



For more information

Indexable drill

# TUNGDRILLTWISTED

Tungaloy Report No. 377-G

Indexable drills with 4 edge inserts now offer an **increased range of insert grades dedicated to drilling applications**







## TUNGDRILL TWISTED

---



**Excellent surface finish and stable chip evacuation due to increased coolant flow with twisted drill body**

# TUNGDRILLTWISTED

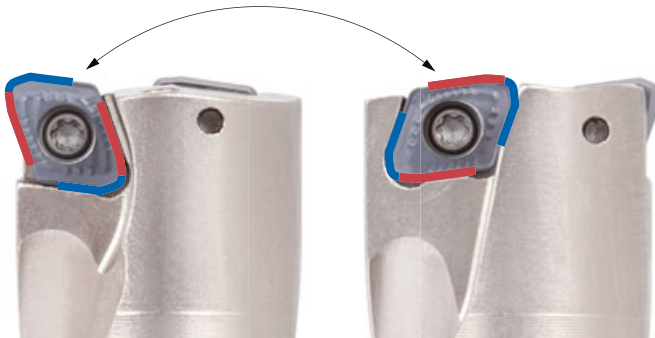
## Extremely versatile indexable drills

- Light-cutting 4-edge positive inserts
- Drilling diameters from 12.5 mm to 54.0 mm
- Drilling depths of 2xD, 3xD, 4xD, and 5xD
- Multiple grades for various material groups

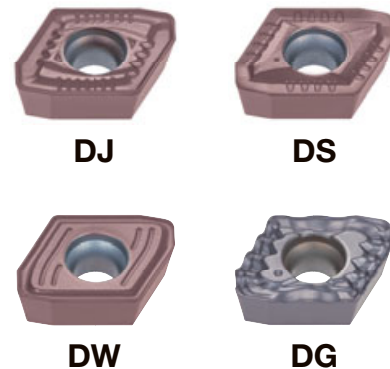


### Features

**1** A single insert is interchangeable for the center cutting edge and peripheral cutting edge. This reduces tool inventory and investment.

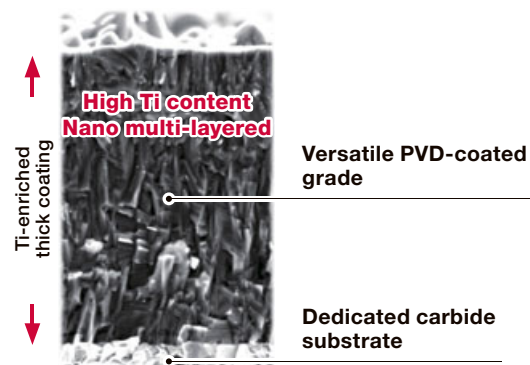


**2** Four different styles of chipbreakers to cover various applications.



**3** New insert grades developed specifically for drilling applications for prolonged insert tool life.

**New** AH7020, AH7030

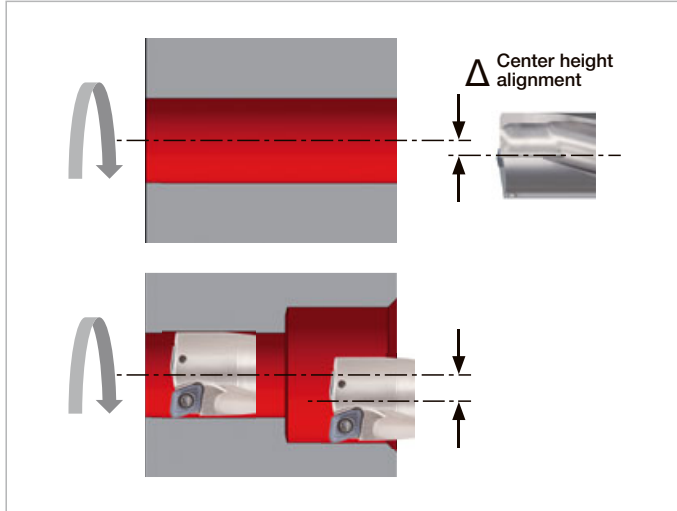




## Versatility and stability for reduced tool investment and inventory

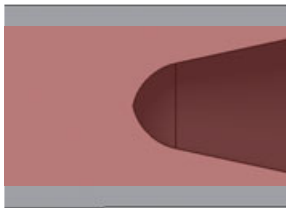
The combination of a strong tool body and light-cutting geometry provides versatility and stability, making **TungDrillTwisted** an all-rounder indexable drill solution for various hole-making applications, from standard drilling to single-point boring operations.

### Stable solution for drilling on lathe machine

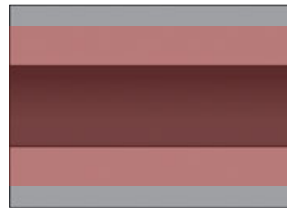


- Sufficient alignment of the drill with the center line of the machine is critical for successful non-rotating drilling applications on a lathe or turning center.
- **TungDrillTwisted** allows much easier drill center height alignment with the work center, compared with solid or exchangeable-head drills.
- By offsetting the drill using X-axis of the machine, fine adjustments of the drill diameter can be achieved. This allows the indexable drill to be used for boring operations, enabling a single tool to perform multiple operations.

### Machining of cast or pre-drilled holes



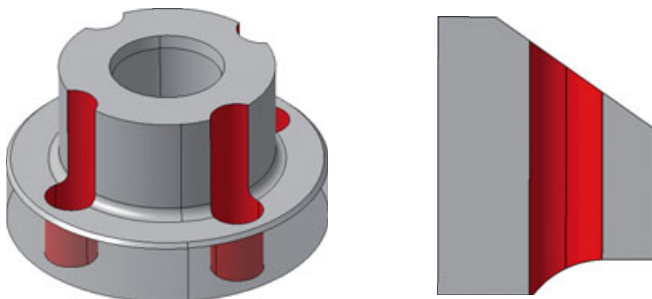
Opening a hole into a pre-cast or pre-forged hole or concave surface



Enlarging a pre-drilled hole

- **TungDrillTwisted** enables drilling to concave or convex surfaces or enlarging of the cast or pre-drilled holes.
- The chipbreaker optimizes chip control and evacuation.

### Drilling irregular or asymmetric surfaces

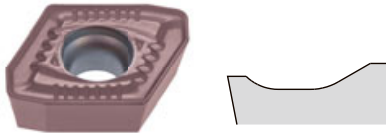


- **TungDrillTwisted** can drill irregular surfaces, such as inclined entry/exit, convex or concave surfaces, and edge plunging.
- Due to extremely high body stiffness, the drill is able to engage in the material with no or little body deflection. Strong insert geometry also contributes to tool life stability during machining involving aggressive interruptions.

# TUNGDRILLTWISTED

4 styles of chipbreakers for optimal chip control and maximum machining stability

**DJ**



First-choice chipbreaker for a wide range of applications in ISO P and M material groups, featuring light cutting action with stability.

**P** SCM440 / 42CrMo4      Drill diameter: 20 mm  
Machine : Vertical M/C

|                           |     |      |     |      |
|---------------------------|-----|------|-----|------|
| Cutting speed: Vc (m/min) | 200 |      |     |      |
|                           | 150 |      |     |      |
|                           | 100 |      |     |      |
|                           |     | 0.08 | 0.1 | 0.15 |
| Feed: f (mm/rev)          |     |      |     |      |

**P** SCM420 / 18CrMo4      Drill diameter: 20 mm  
Machine : Lathe

|                           |     |      |     |      |
|---------------------------|-----|------|-----|------|
| Cutting speed: Vc (m/min) | 200 |      |     |      |
|                           | 150 |      |     |      |
|                           | 100 |      |     |      |
|                           |     | 0.08 | 0.1 | 0.15 |
| Feed: f (mm/rev)          |     |      |     |      |

**M** SUS304 / X5CrNi18-9      Drill diameter: 20 mm  
Machine : Vertical M/C

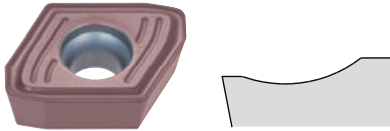
|                           |     |      |      |      |
|---------------------------|-----|------|------|------|
| Cutting speed: Vc (m/min) | 200 |      |      |      |
|                           | 150 |      |      |      |
|                           | 100 |      |      |      |
|                           |     | 0.04 | 0.08 | 0.13 |
| Feed: f (mm/rev)          |     |      |      |      |

**P** SS400 / E275A      Drill diameter: 20 mm  
Machine : Vertical M/C

|                           |     |      |      |     |
|---------------------------|-----|------|------|-----|
| Cutting speed: Vc (m/min) | 250 |      |      |     |
|                           | 200 |      |      |     |
|                           | 150 |      |      |     |
|                           |     | 0.04 | 0.06 | 0.1 |
| Feed: f (mm/rev)          |     |      |      |     |

Not recommended

# DW



Produces tightly-curved chips compared with DJ chipbreaker. Wiper creates excellent surface quality and enables higher feed rates. Superior resistance to fracture.

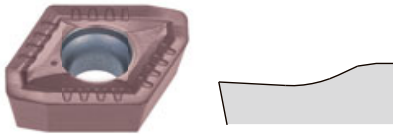
**P** **SCM440 / 42CrMo4** Drill diameter: 20 mm  
Machine : Vertical M/C

|                              |                    |      |     |      |
|------------------------------|--------------------|------|-----|------|
| Cutting speed: $V_c$ (m/min) | 200                |      |     |      |
|                              | 150                |      |     |      |
|                              | 100                |      |     |      |
|                              |                    | 0.08 | 0.1 | 0.15 |
|                              | Feed: $f$ (mm/rev) |      |     |      |

**P** **SCM420 / 18CrMo4** Drill diameter: 20 mm  
Machine : Lathe

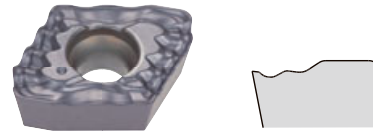
|                              |                    |      |     |      |
|------------------------------|--------------------|------|-----|------|
| Cutting speed: $V_c$ (m/min) | 200                |      |     |      |
|                              | 150                |      |     |      |
|                              | 100                |      |     |      |
|                              |                    | 0.08 | 0.1 | 0.15 |
|                              | Feed: $f$ (mm/rev) |      |     |      |

# DS



Developed specifically for machining stainless steel, DS can handle heat-resistant superalloys. Performs best when used in turning applications.

# DG



Developed for soft steel machining. The unique geometry eliminates chip bird-nesting. Delivers excellent performance when used at low feed rates.

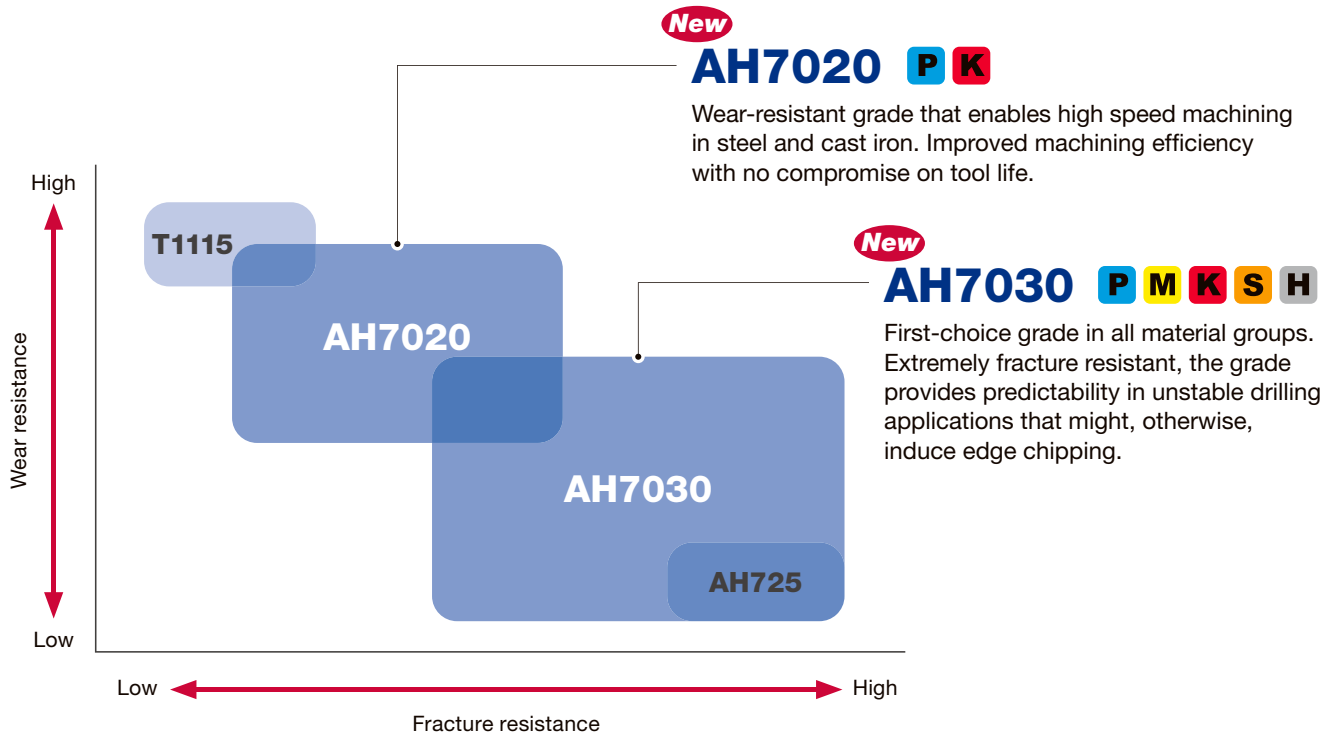
**M** **SUS304 / X5CrNi18-9** Drill diameter: 20 mm  
Machine : Vertical M/C

|                              |                    |      |      |      |
|------------------------------|--------------------|------|------|------|
| Cutting speed: $V_c$ (m/min) | 200                |      |      |      |
|                              | 150                |      |      |      |
|                              | 100                |      |      |      |
|                              |                    | 0.04 | 0.08 | 0.13 |
|                              | Feed: $f$ (mm/rev) |      |      |      |

**P** **SS400 / E275A** Drill diameter: 20 mm  
Machine : Vertical M/C

|                              |                    |      |      |     |
|------------------------------|--------------------|------|------|-----|
| Cutting speed: $V_c$ (m/min) | 150                |      |      |     |
|                              | 100                |      |      |     |
|                              | 60                 |      |      |     |
|                              |                    | 0.04 | 0.06 | 0.1 |
|                              | Feed: $f$ (mm/rev) |      |      |     |

New insert grades developed specifically for drilling applications bring increased tool life and reduced cost per part



### Versatile PVD-coated grade

#### Ti-enriched coating

- Thick Ti-enriched PVD coating for enhanced thermal shock resistance.
- Reduced crater wear.

#### High Ti-content nano-structured multilayer coating

The outer layer consists of a high Ti-content nano-structured multilayer made possible by Tungaloy's latest coating technology. Its high hardness and nano structure provide the grade with a good balance of wear and fracture resistance, enhancing tool life and predictability.

### Dedicated carbide substrate

#### AH7020

Thanks to high thermal conductivity of the substrate, heat generated during machining is dissipated, efficiently reducing temperature on the cutting edge. This provides edge toughness, while reducing plastic deformation of the cutting edge. Ideal for continuous cuts.

#### AH7030

AH7030 incorporates a tough substrate that provides process security during interrupted machining. This tough substrate provides the grade with added reliability during interrupted cuts.

### AH725 P M

- Excellent wear and fracture resistance delivered by (Ti, Al)N coating and tough substrate.
- Suitable for steel and stainless steel machining.

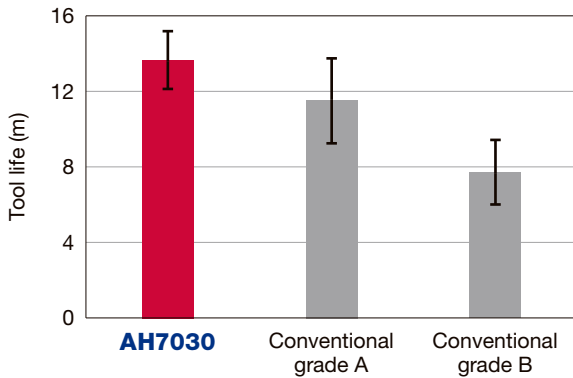
### T1115 K

- Strong resistance to wear due to hard carbide substrate and multi-layered compound coating.
- Ideal grade for drilling of cast iron.

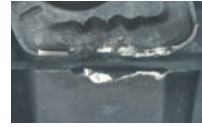


## CUTTING PERFORMANCE

### Tool life test results in peck drilling application



AH7030

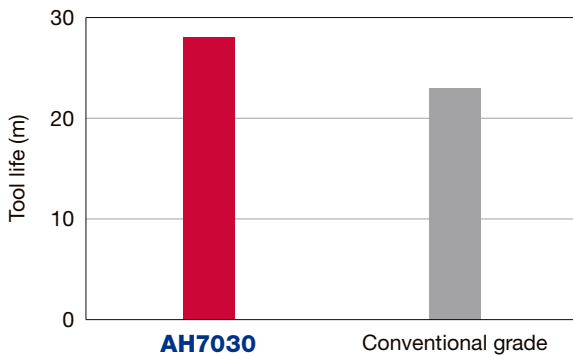


Conventional grade A

|          |                    |                         |
|----------|--------------------|-------------------------|
| <b>P</b> | Drill              | : TDX250F25-3           |
|          | Insert             | : XPMT07H308R-DJ AH7030 |
|          | Workpiece material | : Alloy steel (30HRC)   |
|          | Cutting speed      | : $V_c = 150$ m/min     |
|          | Feed               | : $f = 0.12$ mm/rev     |
|          | Drilling depth     | : 60 mm                 |
|          | Coolant            | : Wet (Internal supply) |
|          | Peck cycle         | : 2 mm/peck             |

Increased wear and chipping resistance compared to conventional tools. Improved tool life stability.

### Tool life test results in stainless steel



AH7030

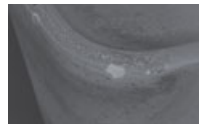
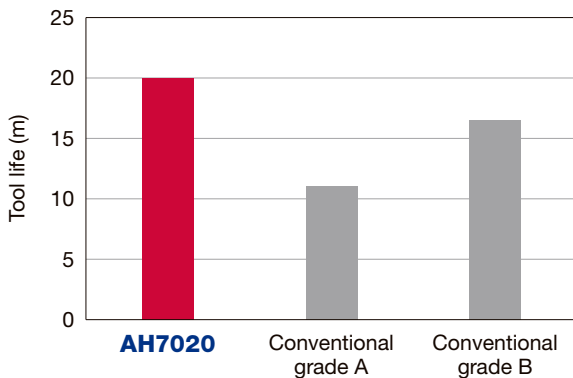


Conventional grade

|          |                    |                              |
|----------|--------------------|------------------------------|
| <b>M</b> | Drill              | : TDX250F25-3                |
|          | Insert             | : XPMT07H308R-DS AH7030      |
|          | Workpiece material | : Austenitic stainless steel |
|          | Cutting speed      | : $V_c = 150$ m/min          |
|          | Feed               | : $f = 0.08$ mm/rev          |
|          | Drilling depth     | : 65 mm                      |
|          | Coolant            | : Wet (Internal supply)      |

Provided wear and fracture resistance in stainless steel and increased tool life.

### Wear resistance



AH7020



Conventional grade A

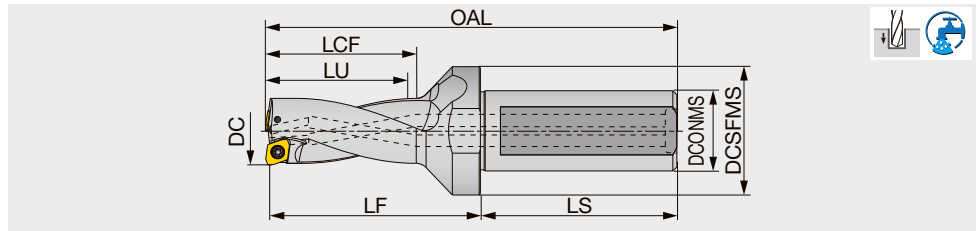
|          |                    |                         |
|----------|--------------------|-------------------------|
| <b>P</b> | Drill              | : TDX250F25-3           |
|          | Insert             | : XPMT07H308R-DJ AH7020 |
|          | Workpiece material | : Carbon steel          |
|          | Cutting speed      | : $V_c = 200$ m/min     |
|          | Feed               | : $f = 0.08$ mm/rev     |
|          | Drilling depth     | : 65 mm                 |
|          | Coolant            | : Wet (Internal supply) |

New coated grade provided improved wear resistance and long tool life at an increased cutting speed.

# TUNGDRILLTWISTED

## TDX-F L/D=2

Indexable drill, L/D = 2, flat cotter



| Designation | DC   | DCONMS | DCSFMS | LU   | LS | LCF  | LF    | OAL   | Max. offset (radial) | WT(kg) | Insert         |
|-------------|------|--------|--------|------|----|------|-------|-------|----------------------|--------|----------------|
| TDX125F20-2 | 12.5 | 20     | 25     | 25.4 | 49 | 28.4 | 41    | 90.4  | 0.8                  | 0.2    | XPMT040104R-D* |
| TDX130F20-2 | 13   | 20     | 25     | 26.4 | 49 | 29.4 | 42    | 91.4  | 0.7                  | 0.2    | XPMT040104R-D* |
| TDX135F20-2 | 13.5 | 20     | 25     | 27.4 | 49 | 30.4 | 43    | 92.4  | 0.6                  | 0.2    | XPMT040104R-D* |
| TDX140F20-2 | 14   | 20     | 25     | 28.4 | 49 | 31.4 | 44    | 93.4  | 0.5                  | 0.2    | XPMT040104R-D* |
| TDX145F20-2 | 14.5 | 20     | 25     | 29.4 | 49 | 32.4 | 46    | 95.4  | 0.4                  | 0.2    | XPMT040104R-D* |
| TDX150F20-2 | 15   | 20     | 25     | 30.5 | 49 | 33.5 | 47    | 96.5  | 0.9                  | 0.2    | XPMT050204R-D* |
| TDX155F20-2 | 15.5 | 20     | 32     | 31.5 | 49 | 34.5 | 49    | 98.5  | 0.8                  | 0.2    | XPMT050204R-D* |
| TDX160F20-2 | 16   | 20     | 32     | 32.5 | 49 | 35.5 | 51    | 100.5 | 0.6                  | 0.2    | XPMT050204R-D* |
| TDX165F20-2 | 16.5 | 20     | 32     | 33.5 | 49 | 36.5 | 52    | 101.5 | 0.5                  | 0.2    | XPMT050204R-D* |
| TDX170F20-2 | 17   | 20     | 32     | 34.5 | 49 | 37.5 | 53    | 102.5 | 0.4                  | 0.2    | XPMT050204R-D* |
| TDX175F25-2 | 17.5 | 25     | 32     | 35.5 | 54 | 38.5 | 55    | 109.5 | 1.2                  | 0.3    | XPMT06X308R-D* |
| TDX180F25-2 | 18   | 25     | 32     | 36.5 | 54 | 39.5 | 56    | 110.5 | 1.1                  | 0.3    | XPMT06X308R-D* |
| TDX185F25-2 | 18.5 | 25     | 32     | 37.5 | 54 | 40.5 | 57    | 111.5 | 0.9                  | 0.3    | XPMT06X308R-D* |
| TDX190F25-2 | 19   | 25     | 32     | 38.5 | 54 | 41.5 | 58    | 112.5 | 0.8                  | 0.3    | XPMT06X308R-D* |
| TDX195F25-2 | 19.5 | 25     | 32     | 39.5 | 54 | 42.5 | 60    | 114.5 | 0.7                  | 0.3    | XPMT06X308R-D* |
| TDX200F25-2 | 20   | 25     | 32     | 40.5 | 54 | 45.5 | 61    | 115.5 | 0.5                  | 0.3    | XPMT06X308R-D* |
| TDX205F25-2 | 20.5 | 25     | 32     | 41.5 | 54 | 46.5 | 62.5  | 117   | 0.4                  | 0.3    | XPMT06X308R-D* |
| TDX210F25-2 | 21   | 25     | 32     | 42.5 | 54 | 47.5 | 64    | 118.5 | 0.3                  | 0.3    | XPMT06X308R-D* |
| TDX215F25-2 | 21.5 | 25     | 32     | 43.5 | 54 | 48.5 | 65    | 119.5 | 0.2                  | 0.3    | XPMT06X308R-D* |
| TDX220F25-2 | 22   | 25     | 32     | 44.6 | 54 | 49.6 | 66    | 120.6 | 1.2                  | 0.3    | XPMT07H308R-D* |
| TDX225F25-2 | 22.5 | 25     | 37     | 45.6 | 54 | 50.6 | 67.5  | 122.1 | 1.1                  | 0.3    | XPMT07H308R-D* |
| TDX230F25-2 | 23   | 25     | 37     | 46.6 | 54 | 51.6 | 69    | 123.6 | 0.9                  | 0.4    | XPMT07H308R-D* |
| TDX235F25-2 | 23.5 | 25     | 37     | 47.6 | 54 | 52.6 | 70    | 124.6 | 0.8                  | 0.4    | XPMT07H308R-D* |
| TDX240F25-2 | 24   | 25     | 37     | 48.6 | 54 | 53.6 | 71    | 125.6 | 0.7                  | 0.4    | XPMT07H308R-D* |
| TDX245F25-2 | 24.5 | 25     | 37     | 49.6 | 54 | 54.6 | 72.5  | 127.1 | 0.5                  | 0.4    | XPMT07H308R-D* |
| TDX250F25-2 | 25   | 25     | 37     | 50.6 | 54 | 55.6 | 74    | 128.6 | 0.4                  | 0.4    | XPMT07H308R-D* |
| TDX255F25-2 | 25.5 | 25     | 37     | 51.6 | 54 | 56.6 | 75.5  | 130.1 | 0.3                  | 0.4    | XPMT07H308R-D* |
| TDX260F25-2 | 26   | 25     | 37     | 52.6 | 54 | 57.6 | 77    | 131.6 | 0.2                  | 0.4    | XPMT07H308R-D* |
| TDX270F32-2 | 27   | 32     | 40     | 54.7 | 59 | 59.7 | 79    | 138.7 | 1.5                  | 0.6    | XPMT08T308R-D* |
| TDX280F32-2 | 28   | 32     | 40     | 56.7 | 59 | 61   | 82.3  | 142   | 1.2                  | 0.6    | XPMT08T308R-D* |
| TDX290F32-2 | 29   | 32     | 40     | 58.7 | 59 | 63   | 84.3  | 144   | 1                    | 0.7    | XPMT08T308R-D* |
| TDX300F32-2 | 30   | 32     | 40     | 60.7 | 59 | 65   | 87.3  | 147   | 0.7                  | 0.7    | XPMT08T308R-D* |
| TDX310F32-2 | 31   | 32     | 40     | 62.7 | 59 | 67   | 90.3  | 150   | 0.4                  | 0.7    | XPMT08T308R-D* |
| TDX320F32-2 | 32   | 32     | 40     | 64.7 | 59 | 69   | 92.3  | 152   | 0.2                  | 0.8    | XPMT08T308R-D* |
| TDX330F40-2 | 33   | 40     | 50     | 67.1 | 69 | 71.7 | 95.6  | 165.7 | 2.3                  | 1.2    | XPMT110412R-D* |
| TDX340F40-2 | 34   | 40     | 50     | 69.1 | 69 | 73.7 | 98.6  | 168.7 | 2.1                  | 1.2    | XPMT110412R-D* |
| TDX350F40-2 | 35   | 40     | 50     | 71.1 | 69 | 75.7 | 101.6 | 171.7 | 1.8                  | 1.2    | XPMT110412R-D* |
| TDX360F40-2 | 36   | 40     | 50     | 73.1 | 69 | 77.7 | 104.6 | 174.7 | 1.5                  | 1.3    | XPMT110412R-D* |
| TDX370F40-2 | 37   | 40     | 50     | 75.1 | 69 | 79.7 | 105.6 | 175.7 | 1.3                  | 1.3    | XPMT110412R-D* |
| TDX380F40-2 | 38   | 40     | 50     | 77.1 | 69 | 81.7 | 108.6 | 178.7 | 1                    | 1.3    | XPMT110412R-D* |
| TDX390F40-2 | 39   | 40     | 50     | 79.1 | 69 | 83.7 | 110.6 | 180.7 | 0.7                  | 1.4    | XPMT110412R-D* |
| TDX400F40-2 | 40   | 40     | 50     | 81.1 | 69 | 85.7 | 113.6 | 183.7 | 0.5                  | 1.4    | XPMT110412R-D* |
| TDX410F40-2 | 41   | 40     | 50     | 83.1 | 69 | 87.7 | 117.6 | 187.7 | 0.2                  | 1.5    | XPMT110412R-D* |
| TDX420F40-2 | 42   | 40     | 55     | 85.6 | 69 | 90.6 | 120   | 190.6 | 3.1                  | 1.6    | XPMT150512R-D* |
| TDX430F40-2 | 43   | 40     | 55     | 87.6 | 69 | 92.6 | 123   | 193.6 | 2.9                  | 1.6    | XPMT150512R-D* |
| TDX440F40-2 | 44   | 40     | 55     | 89.6 | 69 | 94.6 | 125   | 195.6 | 2.6                  | 1.7    | XPMT150512R-D* |
| TDX450F40-2 | 45   | 40     | 55     | 91.6 | 69 | 96.6 | 128   | 198.6 | 2.3                  | 1.7    | XPMT150512R-D* |
| TDX460F40-2 | 46   | 40     | 55     | 93.6 | 69 | 98.6 | 131   | 201.6 | 2.1                  | 1.8    | XPMT150512R-D* |

| Designation | DC | DCONMS | DCSFMS | LU    | LS | LCF   | LF  | OAL   | Max. offset (radial) | WT(kg) | Insert         |
|-------------|----|--------|--------|-------|----|-------|-----|-------|----------------------|--------|----------------|
| TDX470F40-2 | 47 | 40     | 55     | 95.6  | 69 | 100.6 | 133 | 203.6 | 1.8                  | 1.9    | XPMT150512R-D* |
| TDX480F40-2 | 48 | 40     | 55     | 97.6  | 69 | 102.6 | 136 | 206.6 | 1.5                  | 1.9    | XPMT150512R-D* |
| TDX490F40-2 | 49 | 40     | 55     | 99.6  | 69 | 104.6 | 138 | 208.6 | 1.3                  | 1.9    | XPMT150512R-D* |
| TDX500F40-2 | 50 | 40     | 55     | 101.6 | 69 | 106.6 | 141 | 211.6 | 1                    | 2      | XPMT150512R-D* |
| TDX510F40-2 | 51 | 40     | 55     | 103.6 | 69 | 108.6 | 145 | 215.6 | 0.7                  | 2.1    | XPMT150512R-D* |
| TDX520F40-2 | 52 | 40     | 55     | 105.6 | 69 | 110.6 | 147 | 217.6 | 0.5                  | 2.2    | XPMT150512R-D* |
| TDX530F40-2 | 53 | 40     | 55     | 107.6 | 69 | 112.6 | 150 | 220.6 | -                    | 2.3    | XPMT150512R-D* |
| TDX540F40-2 | 54 | 40     | 55     | 109.6 | 69 | 114.6 | 152 | 222.6 | -                    | 2.4    | XPMT150512R-D* |

| Tool diameter | Tool diameter tolerance | Hole diameter tolerance* |
|---------------|-------------------------|--------------------------|
| ø12.5 - ø17   | + 0.1 / 0               | + 0.25 / 0               |
| ø17.5 - ø54   | + 0.2 / 0               | + 0.3 / 0                |

\*Just for reference

## SPARE PARTS



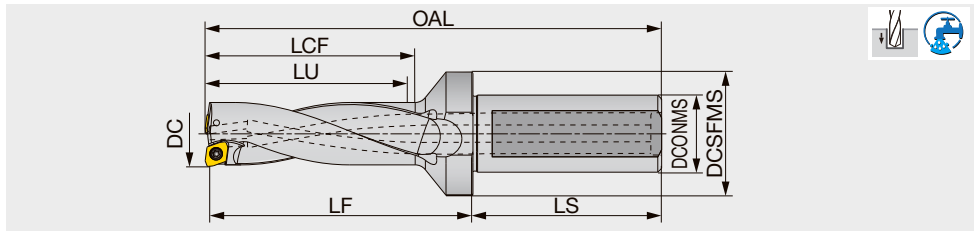
| Designation  | Clamping screw | Wrench |
|--------------|----------------|--------|
| TDX125 - 145 | CSPB-2H        | IP-6DB |
| TDX150 - 170 | CSPB-2L043     | IP-6DB |
| TDX175 - 215 | CSPB-2.2       | IP-7D  |
| TDX220 - 260 | CSPB-2.5       | IP-8D  |
| TDX270 - 320 | CSTB-3         | T-9D   |
| TDX330 - 410 | CSTB-4         | T-15D  |
| TDX420 - 540 | CSTB-5         | T-20D  |

Recommended clamping torque (N·m): CSPB-2H/CSPB-2L043 = 0.7, CSPB-2.2 = 1, CSPB-2.5 = 1.3, CSTB-3 = 2.3, CSTB-4 = 3.5, CSTB-5 = 5

# TUNGDRILLTWISTED

## TDX-F L/D=3

Indexable drill, L/D = 3, flat cotter



| Designation | DC   | DCONMS | DCSFMS | LU    | LS | LCF   | LF    | OAL   | Max. offset (radial) | WT(kg) | Insert         |
|-------------|------|--------|--------|-------|----|-------|-------|-------|----------------------|--------|----------------|
| TDX125F20-3 | 12.5 | 20     | 25     | 37.9  | 49 | 40.9  | 53    | 102.4 | 0.8                  | 0.2    | XPMT040104R-D* |
| TDX130F20-3 | 13   | 20     | 25     | 39.4  | 49 | 42.4  | 55    | 104.4 | 0.7                  | 0.2    | XPMT040104R-D* |
| TDX135F20-3 | 13.5 | 20     | 25     | 40.9  | 49 | 43.9  | 56    | 105.4 | 0.6                  | 0.2    | XPMT040104R-D* |
| TDX140F20-3 | 14   | 20     | 25     | 42.4  | 49 | 45.4  | 58    | 107.4 | 0.5                  | 0.2    | XPMT040104R-D* |
| TDX145F20-3 | 14.5 | 20     | 25     | 43.9  | 49 | 46.9  | 60    | 109.4 | 0.4                  | 0.2    | XPMT040104R-D* |
| TDX150F20-3 | 15   | 20     | 25     | 45.4  | 49 | 48.4  | 62    | 111.4 | 0.9                  | 0.2    | XPMT050204R-D* |
| TDX155F20-3 | 15.5 | 20     | 32     | 46.9  | 49 | 49.9  | 64    | 113.4 | 0.8                  | 0.2    | XPMT050204R-D* |
| TDX160F20-3 | 16   | 20     | 32     | 48.4  | 49 | 51.4  | 66    | 115.4 | 0.6                  | 0.2    | XPMT050204R-D* |
| TDX165F20-3 | 16.5 | 20     | 32     | 49.9  | 49 | 52.9  | 68    | 117.4 | 0.5                  | 0.2    | XPMT050204R-D* |
| TDX170F20-3 | 17   | 20     | 32     | 51.4  | 49 | 54.4  | 69    | 118.4 | 0.4                  | 0.2    | XPMT050204R-D* |
| TDX175F25-3 | 17.5 | 25     | 32     | 53    | 54 | 56    | 72    | 126.5 | 1.2                  | 0.3    | XPMT06X308R-D* |
| TDX180F25-3 | 18   | 25     | 32     | 54.5  | 54 | 57.5  | 73    | 127.5 | 1.1                  | 0.3    | XPMT06X308R-D* |
| TDX185F25-3 | 18.5 | 25     | 32     | 56    | 54 | 59    | 75    | 129.5 | 0.9                  | 0.3    | XPMT06X308R-D* |
| TDX190F25-3 | 19   | 25     | 32     | 57.5  | 54 | 60.5  | 76    | 130.5 | 0.8                  | 0.3    | XPMT06X308R-D* |
| TDX195F25-3 | 19.5 | 25     | 32     | 59    | 54 | 62    | 79    | 133.5 | 0.7                  | 0.3    | XPMT06X308R-D* |
| TDX200F25-3 | 20   | 25     | 32     | 60.5  | 54 | 65.5  | 81    | 135.5 | 0.5                  | 0.3    | XPMT06X308R-D* |
| TDX205F25-3 | 20.5 | 25     | 32     | 62    | 54 | 67    | 82    | 136.5 | 0.4                  | 0.3    | XPMT06X308R-D* |
| TDX210F25-3 | 21   | 25     | 32     | 63.5  | 54 | 68.5  | 84    | 138.5 | 0.3                  | 0.3    | XPMT06X308R-D* |
| TDX215F25-3 | 21.5 | 25     | 32     | 65    | 54 | 70    | 86    | 140.5 | 0.2                  | 0.4    | XPMT06X308R-D* |
| TDX220F25-3 | 22   | 25     | 32     | 66.6  | 54 | 71.6  | 87    | 141.6 | 1.2                  | 0.4    | XPMT07H308R-D* |
| TDX225F25-3 | 22.5 | 25     | 37     | 68.1  | 54 | 73.1  | 90    | 144.6 | 1.1                  | 0.4    | XPMT07H308R-D* |
| TDX230F25-3 | 23   | 25     | 37     | 69.6  | 54 | 74.6  | 91    | 145.6 | 0.9                  | 0.4    | XPMT07H308R-D* |
| TDX235F25-3 | 23.5 | 25     | 37     | 71.1  | 54 | 76.1  | 93    | 147.6 | 0.8                  | 0.4    | XPMT07H308R-D* |
| TDX240F25-3 | 24   | 25     | 37     | 72.6  | 54 | 77.6  | 95    | 149.6 | 0.7                  | 0.4    | XPMT07H308R-D* |
| TDX245F25-3 | 24.5 | 25     | 37     | 74.1  | 54 | 79.1  | 97    | 151.6 | 0.5                  | 0.5    | XPMT07H308R-D* |
| TDX250F25-3 | 25   | 25     | 37     | 75.6  | 54 | 80.6  | 99    | 153.6 | 0.4                  | 0.5    | XPMT07H308R-D* |
| TDX255F25-3 | 25.5 | 25     | 37     | 77.1  | 54 | 82.1  | 100   | 154.6 | 0.3                  | 0.5    | XPMT07H308R-D* |
| TDX260F25-3 | 26   | 25     | 37     | 78.6  | 54 | 83.6  | 102   | 156.6 | 0.2                  | 0.5    | XPMT07H308R-D* |
| TDX270F32-3 | 27   | 32     | 40     | 81.7  | 59 | 86.7  | 105   | 164.7 | 1.5                  | 0.6    | XPMT08T308R-D* |
| TDX280F32-3 | 28   | 32     | 40     | 84.7  | 59 | 89    | 109.3 | 169   | 1.2                  | 0.7    | XPMT08T308R-D* |
| TDX290F32-3 | 29   | 32     | 40     | 87.7  | 59 | 92    | 112.3 | 172   | 1                    | 0.7    | XPMT08T308R-D* |
| TDX300F32-3 | 30   | 32     | 40     | 90.7  | 59 | 95    | 117.3 | 177   | 0.7                  | 0.8    | XPMT08T308R-D* |
| TDX310F32-3 | 31   | 32     | 40     | 93.7  | 59 | 98    | 121.3 | 181   | 0.4                  | 0.8    | XPMT08T308R-D* |
| TDX320F32-3 | 32   | 32     | 40     | 96.7  | 59 | 101   | 124.3 | 184   | 0.2                  | 0.9    | XPMT08T308R-D* |
| TDX330F40-3 | 33   | 40     | 50     | 100.1 | 69 | 104.7 | 128.6 | 198.7 | 2.3                  | 1.3    | XPMT110412R-D* |
| TDX340F40-3 | 34   | 40     | 50     | 103.1 | 69 | 107.7 | 131.6 | 201.7 | 2.1                  | 1.3    | XPMT110412R-D* |
| TDX350F40-3 | 35   | 40     | 50     | 106.1 | 69 | 110.7 | 135.6 | 205.7 | 1.8                  | 1.3    | XPMT110412R-D* |
| TDX360F40-3 | 36   | 40     | 50     | 109.1 | 69 | 113.7 | 139.6 | 209.7 | 1.5                  | 1.4    | XPMT110412R-D* |
| TDX370F40-3 | 37   | 40     | 50     | 112.1 | 69 | 116.7 | 142.6 | 212.7 | 1.3                  | 1.4    | XPMT110412R-D* |
| TDX380F40-3 | 38   | 40     | 50     | 115.1 | 69 | 119.7 | 146.6 | 216.7 | 1                    | 1.5    | XPMT110412R-D* |
| TDX390F40-3 | 39   | 40     | 50     | 118.1 | 69 | 122.7 | 149.6 | 219.7 | 0.7                  | 1.6    | XPMT110412R-D* |
| TDX400F40-3 | 40   | 40     | 50     | 121.1 | 69 | 125.7 | 153.6 | 223.7 | 0.5                  | 1.6    | XPMT110412R-D* |
| TDX410F40-3 | 41   | 40     | 50     | 124.1 | 69 | 128.7 | 157.6 | 227.7 | 0.2                  | 1.7    | XPMT110412R-D* |
| TDX420F40-3 | 42   | 40     | 55     | 127.6 | 69 | 132.6 | 161   | 231.6 | 3.1                  | 1.8    | XPMT150512R-D* |
| TDX430F40-3 | 43   | 40     | 55     | 130.6 | 69 | 135.6 | 165   | 235.6 | 2.9                  | 1.8    | XPMT150512R-D* |
| TDX440F40-3 | 44   | 40     | 55     | 133.6 | 69 | 138.6 | 168   | 238.6 | 2.6                  | 1.9    | XPMT150512R-D* |
| TDX450F40-3 | 45   | 40     | 55     | 136.6 | 69 | 141.6 | 173   | 243.6 | 2.3                  | 2      | XPMT150512R-D* |
| TDX460F40-3 | 46   | 40     | 55     | 139.6 | 69 | 144.6 | 177   | 247.6 | 2.1                  | 2.1    | XPMT150512R-D* |



| Designation | DC | DCONMS | DCSFMS | LU    | LS | LCF   | LF  | OAL   | Max. offset (radial) | WT(kg) | Insert         |
|-------------|----|--------|--------|-------|----|-------|-----|-------|----------------------|--------|----------------|
| TDX470F40-3 | 47 | 40     | 55     | 142.6 | 69 | 147.6 | 180 | 250.6 | 1.8                  | 2.2    | XPMT150512R-D* |
| TDX480F40-3 | 48 | 40     | 55     | 145.6 | 69 | 150.6 | 184 | 254.6 | 1.5                  | 2.3    | XPMT150512R-D* |
| TDX490F40-3 | 49 | 40     | 55     | 148.6 | 69 | 153.6 | 187 | 257.6 | 1.3                  | 2.3    | XPMT150512R-D* |
| TDX500F40-3 | 50 | 40     | 55     | 151.6 | 69 | 156.6 | 191 | 261.6 | 1                    | 2.4    | XPMT150512R-D* |
| TDX510F40-3 | 51 | 40     | 55     | 154.6 | 69 | 159.6 | 195 | 265.6 | 0.7                  | 2.5    | XPMT150512R-D* |
| TDX520F40-3 | 52 | 40     | 55     | 157.6 | 69 | 162.6 | 198 | 268.6 | 0.5                  | 2.6    | XPMT150512R-D* |
| TDX530F40-3 | 53 | 40     | 55     | 160.6 | 69 | 165.6 | 202 | 272.6 | -                    | 2.7    | XPMT150512R-D* |
| TDX540F40-3 | 54 | 40     | 55     | 163.6 | 69 | 168.6 | 205 | 275.6 | -                    | 2.9    | XPMT150512R-D* |

| Tool diameter | Tool diameter tolerance | Hole diameter tolerance* |
|---------------|-------------------------|--------------------------|
| ø12.5 - ø17   | + 0.1 / 0               | + 0.25 / 0               |
| ø17.5 - ø54   | + 0.2 / 0               | + 0.3 / 0                |

\*Just for reference

## SPARE PARTS



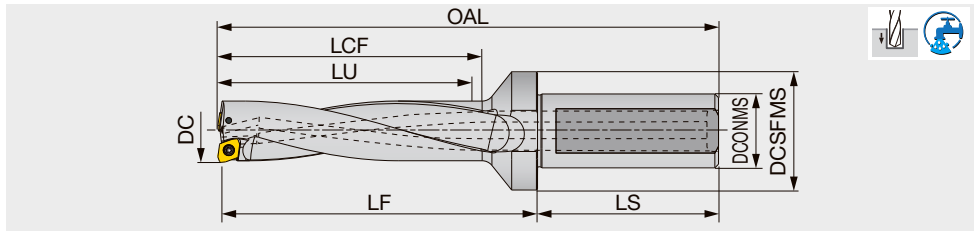
| Designation  | Clamping screw | Wrench |
|--------------|----------------|--------|
| TDX125 - 145 | CSPB-2H        | IP-6DB |
| TDX150 - 170 | CSPB-2L043     | IP-6DB |
| TDX175 - 215 | CSPB-2.2       | IP-7D  |
| TDX220 - 260 | CSPB-2.5       | IP-8D  |
| TDX270 - 320 | CSTB-3         | T-9D   |
| TDX330 - 410 | CSTB-4         | T-15D  |
| TDX420 - 540 | CSTB-5         | T-20D  |

Recommended clamping torque (N·m): CSPB-2H/CSPB-2L043 = 0.7, CSPB-2.2 = 1, CSPB-2.5 = 1.3, CSTB-3 = 2.3, CSTB-4 = 3.5, CSTB-5 = 5

# TUNGDRILLTWISTED

## TDX-F L/D=4

Indexable drill, L/D = 4, flat cotter



| Designation | DC   | DCONMS | DCSFMS | LU    | LS | LCF   | LF    | OAL   | Max. offset (radial) | WT(kg) | Insert         |
|-------------|------|--------|--------|-------|----|-------|-------|-------|----------------------|--------|----------------|
| TDX125F20-4 | 12.5 | 20     | 25     | 50.4  | 49 | 53.4  | 66    | 115.4 | 0.8                  | 0.2    | XPMT040104R-D* |
| TDX130F20-4 | 13   | 20     | 25     | 52.4  | 49 | 55.4  | 68    | 117.4 | 0.7                  | 0.2    | XPMT040104R-D* |
| TDX135F20-4 | 13.5 | 20     | 25     | 54.4  | 49 | 57.4  | 70    | 119.4 | 0.6                  | 0.2    | XPMT040104R-D* |
| TDX140F20-4 | 14   | 20     | 25     | 56.4  | 49 | 59.4  | 72    | 121.4 | 0.5                  | 0.2    | XPMT040104R-D* |
| TDX145F20-4 | 14.5 | 20     | 25     | 58.4  | 49 | 61.4  | 75    | 124.4 | 0.4                  | 0.2    | XPMT040104R-D* |
| TDX150F20-4 | 15   | 20     | 25     | 60.4  | 49 | 63.4  | 77    | 126.4 | 0.9                  | 0.2    | XPMT050204R-D* |
| TDX155F20-4 | 15.5 | 20     | 32     | 62.4  | 49 | 65.4  | 79    | 128.4 | 0.8                  | 0.2    | XPMT050204R-D* |
| TDX160F20-4 | 16   | 20     | 32     | 64.4  | 49 | 67.4  | 82    | 131.4 | 0.6                  | 0.2    | XPMT050204R-D* |
| TDX165F20-4 | 16.5 | 20     | 32     | 66.4  | 49 | 69.4  | 84    | 133.4 | 0.5                  | 0.2    | XPMT050204R-D* |
| TDX170F20-4 | 17   | 20     | 32     | 68.4  | 49 | 71.4  | 86    | 135.4 | 0.4                  | 0.2    | XPMT050204R-D* |
| TDX175F25-4 | 17.5 | 25     | 32     | 70.5  | 54 | 73.5  | 89    | 143.5 | 1.2                  | 0.3    | XPMT06X308R-D* |
| TDX180F25-4 | 18   | 25     | 32     | 72.5  | 54 | 75.5  | 91    | 145.5 | 1.1                  | 0.3    | XPMT06X308R-D* |
| TDX185F25-4 | 18.5 | 25     | 32     | 74.5  | 54 | 77.5  | 93    | 147.5 | 0.9                  | 0.3    | XPMT06X308R-D* |
| TDX190F25-4 | 19   | 25     | 32     | 76.5  | 54 | 79.5  | 95    | 149.5 | 0.8                  | 0.3    | XPMT06X308R-D* |
| TDX195F25-4 | 19.5 | 25     | 32     | 78.5  | 54 | 81.5  | 99    | 153.5 | 0.7                  | 0.4    | XPMT06X308R-D* |
| TDX200F25-4 | 20   | 25     | 32     | 80.5  | 54 | 84.5  | 101   | 155.5 | 0.5                  | 0.4    | XPMT06X308R-D* |
| TDX205F25-4 | 20.5 | 25     | 32     | 82.5  | 54 | 86.5  | 103   | 157.5 | 0.4                  | 0.4    | XPMT06X308R-D* |
| TDX210F25-4 | 21   | 25     | 32     | 84.5  | 54 | 88.5  | 105   | 159.5 | 0.3                  | 0.4    | XPMT06X308R-D* |
| TDX215F25-4 | 21.5 | 25     | 32     | 86.5  | 54 | 90.5  | 107   | 161.5 | 0.2                  | 0.4    | XPMT06X308R-D* |
| TDX220F25-4 | 22   | 25     | 32     | 88.6  | 54 | 92.6  | 109   | 163.6 | 1.2                  | 0.5    | XPMT07H308R-D* |
| TDX225F25-4 | 22.5 | 25     | 37     | 90.6  | 54 | 94.6  | 111.5 | 166.1 | 1.1                  | 0.5    | XPMT07H308R-D* |
| TDX230F25-4 | 23   | 25     | 37     | 92.6  | 54 | 96.6  | 114   | 168.6 | 0.9                  | 0.4    | XPMT07H308R-D* |
| TDX235F25-4 | 23.5 | 25     | 37     | 94.6  | 54 | 98.6  | 116.5 | 171.1 | 0.8                  | 0.4    | XPMT07H308R-D* |
| TDX240F25-4 | 24   | 25     | 37     | 96.6  | 54 | 100.6 | 119   | 173.6 | 0.7                  | 0.4    | XPMT07H308R-D* |
| TDX245F25-4 | 24.5 | 25     | 37     | 98.6  | 54 | 102.6 | 121.5 | 176.1 | 0.5                  | 0.6    | XPMT07H308R-D* |
| TDX250F25-4 | 25   | 25     | 37     | 100.6 | 54 | 104.6 | 124   | 178.6 | 0.4                  | 0.6    | XPMT07H308R-D* |
| TDX255F25-4 | 25.5 | 25     | 37     | 102.6 | 54 | 106.6 | 126   | 180.6 | 0.3                  | 0.6    | XPMT07H308R-D* |
| TDX260F25-4 | 26   | 25     | 37     | 104.6 | 54 | 108.6 | 128   | 182.6 | 0.2                  | 0.6    | XPMT07H308R-D* |
| TDX270F32-4 | 27   | 32     | 40     | 108.7 | 59 | 112.7 | 132   | 191.7 | 1.5                  | 0.6    | XPMT08T308R-D* |
| TDX280F32-4 | 28   | 32     | 40     | 112.7 | 59 | 116.7 | 137   | 196.7 | 1.2                  | 0.8    | XPMT08T308R-D* |
| TDX290F32-4 | 29   | 32     | 40     | 116.7 | 59 | 120.7 | 141   | 200.7 | 1                    | 0.7    | XPMT08T308R-D* |
| TDX300F32-4 | 30   | 32     | 40     | 120.7 | 59 | 124.7 | 147   | 206.7 | 0.7                  | 0.9    | XPMT08T308R-D* |
| TDX310F32-4 | 31   | 32     | 40     | 124.7 | 59 | 128.7 | 152   | 211.7 | 0.4                  | 0.9    | XPMT08T308R-D* |
| TDX320F32-4 | 32   | 32     | 40     | 128.7 | 59 | 132.7 | 156   | 215.7 | 0.2                  | 1      | XPMT08T308R-D* |
| TDX330F40-4 | 33   | 40     | 50     | 133.1 | 69 | 137.1 | 161   | 231.1 | 2.3                  | 1.4    | XPMT110412R-D* |
| TDX340F40-4 | 34   | 40     | 50     | 137.1 | 69 | 141.1 | 165   | 235.1 | 2.1                  | 1.4    | XPMT110412R-D* |
| TDX350F40-4 | 35   | 40     | 50     | 141.1 | 69 | 145.1 | 170   | 240.1 | 1.8                  | 1.4    | XPMT110412R-D* |
| TDX360F40-4 | 36   | 40     | 50     | 145.1 | 69 | 149.1 | 175   | 245.1 | 1.5                  | 1.5    | XPMT110412R-D* |
| TDX370F40-4 | 37   | 40     | 50     | 149.1 | 69 | 153.1 | 179   | 249.1 | 1.3                  | 1.5    | XPMT110412R-D* |
| TDX380F40-4 | 38   | 40     | 50     | 153.1 | 69 | 157.1 | 184   | 254.1 | 1                    | 1.7    | XPMT110412R-D* |
| TDX390F40-4 | 39   | 40     | 50     | 157.1 | 69 | 161.1 | 188   | 258.1 | 0.7                  | 1.8    | XPMT110412R-D* |
| TDX400F40-4 | 40   | 40     | 50     | 161.1 | 69 | 165.1 | 193   | 263.1 | 0.5                  | 1.8    | XPMT110412R-D* |
| TDX410F40-4 | 41   | 40     | 50     | 165.1 | 69 | 169.1 | 198   | 268.1 | 0.2                  | 1.9    | XPMT110412R-D* |
| TDX420F40-4 | 42   | 40     | 55     | 169.6 | 69 | 173.6 | 202   | 272.6 | 3.1                  | 2      | XPMT150512R-D* |
| TDX430F40-4 | 43   | 40     | 55     | 173.6 | 69 | 177.6 | 207   | 277.6 | 2.9                  | 2      | XPMT150512R-D* |
| TDX440F40-4 | 44   | 40     | 55     | 177.6 | 69 | 181.6 | 211   | 281.6 | 2.6                  | 2.1    | XPMT150512R-D* |
| TDX450F40-4 | 45   | 40     | 55     | 181.6 | 69 | 185.6 | 217   | 287.6 | 2.3                  | 2.3    | XPMT150512R-D* |
| TDX460F40-4 | 46   | 40     | 55     | 185.6 | 69 | 189.6 | 222   | 292.6 | 2.1                  | 2.4    | XPMT150512R-D* |

| Designation | DC | DCONMS | DCSFMS | LU    | LS | LCF   | LF  | OAL   | Max. offset (radial) | WT(kg) | Insert         |
|-------------|----|--------|--------|-------|----|-------|-----|-------|----------------------|--------|----------------|
| TDX470F40-4 | 47 | 40     | 55     | 189.6 | 69 | 193.6 | 226 | 296.6 | 1.8                  | 2.5    | XPMT150512R-D* |
| TDX480F40-4 | 48 | 40     | 55     | 193.6 | 69 | 197.6 | 231 | 301.6 | 1.5                  | 2.7    | XPMT150512R-D* |
| TDX490F40-4 | 49 | 40     | 55     | 197.6 | 69 | 201.6 | 235 | 305.6 | 1.3                  | 2.7    | XPMT150512R-D* |
| TDX500F40-4 | 50 | 40     | 55     | 201.6 | 69 | 205.6 | 240 | 310.6 | 1                    | 2.8    | XPMT150512R-D* |
| TDX510F40-4 | 51 | 40     | 55     | 205.6 | 69 | 209.6 | 245 | 315.6 | 0.7                  | 2.9    | XPMT150512R-D* |
| TDX520F40-4 | 52 | 40     | 55     | 209.6 | 69 | 213.6 | 249 | 319.6 | 0.5                  | 3      | XPMT150512R-D* |
| TDX530F40-4 | 53 | 40     | 55     | 213.6 | 69 | 217.6 | 254 | 324.6 | -                    | 3.1    | XPMT150512R-D* |
| TDX540F40-4 | 54 | 40     | 55     | 217.6 | 69 | 221.6 | 258 | 328.6 | -                    | 3.4    | XPMT150512R-D* |

| Tool diameter | Tool diameter tolerance | Hole diameter tolerance* |
|---------------|-------------------------|--------------------------|
| ø12.5 - ø17   | + 0.1 / 0               | + 0.4 / 0                |
| ø17.5 - ø54   | + 0.2 / 0               | + 0.45 / 0               |

\*Just for reference

## SPARE PARTS



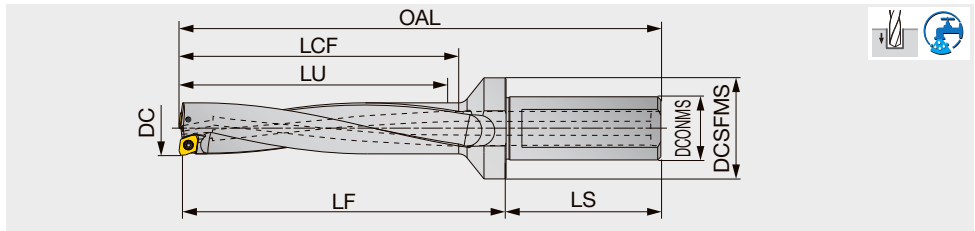
| Designation  | Clamping screw | Wrench |
|--------------|----------------|--------|
| TDX125 - 145 | CSPB-2H        | IP-6DB |
| TDX150 - 170 | CSPB-2L043     | IP-6DB |
| TDX175 - 215 | CSPB-2.2       | IP-7D  |
| TDX220 - 260 | CSPB-2.5       | IP-8D  |
| TDX270 - 320 | CSTB-3         | T-9D   |
| TDX330 - 410 | CSTB-4         | T-15D  |
| TDX420 - 540 | CSTB-5         | T-20D  |

Recommended clamping torque (N·m): CSPB-2H/CSPB-2L043 = 0.7, CSPB-2.2 = 1, CSPB-2.5 = 1.3, CSTB-3 = 2.3, CSTB-4 = 3.5, CSTB-5 = 5

# TUNGDRILLTWISTED

## TDX-F L/D=5

Indexable drill, L/D = 5, flat cotter



| Designation | DC   | DCONMS | DCSFMS | LU    | LS | LCF   | LF    | OAL   | Max. offset (radial) | WT(kg) | Insert         |
|-------------|------|--------|--------|-------|----|-------|-------|-------|----------------------|--------|----------------|
| TDX125F20-5 | 12.5 | 20     | 25     | 62.9  | 49 | 65.9  | 78.5  | 127.9 | 0.8                  | 0.2    | XPMT040104R-D* |
| TDX130F20-5 | 13   | 20     | 25     | 65.4  | 49 | 68.4  | 81    | 130.4 | 0.7                  | 0.2    | XPMT040104R-D* |
| TDX135F20-5 | 13.5 | 20     | 25     | 67.9  | 49 | 70.9  | 83.5  | 132.9 | 0.6                  | 0.2    | XPMT040104R-D* |
| TDX140F20-5 | 14   | 20     | 25     | 70.4  | 49 | 73.4  | 86    | 135.4 | 0.5                  | 0.2    | XPMT040104R-D* |
| TDX145F20-5 | 14.5 | 20     | 25     | 72.9  | 49 | 75.9  | 89.5  | 138.9 | 0.4                  | 0.2    | XPMT040104R-D* |
| TDX150F20-5 | 15   | 20     | 25     | 75.4  | 49 | 78.4  | 92    | 141.4 | 0.9                  | 0.2    | XPMT050204R-D* |
| TDX155F20-5 | 15.5 | 20     | 32     | 77.9  | 49 | 80.9  | 94.5  | 143.9 | 0.8                  | 0.2    | XPMT050204R-D* |
| TDX160F20-5 | 16   | 20     | 32     | 80.4  | 49 | 83.4  | 98    | 147.4 | 0.6                  | 0.2    | XPMT050204R-D* |
| TDX165F20-5 | 16.5 | 20     | 32     | 82.9  | 49 | 85.9  | 100.5 | 149.9 | 0.5                  | 0.2    | XPMT050204R-D* |
| TDX170F20-5 | 17   | 20     | 32     | 85.4  | 49 | 88.4  | 103   | 152.4 | 0.4                  | 0.2    | XPMT050204R-D* |
| TDX175F25-5 | 17.5 | 25     | 32     | 88    | 54 | 91    | 106.5 | 161   | 1.2                  | 0.3    | XPMT06X308R-D* |
| TDX180F25-5 | 18   | 25     | 32     | 90.5  | 54 | 93.5  | 109   | 163.5 | 1.1                  | 0.3    | XPMT06X308R-D* |
| TDX185F25-5 | 18.5 | 25     | 32     | 93    | 54 | 96    | 111.5 | 166   | 0.9                  | 0.4    | XPMT06X308R-D* |
| TDX190F25-5 | 19   | 25     | 32     | 95.5  | 54 | 98.5  | 114   | 168.5 | 0.8                  | 0.4    | XPMT06X308R-D* |
| TDX195F25-5 | 19.5 | 25     | 32     | 98    | 54 | 101   | 118.5 | 173   | 0.7                  | 0.4    | XPMT06X308R-D* |
| TDX200F25-5 | 20   | 25     | 32     | 100.5 | 54 | 104.5 | 121   | 175.5 | 0.5                  | 0.4    | XPMT06X308R-D* |
| TDX205F25-5 | 20.5 | 25     | 32     | 103   | 54 | 107   | 123.5 | 178   | 0.4                  | 0.4    | XPMT06X308R-D* |
| TDX210F25-5 | 21   | 25     | 32     | 105.5 | 54 | 109.5 | 126   | 180.5 | 0.3                  | 0.4    | XPMT06X308R-D* |
| TDX215F25-5 | 21.5 | 25     | 32     | 108   | 54 | 112   | 128.5 | 183   | 0.2                  | 0.4    | XPMT06X308R-D* |
| TDX220F25-5 | 22   | 25     | 32     | 110.6 | 54 | 114.6 | 131   | 185.6 | 1.2                  | 0.6    | XPMT07H308R-D* |
| TDX225F25-5 | 22.5 | 25     | 37     | 113.1 | 54 | 117.1 | 134   | 188.6 | 1.1                  | 0.6    | XPMT07H308R-D* |
| TDX230F25-5 | 23   | 25     | 37     | 115.6 | 54 | 119.6 | 137   | 191.6 | 0.9                  | 0.4    | XPMT07H308R-D* |
| TDX235F25-5 | 23.5 | 25     | 37     | 118.1 | 54 | 122.1 | 140   | 194.6 | 0.8                  | 0.4    | XPMT07H308R-D* |
| TDX240F25-5 | 24   | 25     | 37     | 120.6 | 54 | 124.6 | 143   | 197.6 | 0.7                  | 0.4    | XPMT07H308R-D* |
| TDX245F25-5 | 24.5 | 25     | 37     | 123.1 | 54 | 127.1 | 146   | 200.6 | 0.5                  | 0.7    | XPMT07H308R-D* |
| TDX250F25-5 | 25   | 25     | 37     | 125.6 | 54 | 129.6 | 149   | 203.6 | 0.4                  | 0.7    | XPMT07H308R-D* |
| TDX255F25-5 | 25.5 | 25     | 37     | 128.1 | 54 | 132.1 | 151.5 | 206.1 | 0.3                  | 0.7    | XPMT07H308R-D* |
| TDX260F25-5 | 26   | 25     | 37     | 130.6 | 54 | 134.6 | 154   | 208.6 | 0.2                  | 0.7    | XPMT07H308R-D* |
| TDX270F32-5 | 27   | 32     | 40     | 135.7 | 59 | 139.7 | 159   | 218.7 | 1.5                  | 0.6    | XPMT08T308R-D* |
| TDX280F32-5 | 28   | 32     | 40     | 140.7 | 59 | 144.7 | 165   | 224.7 | 1.2                  | 0.9    | XPMT08T308R-D* |
| TDX290F32-5 | 29   | 32     | 40     | 145.7 | 59 | 149.7 | 170   | 229.7 | 1                    | 0.7    | XPMT08T308R-D* |
| TDX300F32-5 | 30   | 32     | 40     | 150.7 | 59 | 154.7 | 177   | 236.7 | 0.7                  | 1      | XPMT08T308R-D* |
| TDX310F32-5 | 31   | 32     | 40     | 155.7 | 59 | 159.7 | 183   | 242.7 | 0.4                  | 1      | XPMT08T308R-D* |
| TDX320F32-5 | 32   | 32     | 40     | 160.7 | 59 | 164.7 | 188   | 247.7 | 0.2                  | 1.1    | XPMT08T308R-D* |
| TDX330F40-5 | 33   | 40     | 50     | 166.1 | 69 | 170.1 | 194   | 264.1 | 2.3                  | 1.5    | XPMT110412R-D* |
| TDX340F40-5 | 34   | 40     | 50     | 171.1 | 69 | 175.1 | 199   | 269.1 | 2.1                  | 1.5    | XPMT110412R-D* |
| TDX350F40-5 | 35   | 40     | 50     | 176.1 | 69 | 180.1 | 205   | 275.1 | 1.8                  | 1.5    | XPMT110412R-D* |
| TDX360F40-5 | 36   | 40     | 50     | 181.1 | 69 | 185.1 | 211   | 281.1 | 1.5                  | 1.6    | XPMT110412R-D* |
| TDX370F40-5 | 37   | 40     | 50     | 186.1 | 69 | 190.1 | 216   | 286.1 | 1.3                  | 1.6    | XPMT110412R-D* |
| TDX380F40-5 | 38   | 40     | 50     | 191.1 | 69 | 195.1 | 222   | 292.1 | 1                    | 1.9    | XPMT110412R-D* |
| TDX390F40-5 | 39   | 40     | 50     | 196.1 | 69 | 200.1 | 227   | 297.1 | 0.7                  | 2      | XPMT110412R-D* |
| TDX400F40-5 | 40   | 40     | 50     | 201.1 | 69 | 205.1 | 233   | 303.1 | 0.5                  | 2      | XPMT110412R-D* |
| TDX410F40-5 | 41   | 40     | 50     | 206.1 | 69 | 210.1 | 239   | 309.1 | 0.2                  | 2.1    | XPMT110412R-D* |
| TDX420F40-5 | 42   | 40     | 55     | 211.6 | 69 | 215.6 | 244   | 314.6 | 3.1                  | 2.2    | XPMT150512R-D* |
| TDX430F40-5 | 43   | 40     | 55     | 216.6 | 69 | 220.6 | 250   | 320.6 | 2.9                  | 2.2    | XPMT150512R-D* |
| TDX440F40-5 | 44   | 40     | 55     | 221.6 | 69 | 225.6 | 255   | 325.6 | 2.6                  | 2.3    | XPMT150512R-D* |
| TDX450F40-5 | 45   | 40     | 55     | 226.6 | 69 | 230.6 | 262   | 332.6 | 2.3                  | 2.6    | XPMT150512R-D* |
| TDX460F40-5 | 46   | 40     | 55     | 231.6 | 69 | 235.6 | 268   | 338.6 | 2.1                  | 2.7    | XPMT150512R-D* |



| Designation | DC | DCONMS | DCSFMS | LU    | LS | LCF   | LF  | OAL   | Max. offset (radial) | WT(kg) | Insert         |
|-------------|----|--------|--------|-------|----|-------|-----|-------|----------------------|--------|----------------|
| TDX470F40-5 | 47 | 40     | 55     | 236.6 | 69 | 240.6 | 273 | 343.6 | 1.8                  | 2.8    | XPMT150512R-D* |
| TDX480F40-5 | 48 | 40     | 55     | 241.6 | 69 | 245.6 | 279 | 349.6 | 1.5                  | 3.1    | XPMT150512R-D* |
| TDX490F40-5 | 49 | 40     | 55     | 246.6 | 69 | 250.6 | 284 | 354.6 | 1.3                  | 3.1    | XPMT150512R-D* |
| TDX500F40-5 | 50 | 40     | 55     | 251.6 | 69 | 255.6 | 290 | 360.6 | 1                    | 3.2    | XPMT150512R-D* |
| TDX510F40-5 | 51 | 40     | 55     | 256.6 | 69 | 260.6 | 296 | 366.6 | 0.7                  | 3.3    | XPMT150512R-D* |
| TDX520F40-5 | 52 | 40     | 55     | 261.6 | 69 | 265.6 | 301 | 371.6 | 0.5                  | 3.4    | XPMT150512R-D* |
| TDX530F40-5 | 53 | 40     | 55     | 266.6 | 69 | 270.6 | 307 | 377.6 | -                    | 3.5    | XPMT150512R-D* |
| TDX540F40-5 | 54 | 40     | 55     | 271.6 | 69 | 275.6 | 312 | 382.6 | -                    | 3.9    | XPMT150512R-D* |

| Tool diameter | Tool diameter tolerance | Hole diameter tolerance* |
|---------------|-------------------------|--------------------------|
| ø12.5 - ø17   | + 0.1 / 0               | + 0.4 / 0                |
| ø17.5 - ø54   | + 0.2 / 0               | + 0.45 / 0               |

\*Just for reference

## SPARE PARTS



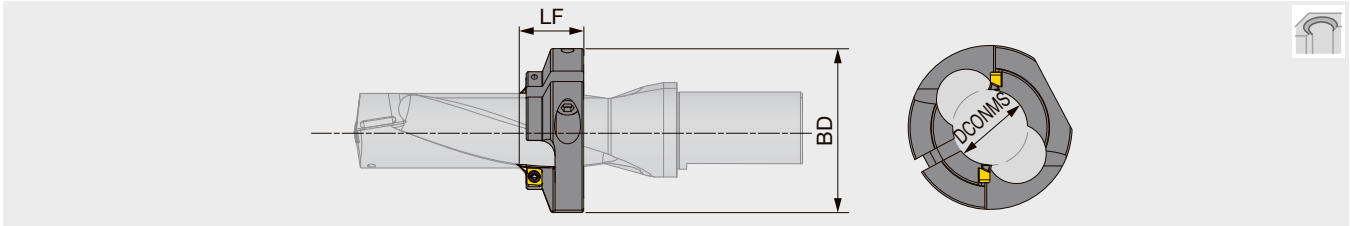
| Designation  | Clamping screw | Wrench |
|--------------|----------------|--------|
| TDX125 - 145 | CSPB-2H        | IP-6DB |
| TDX150 - 170 | CSPB-2L043     | IP-6DB |
| TDX175 - 215 | CSPB-2.2       | IP-7D  |
| TDX220 - 260 | CSPB-2.5       | IP-8D  |
| TDX270 - 320 | CSTB-3         | T-9D   |
| TDX330 - 410 | CSTB-4         | T-15D  |
| TDX420 - 540 | CSTB-5         | T-20D  |

Recommended clamping torque (N·m): CSPB-2H/CSPB-2L043 = 0.7, CSPB-2.2 = 1, CSPB-2.5 = 1.3, CSTB-3 = 2.3, CSTB-4 = 3.5, CSTB-5 = 5

# TUNGDRILLTWISTED

## TDXCF chamfering tool

Chamfering tool for TungDrillTwisted and TungSix-Drill



| Designation | DCONMS | BD | LF | Application drill | L/D = 2 |         | L/D = 3 |         | L/D = 4 |         | L/D = 5 |         |
|-------------|--------|----|----|-------------------|---------|---------|---------|---------|---------|---------|---------|---------|
|             |        |    |    |                   | TDX***F | TDX***W | TDX***F | TDX***W | TDX***F | TDX***W | TDX***F | TDX***W |
| TDXCF180L25 | 17.3   | 49 | 25 | TDX175*25-*       | 13      | 18.8    | 30.5    | 36.3    | 48      | 53.8    | 65.5    | 71.3    |
| TDXCF180L25 | 17.3   | 49 | 25 | TDX180*25-*       | 14      | 19.9    | 32      | 37.9    | 50      | 55.9    | 68      | 73.9    |
| TDXCF190L25 | 18.1   | 49 | 25 | TDX185*25-*       | 15      | 21.1    | 33.5    | 39.6    | 52      | 58.1    | 70.5    | 76.6    |
| TDXCF190L25 | 18.1   | 49 | 25 | TDX190*25-*       | 16      | 22.2    | 35      | 41.2    | 54      | 60.2    | 73      | 79.2    |
| TDXCF200L25 | 19.1   | 49 | 25 | TDX195*25-*       | 17      | 23.4    | 36.5    | 42.9    | 56      | 62.4    | 75.5    | 81.9    |
| TDXCF200L25 | 19.1   | 49 | 25 | TDX200*25-*       | 20      | 24.5    | 40      | 44.5    | 59      | 64.5    | 79      | 84.5    |
| TDXCF210L25 | 20.1   | 49 | 25 | TDX205*25-*       | 21      | 25.7    | 41.5    | 46.2    | 61      | 66.7    | 81.5    | 87.2    |
| TDXCF210L25 | 20.1   | 49 | 25 | TDX210*25-*       | 22      | 26.8    | 43      | 47.8    | 63      | 68.8    | 84      | 89.8    |
| TDXCF220L25 | 21.1   | 49 | 25 | TDX215*25-*       | 23      | 28      | 44.5    | 49.5    | 65      | 71      | 86.5    | 92.5    |
| TDXCF220L25 | 21.1   | 49 | 25 | TDX220*25-*       | 24      | 29.1    | 46      | 51.1    | 67      | 73.1    | 89      | 95.1    |
| TDXCF230L25 | 22.1   | 49 | 25 | TDX225*25-*       | 25      | 30.3    | 47.5    | 52.8    | 69      | 75.3    | 91.5    | 97.8    |
| TDXCF230L25 | 22.1   | 49 | 25 | TDX230*25-*       | 26      | 31.4    | 49      | 54.4    | 71      | 77.4    | 94      | 100.4   |
| TDXCF240L25 | 23.1   | 49 | 25 | TDX235*25-*       | 27      | 32.6    | 50.5    | 56.1    | 73      | 79.6    | 96.5    | 103.1   |
| TDXCF240L25 | 23.1   | 49 | 25 | TDX240*25-*       | 28      | 33.7    | 52      | 57.7    | 75      | 81.7    | 99      | 105.7   |
| TDXCF250L25 | 23.95  | 49 | 25 | TDX245*25-*       | 29      | 34.9    | 53.5    | 59.4    | 77      | 83.9    | 101.5   | 108.4   |
| TDXCF250L25 | 23.95  | 49 | 25 | TDX250*25-*       | 30      | 36      | 55      | 61      | 79      | 86      | 104     | 111     |
| TDXCF260L30 | 24.95  | 64 | 30 | TDX255*25-*       | 26      | 32.2    | 51.5    | 57.7    | 76      | 83.2    | 101.5   | 108.7   |
| TDXCF260L30 | 24.95  | 64 | 30 | TDX260*25-*       | 27      | 33.3    | 53      | 59.3    | 78      | 85.3    | 104     | 111.3   |
| TDXCF270L30 | 25.9   | 64 | 30 | TDX270*32-*       | 29      | 35.6    | 56      | 62.6    | 82      | 89.6    | 109     | 116.6   |
| TDXCF280L30 | 26.9   | 64 | 30 | TDX280*32-*       | 30.3    | 37.9    | 58.3    | 65.9    | 86      | 93.9    | 114     | 121.9   |
| TDXCF290L30 | 27.9   | 64 | 30 | TDX290*32-*       | 32.3    | 40.2    | 61.3    | 69.2    | 90      | 98.2    | 119     | 127.2   |
| TDXCF300L30 | 28.9   | 64 | 30 | TDX300*32-*       | 34.3    | 42.5    | 64.3    | 72.5    | 94      | 102.5   | 124     | 132.5   |
| TDXCF310L30 | 29.9   | 64 | 30 | TDX310*32-*       | 36.3    | 44.8    | 67.3    | 75.8    | 98      | 106.8   | 129     | 137.8   |
| TDXCF320L30 | 30.9   | 64 | 30 | TDX320*32-*       | 38.3    | 47.1    | 70.3    | 79.1    | 102     | 111.1   | 134     | 143.1   |

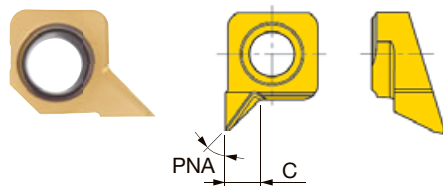
### SPARE PARTS

| Designation               | Screw for insert | Screw for ring | Wrench for insert | Wrench for ring |
|---------------------------|------------------|----------------|-------------------|-----------------|
| TDXCF180... - TDXCF250... | CSPB-4S          | CM6X16         | IP-15D            | P-5             |
| TDXCF260... - TDXCF320... | CSPB-4S          | CM8X1.25X20-A  | IP-15D            | P-6             |

Recommended clamping torque (N·m): CSPB-4S = 3.5

## INSERT

### XHGX-45A



|   |                |   |  |  |  |  |  |  |  |  |  |
|---|----------------|---|--|--|--|--|--|--|--|--|--|
| P | Steel          | ★ |  |  |  |  |  |  |  |  |  |
| M | Stainless      | ★ |  |  |  |  |  |  |  |  |  |
| K | Cast iron      | ★ |  |  |  |  |  |  |  |  |  |
| N | Non-ferrous    | ☆ |  |  |  |  |  |  |  |  |  |
| S | Superalloys    | ★ |  |  |  |  |  |  |  |  |  |
| H | Hard materials | ★ |  |  |  |  |  |  |  |  |  |

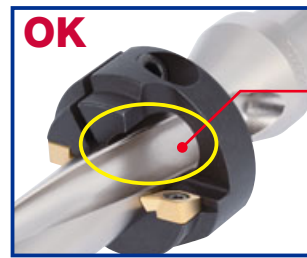
★ : First choice  
☆ : Second choice

| Designation     | PNA | C   | Coated |  |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------|-----|-----|--------|--|--|--|--|--|--|--|--|--|--|--|--|--|
|                 |     |     | GH130  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| XHGX090700R-45A | 45° | 2.5 | ●      |  |  |  |  |  |  |  |  |  |  |  |  |  |

● : Line up

## Caution in mounting the chamfering tool on the drill body

- ① Place the ring on the drill body and match the positions of flutes on drill and ring. Temporarily clamp the ring with the ring screw tightened lightly.
- ② Place the inserts, and tighten the insert screw lightly.
- ③ Adjust the ring position with a presetter, height gauge, or Vernier caliper, and securely tighten the ring screw, then the insert screw.



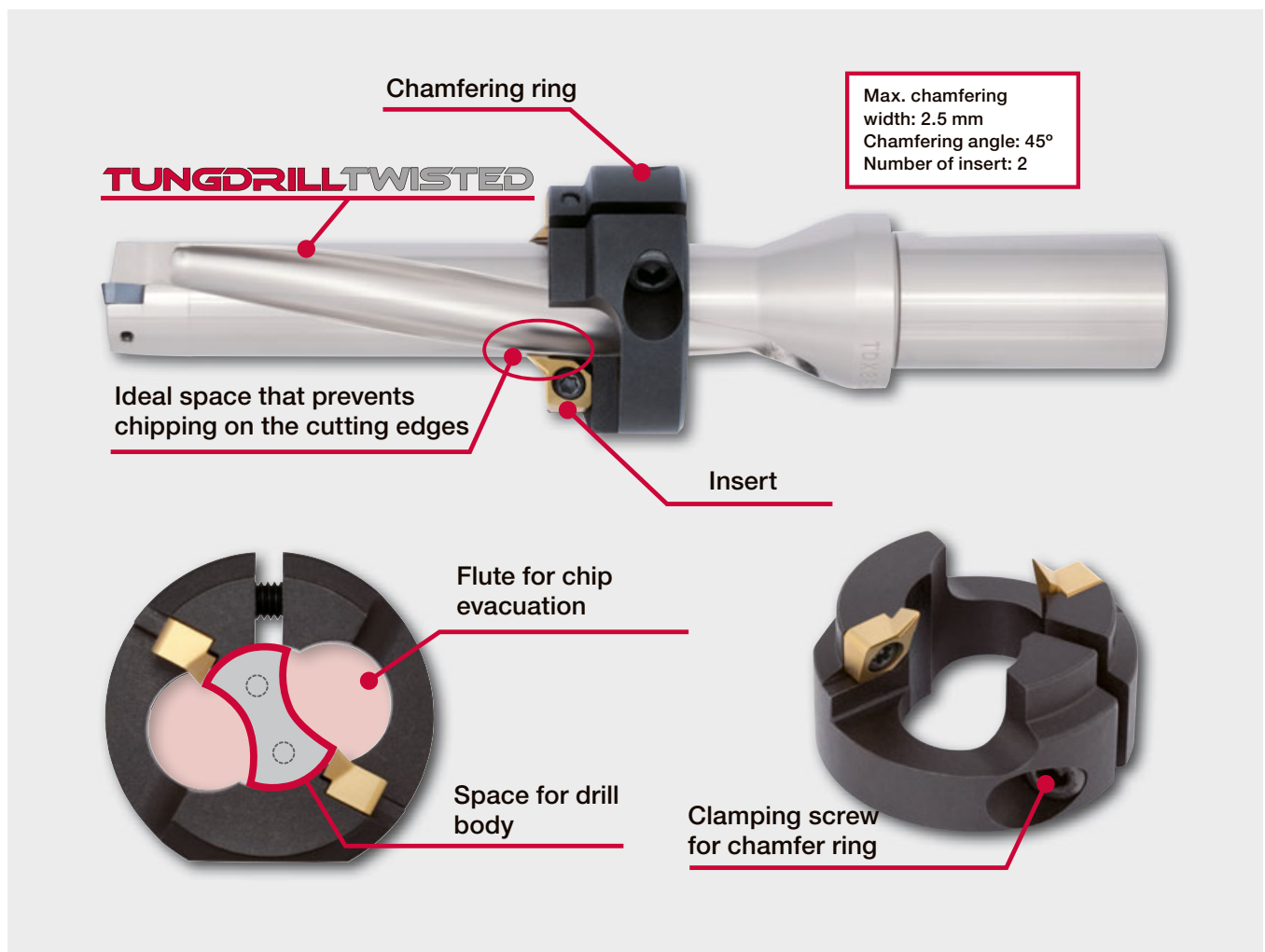
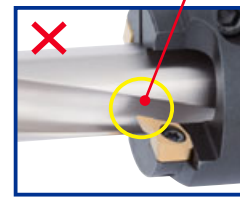
**Match the positions of flutes on drill and ring.**

(Inserts will be automatically set to the right positions.)

**The cutting edge of the insert is in the ring flute.**



**The flutes on drill and ring do not match.**



## EZ sleeve (Eccentric sleeve)

### The function of EZ sleeves

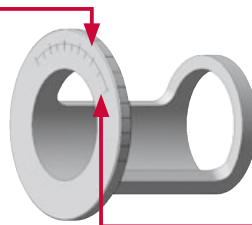
#### Adjusting the hole diameter when drilling

Adjusting the hole diameter in tool-rotating applications.

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



Scale for adjusting the hole diameter in milling machine (Periphery of sleeve)



#### Adjusting cutting edge height on lathe

Adjusting the cutting edge height in rotating work applications.

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

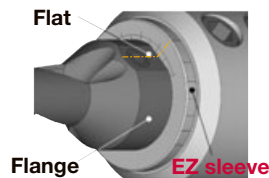


Scale for adjusting cutting edge height in turning (Front face of sleeve)

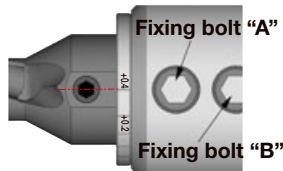
### Setting of EZ sleeve

#### Adjusting the hole diameter on M/C

Set the EZ sleeve between the drill shank and the holder. Align the scale on the periphery of EZ sleeve with the center of the flat on drill flange.



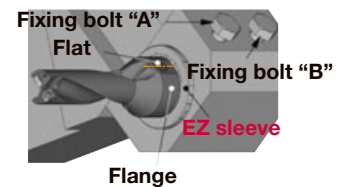
In the figure shown on right, the sleeve is set and the hole diameter will be increased by 0.4 mm.



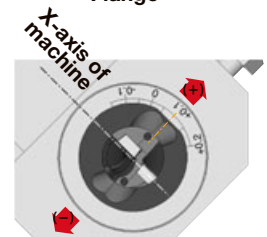
When rotating EZ sleeve, fixing bolts "A" and "B" have to be loosened. After setting the hole diameter, fix the drill body with bolt "A". Then lightly tighten the bolt "B" to fix EZ sleeve. If the bolt "B" is over tightened, EZ sleeve may be damaged.

#### Adjusting cutting edge height on lathe

Set the EZ sleeve between the drill shank and the toolblock. Align the scale on the front face of the EZ sleeve with the center of the flat on drill flange.



In the figure shown on right, the sleeve is set and the center of the drill will shift by 0.1 mm to the plus (+) direction.



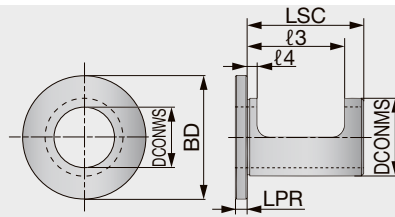
#### Cautious points

- Cannot be used for collet chuck holders.
- For adjustments over  $L/D = 4$ , please reduce feed rate.
- For smaller adjustment, the drill itself will interfere with the hole diameter. It is recommended that the hole diameter should be adjusted to a larger diameter than the drill diameter.



## EZ sleeve

Eccentric sleeve for TungDrillTwisted and TungSix-Drill



| Designation | DCONWS | DCONMS | BD | LSC | LPR | ø3   | ø4 | Hole diameter adjustment | Cutting edge height adjustment |
|-------------|--------|--------|----|-----|-----|------|----|--------------------------|--------------------------------|
| EZ2025      | 20     | 25     | 46 | 49  | 5   | 32.5 | 4  | +0.4 ~ - 0.2             | +0.2 ~ - 0.15                  |
| EZ2532      | 25     | 32     | 51 | 52  | 5   | 38   | 4  | +0.4 ~ - 0.2             | +0.2 ~ - 0.15                  |
| EZ3240      | 32     | 40     | 54 | 62  | 5   | 43   | 4  | +0.4 ~ - 0.2             | +0.2 ~ - 0.15                  |
| EZ4050      | 40     | 50     | 69 | 63  | 5   | 55   | 4  | +0.6 ~ - 0.2             | +0.3 ~ - 0.2                   |

### SPARE PARTS

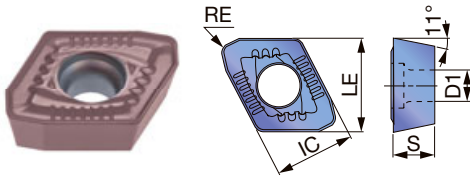


| Designation | Wrench |
|-------------|--------|
| EZ...       | P-2.5  |

# TUNGDRILLTWISTED

## INSERT

### DJ



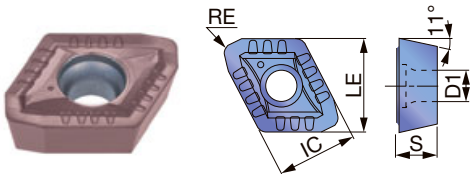
|                         |   |   |   |   |   |   |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|--|--|--|--|--|--|--|--|
| <b>P</b> Steel          |   |   | ☆ | ★ | ★ | ☆ |  |  |  |  |  |  |  |  |
| <b>M</b> Stainless      | ☆ |   |   | ★ | ★ |   |  |  |  |  |  |  |  |  |
| <b>K</b> Cast iron      |   | ☆ | ★ | ☆ | ☆ | ★ |  |  |  |  |  |  |  |  |
| <b>N</b> Non-ferrous    | ★ |   |   | ☆ | ☆ |   |  |  |  |  |  |  |  |  |
| <b>S</b> Superalloys    | ☆ |   | ☆ | ★ | ★ | ☆ |  |  |  |  |  |  |  |  |
| <b>H</b> Hard materials | ☆ |   | ☆ | ★ | ★ | ☆ |  |  |  |  |  |  |  |  |

★ : First choice  
☆ : Second choice

| Designation    | IC   | LE   | Coated |       |        |        |        |        | S    | D1  | RE  | DCN  | DCX  |
|----------------|------|------|--------|-------|--------|--------|--------|--------|------|-----|-----|------|------|
|                |      |      | AH725  | T1115 | AH7020 | AH7030 | AH6030 | AH9030 |      |     |     |      |      |
| XPMT040104R-DJ | 4.3  | 4.5  | ●      | ●     | ●      | ●      | ▲      | ▲      | 1.59 | 2.3 | 0.4 | 12.5 | 14.5 |
| XPMT050204R-DJ | 5.2  | 5.4  | ●      | ●     | ●      | ●      | ▲      | ▲      | 2.38 | 2.3 | 0.4 | 15   | 17   |
| XPMT06X308R-DJ | 6    | 7    | ●      | ●     | ●      | ●      | ▲      | ▲      | 3    | 2.5 | 0.8 | 17.5 | 21.5 |
| XPMT07H308R-DJ | 7    | 8.2  | ●      | ●     | ●      | ●      | ▲      | ▲      | 3.6  | 2.8 | 0.8 | 22   | 26   |
| XPMT08T308R-DJ | 8.5  | 9.9  | ●      | ●     | ●      | ●      | ▲      | ▲      | 3.97 | 3.4 | 0.8 | 27   | 32   |
| XPMT110412R-DJ | 11.2 | 12.5 | ●      | ●     | ●      | ●      | ▲      | ▲      | 4.76 | 4.4 | 1.2 | 33   | 41   |
| XPMT150512R-DJ | 15   | 16.1 | ●      | ●     | ●      | ●      | ▲      | ▲      | 5.56 | 5.5 | 1.2 | 42   | 54   |

● : New product  
● : Line up  
▲ : To be discontinued

### DS



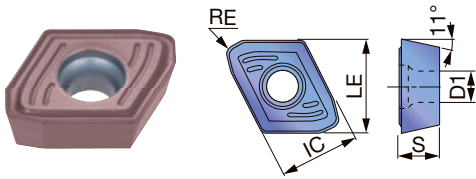
|                         |   |   |   |   |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|--|--|--|--|--|--|--|--|--|--|
| <b>P</b> Steel          | ☆ | ☆ | ★ | ★ |  |  |  |  |  |  |  |  |  |  |
| <b>M</b> Stainless      | ☆ | ☆ | ★ | ★ |  |  |  |  |  |  |  |  |  |  |
| <b>K</b> Cast iron      |   |   |   |   |  |  |  |  |  |  |  |  |  |  |
| <b>N</b> Non-ferrous    | ☆ |   |   |   |  |  |  |  |  |  |  |  |  |  |
| <b>S</b> Superalloys    | ☆ | ☆ | ★ | ★ |  |  |  |  |  |  |  |  |  |  |
| <b>H</b> Hard materials |   |   |   |   |  |  |  |  |  |  |  |  |  |  |

★ : First choice  
☆ : Second choice

| Designation    | IC   | LE   | Coated |        |        |        | S    | D1  | RE  | DCN  | DCX  |
|----------------|------|------|--------|--------|--------|--------|------|-----|-----|------|------|
|                |      |      | AH725  | AH7020 | AH7030 | AH6030 |      |     |     |      |      |
| XPMT040104R-DS | 4.3  | 4.5  | ●      | ●      | ●      | ▲      | 1.59 | 2.3 | 0.4 | 12.5 | 14.5 |
| XPMT050204R-DS | 5.2  | 5.4  | ●      | ●      | ●      | ▲      | 2.38 | 2.3 | 0.4 | 15   | 17   |
| XPMT06X308R-DS | 6    | 7    | ●      | ●      | ●      | ▲      | 3    | 2.5 | 0.8 | 17.5 | 21.5 |
| XPMT07H308R-DS | 7    | 8.2  | ●      | ●      | ●      | ▲      | 3.6  | 2.8 | 0.8 | 22   | 26   |
| XPMT08T308R-DS | 8.5  | 9.9  | ●      | ●      | ●      | ▲      | 3.97 | 3.4 | 0.8 | 27   | 32   |
| XPMT110412R-DS | 11.2 | 12.5 | ●      | ●      | ●      | ▲      | 4.76 | 4.4 | 1.2 | 33   | 41   |
| XPMT150512R-DS | 15   | 16.1 | ●      | ●      | ●      | ▲      | 5.56 | 5.5 | 1.2 | 42   | 54   |

● : New product  
● : Line up  
▲ : To be discontinued

## DW



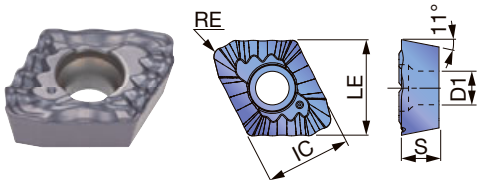
|                         |   |   |   |   |   |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|--|--|--|--|--|--|--|--|
| <b>P</b> Steel          | ☆ | ☆ | ★ | ★ | ☆ |  |  |  |  |  |  |  |  |
| <b>M</b> Stainless      | ☆ | ☆ | ★ | ★ | ☆ |  |  |  |  |  |  |  |  |
| <b>K</b> Cast iron      |   |   | ★ | ☆ | ★ |  |  |  |  |  |  |  |  |
| <b>N</b> Non-ferrous    | ☆ |   | ★ | ★ |   |  |  |  |  |  |  |  |  |
| <b>S</b> Superalloys    | ☆ | ☆ | ★ | ★ | ☆ |  |  |  |  |  |  |  |  |
| <b>H</b> Hard materials | ☆ | ☆ | ★ | ★ | ☆ |  |  |  |  |  |  |  |  |

★ : First choice  
☆ : Second choice

| Designation    | IC   | LE   | Coated |        |        |        |        | S    | D1  | RE  | DCN  | DCX  |
|----------------|------|------|--------|--------|--------|--------|--------|------|-----|-----|------|------|
|                |      |      | AH725  | AH7020 | AH7030 | AH6030 | AH9030 |      |     |     |      |      |
| XPMT040104R-DW | 4.3  | 4.5  | ●      | ●      | ●      | ▲      | ▲      | 1.59 | 2.3 | 0.4 | 12.5 | 14.5 |
| XPMT050204R-DW | 5.2  | 5.4  | ●      | ●      | ●      | ▲      | ▲      | 2.38 | 2.3 | 0.4 | 15   | 17   |
| XPMT06X308R-DW | 6    | 7    | ●      | ●      | ●      | ▲      | ▲      | 3    | 2.5 | 0.8 | 17.5 | 21.5 |
| XPMT07H308R-DW | 7    | 8.2  | ●      | ●      | ●      | ▲      | ▲      | 3.6  | 2.8 | 0.8 | 22   | 26   |
| XPMT08T308R-DW | 8.5  | 9.9  | ●      | ●      | ●      | ▲      | ▲      | 3.97 | 3.4 | 0.8 | 27   | 32   |
| XPMT110412R-DW | 11.2 | 12.5 | ●      | ●      | ●      | ▲      | ▲      | 4.76 | 4.4 | 1.2 | 33   | 41   |
| XPMT150512R-DW | 15   | 16.1 | ●      | ●      | ●      | ▲      | ▲      | 5.56 | 5.5 | 1.2 | 42   | 54   |

● : New product  
● : Line up  
▲ : To be discontinued

## DG



|                         |   |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|--|--|--|--|--|--|--|--|--|--|--|--|
| <b>P</b> Steel          | ★ |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>M</b> Stainless      | ☆ |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>K</b> Cast iron      |   |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>N</b> Non-ferrous    | ★ |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>S</b> Superalloys    | ☆ |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>H</b> Hard materials |   |  |  |  |  |  |  |  |  |  |  |  |  |

★ : First choice  
☆ : Second choice

| Designation    | IC   | LE   | Coated |  |  |  |  | S    | D1  | RE  | DCN | DCX |
|----------------|------|------|--------|--|--|--|--|------|-----|-----|-----|-----|
|                |      |      | AH725  |  |  |  |  |      |     |     |     |     |
| XPMT08T308R-DG | 8.5  | 9.9  | ●      |  |  |  |  | 3.97 | 3.4 | 0.8 | 27  | 32  |
| XPMT110412R-DG | 11.2 | 12.5 | ●      |  |  |  |  | 4.76 | 4.4 | 1.2 | 33  | 41  |
| XPMT150512R-DG | 15   | 16.1 | ●      |  |  |  |  | 5.56 | 5.5 | 1.2 | 42  | 54  |

● : Line up

## RECOMMENDED INSERT

| ISO      | Workpiece material                                       | First choice | Wear resistance | Chip control         |
|----------|--|--------------|-----------------|----------------------|
| <b>P</b> | Low carbon steel (C ≤ 0.3%)                              | DJ AH7030    | DJ AH7020       | DW AH7030 / DG AH725 |
|          | Carbon steel (C > 0.3%),<br>Low alloy steel, Alloy steel | DJ AH7030    | DJ AH7020       | DW AH7030            |
| <b>M</b> | Stainless steel  | DS AH7030    | DS AH7020       | DJ AH7030            |
| <b>K</b> | Grey cast irons  | DJ AH7020    | DJ T1115        | -                    |
|          | Ductile cast irons                                       | DJ AH7030    | DJ AH7020       | -                    |
| <b>N</b> | Aluminium alloy  | DJ AH725     | -               | DG AH725             |
| <b>S</b> | Heat-resistant alloys,<br>Titanium alloys                | DJ AH7030    | DJ AH7020       | -                    |
| <b>H</b> | Hardened steel   | DJ AH7030    | DJ AH7020       | -                    |

## STANDARD CUTTING CONDITIONS

| ISO  | Workpiece material   | Hardness     | Cutting speed<br>V <sub>c</sub> (m/min) | Series<br>L/D | Feed: f (mm/rev) |             |             |             |             |
|--|--|--------------|---|---------------|------------------|-------------|-------------|-------------|-------------|
|  |  |              |   |               | ø12.5 ~<br>ø14.5 | ø15 ~ ø17   | ø17.5 ~ ø26 | ø27 ~ ø32   | ø33 ~ ø54   |
| <b>P</b>   | Low carbon steels (C < 0.3)<br>SS400, SM490, S25C, etc.<br>st42-1, St52-3, C25, etc.       | - 200 HB     | 160 - 320                               | 2D, 3D        | 0.02 - 0.06      | 0.02 - 0.06 | 0.04 - 0.1  | 0.04 - 0.1  | 0.04 - 0.1  |
|  |  |              |   | 4D, 5D        | 0.02 - 0.06      | 0.02 - 0.06 | 0.04 - 0.1  | 0.04 - 0.1  | 0.04 - 0.1  |
|  | Carbon steels (C > 0.3)<br>S45C, S55C, etc. C45, C55, etc.                                 | - 300 HB     | 80 - 250                                | 2D, 3D        | 0.04 - 0.1       | 0.04 - 0.12 | 0.06 - 0.13 | 0.06 - 0.15 | 0.08 - 0.18 |
|  |  |              |   | 4D, 5D        | 0.04 - 0.08      | 0.04 - 0.08 | 0.06 - 0.1  | 0.06 - 0.12 | 0.08 - 0.14 |
| <b>M</b>   | Low alloy steels<br>SCM415, etc.   | - 200 HB     | 160 - 250                               | 2D, 3D        | 0.04 - 0.08      | 0.04 - 0.08 | 0.06 - 0.12 | 0.06 - 0.12 | 0.06 - 0.14 |
|  |  |              |   | 4D, 5D        | 0.04 - 0.08      | 0.04 - 0.08 | 0.06 - 0.12 | 0.06 - 0.12 | 0.06 - 0.14 |
|  | Alloy steels<br>SCM440, SCr420, etc.<br>42CrMo4, 20Cr4, etc.                               | - 300 HB     | 80 - 200                                | 2D, 3D        | 0.04 - 0.1       | 0.04 - 0.12 | 0.06 - 0.13 | 0.06 - 0.15 | 0.08 - 0.18 |
|  |  |              |   | 4D, 5D        | 0.04 - 0.08      | 0.04 - 0.08 | 0.06 - 0.1  | 0.06 - 0.12 | 0.08 - 0.14 |
|  | Stainless steels (Austenitic)<br>SUS304, SUS316, etc.<br>X5CrNi18-9, X5CrNiMo17-12-2, etc. | - 200 HB     | 100 - 200                               | 2D, 3D        | 0.02 - 0.08      | 0.02 - 0.08 | 0.04 - 0.1  | 0.04 - 0.12 | 0.04 - 0.12 |
|  |  |              |   | 4D, 5D        | 0.02 - 0.08      | 0.02 - 0.08 | 0.04 - 0.1  | 0.04 - 0.12 | 0.04 - 0.12 |
| Stainless steels (Martensitic and ferritic)<br>SUS430, SUS416, etc.<br>X6Cr17, X20Cr13, etc. | - 200 HB   | 100 - 220    | 2D, 3D                                  | 0.02 - 0.08   | 0.02 - 0.08      | 0.04 - 0.1  | 0.04 - 0.12 | 0.04 - 0.12 |             |
|  |  |              | 4D, 5D                                  | 0.02 - 0.08   | 0.02 - 0.08      | 0.04 - 0.1  | 0.04 - 0.12 | 0.04 - 0.12 |             |
| Stainless steels (Precipitation hardening)<br>SUS630, etc. X5CrNiCuNb16-4, etc.              | -  | 80 - 120     | 2D, 3D                                  | 0.04 - 0.08   | 0.04 - 0.08      | 0.04 - 0.08 | 0.04 - 0.1  | 0.06 - 0.1  |             |
|  |  |              | 4D, 5D                                  | 0.04 - 0.08   | 0.04 - 0.08      | 0.04 - 0.08 | 0.04 - 0.1  | 0.06 - 0.1  |             |
| <b>K</b>   | Grey cast irons<br>FC250, etc., 250, etc.  | 150 - 250 HB | 80 - 250                                | 2D, 3D        | 0.06 - 0.12      | 0.06 - 0.12 | 0.06 - 0.15 | 0.06 - 0.18 | 0.08 - 0.2  |
|  |  |              |   | 4D, 5D        | 0.06 - 0.1       | 0.06 - 0.1  | 0.06 - 0.12 | 0.06 - 0.14 | 0.08 - 0.16 |
| <b>N</b>   | Aluminium alloy<br>A2017, ADC12, etc.<br>AlCu4SiMg, AlSi11Cu3, etc.                        | -            | 200 - 400                               | 2D, 3D        | 0.1 - 0.12       | 0.1 - 0.15  | 0.15 - 0.2  | 0.15 - 0.2  | 0.15 - 0.25 |
|  |  |              |   | 4D, 5D        | 0.08 - 0.12      | 0.08 - 0.12 | 0.12 - 0.16 | 0.12 - 0.16 | 0.12 - 0.2  |
| <b>S</b>   | Heat-resistant alloys<br>Inconel 718, etc.   | - 40 HRC     | 20 - 60                                 | 2D, 3D        | 0.04 - 0.08      | 0.04 - 0.08 | 0.04 - 0.1  | 0.04 - 0.1  | 0.04 - 0.1  |
|  |  |              |   | 4D, 5D        | 0.04 - 0.08      | 0.04 - 0.08 | 0.04 - 0.1  | 0.04 - 0.1  | 0.04 - 0.1  |
| <b>H</b>   | Titanium alloys<br>Ti-6Al-4V, etc.   | - 40 HRC     | 40 - 120                                | 2D, 3D        | 0.06 - 0.1       | 0.06 - 0.1  | 0.06 - 0.12 | 0.06 - 0.12 | 0.06 - 0.12 |
|  |  |              |   | 4D, 5D        | 0.06 - 0.08      | 0.06 - 0.08 | 0.06 - 0.1  | 0.06 - 0.1  | 0.06 - 0.1  |
| <b>H</b>   | Hardened steel   | - 50 HRC     | 40 - 100                                | 2D, 3D        | 0.04 - 0.08      | 0.04 - 0.08 | 0.04 - 0.1  | 0.04 - 0.1  | 0.04 - 0.1  |
|  |  |              |   | 4D, 5D        | 0.04 - 0.08      | 0.04 - 0.08 | 0.04 - 0.08 | 0.04 - 0.08 | 0.04 - 0.08 |

## STANDARD CUTTING CONDITIONS FOR DG CHIPBREAKER

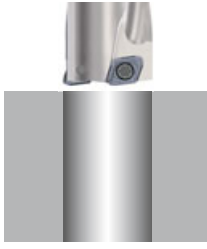
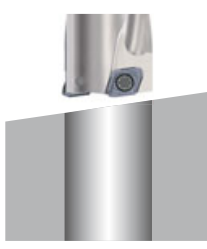
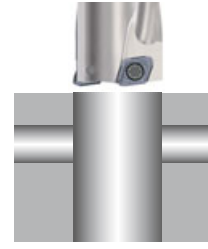

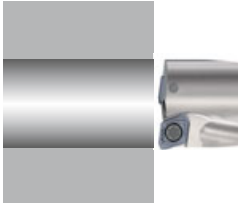
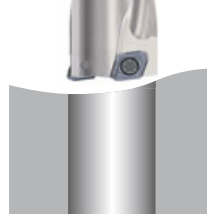
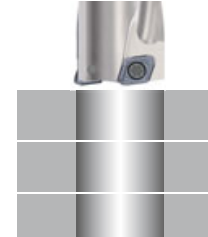

| ISO      | Workpiece material   | Hardness | Cutting speed<br>V <sub>c</sub> (m/min) | Series<br>L/D    | Feed: f (mm/rev) |           |
|----------|--|----------|---|------------------|------------------|-----------|
|          |  |          |   |                  | ø27 ~ ø32        | ø33 ~ ø54 |
| <b>P</b> | Low carbon steels (C < 0.3)<br>SS400, SM490, S25C, etc.<br>st42-1, St52-3, C25, etc. | - 200 HB | 60 - 180                                | 2D, 3D<br>4D, 5D | 0.04 - 0.1       |           |

- When using the smaller side of the diameter range, the feed rate should be set lower.
- When using DW chipbreaker 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.
- High speed machining means cutting speeds over 150 m/min.

- For high-feed machining, apply a feed rate that is approximately 1.5 times the standard feed conditions.
- When using DW chipbreaker for troubleshooting, use it within the range of standard cutting conditions.
- DG chipbreaker is suitable for heavy machines that have low-rpm spindles. If chatter occurs, a lower feed rate is recommended.



## APPLICATION RANGE

|                           |  |   |   |  |
|---------------------------|--|---|---|--|
| Feed<br><i>f</i> (mm/rev) | See page 24  | 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><i>f</i> (mm/rev)  | 0.1   | 0.05  | Disapprove   |
| Application               | <b>OK</b> Boring<br>       | <b>OK</b> Round surface<br> | <b>X</b> Stacked plate<br> | <b>X</b> Back boring<br> |

In case of Interrupted cutting, feed should be decreased.

## Maximum drilling diameter and maximum offset amount for each diameter

The drilling diameter can be adjusted by offsetting the drill using the X-axis of the machine or with the eccentric sleeve. Refer to the list below for the maximum drilling diameter and maximum offset amount available for the individual drill diameters.

| DC   | Max. drilling diameter | Max. offset amount | DC   | Max. drilling diameter | Max. offset amount | DC | Max. drilling diameter | Max. offset amount |
|------|------------------------|--------------------|------|------------------------|--------------------|----|------------------------|--------------------|
| 12.5 | 14.1                   | 0.8                | 22   | 24.4                   | 1.2                | 37 | 39.6                   | 1.3                |
| 13   | 14.4                   | 0.7                | 22.5 | 24.7                   | 1.1                | 38 | 40                     | 1                  |
| 13.5 | 14.5                   | 0.5                | 23   | 24.8                   | 0.9                | 39 | 40.4                   | 0.7                |
| 14   | 14.8                   | 0.4                | 23.5 | 25.1                   | 0.8                | 40 | 41                     | 0.5                |
| 14.5 | 15.1                   | 0.3                | 24   | 25.4                   | 0.7                | 41 | 41.4                   | 0.2                |
| 15   | 16.8                   | 0.9                | 24.5 | 25.5                   | 0.5                | 42 | 48.2                   | 3.1                |
| 15.5 | 17.1                   | 0.8                | 25   | 25.8                   | 0.4                | 43 | 48.8                   | 2.9                |
| 16   | 17.2                   | 0.6                | 25.5 | 26.1                   | 0.3                | 44 | 49.2                   | 2.6                |
| 16.5 | 17.5                   | 0.5                | 26   | 26.4                   | 0.2                | 45 | 49.6                   | 2.3                |
| 17   | 17.8                   | 0.4                | 27   | 30                     | 1.5                | 46 | 50.2                   | 2.1                |
| 17.5 | 19.9                   | 1.2                | 28   | 30.4                   | 1.2                | 47 | 50.6                   | 1.8                |
| 18   | 20.2                   | 1.1                | 29   | 31                     | 1                  | 48 | 51                     | 1.5                |
| 18.5 | 20.3                   | 0.9                | 30   | 31.4                   | 0.7                | 49 | 51.6                   | 1.3                |
| 19   | 20.6                   | 0.8                | 31   | 31.8                   | 0.4                | 50 | 52                     | 1                  |
| 19.5 | 20.9                   | 0.7                | 32   | 32.4                   | 0.2                | 51 | 52.4                   | 0.7                |
| 20   | 21                     | 0.5                | 33   | 37.6                   | 2.3                | 52 | 53                     | 0.5                |
| 20.5 | 21.3                   | 0.4                | 34   | 38.2                   | 2.1                | 53 | -                      | -                  |
| 21   | 21.6                   | 0.3                | 35   | 38.6                   | 1.8                | 54 | -                      | -                  |
| 21.5 | 21.9                   | 0.2                | 36   | 39                     | 1.5                |    |                        |                    |

## Special Indexable Tooling Competency —

Tungaloy's customized indexable combination drills for higher productivity

We at Tungaloy design and produce indexable combination drills tailored to meet your specific application needs. In addition to lower tooling cost thanks to indexable solution, one of the key benefits of these custom combination tools is the ability to perform several different operations such as drilling, chamfering, and counterboring in a single pass, thereby providing increased machine uptime and reduced cost per part.

Drilling + Counter boring



Drilling + Counter boring + Chamfering



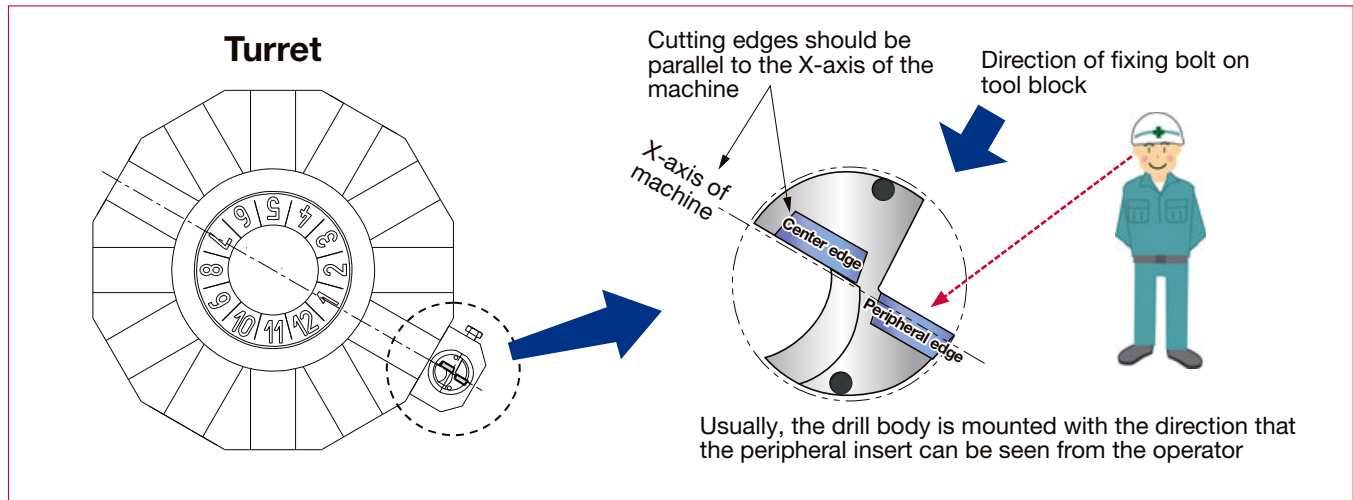
L/D = 7 Deep drilling



## ■ Use of TungDrillTwisted on lathes Setting of drill body is critical for successful machining

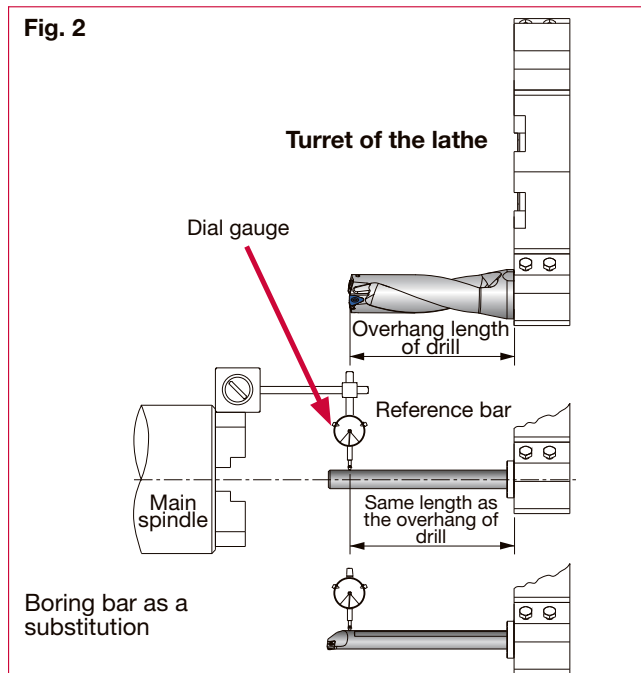
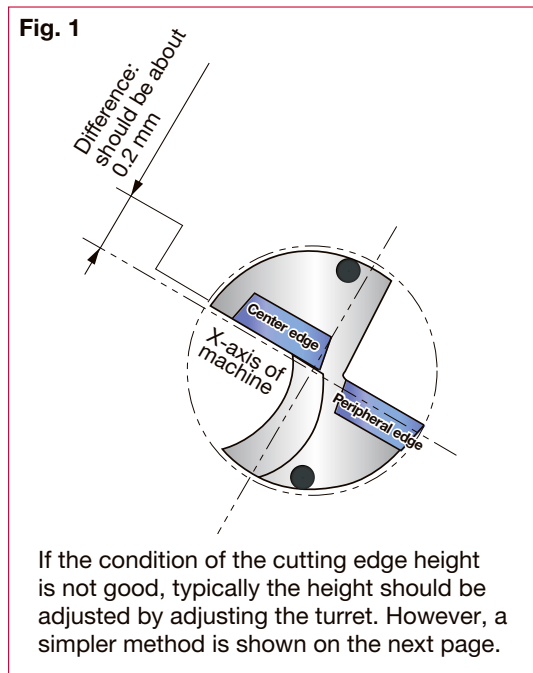
### Mounting the drill on turret (tool post)

- When mounting drill body, the cutting edges should be parallel to the X-axis of the machine.
- Usually, the drill body is mounted in the direction that the peripheral insert can be seen by the operator.
- As the flat on the shank is parallel to the cutting edges, the clamping of the drill ensures that the cutting edges are parallel to the X-axis of the machine.



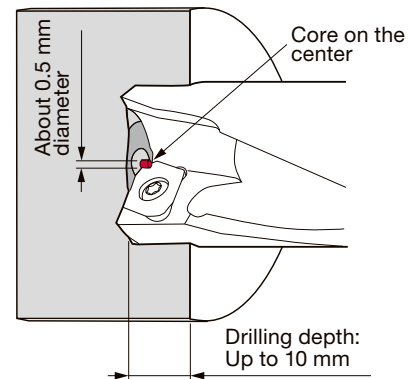
### Checking of cutting edge height

- The cutting edge height is an important factor for stable machining.
- The cutting edge of center insert should be 0.2 mm lower than the rotating axis of machine.
- For checking the difference between rotating center and the tool block, please use a reference bar from ground solid bar. (Fig. 2)
- In this case, the checking of the center height should be measured at the same position as the overhang length of the drill required.
- When there isn't a reference bar, the ground part of a boring bar can be used as a substitute.



## Checking of setting conditions by trial cutting

- After mounting the drill body, the tool center should be checked by trial cutting before production.
- When the drill body is properly set, a core with about  $\phi 0.5$  mm diameter is left on the bottom of hole.
- If there is no core, the drill is "above center". If the core diameter is larger than  $\phi 1$ mm, it is "excessively below center". In these cases, the cutting edge height has to be checked again.
- When trial cutting, the feed should be 0.1 mm/rev or less, drilling depth should be up to 10 mm.



## Adjusting of cutting edge height

When the condition of the cutting edge height is incorrect, the height should be adjusted with the following methods.

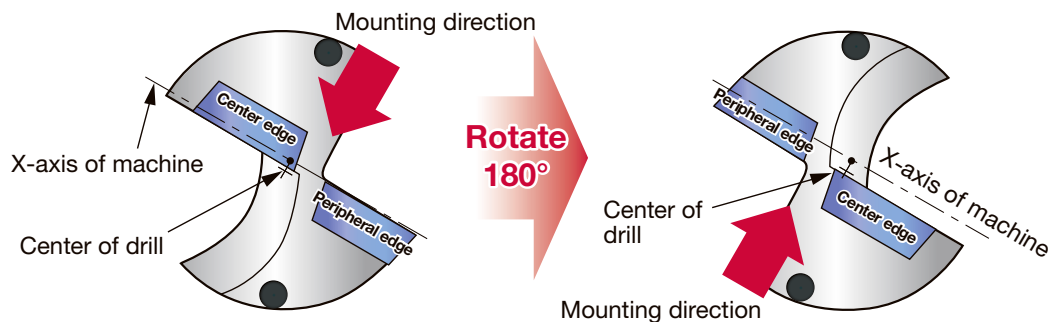
### ① In the case of "above-center"

When machining with such condition, the center cutting edge may be easily chipped. So this condition has to be rectified.

Solution #1: Change the mounting direction.

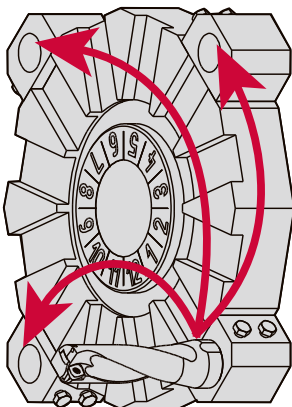
Solution #2: Rotate drill body 180°

In #2, additional cotter is required on the opposite side.



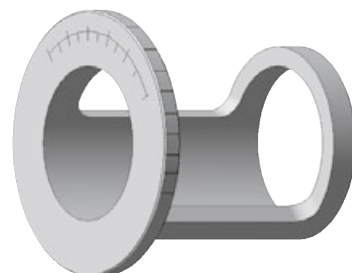
### ② In the case of "slightly above-center" (about 0.05 mm)

In this case, shifting the mounting position may improve the condition.



### ③ In the case of "excessive below-center" (0.2 mm or more)

When this occurs, the large diameter of the core remains and heavy vibration may occur. To improve this situation: Use EZ sleeve (the eccentric sleeve) and adjust the cutting edge height to correct value. Information on EZ sleeve, is on page 20.



## Machining with offset on the lathe

A larger hole than the drill diameter can be machined!

### Drilling with offset

- When drilling on the lathe, the hole diameter can be adjusted by offsetting the drill body along the X-axis of machine.
- When drilling with offset, the drill body must be correctly mounted with cutting edges parallel to the X-axis of the machine. "Mounting the drill on the turret" can be viewed on page 27.

**Interferences**

Offsetting direction to achieve smaller diameters

Offset value must be less than 0.1 mm.

Hole diameter machined with offset are roughly calculated as following.

**Drilled diameter = Drill diameter + offset value x 2**

Example:  
 Drill diameter:  $\varnothing 20$  mm  
 Offset value: 0.2 mm  
 Drilled hole diameter =  $20 + 0.2 \times 2 = \varnothing 20.4$  mm

X-axis of machine

Direction of decreased diameters

Direction to achieve larger diameters

Center edge

Peripheral edge

Offset value (+) depends on each drill body.

Offsetting direction to achieve larger diameters

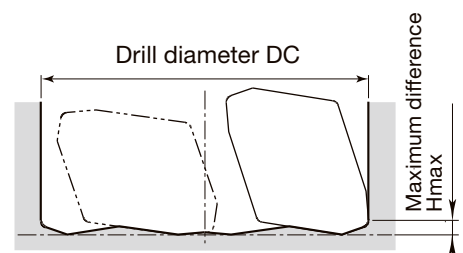
## SHAPE OF THE HOLE BOTTOM

Un-evenness of the hole-bottom face when machined with **TungDrillTwisted** is smaller than with HSS drills!

The shape of the hole bottom machined with **TungDrillTwisted** is closer to flat compared with those machined with HSS drills.


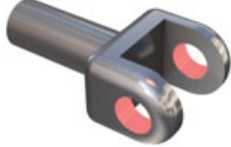
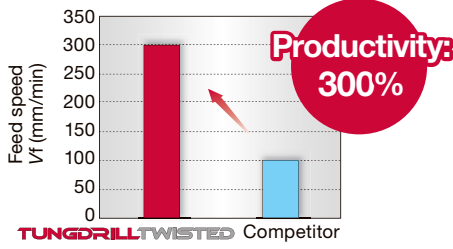
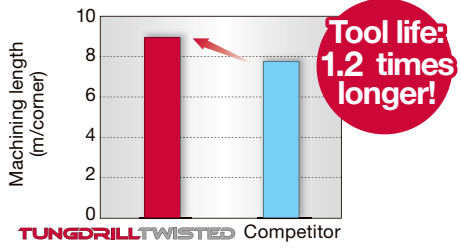


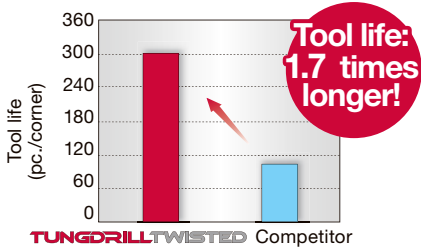
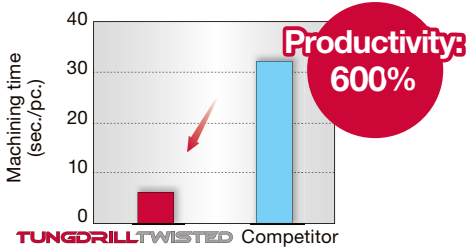
| Drill diameter DC (mm) | $\varnothing 12.5 - 14.5$ | $\varnothing 15 - 17$ | $\varnothing 17.5 - 21.5$ | $\varnothing 22 - 26$ | $\varnothing 27 - 32$ | $\varnothing 33 - 41$ | $\varnothing 42 - 54$ |
|------------------------|---------------------------|-----------------------|---------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Insert                 | XPMT 04...                | XPMT 05...            | XPMT 06...                | XPMT 07...            | XPMT 08...            | XPMT 11...            | XPMT 15...            |
| Hmax (mm)              | 0.6                       | 0.8                   | 1.0                       | 1.1                   | 1.3                   | 1.9                   | 2.3                   |

Bottom shape of the hole machined with **TungDrillTwisted**




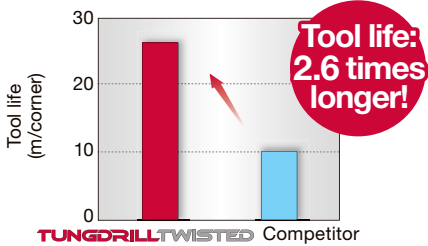


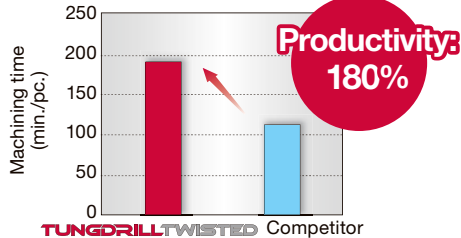
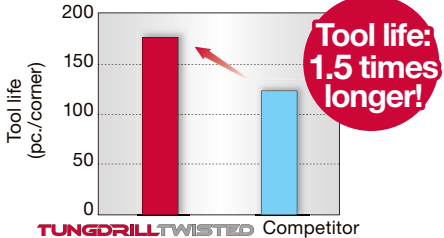


# TUNGDRILLTWISTED

## PRACTICAL EXAMPLES

| Workpiece type     |                              | Pinion  | York  |
|--------------------|------------------------------|---|---|
| Drill              |                              | TDX185F25-2   | TDX200F25-3   |
| Insert             |                              | XPMT06X308R-DW  | XPMT06X308R-DJ  |
| Grade              |                              | AH7020  | AH725   |
| Workpiece material |                              | SCM435 / 34CrMo4  | S33C  |
|                    |                              |  <b>P</b>  |  <b>P</b>  |
| Cutting conditions | Cutting speed: $V_c$ (m/min) | 160   | 138   |
|                    | Feed: $f$ (mm/rev)           | 0.11  | 0.06  |
|                    | Feed speed: $V_f$ (mm/min)   | 300   | 132   |
|                    | Drilling depth: $H$ (mm)     | 18  | 25  |
|                    | Machine                      | NC lathe  | Special-purpose machine   |
| Coolant            |                              | Wet   | Wet   |
| Results            |                              |  <p><b>Productivity: 300%</b></p> <p>Due to strong resistance against oxidation at high temperature, coating layer prevents damage on tools from expanding even at increased feed. Therefore, productivity is improved without shortening the tool life of cutting edges.</p>   |  <p><b>Tool life: 1.2 times longer!</b></p> <p>Competitor's tool had a problem with frequent insert chipping because of low clamping rigidity. However, stable machining is possible with AH725 due to its excellent balance between wear and fracture resistance.</p>              |
| Workpiece type     |                              | Connecting rod  | Bearing cover   |
| Drill              |                              | TDX200F25-3   | TDX180F25-2   |
| Insert             |                              | XPMT06X308R-DW  | XPMT06X308R-DS  |
| Grade              |                              | AH725   | AH7030  |
| Workpiece material |                              | S55C / C55  | S45C / C45  |
|                    |                              |  <b>P</b>  |  <b>P</b>  |
| Cutting conditions | Cutting speed: $V_c$ (m/min) | 90  | 140   |
|                    | Feed: $f$ (mm/rev)           | 0.06  | 0.06  |
|                    | Feed speed: $V_f$ (mm/min)   | 86  | 148   |
|                    | Drilling depth: $H$ (mm)     | 22  | 13  |
|                    | Machine                      | Special-purpose machine   | Vertical lathe  |
| Coolant            |                              | Wet   | Wet   |
| Results            |                              |  <p><b>Tool life: 1.7 times longer!</b></p> <p>DW chipbreaker with tough cutting edges provides stability even during interrupted machining upon hole entry and exit. Sudden insert damages are drastically reduced and tool life is 1.7 times longer than the competitor.</p> |  <p><b>Productivity: 600%</b></p> <p>DS chipbreaker's good hole entry enables stable machining of workpiece materials with low rigidity. Even at double the cutting speed and triple the feed rate, no problems occur during operation, and tool life is increased by 3 times.</p> |



| Workpiece type     |                              | Link  | Shaft   |
|--------------------|------------------------------|---|---|
| Drill              |                              | TDX230F25-3   | TDX190F20-3   |
| Insert             |                              | XPMT07H308R-DW  | XPMT06X308R-DJ  |
| Grade              |                              | AH7030  | AH7030  |
| Workpiece material |                              | S45C / C45  | SUS316L   |
|                    |                              |  <b>P</b>  |  <b>M</b>  |
| Cutting conditions | Cutting speed: $V_c$ (m/min) | 150   | 150   |
|                    | Feed: $f$ (mm/rev)           | 0.10  | 0.12  |
|                    | Feed speed: $V_f$ (mm/min)   | 208   | 310   |
|                    | Drilling depth: $H$ (mm)     | 34  | 33  |
|                    | Machine                      | Vertical M/C  | NC lathe  |
|                    | Coolant                      | Wet   | Wet   |
| Results            |                              |  <p><b>Productivity: 170%</b></p> <p>DW chipbreaker with tough cutting edges prevents damages on tools in the operation of casting skin. Compared to the competitor, the feed in machining is increased by 1.7 times, resulting in drastically improved productivity.</p>   |  <p><b>Tool life: 2.6 times longer!</b></p> <p>AH7030 with thick coating and oxide layer prevents wear and welding on tools and achieves 2.6 times longer tool life than the competitor.</p>                                    |
|                    |                              | <p><b>TUNGDRILLTWISTED</b> Competitor</p>   |   |
| Workpiece type     |                              | Valve   | Brake rotor   |
| Drill              |                              | TDX230F25-2   | TDX235F25-2   |
| Insert             |                              | XPMT07H308R-DS  | XPMT07H308R-DJ  |
| Grade              |                              | AH725   | AH7020  |
| Workpiece material |                              | SUS316L   | FC250 / 250   |
|                    |                              |  <b>M</b>  |  <b>K</b>  |
| Cutting conditions | Cutting speed: $V_c$ (m/min) | 140   | 148   |
|                    | Feed: $f$ (mm/rev)           | 0.10  | 0.08  |
|                    | Feed speed: $V_f$ (mm/min)   | 194   | 160   |
|                    | Drilling depth: $H$ (mm)     | 25  | 35  |
|                    | Machine                      | NC lathe  | Vertical M/C  |
|                    | Coolant                      | Wet   | Wet   |
| Results            |                              |  <p><b>Productivity: 180%</b></p> <p>Special surface technology, PremiumTec, and DS chipbreaker extremely improves chip evacuation. Also, lowered cutting force enables the operation with increased speed (1.4 times) and feed (1.25 times), resulting in machining efficiency which is 1.8 times higher than the competitor.</p> |  <p><b>Tool life: 1.5 times longer!</b></p> <p>The combination of highly rigid body and DJ chipbreaker with low cutting force prevents unusual damages on cutting edges. These features lead to long and stable tool life.</p> |
|                    |                              | <p><b>TUNGDRILLTWISTED</b> Competitor</p>   |   |

### **Tungaloy Corporation (Head office)**

11-1 Yoshima-Kogyodanchi  
Iwaki-city, Fukushima 970-1144 Japan  
Phone: +81-246-36-8501  
Fax: +81-246-36-8542  
www.tungaloy.co.jp

### **Tungaloy-NTK America Inc.**

3726 N Ventura Drive  
Arlington Heights, IL 60004, U.S.A.  
Phone: +1-888-554-8394  
Fax: +1-888-554-8392  
www.tungaloy.com/us

### **Tungaloy Canada**

432 Elgin St. Unit 3  
Brantford, Ontario N3S 7P7, Canada  
Phone: +1-519-758-5779  
Fax: +1-519-758-5791  
www.tungaloy.com/ca

### **Tungaloy-NTK De Mexico S.A.**

C. Los Arellano 113,  
Parque Industrial Siglo XXI  
Aguascalientes, AGS, Mexico 20290  
Phone: +52-449-929-5410  
Fax: +52-449-929-5411  
www.tungaloy.com/mx

### **Tungaloy-NTK do Brasil Ltda.**

Avd. Independencia N4158 Residencial Flora  
13280-000 Vinhedo, São Paulo, Brasil  
Phone: +55-19-38262757  
Fax: +55-19-38262757  
www.tungaloy.com/br

### **Tungaloy-NTK Germany GmbH.**

Katzbergstr. 3a  
D-40764 Langenfeld, Germany  
Phone: +49-2173-90420-0  
Fax: +49-2173-90420-19  
www.tungaloy.com/de

### **Tungaloy France s.a.s**

Les Fjords  
19 avenue de Norvège  
91140 Villebon Sur Yvette, France  
Phone: +33-1-6486-4300  
Fax: +33-1-6907-7817  
www.tungaloy.com/fr

### **Tungaloy Italia S.r.l.**

Via E. Andolfato 10  
I-20126 Milano, Italy  
Phone: +39-02-252012-1  
Fax: +39-02-252012-65  
www.tungaloy.com/it

### **Tungaloy Czech s.r.o.**

Turanka 115  
CZ-627 00 Brno, Czech Republic  
Phone: +420-532 123 391  
Fax: +420-532 123 392  
www.tungaloy.com/cz

### **Tungaloy Ibérica S.L.**

C/Miquel Servet, 43B, Nau 7  
Pol. Ind. Bufalvent  
ES-08243 Manresa (BCN), Spain  
Phone: +34 93 113 1360  
www.tungaloy.com/es

### **Tungaloy Scandinavia AB**

Bultgatan 38  
442 40 Kungälv, Sweden  
Phone: +46-462119200  
Fax: +46-462119207  
www.tungaloy.com/se

### **Tungaloy Rus, LLC**

Andropova avenue, h.18/7,  
11 floor, office 3, 115432,  
Moscow, Russia  
Phone: +7-499-683-01-80  
Fax: +7-499-683-01-81  
www.tungaloy.com/ru

### **Tungaloy Polska Sp. z o.o.**

Ul. Irysowa 1, 55-040 Bielany  
Wroclawskie, Poland  
Phone: +48 607 907 237  
www.tungaloy.com/pl

### **Tungaloy-NTK UK Ltd.**

Suite 3, Pioneer House, Mill Street,  
Cannock, WS11 0EF, UK  
Phone: +44 121 4000 231  
Fax: +44 121 270 9694  
www.tungaloy.com/uk

### **Tungaloy Hungary Kft**

Erzsébet királyné útja 125  
H-1142 Budapest, Hungary  
Phone: +36 1 781-6846  
Fax: +36 1 781-6866  
www.tungaloy.com/hu

### **Tungaloy Turkey**

Serifali Mah.bayraktar Bulvari Kule Sk. No:26  
34775 Umraniye / Istanbul / Turkey  
Phone: +90 216 540 04 67  
Fax: +90 216 540 04 87  
www.tungaloy.com/tr

### **Tungaloy Benelux b.v.**

Tjalk 70  
NL-2411 NZ Bodegraven, Netherlands  
Phone: +31 172 630 420  
Fax: +31 172 630 429  
www.tungaloy.com/nl

### **Tungaloy Croatia**

Ulica bana Josipa Jelačića 87,  
10430, Samobor, Croatia  
Phone: +385 1 3326 604  
Fax: +385 1 3327 683  
www.tungaloy.com/hr

### **Tungaloy Cutting Tool (Shanghai) Co. Ltd.**

Rm No 401 No.88 Zhabei  
Jiangchang No.3 Rd  
Shanghai 200436, China  
Phone: +86-21-3632-1880  
Fax: +86-21-3621-1918  
www.tungaloy.com/cn

### **Tungaloy Cutting Tools Taiwan Co. Ltd.**

9F, No.293, Zhongyang Rd,  
Xinzhuan Dist, New Taipei City,  
24251 Taiwan  
Phone: +886-2-8521-9986  
Fax: +886-2-8521-8935  
www.tungaloy.com/tw

### **Tungaloy-NTK Cutting Tool (Thailand) Co.,Ltd.**

Interlink tower 4th Fl.  
1858/5-7 Bangna-Trad Road  
km.5 Bangna, Bangna, Bangkok 10260  
Thailand  
Phone: +66-2-751-5711  
Fax: +66-2-751-5715  
www.tungaloy.com/th

### **Tungaloy Singapore (Pte.), Ltd.**

62 Ubi Road 1, #06-11 Oxley BizHub 2  
Singapore 408734  
Phone: +65-6391-1833  
Fax: +65-6299-4557  
www.tungaloy.com/sg

### **Tungaloy Vietnam**

LE04.38, Lexington Residence  
67 Mai Chi Tho St., Dist. 2,  
Ho Chi Minh City, Vietnam  
Phone: +84-2837406660  
www.tungaloy.com/sg

### **Tungaloy India Pvt. Ltd.**

One International Center,  
Unit # 902-A, 9th Floor,  
Tower 1, Senapati Bapat Marg,  
Elphinstone Road (West),  
Mumbai 400013, India  
Phone: +91-22-6124-8803  
Fax: +91-22-6124-8899  
www.tungaloy.com/in

### **Tungaloy Korea Co., Ltd**

#1312, Byucksan Digital Valley 5-cha  
Beotkkot-ro 244, Geumcheon-gu  
153-788 Seoul, Korea  
Phone: +82-2-2621-6161  
Fax: +82-2-6393-8952  
www.tungaloy.com/kr

### **Tungaloy Malaysia Sdn Bhd**

50 K-2, Kelana Mall, Jalan SS6/14  
Kelana Jaya, 47301  
Petaling Jaya, Selangor Darul Ehsan  
Malaysia  
Phone: +603-7805-3222  
Fax: +603-7804-8563  
www.tungaloy.com/my

### **Tungaloy Australia Pty Ltd**

Unit 68 1470 Ferntree Gully Road  
Knoxfield 3180 Victoria, Australia  
Phone: +61-3-9755-8147  
Fax: +61-3-9755-6070  
www.tungaloy.com/au

### **PT. Tungaloy Indonesia**

Ruko Blok AA.10 No3&5, Grand Wisata,  
Lambangjaya, Tambun Selatan, Bekasi,  
17510 Indonesia  
Phone: +62-21-8261-5808  
Fax: +62-21-8261-5809  
www.tungaloy.com/id



**tungaloy.com**

follow us at:

facebook.com/tungaloyjapan

twitter.com/tungaloyjapan

www.youtube.com/tungaloycorporation

Distributed by:



Tungaloy APP & SNS

FIND US ON THE CLOUD!  
machingcloud.com



AS9100 Certified  
78006  
2015.11.04  
ISO 14001 Certified  
EC97J1123  
1997.11.26