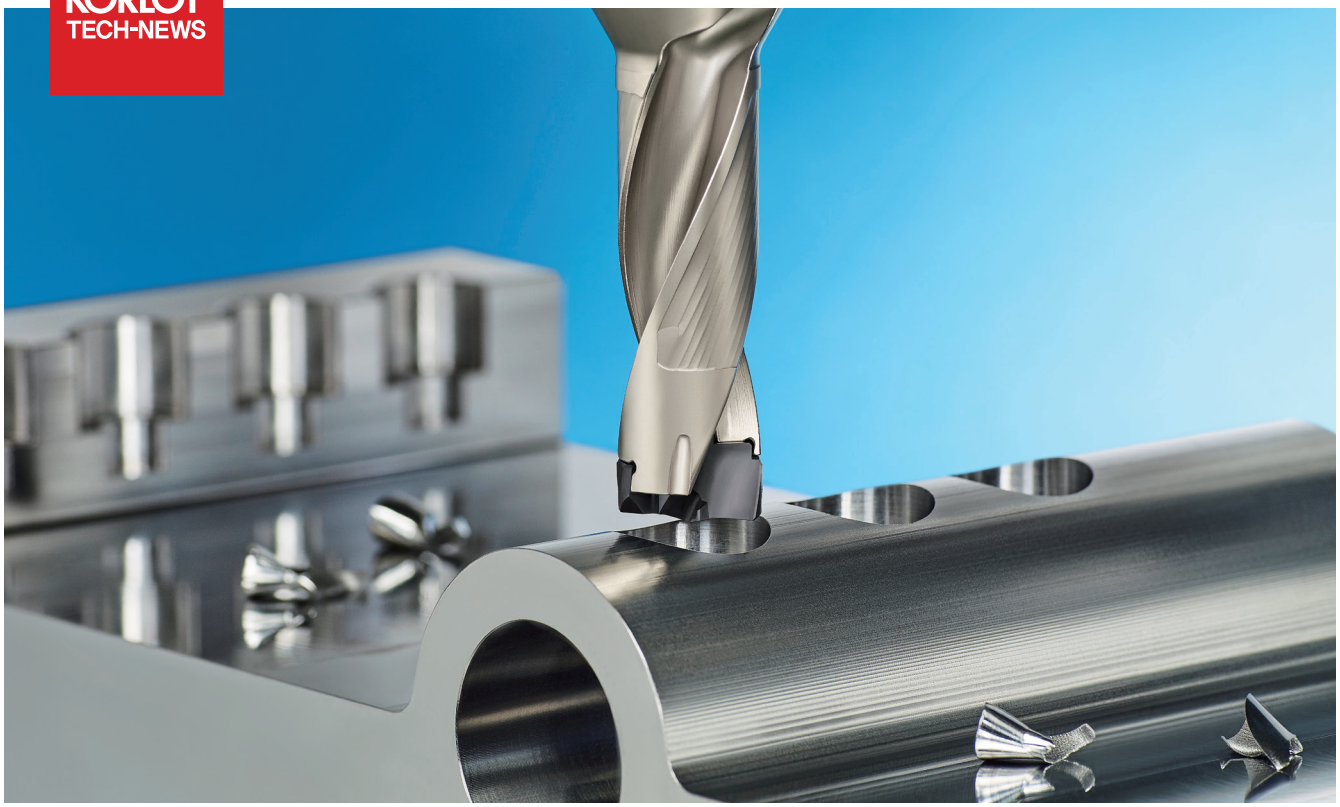
High quality and high feed top solid indexable drill

TPDC Plus Drill

(TPDC-XP, CP, CM, CN, CP-FC)

KORLOY TECH-NEWS



- The optimal tool shape for drilling realizing high precision and high feed machining as of carbide solid drill performance level.
- Usable for various machining through enlarged line-up by workpieces, depth of cuts and workpiece shapes.

KORLOY

TECH-NEWS

High quality and high feed top solid indexable drill

TPDC Plus Drill

To obtain better work efficiency, excellent machining performance and reduced cutting time are always in need for various industries. Thus, the demands for efficient cutting tools are steadily increasing.

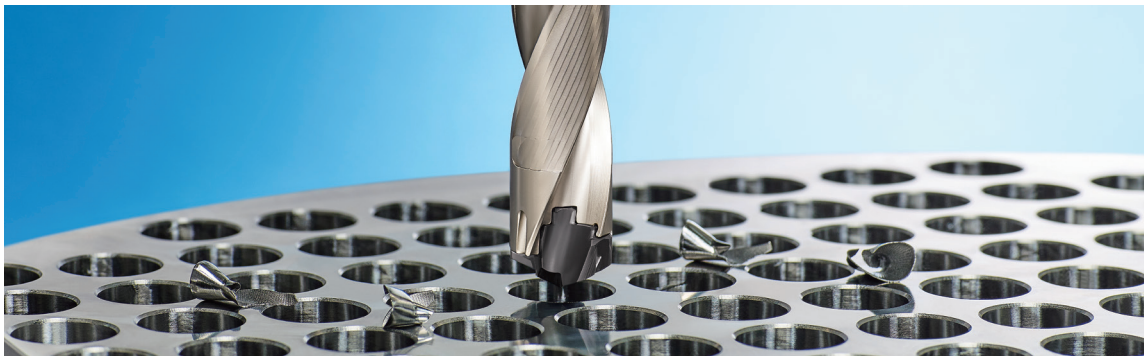
KORLOY newly launched high quality and efficient indexable drill, TPDC Plus Drill in accordance with the market's needs.

TPDC Plus Drill realizes high speed and high feed machining due to solid and stable clamping with exclusive One step clamp structure. In addition, replacing an insert without taking the holder out of the machine reduces tool setting time and enhances convenience and productivity.

The TPDC insert with exclusive grade applying ultra-fine substrate, lubricated coating and different cutting edge per workpiece material with special after treatment ensure stable machining in various kinds of workpiece.

Besides, newly added **TPDC-CP-FC (flat type)** insert applied 145° point angle and exclusive low cutting resistance cutting edge for stable machining, high precision and good surface finish increases productivity due to low cost and short cycle time.

Various types of insert could be clamped to a TPDC holder. Not just for the standard depth of cut such as 3D, 5D, and 8D, the TPDC holders expanded its line-up of 1.5D, 10D, and 12D so it could be applied to various depths of hole-making.



High precision and high convenient clamping

- Applies one step clamp system

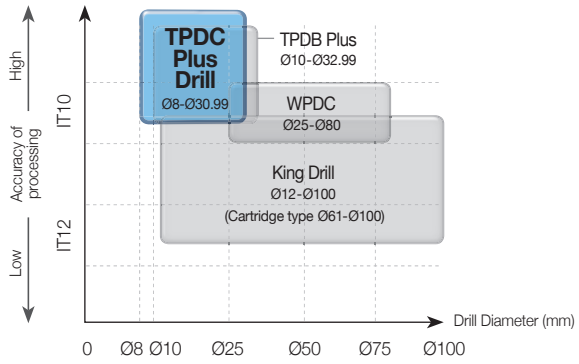
Improved machinability

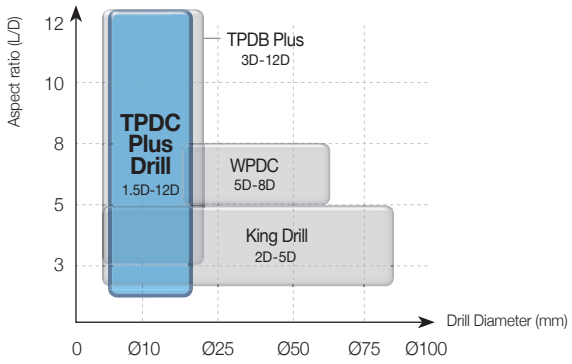
- Reduced cutting load due to high helix angle

Available in various cutting conditions

- Exclusive edge design per workpieces (P, M, K, N)
- Various aspect ratio (1.5D, 3D, 5D, 8D,10D, 12D)
- (For TPDC-FC) Simplified machining process combining 2 in 1

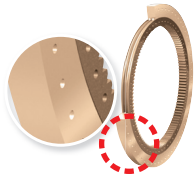
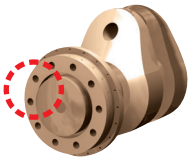
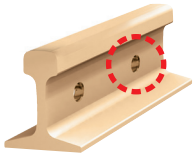
Application range





Tools	Application range					
	Drill Diameter (Ø)	Aspect ratio (L/D)	Tolerance of drill dia.	Tolerance of hole	Surface finish of hole (Ra)	Workpiece material
TPDC Plus Drill	8.00-30.99mm	1.5, 3, 5, 8, 10, 12	h7	IT10	≤ 3.0 ㎛	P, M, K, N

Applicable industries

Generation of wind and nuclear power	Shipbuilding	Railway and construction	Aircraft	Automobile
				

Code system

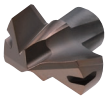
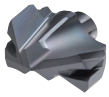
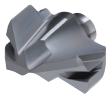
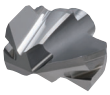
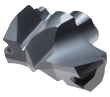
【Holder】

TPD	C	5D	-	150	20	-	75
Top solid Piercing Drill	Insert type X, C: Cone type	Aspect ratio (L/D) 1.5D, 3D, 5D, 8D, 10D, 12D		Drill dia. 150: Ø15.00-Ø15.99	Shank dia. 20: Ø20		Flute length 75: 75 mm

【Insert】

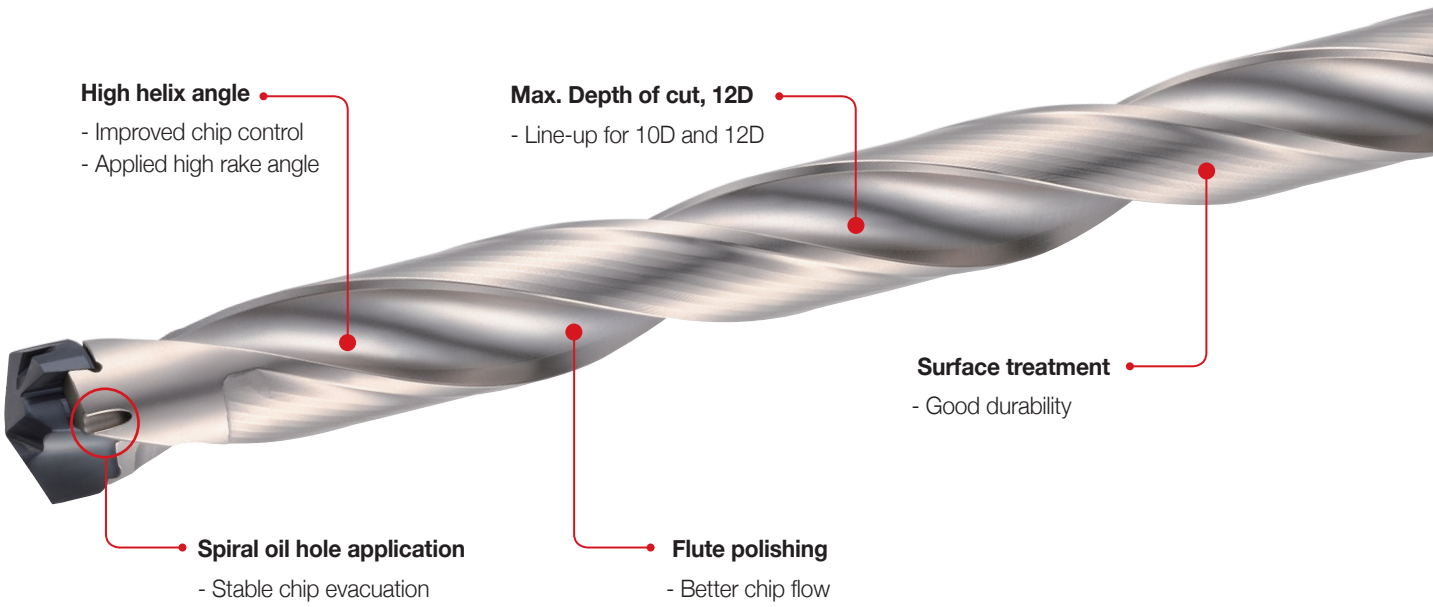
TPD	1500	C	P	-	□
Top solid Piercing Drill	Drill dia. 1500: Ø15.00	Insert type X, C: Cone type	Cutting range P: Steel and general M: Stainless steel K: Cast iron N: Non-ferrous metal		Cutting edge No code: Standard F: Flat FC: Flat Candle

Insert features

Shape	Application	Drill dia. (mm)	Features
 XP new	P	Ø8.00-Ø11.99	• High durability due to the strong clamping system • Excellent quality of machining and stable machining from high clamping force • Enhanced performance by high lubricated grade
 CP	P K	Ø12.00-Ø30.99	• High quality machining due to excellent centering: Good roundness and surface finish • Excellent chip control from exclusive edge design: Stable machining by good chip forming and chip evacuation
 CM new	M	Ø12.00-Ø30.99	• Ensuring strength of point and cutting edge: Stable machinability • Increased stability of machining due to low cutting load • Applied grade with high built up edge resistance and chipping resistance
 CN new	N	Ø12.00-Ø30.99	• Cutting edge with low cutting load: Excellent chip evacuation from increased surface finish of insert by special after treatment • Long tool life due to ultra-fine substrate application
 CP-FC new	P	Ø12.00-Ø30.99	• Cutting edge shape with excellent centering: Stable machinability from low cutting load • Available in various machining applications: Flat surface, angled surface, curved surface drilling, plunging and boring • Reduced cycle time by simplified tools: Endmill+drill machining → TPDC-CP-FC insert

Holder features

- **One step clamp system** - Increased stability and shortened setting time
- **High helix angle and flute polishing** - Reduced cutting load and enhanced chip evacuation
- Various applications from enlarged line-up by depth of cuts and shapes of workpiece



Run-out

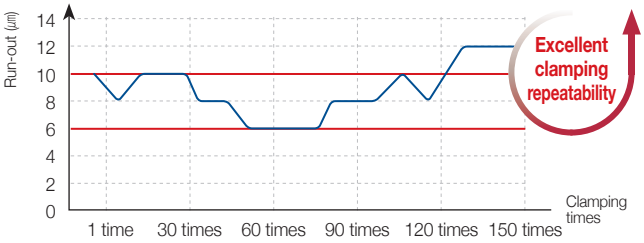
Durability evaluation

- **Workpiece** Alloy steel (42CrMo4, HRC22)
- **Cutting conditions** vc (m/min) = 90, fn (mm/rev) = 0.25, ap (mm) = 60, wet (10bar)
- **Tools** **Insert** TPD1500CP (PC5335)
  Holder TPDC5D-15020-75
  (Drill dia. = Ø15 mm)

▶ **Long tool life with the setting run-out, lower than 15 ㎛ after using 40 inserts**

※ Evaluation standards: Use the machining center under the cutting conditions above.

Clamping repeatability evaluation



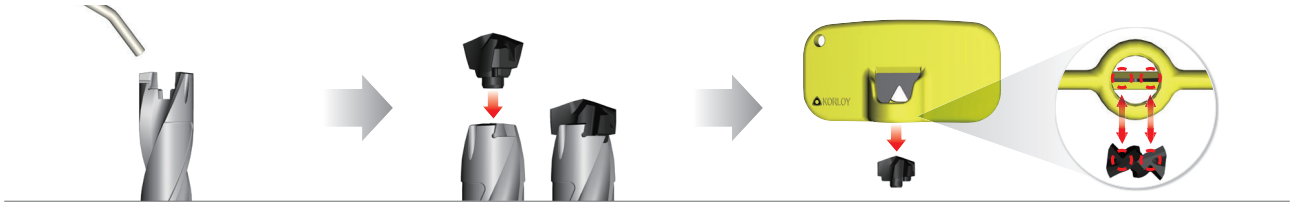
▶ **Excellent clamping system keeping the run-out, lower than 6 ㎛ after clamping 150 times repeatedly**

※ Evaluation standards: Measure it after manually clamping a holder and an insert.

How to clamp insert

Using the improved wrench

• Using the insert with slot on the top (Use the improved inserts only.)



① Clean the mounting seat with air or cloth.

② Put an insert on the holder.

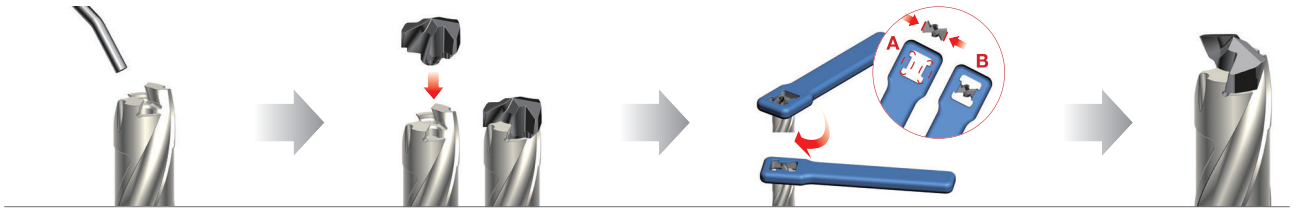
③ Put the wrench in the slot parallel.

④ After fixing the wrench firmly, turn it clockwise and clamp the insert to the holder.

Clamped state

Using the existing wrench

• Using any inserts (Use both existing inserts and improved inserts.) ▶ **Use only the improved wrench later.**



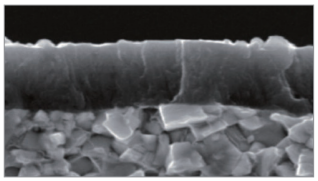
① Clean the mounting seat with air or cloth.

② Put an insert on the holder.

③ A part of wrench and B part of insert must be parallel to each other before clamp the insert. Turn the wrench clockwise to finish clamping.

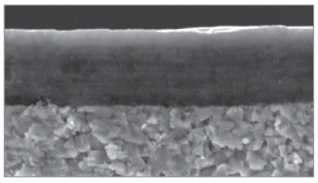
Clamped state

Features



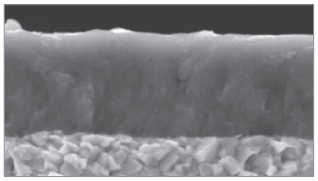
PC5335

- PVD coating technology with high toughness and excellent lubrication
- Coating with high adherence
- General grade for various kinds of workpiece machining



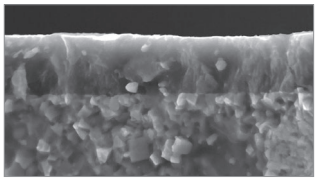
PC330P

- Improved wear resistance, built up edge resistance and heat resistance due to multi-coating layer with high hardness and lubrication
- Improved resistance against chipping and breakage due to alternating laminated structure which minimizes vertical crack
- Grade for carbon steel machining



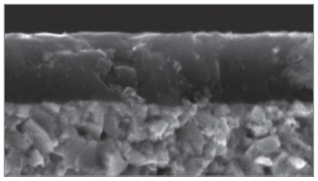
PC5300

- PVD coating layer with high hardness and stability at high temperature
- Stable hole-making from high strength of cutting edge and chipping resistance
- Grade for alloy steel and cast iron machining



PC330N new

- PVD coating technology with hard and smooth surface
- Coating layer with stability of thermal shock and adherence
- Grade for stainless steel machining



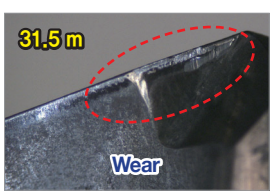
PC325U new

- Enhanced lubrication of surface and reduced cutting load
- Long tool life from higher welding resistance
- Optimal grade for general workpice cutting such as carbon steel

Performance evaluation

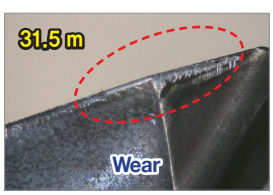
Wear resistance

- **Workpiece** Alloy steel (42CrMo4, HRC22)
- **Cutting conditions** vc (m/min) = 60
  fn (mm/rev) = 0.2
  ap (mm) = 150
  wet (20bar)
- **Tools** **Insert** TPD1500CP (PC5335)
  Holder TPDC12D-15020-170
  (Drill dia. = Ø15 mm)



[TPDC-CP]

Good wear resistance



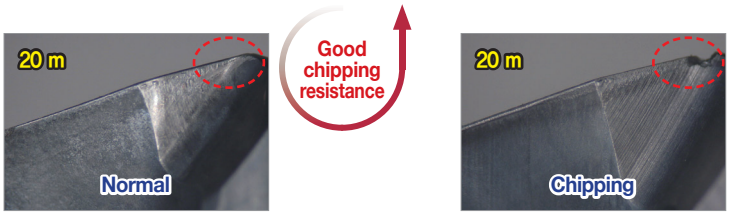
[Competitor]

▶ Maximized tool life due to normal cutting edge in deep hole-making

Performance evaluation

Wear resistance

- **Workpiece** Stainless steel (X5CrNi18-9, HB187)
- **Cutting conditions** vc (m/min) = 60
  fn (mm/rev) = 0.05
  ap (mm) = 40
  wet (30bar)
- **Tools** **Insert** TPD1500CM (PC330N)
  Holder TPDC5D-15020-75
  (Drill dia. = Ø15 mm)



[TPDC-CM] [Competitor]

▶ Maximized tool life due to stable machinability comparing to competitor's tool

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- **Workpiece** Stainless steel (X5CrNi18-9, HB187)
- **Cutting conditions** vc (m/min) = 80
  fn (mm/rev) = 0.15
  ap (mm) = 15.9
  wet (30bar)
- **Tools** **Insert** TPD1590CM (PC330N)
  Holder TPDC5D-15020-75
  (Drill dia. = Ø15.9 mm)

[TPDC-CM] [Competitor]

▶ Increased tool life due to good built up edge resistance comparing to competitor's tool

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- **Workpiece** Alloy steel (42CrMo4, HRC22), Angled surface 10°
- **Cutting conditions** vc (m/min) = 80
  fn (mm/rev) = 0.18
  ap (mm) = 30
  wet (20bar)
- **Tools** **Insert** TPD1500CP-FC (PC5335)
  Holder TPDC3D-15020-45
  (Drill dia. = Ø15 mm)

[TPDC-CP-FC] [Competitor]

▶ Maximized tool life due to good chipping resistance comparing to competitor's tool

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- **Workpiece** Carbon steel (C45, HRC18)
- **Cutting conditions** vc (m/min) = 100
  fn (mm/rev) = 0.25
  ap (mm) = 50
  wet (20bar)
- **Tools** **Insert** TPD2000CP-FC (PC5335)
  Holder TPDC3D-20025-60
  (Drill dia. = Ø20 mm)

[TPDC-CP-FC] [Competitor]

▶ Maximized tool life due to good chipping resistance and built up edge resistance comparing to competitor's tool

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- **Workpiece** Carbon steel (C45, HRC18)
- **Cutting conditions** vc (m/min) = 100
  fn (mm/rev) = 0.17
  ap (mm) = 50
  wet (15bar)
- **Tools** **Insert** TPD1000XP (PC325U)
  Holder TPDX5D-10016-50
  (Drill dia. = Ø10 mm)

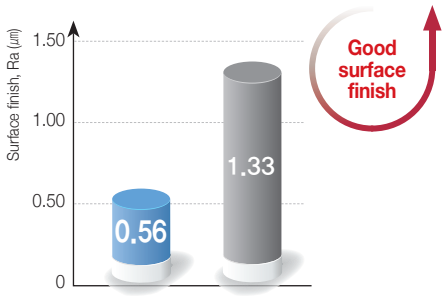
[TPDC-XP] [Competitor]

▶ Higher wear resistance than competitor's

Performance evaluation

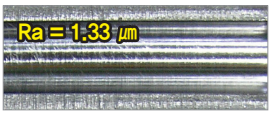
Surface finish

- **Workpiece** Alloy steel (42CrMo4, HRC22)
- **Cutting conditions** vc (m/min) = 100
  fn (mm/rev) = 0.2
  ap (mm) = 90
  wet (10bar)
- **Tools** **Insert** TPD1900CP (PC5335)
  Holder TPDC5D-19025-95
  (Drill dia. = Ø19 mm)



[TPDC-CP] [Competitor]

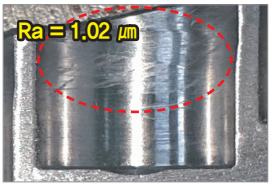
[TPDC-CP]



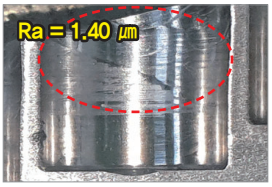
[Competitor]

▶ Good surface finish due to multi-cutting edge and lubricated coating

- **Workpiece** Carbon steel (C45, HRC18), Angled surface 15°
- **Cutting conditions** vc (m/min) = 100
  fn (mm/rev) = 0.18
  ap (mm) = 30
  wet (20bar)
- **Tools** **Insert** TPD2000CP-FC (PC5335)
  Holder TPDC3D-20025-60
  (Drill dia. = Ø20 mm)



[TPDC-CP-FC]

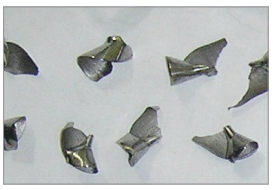


[Competitor]

▶ Good surface finish due to profiled cutting edge and lubricated coating

Chip control

- **Workpiece** Welding structural steel (SM355A, HRC20)
- **Cutting conditions** vc (m/min) = 90
  fn (mm/rev) = 0.25
  ap (mm) = 90
  wet (10bar)
- **Tools** **Insert** TPD1900CP (PC5335)
  Holder TPDC5D-19025-95
  (Drill dia. = Ø19 mm)



[TPDC-CP]

[Competitor]

▶ Regular chip shape and stable chip evacuation

- **Workpiece** Carbon steel (C45, HRC18)
- **Cutting conditions** vc (m/min) = 100
  fn (mm/rev) = 0.25
  ap (mm) = 50
  wet (20bar)
- **Tools** **Insert** TPD2000CP-FC (PC5335)
  Holder TPDC3D-20025-60
  (Drill dia. = Ø20 mm)

[TPDC-CP-FC]

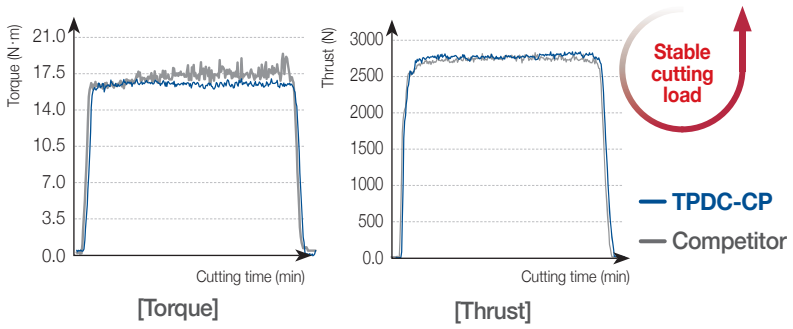
[Competitor]

▶ Regular chip shape and stable chip evacuation

Performance evaluation

Cutting load

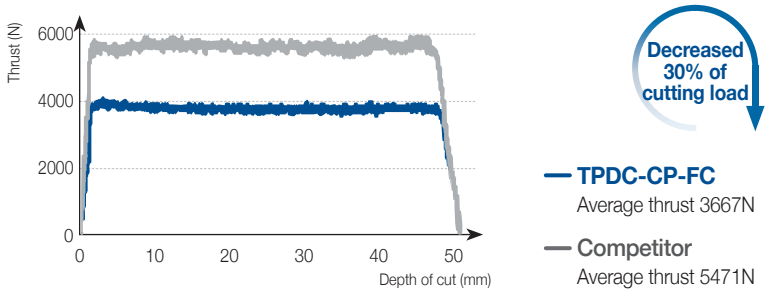
- **Workpiece** Carbon steel (45C, HRC19)
- **Cutting conditions** vc (m/min) = 90
  fn (mm/rev) = 0.25
  ap (mm) = 60
  wet (10bar)
- **Tools** **Insert** TPD1500CP (PC5335)
  Holder TPDC5D-15025-75
  (Drill dia. = Ø15 mm)



[Torque] [Thrust]

▶ Stable cutting load due to multi-cutting edge and good chip control

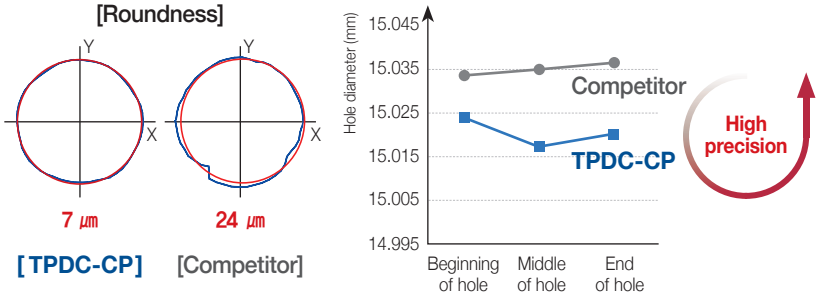
- **Workpiece** Carbon steel (45C, HRC18)
- **Cutting conditions** vc (m/min) = 100
  fn (mm/rev) = 0.25
  ap (mm) = 50
  wet (10bar)
- **Tools** **Insert** TPD2000CP-FC (PC5335)
  Holder TPDC3D-20025-60
  (Drill dia. = Ø20 mm)



▶ Low and stable cutting load due to profiled-cutting edge

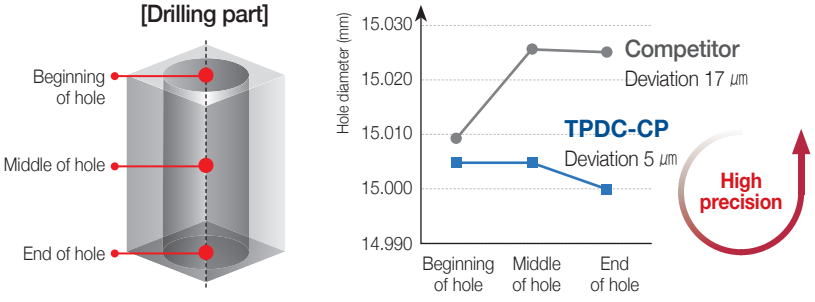
Precision

- **Workpiece** Alloy steel (42CrMo4, HRC22)
- **Cutting conditions** vc (m/min) = 100
  fn (mm/rev) = 0.2
  ap (mm) = 60
  wet (10bar)
- **Tools** **Insert** TPD1500CP (PC5335)
  Holder TPDC5D-15025-75
  (Drill dia. = Ø15 mm)



▶ Stable cutting load due to multi-cutting edge and good chip control

- **Workpiece** Carbon steel (C45, HRC19)
- **Cutting conditions** vc (m/min) = 60
  fn (mm/rev) = 0.2
  ap (mm) = 150
  wet (20bar)
- **Tools** **Insert** TPD1500CP (PC5335)
  Holder TPDC12D-15020-170
  (Drill dia. = Ø15 mm)

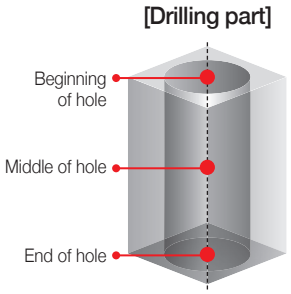


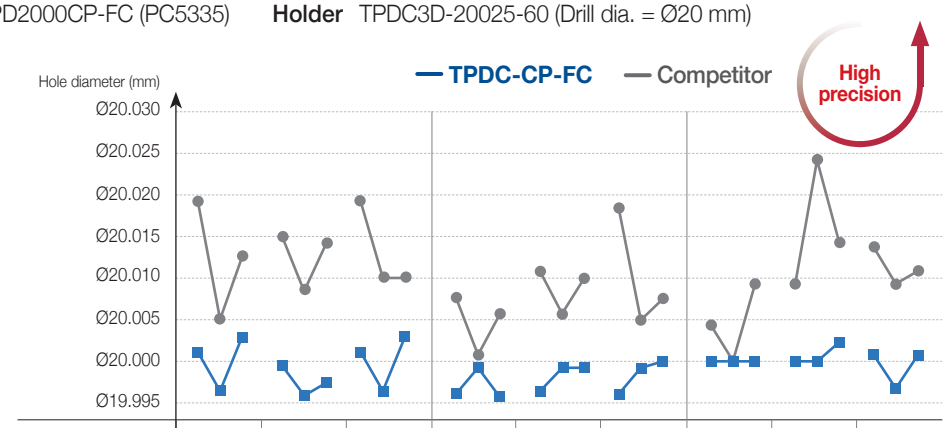
▶ High precision in deep hole-making

Performance evaluation

Precision

- **Workpiece** Carbon steel (C45, HRC18)
- **Cutting conditions** vc (m/min) = 60-100, fn (mm/rev) = 0.2-0.3, ap (mm) = 50, wet (20 bar)
- **Tools** **Insert** TPD2000CP-FC (PC5335) **Holder** TPDC3D-20025-60 (Drill dia. = Ø20 mm)

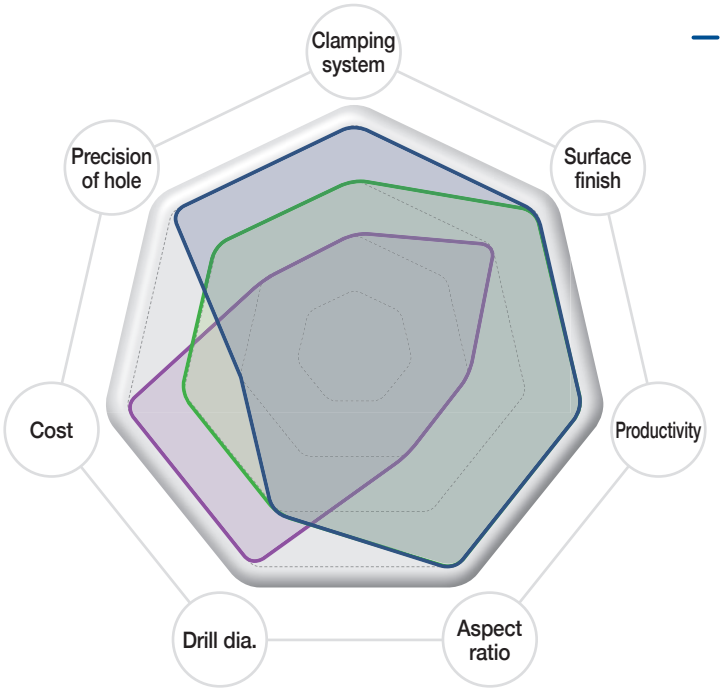




Drilling part	Beginning	Middle	End	Beginning	Middle	End	Beginning	Middle	End
fn (mm/rev)	0.20	0.25	0.30	0.20	0.25	0.30	0.20	0.25	0.30
vc (m/min)	60			80			100		

▶ High precision and excellent centering due to profiled cutting edge

Indexable drill selection guide



— TPDC Plus Drill — TPDB Plus — King Drill

TPDC Plus Drill new

- One step clamping
- High precision of hole
- 1.5D, 3D, 5D, 8D, 10D, 12D

TPDB Plus new

- Good surface finish
- High productivity
- 3D, 5D, 8D, 10D, 12D

King Drill

- 4 corners (central and peripheral)
- 2D, 3D, 4D, 5D

Tools	Clamping system	Surface finish	Productivity	Aspect ratio	Drill dia.	Cost	Precision of hole
TPDC Plus Drill new	★★★★	★★★★	★★★★	★★★★	★★★	★★	★★★★
TPDB Plus new	★★★	★★★★	★★★★	★★★★	★★★	★★★	★★★
King Drill	★★	★★★	★★	★★	★★★★	★★★★	★★

Recommended cutting conditions (TPDC-XP)

【3D Drilling】

Workpiece			Grade	vc (m/min)	Aspect ratio (L/D) = 3D Feed rate (mm/rev) per drill dia. (mm)	
ISO	Workpiece	HB			Ø8.00-Ø9.99	Ø10.00-Ø11.99
P Carbon steel	Low carbon steel	80-120	PC325U	**110** (80-140)	0.12-0.22	0.15-0.28
	High carbon steel	180-280	PC325U	**90** (70-110)		
P Alloy steel	Low alloy steel	140-260	PC325U	**90** (70-110)	0.12-0.20	0.14-0.25
	Low alloy heat-treated steel	200-400	PC325U	**70** (50-90)		
	High alloy steel	260-320	PC325U	**70** (50-90)	0.10-0.15	0.12-0.18
	High alloy heat-treated steel	300-450	PC325U	**60** (40-80)		
K Cast iron	Gray cast iron	150-230	PC325U	**125** (90-160)	0.15-0.30	0.20-0.35
	Ductile cast iron	160-260	PC325U	**110** (80-140)		

※ In interrupted machining, reduce the feed to 0.1-0.15 machining around the interrupted part.

【5D Drilling】

Workpiece			Grade	vc (m/min)	Aspect ratio (L/D) = 5D Feed rate (mm/rev) per drill dia. (mm)	
ISO	Workpiece	HB			Ø8.00-Ø9.99	Ø10.00-Ø11.99
P Carbon steel	Low carbon steel	80-120	PC325U	**110** (80-140)	0.12-0.22	0.15-0.28
	High carbon steel	180-280	PC325U	**90** (70-110)		
P Alloy steel	Low alloy steel	140-260	PC325U	**90** (70-110)	0.12-0.20	0.14-0.25
	Low alloy heat-treated steel	200-400	PC325U	**70** (50-90)		
	High alloy steel	260-320	PC325U	**70** (50-90)	0.10-0.15	0.12-0.18
	High alloy heat-treated steel	300-450	PC325U	**60** (40-80)		
K Cast iron	Gray cast iron	150-230	PC325U	**125** (90-160)	0.15-0.30	0.20-0.35
	Ductile cast iron	160-260	PC325U	**110** (80-140)		

※ In interrupted machining, reduce the feed to 0.1-0.15 machining around the interrupted part.

【8D Drilling】

Workpiece			Grade	vc (m/min)	Aspect ratio (L/D) = 8D Feed rate (mm/rev) per drill dia. (mm)	
ISO	Workpiece	HB			Ø8.00-Ø9.99	Ø10.00-Ø11.99
P Carbon steel	Low carbon steel	80-120	PC325U	**100** (70-130)	0.10-0.20	0.12-0.25
	High carbon steel	180-280	PC325U	**80** (60-100)		
P Alloy steel	Low alloy steel	140-260	PC325U	**80** (60-100)	0.10-0.18	0.12-0.20
	Low alloy heat-treated steel	200-400	PC325U	**60** (40-80)		
	High alloy steel	260-320	PC325U	**60** (40-80)	0.09-0.13	0.10-0.16
	High alloy heat-treated steel	300-450	PC325U	**50** (30-70)		
K Cast iron	Gray cast iron	150-230	PC325U	**115** (80-150)	0.12-0.27	0.17-0.32
	Ductile cast iron	160-260	PC325U	**100** (70-130)		

※ In interrupted machining, reduce the feed to 0.1-0.15 machining around the interrupted part.
※ In case of 8D drilling, please use a Pilot Dirll.

Recommended cutting conditions (TPDC-CP/CM/CN)

【1.5D/3D Drilling】

Workpiece			Insert	Grade	vc (m/min)	Aspect ratio (L/D) = 1.5D, 3D Feed rate (mm/rev) per drill dia. (mm)		
ISO	Workpiece	HB				Ø12.00-Ø17.99	Ø18.00-Ø25.99	Ø26.00-Ø30.99
P Carbon steel	Low carbon steel	80-120	CP	PC5335 PC330P	**120** (90-140)	0.25-0.35	0.30-0.40	0.35-0.45
	High carbon steel	180-280	CP	PC5335 PC330P	**110** (80-130)	0.25-0.35	0.30-0.40	0.30-0.45
P Alloy steel	Low alloy steel	140-260	CP	PC5335 PC5300	**120** (90-140)	0.28-0.40	0.33-0.43	0.38-0.48
	Low alloy heat-treated steel	200-400	CP	PC5335 PC5300	**80** (60-100)	0.28-0.40	0.33-0.43	0.30-0.48
	High alloy steel	260-320	CP	PC5335 PC5300	**75** (60-90)	0.20-0.35	0.22-0.40	0.25-0.45
	High alloy heat-treated steel	300-450	CP	PC5335 PC5300	**65** (50-80)	0.20-0.35	0.22-0.40	0.22-0.45
M Stainless steel	Austenitic	135-275	CM	PC330N	**65** (50-80)	0.05-0.15	0.10-0.20	0.15-0.25
	Ferritic, martensitic	135-275	CM	PC330N	**75** (60-90)	0.10-0.20	0.15-0.30	0.20-0.35
K Cast iron	Gray cast iron	150-230	CP	PC5335 PC5300	**130** (90-140)	0.35-0.45	0.40-0.50	0.45-0.55
	Ductile cast iron	160-260	CP	PC5335 PC5300	**120** (80-130)	0.30-0.40	0.30-0.45	0.40-0.50
N Non-ferrous metal	Aluminum	30-150	CN	H01	**200** (120-220)	0.35-0.45	0.40-0.50	0.45-0.55
	Copper alloy	150-160	CN	H01	**200** (120-220)	0.35-0.45	0.40-0.50	0.45-0.55

※ In interrupted machining, reduce the feed to 0.1-0.15 machining around the interrupted part.
※ In stainless steel machining, start with low feed machining then, gradually get the cutting conditions higher and set the optimal cutting conditions.

【5D Drilling】

Workpiece			Insert	Grade	vc (m/min)	Aspect ratio (L/D) = 5D Feed rate (mm/rev) per drill dia. (mm)		
ISO	Workpiece	HB				Ø12.00-Ø17.99	Ø18.00-Ø25.99	Ø26.00-Ø30.99
P Carbon steel	Low carbon steel	80-120	CP	PC5335 PC330P	**110** (80-140)	0.15-0.30	0.20-0.35	0.25-0.40
	High carbon steel	180-280	CP	PC5335 PC330P	**100** (70-130)	0.15-0.30	0.20-0.35	0.25-0.40
P Alloy steel	Low alloy steel	140-260	CP	PC5335 PC5300	**110** (80-140)	0.18-0.35	0.23-0.38	0.28-0.43
	Low alloy heat-treated steel	200-400	CP	PC5335 PC5300	**75** (50-100)	0.18-0.35	0.23-0.38	0.28-0.43
	High alloy steel	260-320	CP	PC5335 PC5300	**70** (50-90)	0.18-0.30	0.20-0.35	0.25-0.40
	High alloy heat-treated steel	300-450	CP	PC5335 PC5300	**60** (40-80)	0.18-0.30	0.20-0.35	0.22-0.40
M Stainless steel	Austenitic	135-275	CM	PC330N	**60** (40-80)	0.05-0.15	0.10-0.20	0.15-0.25
	Ferritic, martensitic	135-275	CM	PC330N	**70** (50-90)	0.10-0.20	0.15-0.30	0.20-0.35
K Cast iron	Gray cast iron	150-230	CP	PC5335 PC5300	**120** (80-140)	0.25-0.40	0.30-0.45	0.35-0.50
	Ductile cast iron	160-260	CP	PC5335 PC5300	**110** (70-130)	0.20-0.35	0.25-0.40	0.30-0.45
N Non-ferrous metal	Aluminum	30-150	CN	H01	**200** (90-220)	0.35-0.45	0.40-0.50	0.45-0.55
	Copper alloy	150-160	CN	H01	**200** (90-220)	0.35-0.45	0.40-0.50	0.45-0.55

※ In interrupted machining, reduce the feed to 0.1-0.15 machining around the interrupted part.
※ In stainless steel machining, start with low feed machining then, gradually get the cutting conditions higher and set the optimal cutting conditions.

Recommended cutting conditions (TPDC-CP/CM/CN)

【8D Drilling】

Workpiece			Insert	Grade	vc (m/min)	Aspect ratio (L/D) = 8D Feed rate (mm/rev) per drill dia. (mm)		
ISO	Workpiece	HB				Ø12.00-Ø17.99	Ø18.00-Ø25.99	Ø26.00-Ø30.99
P Carbon steel	Low carbon steel	80-120	CP	PC5335 PC330P	**100** (70-130)	0.12-0.25	0.17-0.30	0.22-0.35
	High carbon steel	180-280	CP	PC5335 PC330P	**90** (60-120)	0.12-0.25	0.17-0.30	0.22-0.35
P Alloy steel	Low alloy steel	140-260	CP	PC5335 PC5300	**100** (70-130)	0.15-0.30	0.20-0.33	0.25-0.38
	Low alloy heat-treated steel	200-400	CP	PC5335 PC5300	**65** (40-90)	0.15-0.30	0.20-0.33	0.25-0.38
	High alloy steel	260-320	CP	PC5335 PC5300	**60** (40-80)	0.15-0.25	0.17-0.30	0.22-0.35
	High alloy heat-treated steel	300-450	CP	PC5335 PC5300	**50** (30-70)	0.15-0.25	0.17-0.30	0.22-0.35
M Stainless steel	Austenitic	135-275	CM	PC330N	**50** (30-70)	0.05-0.10	0.05-0.15	0.10-0.20
	Ferritic, martensitic	135-275	CM	PC330N	**60** (40-80)	0.05-0.15	0.10-0.25	0.15-0.30
K Cast iron	Gray cast iron	150-230	CP	PC5335 PC5300	**110** (70-130)	0.22-0.35	0.27-0.40	0.32-0.45
	Ductile cast iron	160-260	CP	PC5335 PC5300	**100** (60-120)	0.17-0.30	0.22-0.35	0.27-0.40
N Non-ferrous metal	Aluminum	30-150	CN	H01	**190** (80-200)	0.30-0.40	0.35-0.45	0.40-0.50
	Copper alloy	150-160	CN	H01	**190** (80-200)	0.30-0.40	0.35-0.45	0.40-0.50

※ In interrupted machining, reduce the feed to 0.1-0.15 machining around the interrupted part.
※ In stainless steel machining, start with low feed machining then, gradually get the cutting conditions higher and set the optimal cutting conditions.

【10D/12D Drilling】

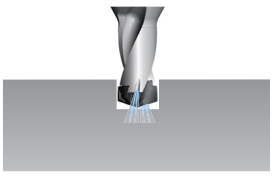
Workpiece			Insert	Grade	vc (m/min)	Aspect ratio (L/D) = 10D, 12D Feed rate (mm/rev) per drill dia. (mm)		
ISO	Workpiece	HB				Ø12.00-Ø17.99	Ø18.00-Ø25.99	Ø26.00-Ø30.99
P Carbon steel	Low carbon steel	80-120	CP	PC5335 PC330P	**90** (60-120)	0.10-0.20	0.15-0.25	0.20-0.30
	High carbon steel	180-280	CP	PC5335 PC330P	**80** (50-110)	0.10-0.20	0.15-0.25	0.20-0.30
P Alloy steel	Low alloy steel	140-260	CP	PC5335 PC5300	**90** (60-120)	0.13-0.25	0.18-0.28	0.23-0.33
	Low alloy heat-treated steel	200-400	CP	PC5335 PC5300	**55** (40-80)	0.13-0.30	0.18-0.28	0.23-0.33
	High alloy steel	260-320	CP	PC5335 PC5300	**50** (40-70)	0.13-0.25	0.15-0.25	0.20-0.30
	High alloy heat-treated steel	300-450	CP	PC5335 PC5300	**40** (30-60)	0.13-0.25	0.15-0.25	0.20-0.30
M Stainless steel	Austenitic	135-275	CM	PC330N	**50** (30-60)	0.05-0.10	0.05-0.15	0.10-0.20
	Ferritic, martensitic	135-275	CM	PC330N	**60** (40-70)	0.05-0.15	0.10-0.25	0.15-0.30
K Cast iron	Gray cast iron	150-230	CP	PC5335 PC5300	**100** (60-120)	0.20-0.30	0.25-0.35	0.30-0.40
	Ductile cast iron	160-260	CP	PC5335 PC5300	**90** (50-110)	0.15-0.25	0.20-0.30	0.25-0.35
N Non-ferrous metal	Aluminum	30-150	CN	H01	**180** (70-190)	0.28-0.35	0.33-0.40	0.38-0.45
	Copper alloy	150-160	CN	H01	**180** (70-190)	0.28-0.35	0.33-0.40	0.38-0.45

※ In interrupted machining, reduce the feed to 0.1-0.15 machining around the interrupted part.
※ In case of 10D and 12D, apply the recommended cutting conditions in the other side.
※ In stainless steel machining, start with low feed machining then, gradually get the cutting conditions higher and set the optimal cutting conditions.

How to drill a deep hole (10D/12D)

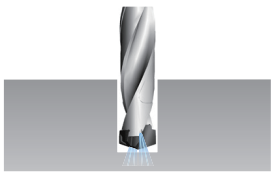
【Using a pilot drill (recommended)】

1. Drilling a pilot hole (with a pilot drill)



• Drill a 0.5D pilot hole in 70% lower cutting speed with 1.5D drill or 3D drill.

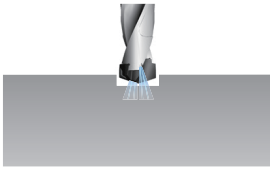
2. Start drilling



• Start drilling in recommended cutting conditions after replacing the drill.

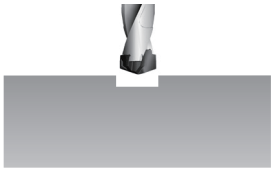
【Without a pilot drill】

1. Drilling a pilot hole (without a pilot drill)



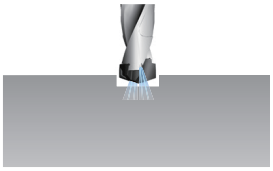
• After drill 0.5D with 70% lower cutting speed, stop drilling for 2-3 seconds putting the drill in the hole.

2. Stop drilling



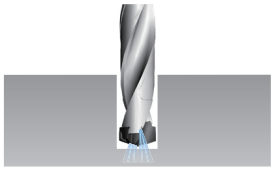
• Stop supplying the coolant and take out the drill from the hole. Then, stop drilling for 2-3 seconds.

3. Ready to drill



• After putting the drill in the hole to 2-3 mm upper than the bottom of the pilot hole, start supplying the coolant. Then, be ready to start drilling.

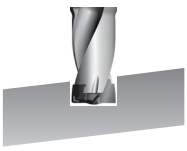
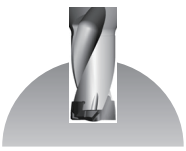
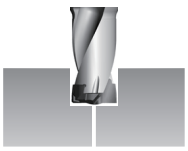
4. Start drilling



• Start drilling in recommended cutting conditions.

Recommended cutting conditions (TPDC-CP-FC)

Workpiece			Grade	vc (m/min)	Aspect ratio (L/D) = 1.5D, 3D, 5D Feed rate (mm/rev) per drill dia. (mm)		
ISO	Workpiece	HB			Ø12.00-Ø17.99	Ø18.00-Ø25.99	Ø26.00-Ø30.99
P Carbon steel	Low carbon steel (C10, C25 etc)	80-120	PC5335	**90** (70-110)	0.18-0.28	0.2-0.3	0.23-0.33
	High carbon steel (C45, C50 etc)	180-280		**80** (60-100)	0.18-0.28	0.2-0.3	0.23-0.33
P Alloy steel	Low alloy steel (18CrMo4, 42CrMo4 etc)	140-260		**90** (70-110)	0.18-0.28	0.2-0.3	0.23-0.33
	High alloy steel (34CrMo4 etc)	260-320		**70** (50-90)	0.18-0.28	0.2-0.3	0.23-0.33

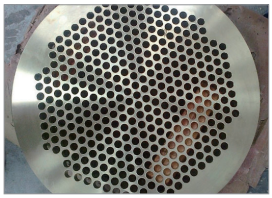
Machining	Flat surface drilling	Angled surface drilling	Curved surface drilling	Plunging	Boring
Pic.					
1.5D/3D	○	○	○	○	○
5D	○	×	×	×	×

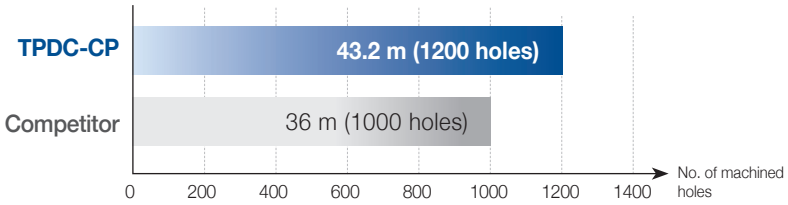
※ Please refer to the precaution in drilling in case of angled surface drilling, curved surface drilling, plunging and boring.

Application examples

Carbon steel (ASTM 1518, HRC18)

- **Workpiece** Tube sheet
- **Cutting conditions** vc (m/min) = 85, n (rpm) = 1381, fn (mm/rev) = 0.27, ap (mm) = 12 mm x 3 Passes, wet
- **Tools** **Insert** TPD1960CP (PC330P) **Holder** TPDC3D-19025-57

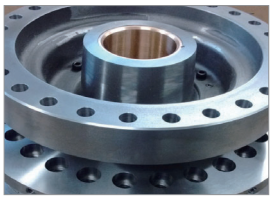


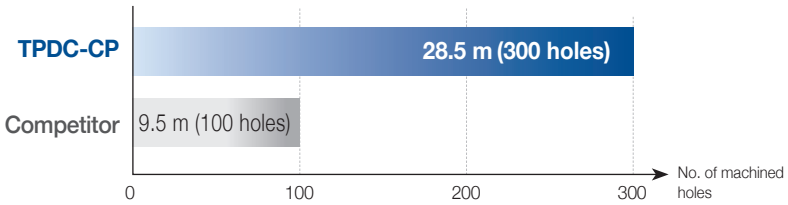


▶ Optimized cutting edge enhances wear resistance due to stable cutting load and lubricated multi-layer coating.

Alloy steel (42CrMo4, HRC22)

- **Workpiece** Turret flange
- **Cutting conditions** vc (m/min) = 82, n (rpm) = 2000, fn (mm/rev) = 0.2, ap (mm) = 95, wet
- **Tools** **Insert** TPD1300CP (PC5335) **Holder** TPDC8D-13016-104

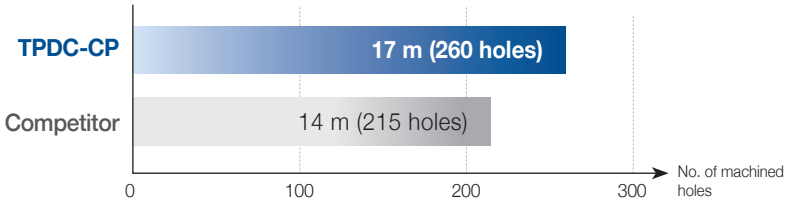




▶ Lubricated multi-layer coating improving chipping resistance prevents chipping on the cutting edge.

Carbon steel (C45, HRC19)

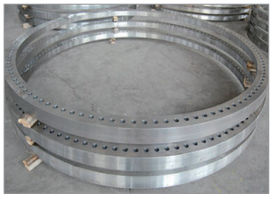
- **Workpiece** Connecting shaft
- **Cutting conditions** vc (m/min) = 60, n (rpm) = 1187, fn (mm/rev) = 0.11, ap (mm) = 65, wet
- **Tools** **Insert** TPD1610CP (PC330P) **Holder** TPDC5D-16020-80

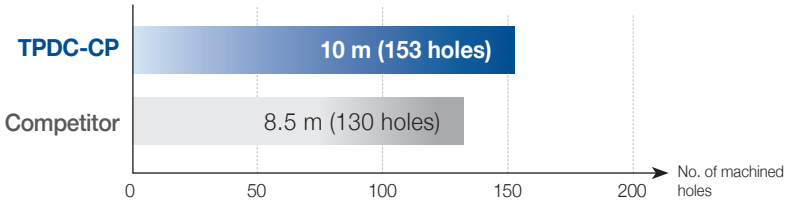


▶ Optimized cutting edge realizes stable chip shape and chip evacuation even occurring wear on the cutting edge.

Carbon steel (C45, HRC40)

- **Workpiece** Tower flange
- **Cutting conditions** vc (m/min) = 60, n (rpm) = 1062, fn (mm/rev) = 0.15, ap (mm) = 65, wet
- **Tools** **Insert** TPD1800CP (PC5335) **Holder** TPDC5D-18025-90



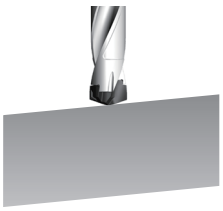


▶ Lubricated multi-coating enhances wear resistance.

Precaution in drilling

【TPDC-CP/CM/CN】

Angled surface drilling

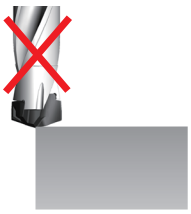


- The approach angle between drill and the workpiece at the beginning and the end should be less than 6˚.
- Reduce the feed (fn) to 30-50% than general cutting conditions at the beginning and the end of angled surface.

Stacked plates drilling

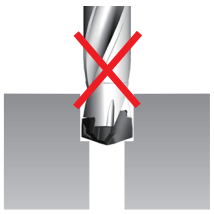
- Gap between the plates could make wrong chip evacuation causing fracture of the drill.
- Place stacked plates without any gap between each.

Plunging



- Irregular cutting resistance in plunging could cause fracture and deformation of the drill.

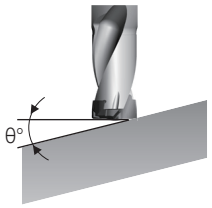
Boring



- Boring is not recommended due to wear and chipping in the corner of the insert.

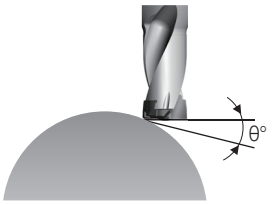
【TPDC-CP-FC】

Angled surface drilling



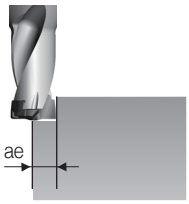
- Reduce the feed (fn) to 30% than general cutting conditions at the beginning and the end of angled surface. (Recommended only in case of θ is less than 10˚.)

Curved surface drilling



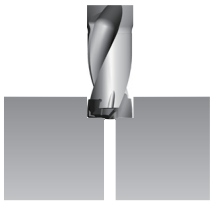
- Reduce the feed (fn) to 30% than general cutting conditions at the beginning of curved surface. (In case, θ is over 30˚, reduce it to 50%.)

Plunging



- Reduce the depth of cut (ae) to shorter than 1/2 of drill diameter.
- In case, the depth of cut is longer than drill diameter, plunge with divided depth of cut.

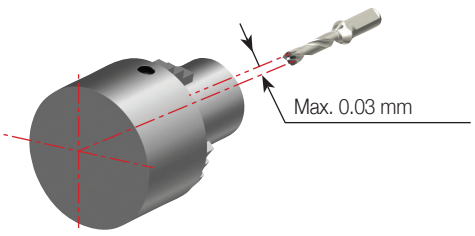
Boring



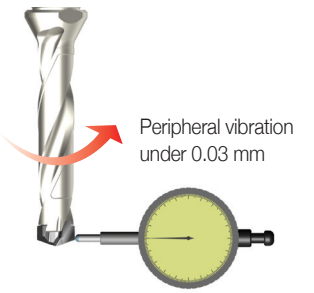
- Reduce the feed (fn) to 30% than general cutting conditions at the beginning of boring.
- Start with 2 mm stepping before boring to prevent long chip.

Check point in drilling

- Condition of the clamped workpiece
- Revolution of the main axis of the machine
- Condition of the holder
- Run-out of the clamped drill (Max. 0.03 mm)
- Condition of supplying coolant (pressure, flow, concentration)
- Chip evacuation



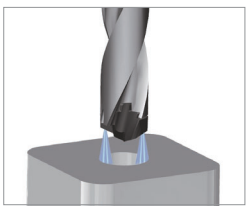
[Setting of the horizontal equipment]

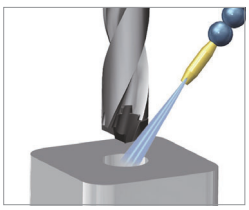


[Setting of the vertical equipment]

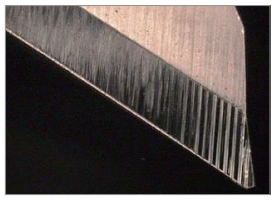
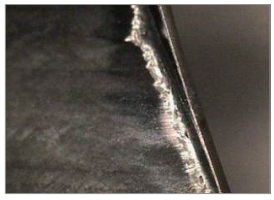
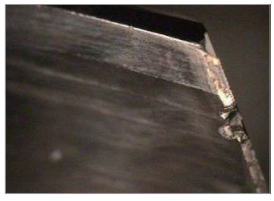
Supply of coolant

- Supply enough coolant to the beginning of the hole.
- Minimum pressure of oil coolant: 5 bar
- Minimum flow of coolant: 5 ℓ/min

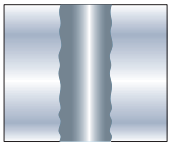
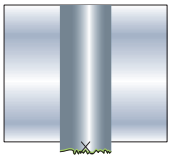
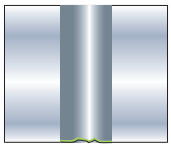
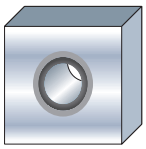




Types of damage to drill and solutions

Scratches on the margin		
	Factors	• Lack of coolant lubrication • Lack of coolant in deep drilling due to MQL system • Bend of drill due to improperly placed holder or using a long holder • Low rigidity or large concentricity
	Solutions	• Use more coolant. • Place workpiece tightly and check the concentricity. • Check the precision of installment of drill. (below 0.03 mm) • Reduce the cutting speed.
Wear on the margin		
	Factors	• Due to machining pure metal or heat resisting alloy • Less back taper due to using a holder for a long time • Unstable machining at the end of hole due to interruption • Lack of coolant lubrication on the peripheral section of holder contacting workpiece
	Solutions	• Set up proper tool life and manage its usage. • Check the shape of machining part. • Check the kind and concentration of coolant.
Chipping on the corner		
	Factors	• Interrupted machining (End of hole is inclined or curved shape, junction hole in the middle of hole.) • Chattering in drilling due to unstable clamping, low rigidity of machine or bending of drill • Chattering due to unstable clamping of drill
	Solutions	• Check the part of machining. • Machine in lower cutting speed. • Place workpiece tightly. • Check the performance of the machine. • Check the precision of installment of drill. (below 0.03 mm)
Wear on the rake face		
	Factors	• Low cutting speed • Machining free-cutting steel • Erosion of chip and flute • Lack of coolant lubrication
	Solutions	• Increase cutting speed. • Set a lower thinning angle. • Reduce the honing. • Use more coolant.
Chipping on the rake face		
	Factors	• Fracture on the cutting edge partially due to pre-treatment on the center of hole • Unstable chip evacuation due to step drilling and external coolant • Chattering in drilling and low precision of holder installment
	Solutions	• Check if there is pre-machining or not. • It is recommended to use internal coolant in step drilling. • Check the state of clamping workpiece and the precision of drill installment. (below 0.03 mm)

Types of damage to workpiece and check points

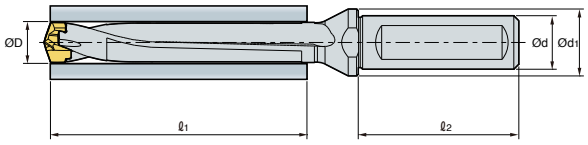
Poor surface finish (rough, scratch, etc.)		
	Factors	• Low rigidity of machine and improperly clamped workpiece • Large concentricity and lack of coolant
	Solutions	• Clamp the workpiece properly and check the concentricity. • Increase the amount and pressure of coolant
Remained lots of burr at the end of the drilled hole		
	Factors	• High feed and excessive honing of the cutting edge • Exceeded cutting tool's tool life (Too much wear and chipping)
	Solutions	• Reduce feed (especially at the end of hole) and use a new drill. • Increase point angle or reduce honing.
Flaking the end of the drilled hole		
	Factors	• Machining of low toughness materials as cast iron • Rapid feed and excessive honing of the cutting edge • Exceeded cutting tool's tool life (Too much wear and chipping)
	Solutions	• Reduce the feed. (Especially at the end of hole) • Use a new drill. • Reduce honing on the cutting edge.
Thermal deformation and oxidation of the end of the drilled hole		
	Factors	• Rapid feed • Lack of coolant • Excessive cutting load • Exceeded cutting tool's tool life (Too much wear and chipping)
	Solutions	• Reduce the feed and honing on the cutting edge. • Use more coolant and use a new drill.

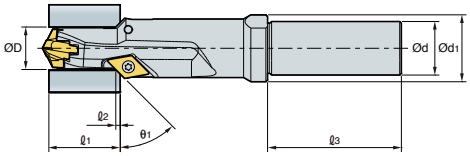
Solutions for troubles

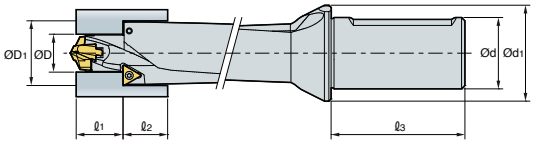
⬆ Increase ⬇ Decrease ○ Use

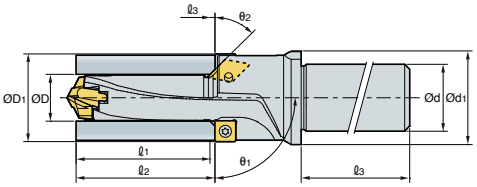
Trouble	Designation	Solutions															
		Cutting conditions					Tool shape					Grade		The others			
		vc	fn	Coolant	fn (in the beginning)	Depth of cut	Relief angle	Point angle	Thinning angle	Honing	Flute width rate	Toughness	Hardness	Rigidity of machine	Chattering of machine	Fixing workpiece	Overhang
Chipping	• Improper cutting conditions • Low rigidity of tool • Built-up edge • Improper grade • Chattering	⬇	⬇	○			⬇		⬇	⬆		⬆		⬆	⬇	⬆	⬇
Wear	• Excessive cutting speed (wear on margin)	⬇	⬇	○									⬆				
	• Low cutting speed (wear in the center of drill)	⬆	⬇	○									⬆				
Fracture	• Improper cutting conditions • Too much cutting load • Too long overhang • Less rigidity of machine	⬇	⬇	○	⬇	⬇								⬆		⬆	⬇
Poor chip evacuation	• Improper cutting conditions		⬇	○		⬇					⬆						
Poor surface finish	• Built-up edge • Chattering • Improper cutting conditions	⬆	⬇	○	⬇			⬇		⬇				⬆	⬇	⬆	⬇
Poor accuracy of hole	• Low cutting speed (wear in the center of drill)	⬆	⬇											⬆	⬇		⬇

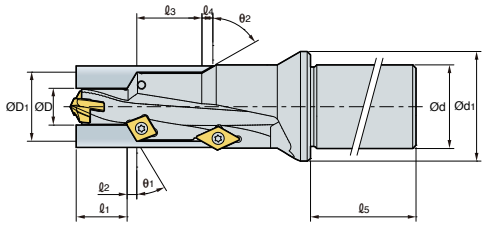
Special drill order form

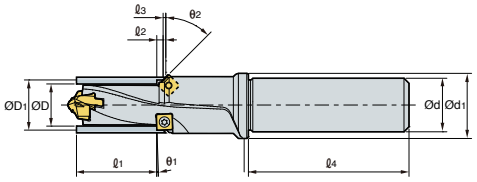












Hole type

☐ Blind hole ☐ Through hole

Coolant type

☐ Internal ☐ External

Special note

- Currently using tool:
- Current cutting condition
  - n (rpm) or vc (m/min):
  - vf (mm/min) or fn (mm/rev):
  - Depth of cut, ap (mm):
- Standard of measuring tool life:
- Currently using machine
  - Machining center:
  - General lathe:
  - CNC lathe:

Shank type

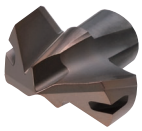
☐  Plain type

☐  Flat type

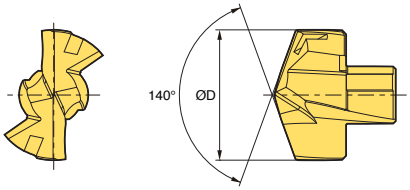
☐  Weldon type

☐  Whistle notch type

Insert



XP



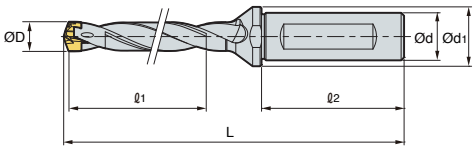
Drill dia. ØD (mm)	P type (XP)	Coated	Holder	Wrench
	TPDC-XP	PC325U		
8.0	TPD0800XP	●	TPDX□D-08012-□	TPDC-W0811
8.1	TPD0810XP	●		
8.2	TPD0820XP	●		
8.3	TPD0830XP	●		
8.4	TPD0840XP	●		
8.5	TPD0850XP	●	TPDX□D-08512-□	
8.6	TPD0860XP	●		
8.7	TPD0870XP	●		
8.8	TPD0880XP	●		
8.9	TPD0890XP	●		
9.0	TPD0900XP	●	TPDX□D-09012-□	
9.1	TPD0910XP	●		
9.2	TPD0920XP	●		
9.3	TPD0930XP	●		
9.4	TPD0940XP	●		
9.5	TPD0950XP	●	TPDX□D-09512-□	
9.6	TPD0960XP	●		
9.7	TPD0970XP	●		
9.8	TPD0980XP	●		
9.9	TPD0990XP	●		
10.0	TPD1000XP	●	TPDX□D-10016-□	
10.1	TPD1010XP	●		
10.2	TPD1020XP	●		
10.3	TPD1030XP	●		
10.4	TPD1040XP	●		
10.5	TPD1050XP	●	TPDX□D-10516-□	
10.6	TPD1060XP	●		
10.7	TPD1070XP	●		
10.8	TPD1080XP	●		
10.9	TPD1090XP	●		
11.0	TPD1100XP	●	TPDX□D-11016-□	
11.1	TPD1110XP	●		
11.2	TPD1120XP	●		
11.3	TPD1130XP	●		
11.4	TPD1140XP	●		
11.5	TPD1150XP	●	TPDX□D-11516-□	
11.6	TPD1160XP	●		
11.7	TPD1170XP	●		
11.8	TPD1180XP	●		
11.9	TPD1190XP	●		

※ We can provide if you order exact machining specification. ●: Stock item

Parts (applicable wrench)

Picture	Designation	Drill diameter ØD (mm)	Torque (N·m)
	TPDC-W0811	8.00-11.99	0.7-1.5

TPDC Plus Drill (3D/5D/8D)

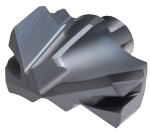


(mm)

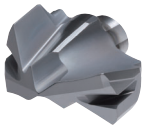
Designation		Stock	ØD	Ød	Ød1	ℓ1	ℓ2	L	Applicable insert
TPDX	3D-08012-24	●	8.0-8.4	12	16	24	45	82.2	TPD0800XP-0849XP
	3D-08512-26	●	8.5-8.9	12	16	26	45	84.1	TPD0850XP-0899XP
	3D-09012-27	●	9.0-9.4	12	16	27	45	85.9	TPD0900XP-0949XP
	3D-09512-29	●	9.5-9.9	12	16	29	45	87.7	TPD0950XP-0999XP
	3D-10016-30	●	10.0-10.4	16	20	30	48	94.6	TPD1000XP-1049XP
	3D-10516-32	●	10.5-10.9	16	20	32	48	96.5	TPD1050XP-1099XP
	3D-11016-33	●	11.0-11.4	16	20	33	48	98.2	TPD1100XP-1149XP
	3D-11516-35	●	11.5-11.9	16	20	35	48	100.1	TPD1150XP-1199XP
	5D-08012-40	●	8.0-8.4	12	16	40	45	98.2	TPD0800XP-0849XP
	5D-08512-43	●	8.5-8.9	12	16	43	45	101.1	TPD0850XP-0899XP
	5D-09012-45	●	9.0-9.4	12	16	45	45	103.9	TPD0900XP-0949XP
	5D-09512-48	●	9.5-9.9	12	16	48	45	106.7	TPD0950XP-0999XP
	5D-10016-50	●	10.0-10.4	16	20	50	48	114.6	TPD1000XP-1049XP
	5D-10516-53	●	10.5-10.9	16	20	53	48	117.5	TPD1050XP-1099XP
	5D-11016-55	●	11.0-11.4	16	20	55	48	120.2	TPD1100XP-1149XP
	5D-11516-58	●	11.5-11.9	16	20	58	48	123.1	TPD1150XP-1199XP
	8D-08012-64	●	8.0-8.4	12	16	64	45	122.2	TPD0800XP-0849XP
	8D-08512-68	●	8.5-8.9	12	16	68	45	126.6	TPD0850XP-0899XP
	8D-09012-72	●	9.0-9.4	12	16	72	45	130.9	TPD0900XP-0949XP
	8D-09512-76	●	9.5-9.9	12	16	76	45	135.2	TPD0950XP-0999XP
	8D-10016-80	●	10.0-10.4	16	20	80	48	144.6	TPD1000XP-1049XP
	8D-10516-84	●	10.5-10.9	16	20	84	48	149.0	TPD1050XP-1099XP
	8D-11016-88	●	11.0-11.4	16	20	88	48	153.2	TPD1100XP-1149XP
	8D-11516-92	●	11.5-11.9	16	20	92	48	157.6	TPD1150XP-1199XP

※ We can provide if you order exact machining specification. Ex) Ø10 and 60 mm depth of cut → TPDX6D-10016-60 ●: Stock item

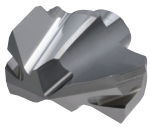
Insert



CP



CM



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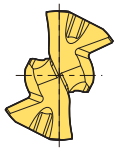
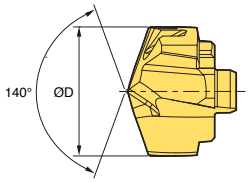




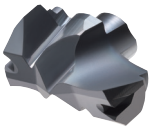
Drill dia. ØD (mm)	P type (CP)	Coated			M type (CM)	Coated	N type (CN)	Uncoated	Holder	Wrench
	TPDC-CP	PC5335	PC5300	PC330P	TPDC-CM	PC330N	TPDC-CN	H01		
12.0	TPD1200CP	●			TPD1200CM	●	TPD1200CN		TPDC□D-12016-□	TPDC-W1216
12.2	TPD1220CP	●			TPD1220CM	●	TPD1220CN			
12.5	TPD1250CP	●			TPD1250CM	●	TPD1250CN		TPDC□D-12516-□	
12.6	TPD1260CP	●			TPD1260CM	●	TPD1260CN			
13.0	TPD1300CP	●			TPD1300CM	●	TPD1300CN		TPDC□D-13016-□	
13.5	TPD1350CP	●			TPD1350CM	●	TPD1350CN		TPDC□D-13516-□	
14.0	TPD1400CP	●			TPD1400CM	●	TPD1400CN		TPDC□D-14016-□	
14.2	TPD1420CP	●			TPD1420CM	●	TPD1420CN			
14.3	TPD1430CP	●			TPD1430CM	●	TPD1430CN			
14.5	TPD1450CP	●			TPD1450CM	●	TPD1450CN		TPDC□D-14516-□	
15.0	TPD1500CP	●			TPD1500CM	●	TPD1500CN		TPDC□D-15020-□	
15.5	TPD1550CP	●			TPD1550CM	●	TPD1550CN			
16.0	TPD1600CP	●			TPD1600CM	●	TPD1600CN		TPDC□D-16020-□	
16.3	TPD1630CP	●			TPD1630CM	●	TPD1630CN			
16.5	TPD1650CP	●			TPD1650CM	●	TPD1650CN			
16.7	TPD1670CP	●			TPD1670CM	●	TPD1670CN			
17.0	TPD1700CP	●			TPD1700CM	●	TPD1700CN		TPDC□D-17020-□	TPDC-W1721
17.5	TPD1750CP	●			TPD1750CM	●	TPD1750CN			
17.7	TPD1770CP	●			TPD1770CM	●	TPD1770CN			
18.0	TPD1800CP	●			TPD1800CM	●	TPD1800CN		TPDC□D-18025-□	
18.1	TPD1810CP	●			TPD1810CM	●	TPD1810CN			
18.5	TPD1850CP	●			TPD1850CM	●	TPD1850CN			
18.6	TPD1860CP	●			TPD1860CM	●	TPD1860CN			
18.7	TPD1870CP	●			TPD1870CM	●	TPD1870CN			
19.0	TPD1900CP	●			TPD1900CM	●	TPD1900CN		TPDC□D-19025-□	
19.2	TPD1920CP	●			TPD1920CM	●	TPD1920CN			
19.5	TPD1950CP	●			TPD1950CM	●	TPD1950CN			
19.7	TPD1970CP	●			TPD1970CM	●	TPD1970CN			
20.0	TPD2000CP	●			TPD2000CM	●	TPD2000CN		TPDC□D-20025-□	
20.5	TPD2050CP	●			TPD2050CM	●	TPD2050CN			
21.0	TPD2100CP	●			TPD2100CM	●	TPD2100CN		TPDC□D-21025-□	
21.5	TPD2150CP	●			TPD2150CM	●	TPD2150CN			
22.0	TPD2200CP	●			TPD2200CM	●	TPD2200CN		TPDC□D-22025-□	TPDC-W2225
22.5	TPD2250CP	●			TPD2250CM	●	TPD2250CN			
22.6	TPD2260CP	●			TPD2260CM	●	TPD2260CN			
22.7	TPD2270CP	●			TPD2270CM	●	TPD2270CN			
23.0	TPD2300CP	●			TPD2300CM	●	TPD2300CN		TPDC□D-23025-□	
23.5	TPD2350CP	●			TPD2350CM	●	TPD2350CN			
24.0	TPD2400CP	●			TPD2400CM	●	TPD2400CN		TPDC□D-24032-□	
24.5	TPD2450CP	●			TPD2450CM	●	TPD2450CN			
25.0	TPD2500CP	●			TPD2500CM	●	TPD2500CN		TPDC□D-25032-□	
25.3	TPD2530CP	●			TPD2530CM	●	TPD2530CN			
25.5	TPD2550CP	●			TPD2550CM	●	TPD2550CN			
25.8	TPD2580CP	●			TPD2580CM	●	TPD2580CN			
25.9	TPD2590CP	●			TPD2590CM	●	TPD2590CN			
26.0	TPD2600CP	●			TPD2600CM	●	TPD2600CN		TPDC□D-26032-□	TPDC-W2630
26.5	TPD2650CP	●			TPD2650CM	●	TPD2650CN			
27.0	TPD2700CP	●			TPD2700CM	●	TPD2700CN		TPDC□D-27032-□	
27.5	TPD2750CP	●			TPD2750CM	●	TPD2750CN			
28.0	TPD2800CP	●			TPD2800CM	●	TPD2800CN		TPDC□D-28032-□	
28.5	TPD2850CP	●			TPD2850CM	●	TPD2850CN			
29.0	TPD2900CP	●			TPD2900CM	●	TPD2900CN		TPDC□D-29032-□	
29.5	TPD2950CP	●			TPD2950CM	●	TPD2950CN			
30.0	TPD3000CP	●			TPD3000CM	●	TPD3000CN		TPDC□D-30032-□	
30.5	TPD3050CP	●			TPD3050CM	●	TPD3050CN			

※ We can provide if you order exact machining specification. Ex) Ø15.9, carbon steel machining → TPDC1590CP/PC330P ●: Stock item

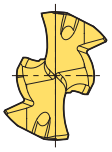
Parts (applicable wrench)

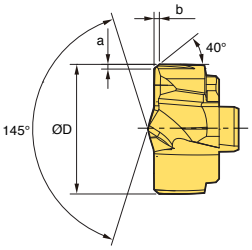
Picture	Designation		Drill diameter ØD (mm)	Torque (N·m)
	TPDC-	W1216	12.00-16.99	2.0-3.0
		W1721	17.00-21.99	2.0-4.0
		W2225	22.00-25.99	3.0-4.0
		W2630	26.00-30.99	4.0-5.0

Insert



FC





Drill dia. ØD (mm)	FC type (CP-FC)	Coated	Holder	Chamfer (mm)		Wrench
	TPDC-CP-FC	PC5335		a	b	
12.0	TPD1200CP-FC		TPDC□D-12016-□	0.38	0.45	TPDC-W1216
12.2	TPD1220CP-FC					
12.5	TPD1250CP-FC		TPDC□D-12516-□			
12.6	TPD1260CP-FC					
13.0	TPD1300CP-FC		TPDC□D-13016-□			
13.5	TPD1350CP-FC		TPDC□D-13516-□			
14.0	TPD1400CP-FC		TPDC□D-14016-□			
14.2	TPD1420CP-FC					
14.3	TPD1430CP-FC					
14.5	TPD1450CP-FC		TPDC□D-14516-□			
15.0	TPD1500CP-FC		TPDC□D-15020-□			
15.5	TPD1550CP-FC					
16.0	TPD1600CP-FC		TPDC□D-16020-□			
16.3	TPD1630CP-FC					
16.5	TPD1650CP-FC					
16.7	TPD1670CP-FC					
17.0	TPD1700CP-FC		TPDC□D-17020-□	0.46	0.55	TPDC-W1721
17.5	TPD1750CP-FC					
17.7	TPD1770CP-FC					
18.0	TPD1800CP-FC		TPDC□D-18025-□			
18.1	TPD1810CP-FC					
18.5	TPD1850CP-FC					
18.6	TPD1860CP-FC					
18.7	TPD1870CP-FC					
19.0	TPD1900CP-FC		TPDC□D-19025-□			
19.2	TPD1920CP-FC					
19.5	TPD1950CP-FC					
19.7	TPD1970CP-FC					
20.0	TPD2000CP-FC		TPDC□D-20025-□			
20.5	TPD2050CP-FC					
21.0	TPD2100CP-FC		TPDC□D-21025-□			
21.5	TPD2150CP-FC					
22.0	TPD2200CP-FC		TPDC□D-22025-□			TPDC-W2225
22.5	TPD2250CP-FC					
22.6	TPD2260CP-FC					
22.7	TPD2270CP-FC					
23.0	TPD2300CP-FC		TPDC□D-23025-□			
23.5	TPD2350CP-FC					
24.0	TPD2400CP-FC		TPDC□D-24032-□			
24.5	TPD2450CP-FC					
25.0	TPD2500CP-FC		TPDC□D-25032-□			
25.3	TPD2530CP-FC					
25.5	TPD2550CP-FC					
25.8	TPD2580CP-FC					
25.9	TPD2590CP-FC					
26.0	TPD2600CP-FC		TPDC□D-26032-□	0.54	0.65	TPDC-W2630
26.5	TPD2650CP-FC					
27.0	TPD2700CP-FC		TPDC□D-27032-□			
27.5	TPD2750CP-FC					
28.0	TPD2800CP-FC		TPDC□D-28032-□			
28.5	TPD2850CP-FC					
29.0	TPD2900CP-FC		TPDC□D-29032-□			
29.5	TPD2950CP-FC					
30.0	TPD3000CP-FC		TPDC□D-30032-□			
30.5	TPD3050CP-FC					

※ We can provide if you order exact machining specification. Ex) Ø15.9 and carbon steel machining → TPDC1590CP-FC/PC5335

●: Stock item

※ TPDC-CP-FC insert: impossible to be reground

Parts (applicable wrench)

Picture	Designation		Drill diameter ØD (mm)	Torque (N·m)
	TPDC-	W1216	12.00-16.99	2.0-3.0
		W1721	17.00-21.99	2.0-4.0
		W2225	22.00-25.99	3.0-4.0
		W2630	26.00-30.99	4.0-5.0

TPDC Plus Drill (1.5D/3D)

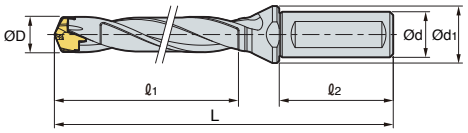


Fig. 1

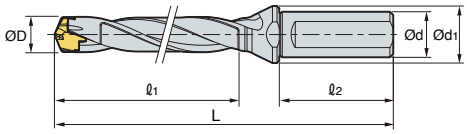


Fig. 2

(mm)

Designation		Stock	ØD	Ød	Ød1	ℓ1	ℓ2	L	Applicable insert	Fig.
TPDC	1.5D-12016-18	●	12.0-12.4	16	20	18	48	85	TPD1200C□-1249C□	1
	1.5D-12516-19	●	12.5-12.9	16	20	19	48	86	TPD1250C□-1299C□	1
	1.5D-13016-20	●	13.0-13.4	16	20	20	48	87	TPD1300C□-1349C□	1
	1.5D-13516-20	●	13.5-13.9	16	20	20	48	88	TPD1350C□-1399C□	1
	1.5D-14016-21	●	14.0-14.4	16	20	21	48	93	TPD1400C□-1449C□	1
	1.5D-14516-22	●	14.5-14.9	16	20	22	48	94	TPD1450C□-1499C□	1
	1.5D-15020-23	●	15.0-15.9	20	25	23	50	95	TPD1500C□-1599C□	2
	1.5D-16020-24	●	16.0-16.9	20	25	24	50	98	TPD1600C□-1699C□	2
	1.5D-17020-26	●	17.0-17.9	20	25	26	50	100	TPD1700C□-1799C□	2
	1.5D-18025-27	●	18.0-18.9	25	33	27	56	110	TPD1800C□-1899C□	2
	1.5D-19025-28	●	19.0-19.9	25	33	28	56	112	TPD1900C□-1999C□	2
	1.5D-20025-30	●	20.0-20.9	25	33	30	56	114	TPD2000C□-2099C□	2
	1.5D-21025-31	●	21.0-21.9	25	33	31	56	116	TPD2100C□-2199C□	2
	1.5D-22025-33	●	22.0-22.9	25	33	33	56	119	TPD2200C□-2299C□	2
	1.5D-23025-34	●	23.0-23.9	25	33	34	56	121	TPD2300C□-2399C□	2
	1.5D-24032-36	●	24.0-24.9	32	43	36	60	130	TPD2400C□-2499C□	2
	1.5D-25032-37	●	25.0-25.9	32	43	37	60	132	TPD2500C□-2599C□	2
	1.5D-26032-39	●	26.0-26.9	32	43	39	60	134	TPD2600C□-2699C□	2
	1.5D-27032-40	●	27.0-27.9	32	43	40	60	136	TPD2700C□-2799C□	2
	1.5D-28032-42	●	28.0-28.9	32	43	42	60	138	TPD2800C□-2899C□	2
	1.5D-29032-43	●	29.0-29.9	32	43	43	60	141	TPD2900C□-2999C□	2
	1.5D-30032-45	●	30.0-30.9	32	43	45	60	143	TPD3000C□-3099C□	2
	3D-12016-36	●	12.0-12.4	16	20	36	48	99	TPD1200C□-1249C□	1
	3D-12516-38	●	12.5-12.9	16	20	38	48	101	TPD1250C□-1299C□	1
	3D-13016-39	●	13.0-13.4	16	20	39	48	103	TPD1300C□-1349C□	1
	3D-13516-41	●	13.5-13.9	16	20	41	48	105	TPD1350C□-1399C□	1
	3D-14016-42	●	14.0-14.4	16	20	42	48	106	TPD1400C□-1449C□	1
	3D-14516-44	●	14.5-14.9	16	20	44	48	107	TPD1450C□-1499C□	1
	3D-15020-45	●	15.0-15.9	20	25	45	50	113	TPD1500C□-1599C□	2
	3D-16020-48	●	16.0-16.9	20	25	48	50	117	TPD1600C□-1699C□	2
	3D-17020-51	●	17.0-17.9	20	25	51	50	120	TPD1700C□-1799C□	2
	3D-18025-54	●	18.0-18.9	25	33	54	56	132	TPD1800C□-1899C□	2
	3D-19025-57	●	19.0-19.9	25	33	57	56	135	TPD1900C□-1999C□	2
	3D-20025-60	●	20.0-20.9	25	33	60	56	138	TPD2000C□-2099C□	2
	3D-21025-63	●	21.0-21.9	25	33	63	56	141	TPD2100C□-2199C□	2
	3D-22025-66	●	22.0-22.9	25	33	66	56	145	TPD2200C□-2299C□	2
	3D-23025-69	●	23.0-23.9	25	33	69	56	149	TPD2300C□-2399C□	2
	3D-24032-72	●	24.0-24.9	32	43	72	60	159	TPD2400C□-2499C□	2
	3D-25032-75	●	25.0-25.9	32	43	75	60	162	TPD2500C□-2599C□	2
	3D-26032-78	●	26.0-26.9	32	43	78	60	173	TPD2600C□-2699C□	2
	3D-27032-81	●	27.0-27.9	32	43	81	60	176	TPD2700C□-2799C□	2
	3D-28032-84	●	28.0-28.9	32	43	84	60	180	TPD2800C□-2899C□	2
	3D-29032-87	●	29.0-29.9	32	43	87	60	185	TPD2900C□-2999C□	2
	3D-30032-90	●	30.0-30.9	32	43	90	60	188	TPD3000C□-3099C□	2

※ We can provide if you order exact machining specification. Ex) Ø15 and 60 mm depth of cut → TPDC4D-15020-60 ●: Stock item

TPDC Plus Drill (5D/8D)

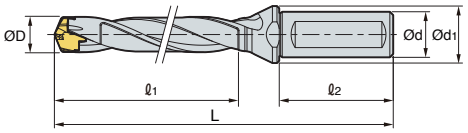


Fig. 1

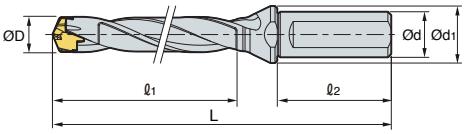


Fig. 2

(mm)

Designation		Stock	ØD	Ød	Ød1	ℓ1	ℓ2	L	Applicable insert	Fig.
TPDC	5D-12016-60	●	12.0-12.4	16	20	60	48	123	TPD1200C□-1249C□	1
	5D-12516-63	●	12.5-12.9	16	20	63	48	126	TPD1250C□-1299C□	1
	5D-13016-65	●	13.0-13.4	16	20	65	48	129	TPD1300C□-1349C□	1
	5D-13516-68	●	13.5-13.9	16	20	68	48	132	TPD1350C□-1399C□	1
	5D-14016-70	●	14.0-14.4	16	20	70	48	134	TPD1400C□-1449C□	1
	5D-14516-73	●	14.5-14.9	16	20	73	48	136	TPD1450C□-1499C□	1
	5D-15020-75	●	15.0-15.9	20	25	75	50	143	TPD1500C□-1599C□	2
	5D-16020-80	●	16.0-16.9	20	25	80	50	149	TPD1600C□-1699C□	2
	5D-17020-85	●	17.0-17.9	20	25	85	50	154	TPD1700C□-1799C□	2
	5D-18025-90	●	18.0-18.9	25	33	90	56	168	TPD1800C□-1899C□	2
	5D-19025-95	●	19.0-19.9	25	33	95	56	173	TPD1900C□-1999C□	2
	5D-20025-100	●	20.0-20.9	25	33	100	56	178	TPD2000C□-2099C□	2
	5D-21025-105	●	21.0-21.9	25	33	105	56	183	TPD2100C□-2199C□	2
	5D-22025-110	●	22.0-22.9	25	33	110	56	189	TPD2200C□-2299C□	2
	5D-23025-115	●	23.0-23.9	25	33	115	56	195	TPD2300C□-2399C□	2
	5D-24032-120	●	24.0-24.9	32	43	120	60	207	TPD2400C□-2499C□	2
	5D-25032-125	●	25.0-25.9	32	43	125	60	212	TPD2500C□-2599C□	2
	5D-26032-130	●	26.0-26.9	32	43	130	60	225	TPD2600C□-2699C□	2
	5D-27032-135	●	27.0-27.9	32	43	135	60	230	TPD2700C□-2799C□	2
	5D-28032-140	●	28.0-28.9	32	43	140	60	236	TPD2800C□-2899C□	2
	5D-29032-145	●	29.0-29.9	32	43	145	60	243	TPD2900C□-2999C□	2
	5D-30032-150	●	30.0-30.9	32	43	150	60	248	TPD3000C□-3099C□	2
	8D-12016-96	●	12.0-12.4	16	20	96	48	159	TPD1200C□-1249C□	1
	8D-12516-100	●	12.5-12.9	16	20	100	48	163	TPD1250C□-1299C□	1
	8D-13016-104	●	13.0-13.4	16	20	104	48	168	TPD1300C□-1349C□	1
	8D-13516-108	●	13.5-13.9	16	20	108	48	173	TPD1350C□-1399C□	1
	8D-14016-112	●	14.0-14.4	16	20	112	48	176	TPD1400C□-1449C□	1
	8D-14516-116	●	14.5-14.9	16	20	116	48	180	TPD1450C□-1499C□	1
	8D-15020-120	●	15.0-15.9	20	25	120	50	188	TPD1500C□-1599C□	2
	8D-16020-128	●	16.0-16.9	20	25	128	50	197	TPD1600C□-1699C□	2
	8D-17020-136	●	17.0-17.9	20	25	136	50	205	TPD1700C□-1799C□	2
	8D-18025-144	●	18.0-18.9	25	33	144	56	222	TPD1800C□-1899C□	2
	8D-19025-152	●	19.0-19.9	25	33	152	56	230	TPD1900C□-1999C□	2
	8D-20025-160	●	20.0-20.9	25	33	160	56	238	TPD2000C□-2099C□	2
	8D-21025-168	●	21.0-21.9	25	33	168	56	246	TPD2100C□-2199C□	2
	8D-22025-176	●	22.0-22.9	25	33	176	56	255	TPD2200C□-2299C□	2
	8D-23025-184	●	23.0-23.9	25	33	184	56	264	TPD2300C□-2399C□	2
	8D-24032-192	●	24.0-24.9	32	43	192	60	279	TPD2400C□-2499C□	2
	8D-25032-200	●	25.0-25.9	32	43	200	60	287	TPD2500C□-2599C□	2
	8D-26032-208	●	26.0-26.9	32	43	208	60	303	TPD2600C□-2699C□	2
	8D-27032-216	●	27.0-27.9	32	43	216	60	311	TPD2700C□-2799C□	2
	8D-28032-224	●	28.0-28.9	32	43	224	60	320	TPD2800C□-2899C□	2
	8D-29032-232	●	29.0-29.9	32	43	232	60	330	TPD2900C□-2999C□	2
	8D-30032-240	●	30.0-30.9	32	43	240	60	338	TPD3000C□-3099C□	2

※ We can provide if you order exact machining specification. Ex) Ø15 and 60 mm depth of cut → TPDC4D-15020-60 ●: Stock item

TPDC Plus Drill (10D/12D)

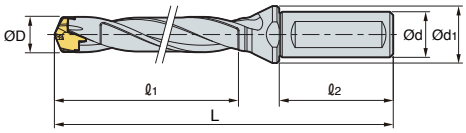


Fig. 1

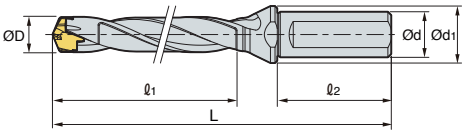


Fig. 2

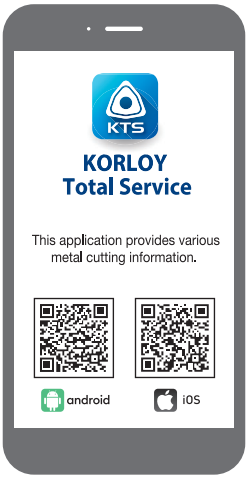
(mm)

Designation		Stock	ØD	Ød	Ød1	ℓ1	ℓ2	L	Applicable insert	Fig.
TPDC	10D-12016-120		12.0-12.4	16	20	120	48	183	TPD1200C□-1249C□	1
	10D-12516-125		12.5-12.9	16	20	125	48	188	TPD1250C□-1299C□	1
	10D-13016-130		13.0-13.4	16	20	130	48	194	TPD1300C□-1349C□	1
	10D-13516-135		13.5-13.9	16	20	135	48	199	TPD1350C□-1399C□	1
	10D-14016-140		14.0-14.4	16	20	140	48	204	TPD1400C□-1449C□	1
	10D-14516-145		14.5-14.9	16	20	145	48	208	TPD1450C□-1499C□	1
	10D-15020-150		15.0-15.9	20	25	150	50	218	TPD1500C□-1599C□	1
	10D-16020-160		16.0-16.9	20	25	160	50	229	TPD1600C□-1699C□	1
	10D-17020-170		17.0-17.9	20	25	170	50	239	TPD1700C□-1799C□	1
	10D-18025-180		18.0-18.9	25	33	180	56	258	TPD1800C□-1899C□	1
	10D-19025-190		19.0-19.9	25	33	190	56	268	TPD1900C□-1999C□	1
	10D-20025-200		20.0-20.9	25	33	200	56	278	TPD2000C□-2099C□	1
	10D-21025-210		21.0-21.9	25	33	210	56	288	TPD2100C□-2199C□	1
	10D-22025-220		22.0-22.9	25	33	220	56	299	TPD2200C□-2299C□	1
	10D-23025-230		23.0-23.9	25	33	230	56	310	TPD2300C□-2399C□	1
	10D-24032-240		24.0-24.9	32	43	240	60	327	TPD2400C□-2499C□	2
	10D-25032-250		25.0-25.9	32	43	250	60	337	TPD2500C□-2599C□	2
	10D-26032-260		26.0-26.9	32	43	260	60	355	TPD2600C□-2699C□	2
	10D-27032-270		27.0-27.9	32	43	270	60	365	TPD2700C□-2799C□	2
	10D-28032-280		28.0-28.9	32	43	280	60	376	TPD2800C□-2899C□	2
	10D-29032-290		29.0-29.9	32	43	290	60	388	TPD2900C□-2999C□	2
	10D-30032-300		30.0-30.9	32	43	300	60	398	TPD3000C□-3099C□	2
	12D-12016-144		12.0-12.4	16	20	144	48	207	TPD1200C□-1249C□	1
	12D-12516-150		12.5-12.9	16	20	150	48	213	TPD1250C□-1299C□	1
	12D-13016-156		13.0-13.4	16	20	156	48	220	TPD1300C□-1349C□	1
	12D-13516-162		13.5-13.9	16	20	162	48	226	TPD1350C□-1399C□	1
	12D-14016-168		14.0-14.4	16	20	168	48	232	TPD1400C□-1449C□	1
	12D-14516-174		14.5-14.9	16	20	174	48	237	TPD1450C□-1499C□	1
	12D-15020-180		15.0-15.9	20	25	180	50	248	TPD1500C□-1599C□	1
	12D-16020-192		16.0-16.9	20	25	192	50	261	TPD1600C□-1699C□	1
	12D-17020-204		17.0-17.9	20	25	204	50	273	TPD1700C□-1799C□	1
	12D-18025-216		18.0-18.9	25	33	216	56	294	TPD1800C□-1899C□	1
	12D-19025-228		19.0-19.9	25	33	228	56	306	TPD1900C□-1999C□	1
	12D-20025-240		20.0-20.9	25	33	240	56	318	TPD2000C□-2099C□	1
	12D-21025-252		21.0-21.9	25	33	252	56	330	TPD2100C□-2199C□	1
	12D-22025-264		22.0-22.9	25	33	264	56	343	TPD2200C□-2299C□	1
	12D-23025-276		23.0-23.9	25	33	276	56	356	TPD2300C□-2399C□	1
	12D-24032-288		24.0-24.9	32	43	288	60	375	TPD2400C□-2499C□	2
	12D-25032-300		25.0-25.9	32	43	300	60	387	TPD2500C□-2599C□	2
	12D-26032-312		26.0-26.9	32	43	312	60	407	TPD2600C□-2699C□	2
	12D-27032-324		27.0-27.9	32	43	324	60	419	TPD2700C□-2799C□	2
	12D-28032-336		28.0-28.9	32	43	336	60	432	TPD2800C□-2899C□	2
	12D-29032-348		29.0-29.9	32	43	348	60	446	TPD2900C□-2999C□	2
	12D-30032-360		30.0-30.9	32	43	360	60	458	TPD3000C□-3099C□	2

※ We can provide if you order exact machining specification. Ex) Ø15 and 135 mm depth of cut → TPDC9D-15020-135 ●: Stock item

⚠ For the safe metalcutting

- Use safety supplies such as protective gloves to prevent possible injury while touching the edge of tools.
- Use safety glasess or safety cover to hedge possible dangers. Inappropriate usage or excessive cutting condition may lead tool's breakage or even the fragment's scattering.
- Clamp the workpiece tightly enough to prevent its movement while its machining.
- Properly manage the tool change phase because the inordinately used tool can be easily broken under the excessive cutting load or severe wear, and it may threat the operator's safety.
- Use safety cover because chips evacuated during cutting are hot and sharp and may cause burns and cuts. To remove chips safely, stop machining, put on protective gloves, and use a hook or other tools.
- Prepare for fire prevention measures as the use of the non-water soluble cutting oil may cause fire.
- Use safety cover and other safety supplies because the spare parts or the inserts can be pulled out due to centrifugal force while high speed machining.



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