|                         | ø0.1 ~ ø0.3                           | ø0.3 ~ ø0.5  | ø0.5 ~ ø3.0  | ø0.1 ~ ø0.3            | ø0.3 ~ ø0.5           | ø0.5 ~ ø1.0           | ø1.0 ~ ø2.0           | ø2.0 ~ ø3.0        |  |
| Carbon and alloy steels | 5 - 15 - 20                           | 15 - 25 - 30 | 25 - 40 - 60 | 0.001 - 0.002 - 0.004  | 0.002 - 0.005 - 0.01  | 0.005 - 0.01 - 0.05   | 0.03 - 0.06 - 0.09    | 0.05 - 0.08 - 0.1  |  |
| Stainless steels        | 2 - 6 - 12                            | 6 - 12 - 18  | 10 - 15 - 20 | 0.0005 - 0.002 - 0.004 | 0.002 - 0.005 - 0.008 | 0.005 - 0.01 - 0.03   | 0.01 - 0.02 - 0.04    | 0.02 - 0.03 - 0.05 |  |
| Grey cast irons         | 5 - 10 - 15                           | 10 - 20 - 25 | 20 - 35 - 50 | 0.0005 - 0.002 - 0.004 | 0.002 - 0.005 - 0.012 | 0.005 - 0.01 - 0.03   | 0.01 - 0.03 - 0.06    | 0.03 - 0.05 - 0.12 |  |
| Ductile cast irons      | 5 - 10 - 15                           | 10 - 20 - 25 | 20 - 35 - 50 | 0.001 - 0.002 - 0.003  | 0.002 - 0.005 - 0.01  | 0.005 - 0.01 - 0.02   | 0.01 - 0.03 - 0.05    | 0.03 - 0.05 - 0.1  |  |
| Aluminium alloys        | 10 - 15 - 20                          | 10 - 20 - 30 | 20 - 35 - 50 | 0.001 - 0.005 - 0.01   | 0.005 - 0.01 - 0.03   | 0.01 - 0.03 - 0.05    | 0.04 - 0.05 - 0.15    | 0.06 - 0.1 - 0.2   |  |
| Copper / Brass          | 10 - 15 - 20                          | 10 - 20 - 30 | 20 - 35 - 50 | 0.001 - 0.005 - 0.01   | 0.005 - 0.01 - 0.03   | 0.01 - 0.03 - 0.05    | 0.04 - 0.05 - 0.15    | 0.06 - 0.1 - 0.2   |  |
| Hard materials          | 4 - 6 - 8                             | 6 - 8 - 10   | 6 - 10 - 16  | 0.0005 - 0.001 - 0.002 | 0.001 - 0.003 - 0.005 | 0.005 - 0.01 - 0.02   | 0.01 - 0.02 - 0.03    | 0.02 - 0.04 - 0.06 |  |
| Heat-resistant alloys   | 2 - 4 - 6                             | 5 - 8 - 10   | 8 - 15 - 20  | 0.0005 - 0.001 - 0.003 | 0.002 - 0.003 - 0.004 | 0.002 - 0.003 - 0.004 | 0.002 - 0.003 - 0.004 | Not recommended    |  |

Notes :

- When the drilling depth is deeper than L/D = 5, use drill pecking every 10 to 50% of the drill diameter.
- The above cutting conditions are applied to when a water soluble cutting fluid is used. For drilling a hole smaller than ø0.3 mm, use of a starting drill is recommended.
- When setting the drill, the drill run out should be within 0.002 mm on the taper. (Especially for the drill diameter smaller than ø0.5 mm)

# Regrinding Procedures

## Regrinding method [Applied to DSW]

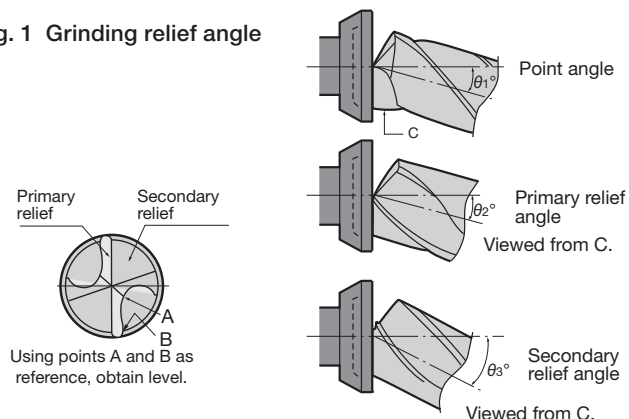
### Before regrinding

Check the cutting edge for damage and wear. If any large fracture is found, remove with a silicon carbide wheel.

### (1) Grinding the flank

- Use a 280 to 400 grit diamond cup type wheel of 100 ~ 200 mm in diameter.
- 1) Grind the relief surface so that primary relief angle ( $\theta$ ) of  $2^\circ$  can be formed as shown in Fig.1. After grinding the other side likewise, do sparkout grinding so that the difference of the lip height will be kept within 0.02 mm.
- 2) In the cases of DSW types: After grinding the primary relief angle ( $\theta$ )  $2^\circ$ , without rotating the drill, grind the secondary relief surface so that the relief angle ( $\theta$ ) of  $3^\circ$  can be formed. In the same way as 2), take care to bring the ridge line formed between the primary and secondary relief surfaces to the drill center. (Values ( $\theta$ ) of  $1^\circ \sim 3^\circ$  are shown in Table 1)

Fig. 1 Grinding relief angle



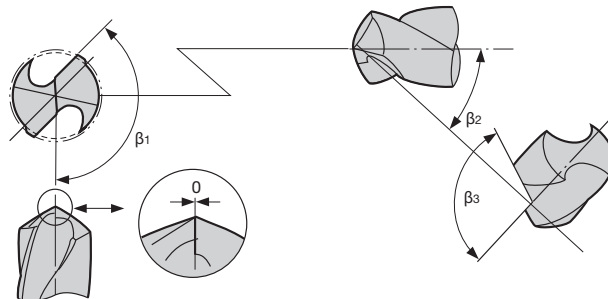
### (2) Thinning

- Use a 280 ~ 400 grit diamond straight-type wheel of 100 ~ 200 mm in diameter.
- Conduct thinning in the same manner as cross thinning (X-type).
- Values of  $\beta_1$  to  $\beta_3$  written in the figures are given in the Table 2.

| Table 1 | $\theta_1$<br>(Point angle) | $\theta_2$<br>(Primary relief angle) | $\theta_3$<br>(Secondary relief angle) | $\theta_4$<br>(Rotating angle) |
|---------|-----------------------------|--------------------------------------|----------------------------------------|--------------------------------|
| DSW     | $-20^\circ$                 | $-5^\circ \sim -9^\circ$             | $-23^\circ \sim -27^\circ$             | —                              |

| Table 2 | $\beta_1$                  | $\beta_2$                | $\beta_3$                  | R |
|---------|----------------------------|--------------------------|----------------------------|---|
| DSW     | $145^\circ \sim 150^\circ$ | $33^\circ \sim 35^\circ$ | $108^\circ \sim 112^\circ$ | — |

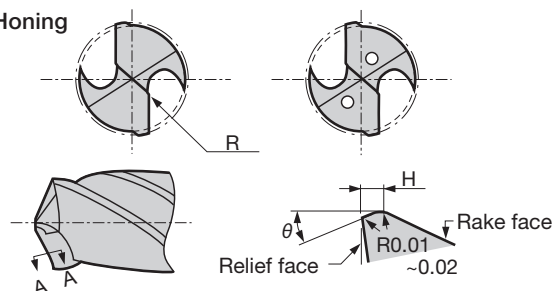
Fig. 2



### (3) Honing

- The honing angle  $\theta$  and width H should be varied depending on the drill type, diameter, and work material. Recommended honing specifications are given in the Table below.
- Honing procedures (refer to Fig.3)
  - (1) Round the R portion shown in Fig.3 in large.
  - (2) Then, roughly hone the cutting edge lines by using an electro-deposited diamond file of around 170 grit.
  - (3) Carry out finish honing by using a diamond hand stick of 400 to 600 grit.
- The honing width should be changed depending on the drill diameter. For smaller side of diameters, the width should be in smaller side of values given in the Table.

Fig.3 Honing



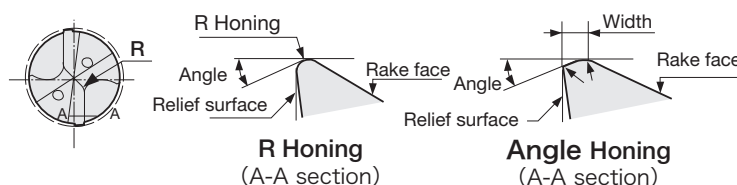
### Honing specifications for DSW

#### Honing

|          | $\sim \phi 6$ mm | $\phi 6 \sim \phi 10$ mm | $\phi 10 \sim \phi 16$ mm |
|----------|------------------|--------------------------|---------------------------|
| $\theta$ | $-20^\circ$      | $-20^\circ$              | $-20^\circ$               |
| H        | 0.03 ~ 0.05      | 0.05 ~ 0.08              | 0.08 ~ 0.10               |

#### R Honing

| Dimensions (mm)                 | R Honing<br>R (mm) |
|---------------------------------|--------------------|
| $\phi Dc \leq \phi 6$           | 0.02 ~ 0.04        |
| $\phi 6 < \phi Dc \leq \phi 12$ | 0.03 ~ 0.05        |



After regrinding, check the following before use.

- The difference of the lip height is kept within 0.02 mm.
- Any damaged portion on the cutting edges is not left.
- Cutting edges are properly honed.
- Any grinding burr is not left.

Notes:

- For more details on regrinding, consult the nearest Tungaloy sales office.


Diameter  
 $\phi 10.4 \sim 16 \text{ mm}$ 

IT8~9  
IT class

**P M K N S**  
Steel Stainless Cast Iron Non-Ferrous Superalloys

0°  
Helix

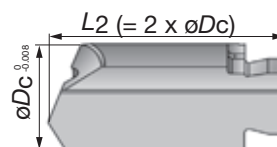
100  
L/D

For Deep Hole Drilling  
Indexable Head Gun Drills

Coolant supply: internal



Drill heads



M type



P type

## Drill heads

| Cat. No          | Stock | Tool dia.<br>$\phi D_c$ (mm) | Head length<br>L2 (mm) | Head type | Wrench    |
|------------------|-------|------------------------------|------------------------|-----------|-----------|
| TGI105-P-G-KS15F | ●     | 10.5                         | 21                     | P         | K GDT-100 |
| TGI110-P-G-KS15F | ●     | 11                           | 22                     | P         | K GDT-110 |
| TGI115-P-G-KS15F | ●     | 11.5                         | 23                     | P         |           |
| TGI120-P-G-KS15F | ●     | 12                           | 24                     | P         | K GDT-120 |
| TGI121-P-G-KS15F | ●     | 12.1                         | 24.2                   | P         |           |
| TGI130-P-G-KS15F | ●     | 13                           | 26                     | P         | K GDT-130 |
| TGI140-P-G-KS15F | ●     | 14                           | 28                     | P         | K GDT-140 |
| TGI141-P-G-KS15F | ●     | 14.1                         | 28.2                   | P         |           |
| TGI150-P-G-KS15F | ●     | 15                           | 30                     | P         | K GDT-150 |
| TGI160-P-G-KS15F | ●     | 16                           | 32                     | P         |           |
| TGI161-P-G-KS15F | ●     | 16.1                         | 32.2                   | P         |           |
| TGI110-M-G-KS15F | ●     | 11                           | 22                     | M         | K GDT-110 |
| TGI115-M-G-KS15F | ●     | 11.5                         | 23                     | M         |           |
| TGI120-M-G-KS15F | ●     | 12                           | 24                     | M         | K GDT-120 |
| TGI121-M-G-KS15F | ●     | 12.1                         | 24.2                   | M         |           |
| TGI140-M-G-KS15F | ●     | 14                           | 28                     | M         | K GDT-140 |
| TGI141-M-G-KS15F | ●     | 14.1                         | 28.2                   | M         |           |
| TGI160-M-G-KS15F | ●     | 16                           | 32                     | M         | K GDT-150 |
| TGI161-M-G-KS15F | ●     | 16.1                         | 32.2                   | M         |           |
| TGI110-P-G-AH725 | ●     | 11                           | 22                     | P         | K GDT-110 |
| TGI120-P-G-AH725 | ●     | 12                           | 24                     | P         | K GDT-120 |
| TGI140-P-G-AH725 | ●     | 14                           | 28                     | P         | K GDT-140 |

● : Stocked items

## Drill body

\* Drill body should be ordered depending on each application. When ordering, tool information such as drill diameter, overall length and type of driver must be specified.

## Standard cutting condition

| Work material                                         | Cutting speed<br>$V_c$ (m/min) | Feed $f$ (mm/rev)<br>$\phi D_c$ (mm) |                             |                             |
|-------------------------------------------------------|--------------------------------|--------------------------------------|-----------------------------|-----------------------------|
|                                                       |                                | $\phi 9.8 \sim \phi 11.69$           | $\phi 11.7 \sim \phi 13.19$ | $\phi 13.2 \sim \phi 16.19$ |
|                                                       |                                | $\phi 9.8 \sim \phi 11.69$           | $\phi 11.7 \sim \phi 13.19$ | $\phi 13.2 \sim \phi 16.19$ |
| Carbon steel, free-cutting steel                      | 70 - 110                       | 0.030 - 0.050                        | 0.035 - 0.060               | 0.040 - 0.070               |
| Low alloy steel<br>( $\leq 5\%$ of alloying elements) | 50 - 110                       | 0.030 - 0.050                        | 0.035 - 0.060               | 0.040 - 0.070               |
| High alloy steel                                      | 50 - 70                        | 0.025 - 0.040                        | 0.030 - 0.045               | 0.035 - 0.050               |
| Stainless steel                                       | 40 - 80                        | 0.025 - 0.040                        | 0.030 - 0.045               | 0.035 - 0.050               |
| Cast iron                                             | 70 - 115                       | 0.040 - 0.100                        | 0.050 - 0.120               | 0.060 - 0.140               |
| Aluminium alloy                                       | 80 - 160                       | 0.030 - 0.170                        | 0.030 - 0.180               | 0.035 - 0.190               |
| Copper alloy                                          | 80 - 180                       | 0.020 - 0.130                        | 0.030 - 0.160               | 0.040 - 0.180               |
| Titanium alloy                                        | 25 - 60                        | 0.025 - 0.030                        | 0.030 - 0.035               | 0.030 - 0.040               |
| Hardened steel                                        | 25 - 50                        | 0.025 - 0.030                        | 0.030 - 0.035               | 0.030 - 0.040               |

\* When machining carbon steel or alloy steel with M type head, 20 - 30% higher feed can be applied.

