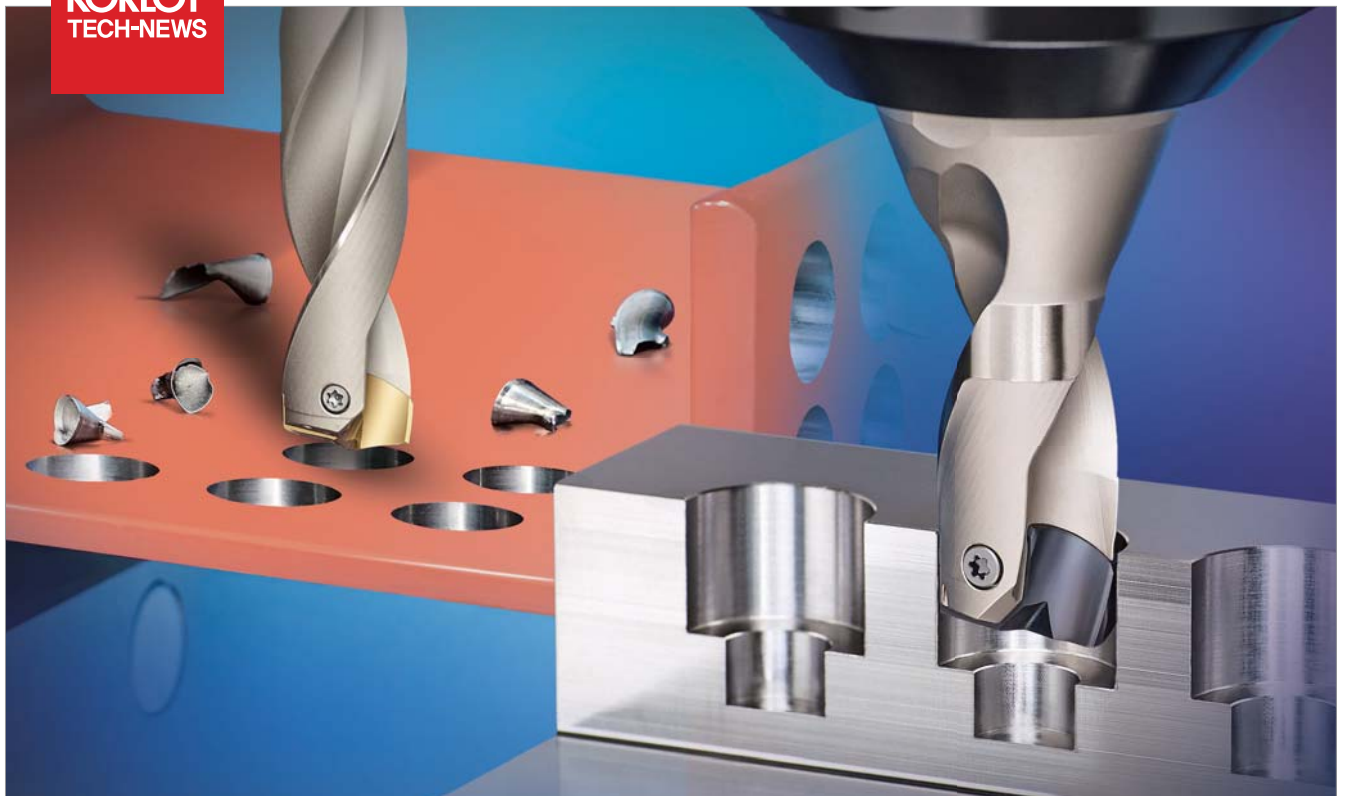


Highly precise and efficient top solid indexable drill

TPDB Plus Drill

(TPDB Plus/TPDB-F^{new}/TPDB-H^{new})

KORLOY
TECH-NEWS



- Increased productivity with stable machining.
- Optimized flute design and excellent chip evacuation ensure high quality of hole condition.
- TPDB Plus Drill is available for machining of variously shaped surfaces and steel structure frames.

Highly precise and efficient top solid indexable drill

TPDB 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, TPDB Plus Drill in accordance with the market's needs.

TPDB Plus implemented high helix flute, which enhanced chip evacuation, and it leads to higher qualified machining with surface finish of hole and roundness.

In addition, TPDB-F for drilling various workpiece with various shaped surfaces and TPDB-H, an

exclusive indexable drill for drilling steel structural frame are launched for various industries.

TPDB-F is available for drilling of angled surface, curved surface drilling, plunging and boring. It is suitable for drilling flat bottom and drilling pilot hole. In addition, by using the least tools, it reduces the time for tool exchanging and cycle time as well.

The TPDB-H insert, with its exclusive low cutting resistance cutting edge design enhancing centering, reduces cutting load and increases quality of hole condition. Its high helix angled flutes also devote to improve machining stability and productivity by preventing chip jamming which causes chattering nor unexpected breakage.



Excellent machinability

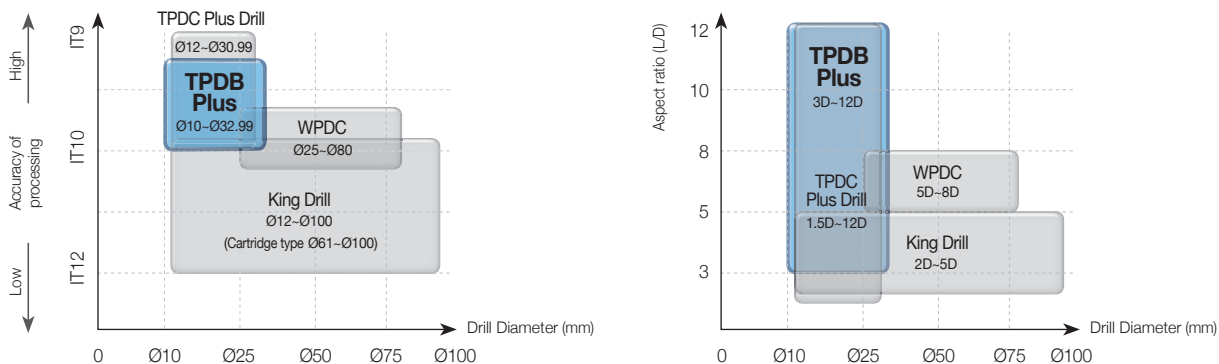
- Fine drilling performance with exclusive edge per application
- Enhanced chip evacuation with high helix angle

Increased productivity

- Reduced cycle time by using the least tools (TPDB-F)
- High durability due to special surface treatment

TPDB Plus

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
TPDB Plus	10-32.99 mm	3, 5, 8, 10, 12	h7	IT10	≤ 2.0 µm	P, K

Applicable industries

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

Code system

【Holder】

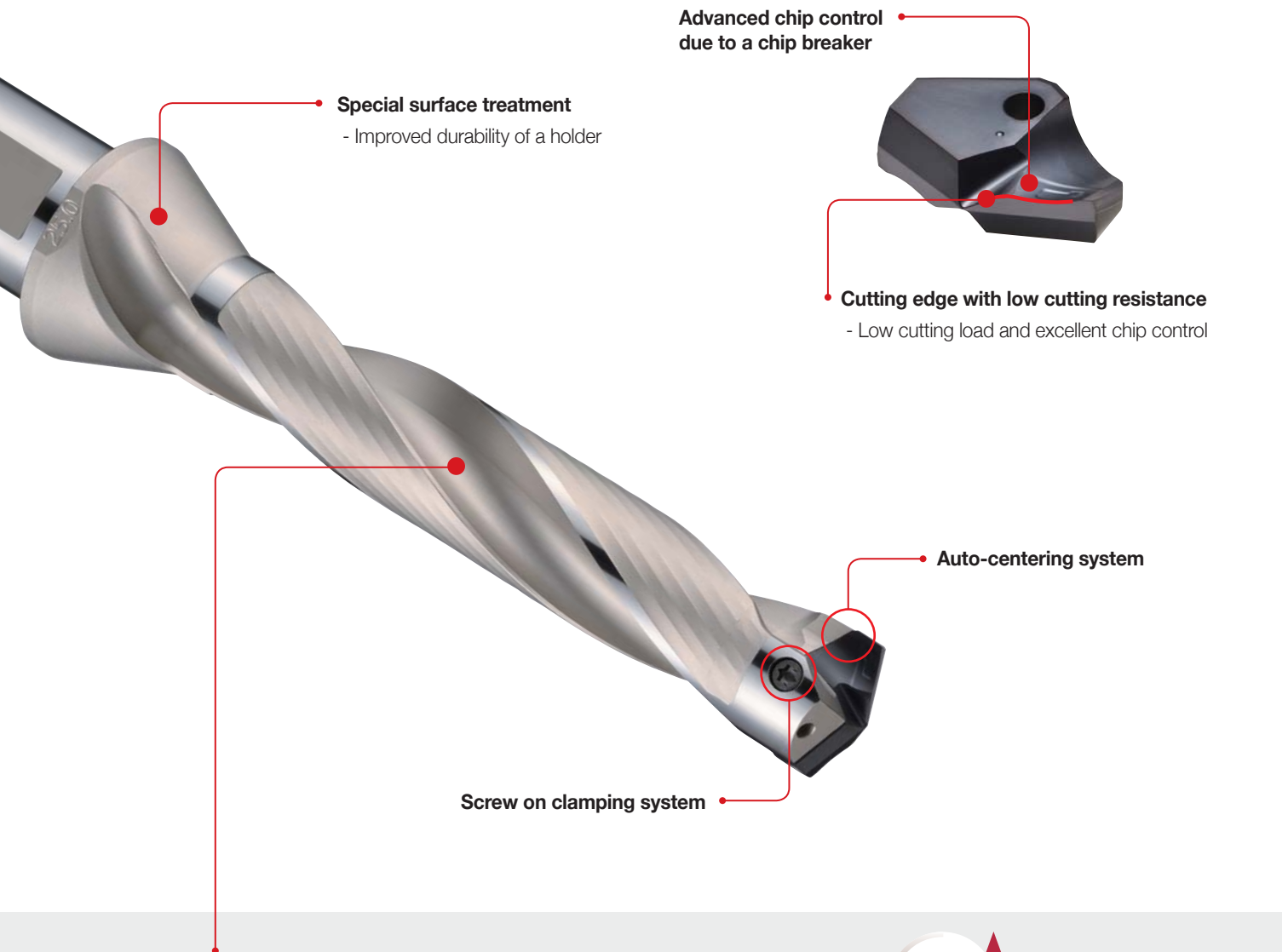
TPD	B	200	-	25	-	5	-	P
Top solid Piercing Drill	Insert type B: Blade type	Drill dia. 200: Ø20.0		Shank dia. 25: Ø25		Aspect ratio (L/D) 3D, 5D, 8D, 10D, 12D		Plus

【Insert】

TPD	200	B
Top solid Piercing Drill	Drill dia. 200: Ø20.0	Insert type B: Blade type

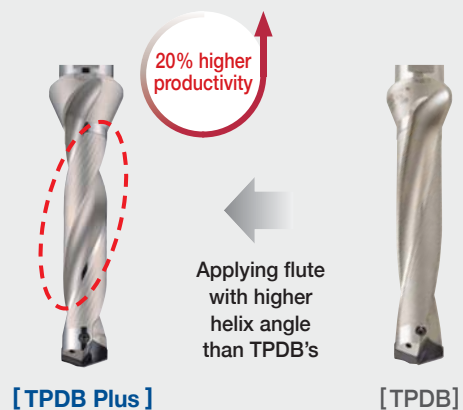
Features

- **Highly precise clamping system** - Superior clamping precision with auto-centering system and highly precise grinding clamping parts
- **Screw on clamping system** - Easy to replace inserts
- **Sharp cutting edge** - Low cutting load and good chip control
- **Holder with excellent durability** - Holder with high rigidity and excellent wear resistance due to special surface treatment
- **Holder with excellent chip control** - Low cutting resistance and outstanding chip evaluation by applying high helix angle



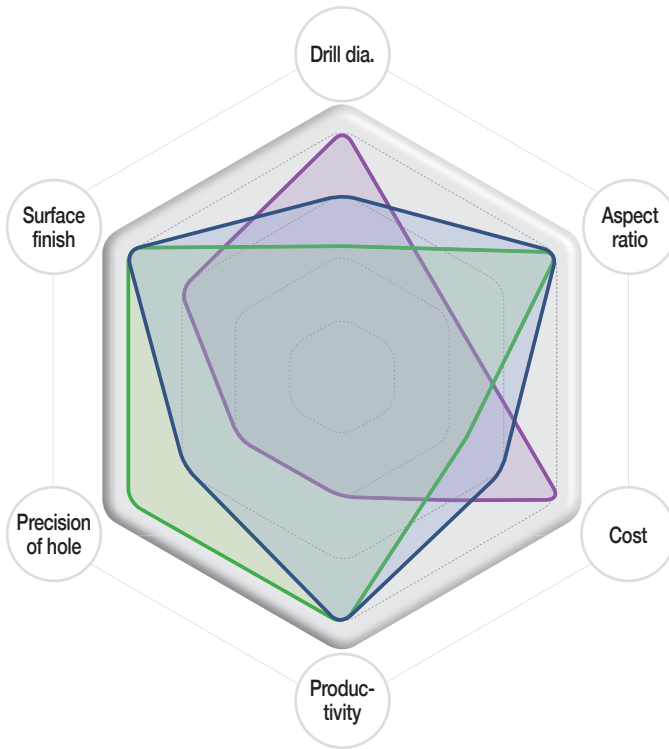
High helix angle

- **High productivity**
 - Stable chip evacuation realizes stable machinability
 - Decreased cycle time by applying improved cutting conditions
- **Improvement in machining quality**
 - Good surface finish and regular size of the hole



Indexable drill selection guide

— TPDB Plus — TPDC Plus Drill — King Drill



TPDB Plus ^{new}

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



TPDC Plus Drill ^{new}

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



King Drill

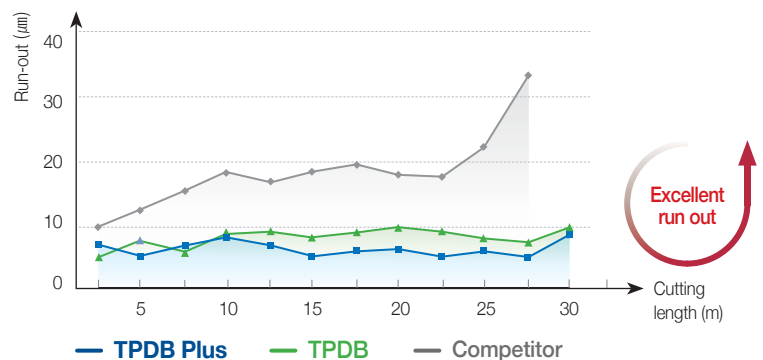
- 4 corners (central and peripheral)
- 2D, 3D, 4D, 5D



Tools	Drill dia.	Aspect ratio	Cost	Productivity	Precision of hole	Surface finish
TPDB Plus ^{new}	★★★	★★★★	★★★	★★★★	★★★	★★★★
TPDC Plus Drill ^{new}	★★	★★★★	★★	★★★★	★★★★	★★★★
King Drill	★★★★	★★	★★★★	★★	★★	★★★

Run-out

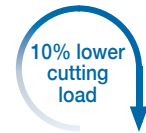
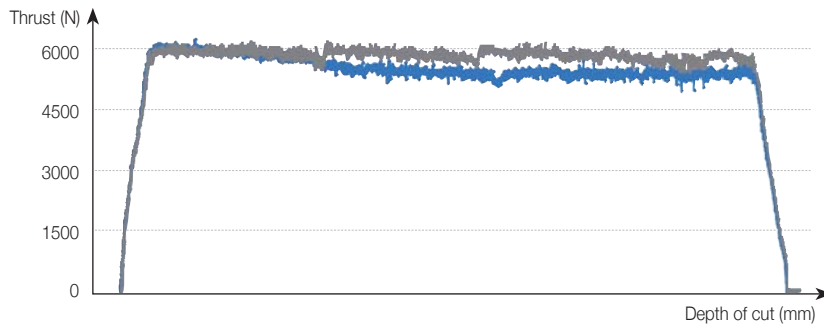
- **Workpiece** Alloy steel (42CrMo4)
- **Cutting conditions**
 - vc (m/min) = 90
 - fn (mm/rev) = 0.25
 - ap (mm) = 120
 - wet (20 bar)
- **Tools**
 - Insert** TPD250B (PC5300)
 - Holder** TPDB250-32-5-P (Drill dia. = Ø25 mm)



Performance evaluation

Cutting load

- **Workpiece** Alloy steel (42CrMo4)
- **Cutting conditions** vc (m/min) = 120, f_n (mm/rev) = 0.25, a_p (mm) = 120, wet (20 bar)
- **Tools** **Insert** TPD250B(PC5300) **Holder** TPDB250-32-5-P (Drill dia. = Ø25 mm)



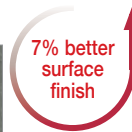
- **TPDB Plus**
Average thrust 4998N
- **Competitor**
Average thrust 5492N

Surface finish

- **Workpiece** Alloy steel (42CrMo4)
- **Cutting conditions** vc (m/min) = 120, f_n (mm/rev) = 0.35, a_p (mm) = 120, wet (20 bar)
- **Tools** **Insert** TPD250B (PC5300) **Holder** TPDB250-32-5-P (Drill dia. = Ø25 mm)



[TPDB Plus]
 $R_a = 0.54 \mu\text{m}$



[Competitor]
 $R_a = 0.57 \mu\text{m}$

Chip control

- **Workpiece** Alloy steel (42CrMo4)
- **Cutting conditions** vc (m/min) = 120, f_n (mm/rev) = 0.35, a_p (mm) = 120, wet (20 bar)
- **Tools** **Insert** TPD250B (PC5300) **Holder** TPDB250-32-5-P (Drill dia. = Ø25 mm)



[TPDB Plus]

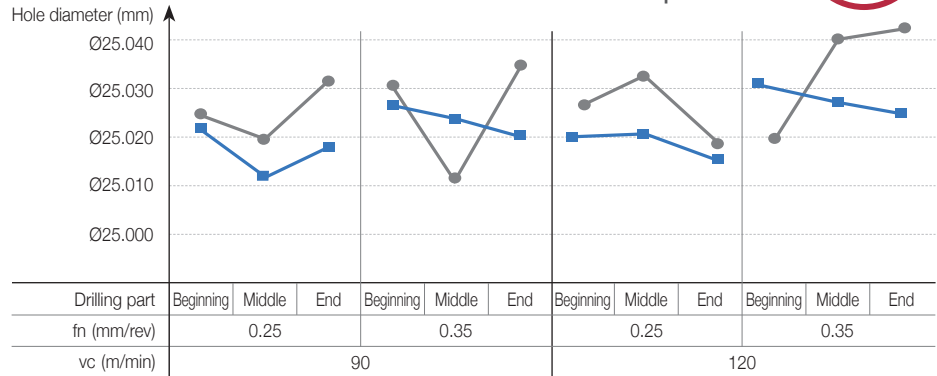
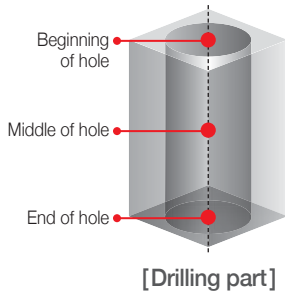


[Competitor]

Performance evaluation

Precision

- **Workpiece** Alloy steel (42CrMo4)
- **Cutting conditions** vc (m/min) = 90/120, fn (mm/rev) = 0.25/0.35, ap (mm) = 120, wet (20 bar)
- **Tools**
 - Insert** TPD250B (PC5300)
 - Holder** TPDB250-32-5-P (Drill dia. = $\varnothing 25$ mm)



Wear resistance

- **Workpiece** Alloy steel (42CrMo4)
- **Cutting conditions** vc (m/min) = 100, fn (mm/rev) = 0.3, ap (mm) = 100, wet (30 bar)
- **Tools**
 - Insert** TPD250B (PC5300)
 - Holder** TPDB250-32-5-P (Drill dia. = $\varnothing 25$ mm)



[TPDB Plus]



[Competitor]

► Improved built up edge and chipping resistance lead stable wear on TPDB Plus insert's edge and obtain longer Max. tool life.

- **Workpiece** Carbon steel (C45)
- **Cutting conditions** vc (m/min) = 100, fn (mm/rev) = 0.3, ap (mm) = 100, wet (30 bar)
- **Tools**
 - Insert** TPD250B (PC5335)
 - Holder** TPDB250-32-5-P (Drill dia. = $\varnothing 25$ mm)



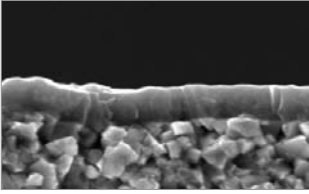
[TPDB Plus]



[Competitor]

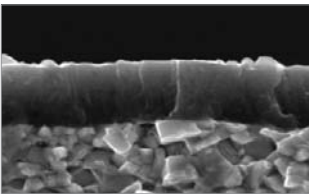
► Sharper cutting edge than competitor's improves built up edge resistance and tool life.

Grade features



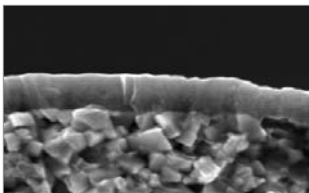
PC5300

- Applying PVD coating with high hardness and stability in machining at high temperature
- Stable drilling due to high cutting edge strength and excellent chipping resistance
- Optimal grade for drilling alloy steel and cast iron



PC5335

- Applying PVD coating with high toughness and excellent lubrication
- Coating layer highly adhering to substrate
- Optimal grade for general structural carbon steel (FE360B, etc.) and machine structural carbon steel (C45, etc.) machining



PC330P

- Applying PVD coating with high surface finish and excellent lubrication
- Coating layer with excellent hardness at high temperature and oxidation resistance
- Optimal grade for welding structural carbon steel (E355DD, etc.)

Recommended cutting conditions

Workpiece			Grade	vc (m/min)	Aspect ratio (L/D) = 3D, 5D Feed rate (mm/rev) per drill dia. (mm)		
ISO	Workpiece materials	HB			Ø10 - Ø16.9	Ø17 - Ø26.9	Ø27 - Ø32.9
P Carbon steel	Low carbon steel	80 - 120	PC5335 PC330P	110 (80-140)	0.15 - 0.30	0.20 - 0.35	0.25 - 0.40
	High carbon steel	180 - 280	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	PC5300	110 (80-140)	0.18 - 0.35	0.23 - 0.38	0.28 - 0.43
	Low alloy heat treated steel	200 - 400	PC5300	75 (50-100)	0.18 - 0.35	0.23 - 0.38	0.28 - 0.43
	High alloy steel	50 - 260	PC5300	70 (50-90)	0.18 - 0.30	0.20 - 0.35	0.25 - 0.40
	High alloy heat treated steel	220 - 450	PC5300	60 (40-80)	0.18 - 0.30	0.20 - 0.35	0.25 - 0.40
K Cast iron	Gray cast iron	150 - 230	PC5300	110 (80-140)	0.18 - 0.35	0.20 - 0.40	0.25 - 0.45
	Ductile cast iron	160 - 260	PC5300	100 (70-130)	0.18 - 0.35	0.20 - 0.40	0.25 - 0.45

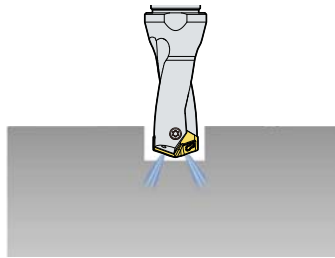
※ In case of 8D, machine in 20-30% lower cutting conditions than the mentioned above, or machine the beginning of hole (1.5D) before drilling.

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

※ Refer to the 'Recommended drilling method' on the page 10 for drilling of 10D -12D.

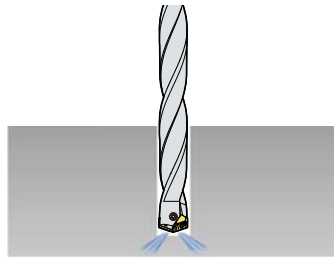
Recommended drilling method (10D, 12D)

Machine a pilot hole (with a pilot drill)



- Machine a pilot hole with the depth of cut as 0.5D and at 30% lower speed using a 1.5D or 3D drill.

Start drilling



- After machining the pilot hole, replace the pilot drill to a drill for further operation and machine in recommended cutting conditions.



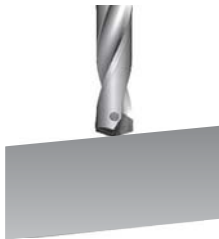
Result of general drilling



Result of recommended drilling

Precaution in drilling

Angled surface drilling



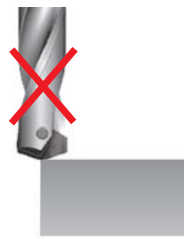
- The approach angle between drill and the workpiece at the beginning and the end should be less than 6°.
- Reduce the feed (fr) to 30-50% than general cutting conditions at the beginning and the end of angled surface.

Stacked plates drilling



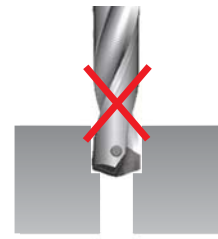
- Gap between the plates could make wrong chip evacuation causing fracture of the drill.
- Place stacked plates without any gap between each.

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.

How to clamp an insert

Clamping an insert to a holder



- ① Put an insert on the tip seat of the holder.
- ② As the [Pic.1], push the insert to the v-shaped groove of the holder.
- ③ Screw and clamp the insert.

Changing the used insert to a new one



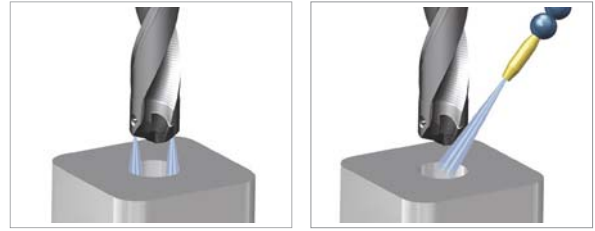
- ① Unscrew and separate the used insert from the holder.
- ② As the [Pic.2], clean the insert seat.
- ③ Put a new insert on the tip seat.
- ④ As the [Pic.3], clamp the insert pushing it with a hand not to separate from the holder.

Check point in drilling


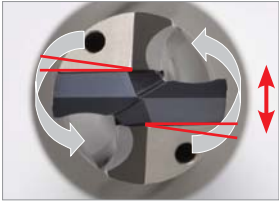
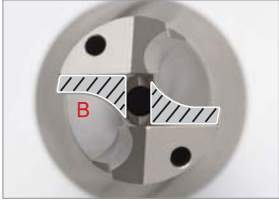



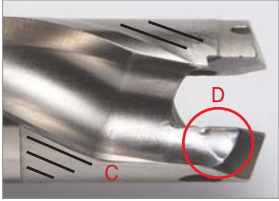
- Condition of the clamped workpiece
- Revolution of the main axis of the machine
- Condition of the holder
- Run-out of the clamped drill (Max. 0.03 mm)
- Condition of supplying coolant (pressure, flow, concentration)
- Chip evacuation

Supply of coolant

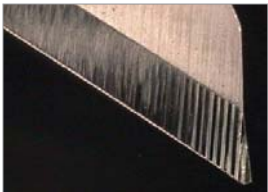



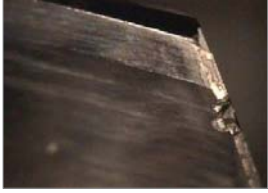
- Supply enough coolant to the beginning of the hole.
- Minimum pressure of oil coolant: 5 bar
- Minimum flow of coolant: 5 l/min



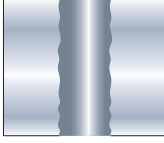
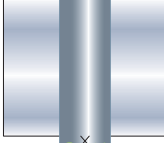
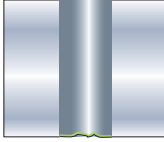
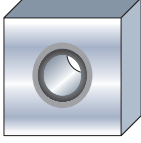
Replacement of holders and screws

Worn part	How to check	Description
<p>[Pic.1]</p> 	<p>[Pic.2] Check the gap</p> 	<ul style="list-style-type: none"> • In case of drilling for a long time as shown in the [Pic.1] the 'A' part is torn and twisted due to torque. • As shown in the [Pic.2] check the gap between the insert and the tip seat turning the clamped insert from side to side. If there is a gap between them, replace the used holder to a new one.
<p>[Pic.3]</p> 	<p>[Pic.4] Check the moving</p> 	<ul style="list-style-type: none"> • The insert could move up or down due to the load on the Z-axis in drilling over an extended period of time which causes wear on the 'B' part as shown the [Pic.3]. • After clamping an insert, if the insert is moving or there is a gap between the insert and the tip seat as shown in the [Pic.4] replace the used holder to a new one.
<p>[Pic.5]</p> 	<p>[Pic.4] Check the moving</p> 	<ul style="list-style-type: none"> • After an extended period of use, the screw can be worn as shown in the 'E' part of [Pic.5] which could decrease the clamping force of the insert. When the screw is worn, replace the old screw to a new one among the enclosed extras. • Spreading the grease on the screw makes it last longer.
<p>[Pic.6]</p> <ol style="list-style-type: none"> ① Check the 'C' and 'D' parts as shown in the [Pic.6] ② Check whether the chips are getting longer or not. 		<ul style="list-style-type: none"> • Winding or jamming of long and tiny chips in drilling causes wear or scratch on the 'C' part as shown in the [Pic.6] due to chattering from machining in improper cutting conditions. In that case, reset the cutting conditions and check the Run-out before machining. • The excessive wear of the part 'D' as shown in the [Pic.6] relating to chip curling might cause long chips.

Types of damage to drill and solutions

Scratches on the margin		
	Factors	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Low cutting speed • Machining free-cutting steel • Erosion of chip and flute • Lack of coolant lubrication
	Solutions	<ul style="list-style-type: none"> • Increase cutting speed. • Set a lower thinning angle. • Reduce the honing. • Use more coolant.
Chipping on the rake face		
	Factors	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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

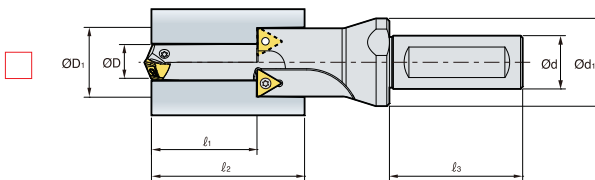
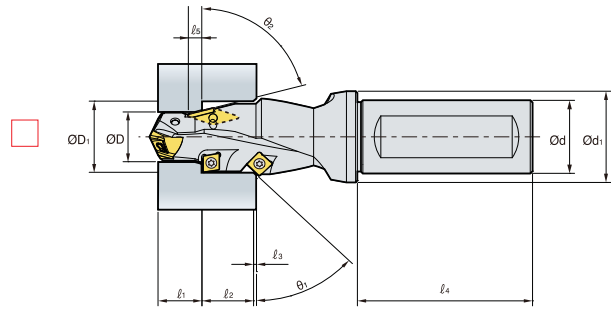
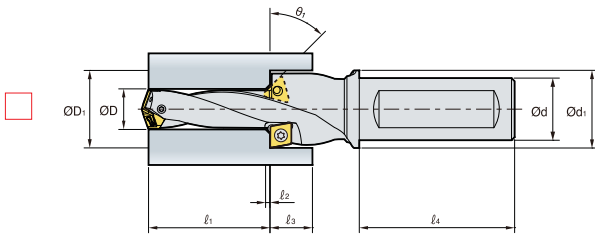
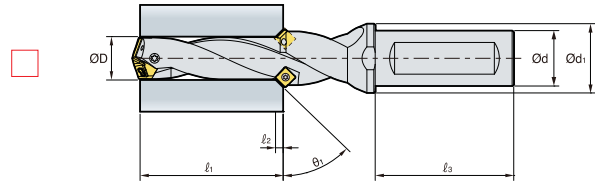
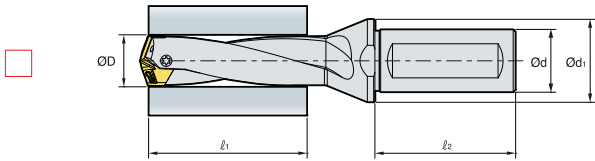
Poor surface finish (rough, scratch, etc.)		
	Factors	<ul style="list-style-type: none"> • Low rigidity of machine and improperly clamped workpiece • Large concentricity and lack of coolant
	Solutions	<ul style="list-style-type: none"> • Clamp the workpiece properly and check the concentricity. • Increase the amount and pressure of coolant
Remained lots of burr at the end of the drilled hole		
	Factors	<ul style="list-style-type: none"> • High feed and excessive honing of the cutting edge • Exceeded cutting tool's tool life (Too much wear and chipping)
	Solutions	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Reduce the feed. (Especially at the end of hole) • Reduce honing on the cutting edge. • Use a new drill.
Thermal deformation and oxidation of the end of the drilled hole		
	Factors	<ul style="list-style-type: none"> • Rapid feed • Excessive cutting load • Lack of coolant • Exceeded cutting tool's tool life (Too much wear and chipping)
	Solutions	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Improper cutting conditions • Too much cutting load • Too long overhang • Less rigidity of machine 	↓	↓	○	↓	↓							↑		↑	↓	
Poor chip evacuation	• Improper cutting conditions		↓	○		↓					↑						
Poor surface finish	<ul style="list-style-type: none"> • 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

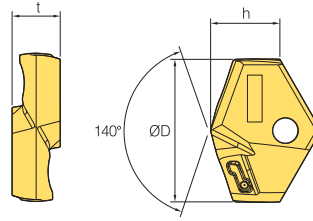
Special note

- 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





(mm)

Designation	Coated			ØD	h	t
	PC5300	PC5335	PC330P			
TPD 100B	●			10.0	5.5	3.5
105B	●			10.5	5.5	3.5
110B	●	●		11.0	5.8	3.5
115B	●			11.5	5.8	3.5
120B	●	●		12.0	6.3	3.5
125B	●	●		12.5	6.3	3.5
130B	●			13.0	6.5	4.0
135B	●			13.5	6.5	4.0
140B	●	●		14.0	6.8	4.0
145B	●	●		14.5	6.8	4.0
150B	●	●		15.0	7.0	4.0
155B	●	●		15.5	7.0	4.0
160B	●	●		16.0	7.7	5.5
165B	●			16.5	7.7	5.5
170B	●	●		17.0	7.9	5.5
175B	●	●		17.5	7.9	5.5
180B	●	●		18.0	8.1	6.0
185B	●	●		18.5	8.1	6.0
190B	●	●		19.0	8.3	6.0
195B	●			19.5	8.3	6.0
200B	●	●		20.0	9.7	6.5
205B	●			20.5	9.7	6.5
210B	●	●		21.0	9.4	6.5
215B	●			21.5	9.4	6.5
220B	●	●		22.0	9.6	7.0
225B	●			22.5	9.6	7.0
230B	●	●		23.0	9.8	7.0
235B	●			23.5	9.8	7.0
240B	●	●		24.0	10.7	7.5
245B	●			24.5	10.7	7.5
250B	●	●		25.0	10.9	7.5
255B	●			25.5	10.9	7.5
260B	●	●		26.0	11.0	8.5
265B	●			26.5	11.0	8.5
270B	●			27.0	11.8	8.5
275B	●			27.5	11.8	8.5
280B	●			28.0	12.6	9.5
285B	●			28.5	12.6	9.5
290B	●			29.0	12.9	9.5
295B	●			29.5	12.9	9.5
300B	●			30.0	13.0	10.0
305B	●			30.5	13.0	10.0
310B	●			31.0	13.2	10.0
315B	●			31.5	13.2	10.0
320B	●			32.0	13.4	10.0
325B	●			32.5	13.4	10.0

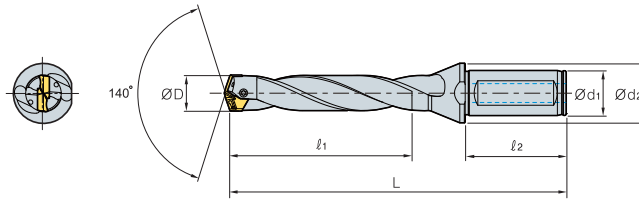
※ We can provide nonstock items with Ø10.00 - Ø32.99

●: Stock item

Parts

Designation	Drill diameter ØD (mm)	Screw 	Wrench 	Torque (N·m)
TPD 100B - 129B	10.0 - 12.9	FTNB0209-P	TW06P	0.4
130B - 149B	13.0 - 14.9	FTNB02512-P	TW07S	0.8
150B - 179B	15.0 - 17.9	FTNB02514-P	TW07S	0.8
180B - 199B	18.0 - 19.9	FTNB0316-P	TW09S	1.2
200B - 239B	20.0 - 23.9	FTNB0319	TW09S	1.2
240B - 259B	24.0 - 25.9	FTNB03522	TW15S	3.0
260B - 279B	26.0 - 27.9	FTNB03524	TW15S	3.0
280B - 299B	28.0 - 29.9	FTNB0426	TW15S	3.0
300B - 329B	30.0 - 32.9	FTNB0528	TW20-100	4.0

TPDB Plus (3D)

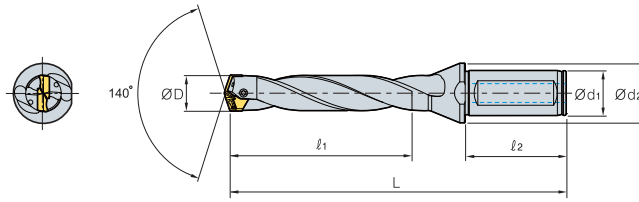


(mm)

Designation	Stock	ØD	Ød1	Ød2	l1	l2	L	Insert
TPDB 100-16-3-P	●	10.0 - 10.4	16	20	30.0	48	95	TPD100B - 104B
105-16-3-P	●	10.5 - 10.9	16	20	31.5	48	96	TPD105B - 109B
110-16-3-P	●	11.0 - 11.4	16	20	33.0	48	98	TPD110B - 114B
115-16-3-P	●	11.5 - 11.9	16	20	34.5	48	99	TPD115B - 119B
120-16-3-P	●	12.0 - 12.4	16	20	36.0	48	102	TPD120B - 124B
125-16-3-P	●	12.5 - 12.9	16	20	37.5	48	104	TPD125B - 129B
130-16-3-P	●	13.0 - 13.4	16	20	39.0	48	107	TPD130B - 134B
135-16-3-P	●	13.5 - 13.9	16	20	40.5	48	109	TPD135B - 139B
140-16-3-P	●	14.0 - 14.4	16	20	42.0	48	111	TPD140B - 144B
145-16-3-P	●	14.5 - 14.9	16	20	43.5	48	114	TPD145B - 149B
150-20-3-P	●	15.0 - 15.4	20	25	45.0	50	118	TPD150B - 154B
155-20-3-P	●	15.5 - 15.9	20	25	46.5	50	120	TPD155B - 159B
160-20-3-P	●	16.0 - 16.4	20	25	48.0	50	122	TPD160B - 164B
165-20-3-P	●	16.5 - 16.9	20	25	49.5	50	124	TPD165B - 169B
170-20-3-P	●	17.0 - 17.4	20	25	51.0	50	127	TPD170B - 174B
175-20-3-P	●	17.5 - 17.9	20	25	52.5	50	129	TPD175B - 179B
180-25-3-P	●	18.0 - 18.4	25	33	54.0	56	137	TPD180B - 184B
185-25-3-P	●	18.5 - 18.9	25	33	55.5	56	139	TPD185B - 189B
190-25-3-P	●	19.0 - 19.4	25	33	57.0	56	142	TPD190B - 194B
195-25-3-P	●	19.5 - 19.9	25	33	58.5	56	144	TPD195B - 199B
200-25-3-P	●	20.0 - 20.4	25	33	60.0	56	146	TPD200B - 204B
205-25-3-P	●	20.5 - 20.9	25	33	61.5	56	148	TPD205B - 209B
210-25-3-P	●	21.0 - 21.4	25	33	63.0	60	151	TPD210B - 214B
215-25-3-P	●	21.5 - 21.9	25	33	64.5	60	153	TPD215B - 219B
220-25-3-P	●	22.0 - 22.4	25	33	66.0	60	155	TPD220B - 224B
225-25-3-P	●	22.5 - 22.9	25	33	67.5	60	157	TPD225B - 229B
230-25-3-P	●	23.0 - 23.4	25	33	69.0	60	160	TPD230B - 234B
235-25-3-P	●	23.5 - 23.9	25	33	70.5	60	162	TPD235B - 239B
240-32-3-P	●	24.0 - 24.4	32	43	72.0	60	168	TPD240B - 244B
245-32-3-P	●	24.5 - 24.9	32	43	73.5	60	170	TPD245B - 249B
250-32-3-P	●	25.0 - 25.4	32	43	75.0	60	173	TPD250B - 254B
255-32-3-P	●	25.5 - 25.9	32	43	76.5	60	175	TPD255B - 259B
260-32-3-P	●	26.0 - 26.9	32	43	78.0	60	177	TPD260B - 269B
270-32-3-P	●	27.0 - 27.9	32	43	81.0	60	182	TPD270B - 279B
280-32-3-P	●	28.0 - 28.9	32	43	84.0	60	186	TPD280B - 289B
290-32-3-P	●	29.0 - 29.9	32	43	87.0	60	191	TPD290B - 299B
300-32-3-P	●	30.0 - 30.9	32	43	90.0	60	195	TPD300B - 309B
310-32-3-P	●	31.0 - 31.9	32	43	93.0	60	200	TPD310B - 319B
320-32-3-P	●	32.0 - 32.9	32	43	96.0	60	204	TPD320B - 329B

●: Stock item

TPDB Plus (5D)

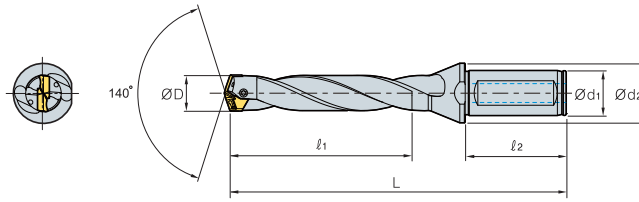


(mm)

Designation	Stock	ØD	Ød1	Ød2	l1	l2	L	Insert
TPDB 100-16-5-P	●	10.0 - 10.4	16	20	50.0	48	115	TPD100B - 104B
105-16-5-P	●	10.5 - 10.9	16	20	52.5	48	117	TPD105B - 109B
110-16-5-P	●	11.0 - 11.4	16	20	55.0	48	120	TPD110B - 114B
115-16-5-P	●	11.5 - 11.9	16	20	57.5	48	123	TPD115B - 119B
120-16-5-P	●	12.0 - 12.4	16	20	60.0	48	126	TPD120B - 124B
125-16-5-P	●	12.5 - 12.9	16	20	62.5	48	129	TPD125B - 129B
130-16-5-P	●	13.0 - 13.4	16	20	65.0	48	133	TPD130B - 134B
135-16-5-P	●	13.5 - 13.9	16	20	67.5	48	136	TPD135B - 139B
140-16-5-P	●	14.0 - 14.4	16	20	70.0	48	139	TPD140B - 144B
145-16-5-P	●	14.5 - 14.9	16	20	72.5	48	143	TPD145B - 149B
150-20-5-P	●	15.0 - 15.4	20	25	75.0	50	148	TPD150B - 154B
155-20-5-P	●	15.5 - 15.9	20	25	77.5	50	151	TPD155B - 159B
160-20-5-P	●	16.0 - 16.4	20	25	80.0	50	154	TPD160B - 164B
165-20-5-P	●	16.5 - 16.9	20	25	82.5	50	157	TPD165B - 169B
170-20-5-P	●	17.0 - 17.4	20	25	85.0	50	161	TPD170B - 174B
175-20-5-P	●	17.5 - 17.9	20	25	87.5	50	164	TPD175B - 179B
180-25-5-P	●	18.0 - 18.4	25	33	90.0	56	173	TPD180B - 184B
185-25-5-P	●	18.5 - 18.9	25	33	92.5	56	176	TPD185B - 189B
190-25-5-P	●	19.0 - 19.4	25	33	95.0	56	180	TPD190B - 194B
195-25-5-P	●	19.5 - 19.9	25	33	97.5	56	183	TPD195B - 199B
200-25-5-P	●	20.0 - 20.4	25	33	100.0	56	186	TPD200B - 204B
205-25-5-P	●	20.5 - 20.9	25	33	102.5	56	189	TPD205B - 209B
210-25-5-P	●	21.0 - 21.4	25	33	105.0	60	193	TPD210B - 214B
215-25-5-P	●	21.5 - 21.9	25	33	107.5	60	196	TPD215B - 219B
220-25-5-P	●	22.0 - 22.4	25	33	110.0	60	199	TPD220B - 224B
225-25-5-P	●	22.5 - 22.9	25	33	112.5	60	202	TPD225B - 229B
230-25-5-P	●	23.0 - 23.4	25	33	115.0	60	206	TPD230B - 234B
235-25-5-P	●	23.5 - 23.9	25	33	117.5	60	209	TPD235B - 239B
240-32-5-P	●	24.0 - 24.4	32	43	120.0	60	216	TPD240B - 244B
245-32-5-P	●	24.5 - 24.9	32	43	122.5	60	219	TPD245B - 249B
250-32-5-P	●	25.0 - 25.4	32	43	125.0	60	223	TPD250B - 254B
255-32-5-P	●	25.5 - 25.9	32	43	127.5	60	226	TPD255B - 259B
260-32-5-P	●	26.0 - 26.9	32	43	130.0	60	229	TPD260B - 269B
270-32-5-P	●	27.0 - 27.9	32	43	135.0	60	236	TPD270B - 279B
280-32-5-P	●	28.0 - 28.9	32	43	140.0	60	242	TPD280B - 289B
290-32-5-P	●	29.0 - 29.9	32	43	145.0	60	249	TPD290B - 299B
300-32-5-P	●	30.0 - 30.9	32	43	150.0	60	255	TPD300B - 309B
310-32-5-P	●	31.0 - 31.9	32	43	155.0	60	262	TPD310B - 319B
320-32-5-P	●	32.0 - 32.9	32	43	160.0	60	268	TPD320B - 329B

●: Stock item

TPDB Plus (8D)

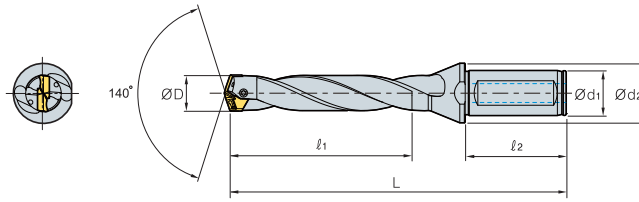


(mm)

Designation	Stock	ØD	Ød ₁	Ød ₂	ℓ ₁	ℓ ₂	L	Insert
TPDB 100-16-8-P	●	10.0 - 10.4	16	20	80	48	145	TPD100B - 104B
105-16-8-P	●	10.5 - 10.9	16	20	84	48	149	TPD105B - 109B
110-16-8-P	●	11.0 - 11.4	16	20	88	48	153	TPD110B - 114B
115-16-8-P	●	11.5 - 11.9	16	20	92	48	157	TPD115B - 119B
120-16-8-P	●	12.0 - 12.4	16	20	96	48	162	TPD120B - 124B
125-16-8-P	●	12.5 - 12.9	16	20	100	48	166.5	TPD125B - 129B
130-16-8-P	●	13.0 - 13.4	16	20	104	48	172	TPD130B - 134B
135-16-8-P	●	13.5 - 13.9	16	20	108	48	176.5	TPD135B - 139B
140-16-8-P	●	14.0 - 14.4	16	20	112	48	181	TPD140B - 144B
145-16-8-P	●	14.5 - 14.9	16	20	116	48	186.5	TPD145B - 149B
150-20-8-P	●	15.0 - 15.4	20	25	120	50	193	TPD150B - 154B
155-20-8-P	●	15.5 - 15.9	20	25	124	50	197.5	TPD155B - 159B
160-20-8-P	●	16.0 - 16.4	20	25	128	50	202	TPD160B - 164B
165-20-8-P	●	16.5 - 16.9	20	25	132	50	206.5	TPD165B - 169B
170-20-8-P	●	17.0 - 17.4	20	25	136	50	212	TPD170B - 174B
175-20-8-P	●	17.5 - 17.9	20	25	140	50	216.5	TPD175B - 179B
180-25-8-P	●	18.0 - 18.4	25	33	144	56	227	TPD180B - 184B
185-25-8-P	●	18.5 - 18.9	25	33	148	56	231.5	TPD185B - 189B
190-25-8-P	●	19.0 - 19.4	25	33	152	56	237	TPD190B - 194B
195-25-8-P	●	19.5 - 19.9	25	33	156	56	241.5	TPD195B - 199B
200-25-8-P	●	20.0 - 20.4	25	33	160	56	246	TPD200B - 204B
205-25-8-P	●	20.5 - 20.9	25	33	164	56	250.5	TPD205B - 209B
210-25-8-P	●	21.0 - 21.4	25	33	168	60	256	TPD210B - 214B
215-25-8-P	●	21.5 - 21.9	25	33	172	60	260.5	TPD215B - 219B
220-25-8-P	●	22.0 - 22.4	25	33	176	60	265	TPD220B - 224B
225-25-8-P	●	22.5 - 22.9	25	33	180	60	269.5	TPD225B - 229B
230-25-8-P	●	23.0 - 23.4	25	33	184	60	275	TPD230B - 234B
235-25-8-P	●	23.5 - 23.9	25	33	188	60	279.5	TPD235B - 239B
240-32-8-P	●	24.0 - 24.4	32	43	192	60	288	TPD240B - 244B
245-32-8-P	●	24.5 - 24.9	32	43	196	60	292.5	TPD245B - 249B
250-32-8-P	●	25.0 - 25.4	32	43	200	60	298	TPD250B - 254B
255-32-8-P	●	25.5 - 25.9	32	43	204	60	302.5	TPD255B - 259B
260-32-8-P	●	26.0 - 26.9	32	43	208	60	307	TPD260B - 269B
270-32-8-P	●	27.0 - 27.9	32	43	216	60	317	TPD270B - 279B
280-32-8-P	●	28.0 - 28.9	32	43	224	60	326	TPD280B - 289B
290-32-8-P	●	29.0 - 29.9	32	43	232	60	336	TPD290B - 299B
300-32-8-P	●	30.0 - 30.9	32	43	240	60	344	TPD300B - 309B
310-32-8-P	●	31.0 - 31.9	32	43	248	60	354	TPD310B - 319B
320-32-8-P	●	32.0 - 32.9	32	43	256	60	361	TPD320B - 329B

●: Stock item

TPDB Plus (10D)

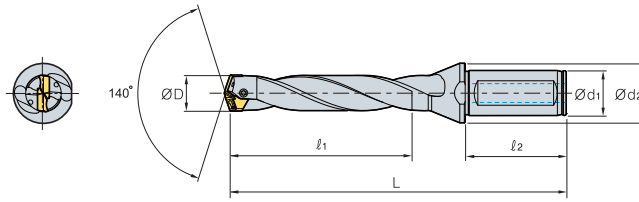


(mm)

Designation	Stock	ØD	Ød1	Ød2	l1	l2	L	Insert
TPDB 100-16-10-P	●	10.0 - 10.4	16	20	100	48	165	TPD100B - 104B
105-16-10-P	●	10.5 - 10.9	16	20	105	48	170	TPD105B - 109B
110-16-10-P	●	11.0 - 11.4	16	20	110	48	175	TPD110B - 114B
115-16-10-P	●	11.5 - 11.9	16	20	115	48	180	TPD115B - 119B
120-16-10-P	●	12.0 - 12.4	16	20	120	48	186	TPD120B - 124B
125-16-10-P	●	12.5 - 12.9	16	20	125	48	191.5	TPD125B - 129B
130-16-10-P	●	13.0 - 13.4	16	20	130	48	198	TPD130B - 134B
135-16-10-P	●	13.5 - 13.9	16	20	135	48	203.5	TPD135B - 139B
140-16-10-P	●	14.0 - 14.4	16	20	140	48	209	TPD140B - 144B
145-16-10-P	●	14.5 - 14.9	16	20	145	48	215.5	TPD145B - 149B
150-20-10-P	●	15.0 - 15.4	20	25	150	50	223	TPD150B - 154B
155-20-10-P	●	15.5 - 15.9	20	25	155	50	228.5	TPD155B - 159B
160-20-10-P	●	16.0 - 16.4	20	25	160	50	234	TPD160B - 164B
165-20-10-P	●	16.5 - 16.9	20	25	165	50	239.5	TPD165B - 169B
170-20-10-P	●	17.0 - 17.4	20	25	170	50	246	TPD170B - 174B
175-20-10-P	●	17.5 - 17.9	20	25	175	50	251.5	TPD175B - 179B
180-25-10-P	●	18.0 - 18.4	25	33	180	56	263	TPD180B - 184B
185-25-10-P	●	18.5 - 18.9	25	33	185	56	268.5	TPD185B - 189B
190-25-10-P	●	19.0 - 19.4	25	33	190	56	275	TPD190B - 194B
195-25-10-P	●	19.5 - 19.9	25	33	195	56	280.5	TPD195B - 199B
200-25-10-P	●	20.0 - 20.4	25	33	200	56	286	TPD200B - 204B
205-25-10-P	●	20.5 - 20.9	25	33	205	56	291.5	TPD205B - 209B
210-25-10-P	●	21.0 - 21.4	25	33	210	60	298	TPD210B - 214B
215-25-10-P	●	21.5 - 21.9	25	33	215	60	303.5	TPD215B - 219B
220-25-10-P	●	22.0 - 22.4	25	33	220	60	309	TPD220B - 224B
225-25-10-P	●	22.5 - 22.9	25	33	225	60	314.5	TPD225B - 229B
230-25-10-P	●	23.0 - 23.4	25	33	230	60	321	TPD230B - 234B
235-25-10-P	●	23.5 - 23.9	25	33	235	60	326.5	TPD235B - 239B
240-32-10-P	●	24.0 - 24.4	32	43	240	60	336	TPD240B - 244B
245-32-10-P	●	24.5 - 24.9	32	43	245	60	341.5	TPD245B - 249B
250-32-10-P	●	25.0 - 25.4	32	43	250	60	348	TPD250B - 254B
255-32-10-P	●	25.5 - 25.9	32	43	255	60	353.5	TPD255B - 259B
260-32-10-P	●	26.0 - 26.9	32	43	260	60	359	TPD260B - 269B
270-32-10-P	●	27.0 - 27.9	32	43	270	60	371	TPD270B - 279B
280-32-10-P	●	28.0 - 28.9	32	43	280	60	382	TPD280B - 289B
290-32-10-P	●	29.0 - 29.9	32	43	290	60	394	TPD290B - 299B
300-32-10-P	●	30.0 - 30.9	32	43	300	60	404	TPD300B - 309B
310-32-10-P	●	31.0 - 31.9	32	43	310	60	416	TPD310B - 319B
320-32-10-P	●	32.0 - 32.9	32	43	320	60	425	TPD320B - 329B

●: Stock item

TPDB Plus (12D)



(mm)

Designation	Stock	ØD	Ød1	Ød2	l1	l2	L	Insert
TPDB 100-16-12-P	●	10.0 - 10.4	16	20	120	48	185	TPD100B - 104B
105-16-12-P	●	10.5 - 10.9	16	20	126	48	191	TPD105B - 109B
110-16-12-P	●	11.0 - 11.4	16	20	132	48	197	TPD110B - 114B
115-16-12-P	●	11.5 - 11.9	16	20	138	48	203	TPD115B - 119B
120-16-12-P	●	12.0 - 12.4	16	20	144	48	210	TPD120B - 124B
125-16-12-P	●	12.5 - 12.9	16	20	150	48	216.5	TPD125B - 129B
130-16-12-P	●	13.0 - 13.4	16	20	156	48	224	TPD130B - 134B
135-16-12-P	●	13.5 - 13.9	16	20	162	48	230.5	TPD135B - 139B
140-16-12-P	●	14.0 - 14.4	16	20	168	48	237	TPD140B - 144B
145-16-12-P	●	14.5 - 14.9	16	20	174	48	244.5	TPD145B - 149B
150-20-12-P	●	15.0 - 15.4	20	25	180	50	253	TPD150B - 154B
155-20-12-P	●	15.5 - 15.9	20	25	186	50	259.5	TPD155B - 159B
160-20-12-P	●	16.0 - 16.4	20	25	192	50	266	TPD160B - 164B
165-20-12-P	●	16.5 - 16.9	20	25	198	50	272.5	TPD165B - 169B
170-20-12-P	●	17.0 - 17.4	20	25	204	50	280	TPD170B - 174B
175-20-12-P	●	17.5 - 17.9	20	25	210	50	286.5	TPD175B - 179B
180-25-12-P	●	18.0 - 18.4	25	33	216	56	299	TPD180B - 184B
185-25-12-P	●	18.5 - 18.9	25	33	222	56	305.5	TPD185B - 189B
190-25-12-P	●	19.0 - 19.4	25	33	228	56	313	TPD190B - 194B
195-25-12-P	●	19.5 - 19.9	25	33	234	56	319.5	TPD195B - 199B
200-25-12-P	●	20.0 - 20.4	25	33	240	56	326	TPD200B - 204B
205-25-12-P	●	20.5 - 20.9	25	33	246	56	332.5	TPD205B - 209B
210-25-12-P	●	21.0 - 21.4	25	33	252	60	340	TPD210B - 214B
215-25-12-P	●	21.5 - 21.9	25	33	258	60	346.5	TPD215B - 219B
220-25-12-P	●	22.0 - 22.4	25	33	264	60	353	TPD220B - 224B
225-25-12-P	●	22.5 - 22.9	25	33	270	60	359.5	TPD225B - 229B
230-25-12-P	●	23.0 - 23.4	25	33	276	60	367	TPD230B - 234B
235-25-12-P	●	23.5 - 23.9	25	33	282	60	373.5	TPD235B - 239B
240-32-12-P	●	24.0 - 24.4	32	43	288	60	384	TPD240B - 244B
245-32-12-P	●	24.5 - 24.9	32	43	294	60	390.5	TPD245B - 249B
250-32-12-P	●	25.0 - 25.4	32	43	300	60	398	TPD250B - 254B
255-32-12-P	●	25.5 - 25.9	32	43	306	60	404.5	TPD255B - 259B
260-32-12-P	●	26.0 - 26.9	32	43	312	60	411	TPD260B - 269B
270-32-12-P	●	27.0 - 27.9	32	43	324	60	425	TPD270B - 279B
280-32-12-P	●	28.0 - 28.9	32	43	336	60	438	TPD280B - 289B
290-32-12-P	●	29.0 - 29.9	32	43	348	60	452	TPD290B - 299B
300-32-12-P	●	30.0 - 30.9	32	43	360	60	464	TPD300B - 309B
310-32-12-P	●	31.0 - 31.9	32	43	372	60	478	TPD310B - 319B
320-32-12-P	●	32.0 - 32.9	32	43	384	60	489	TPD320B - 329B

●: Stock item

TPDB-F

Code system

【Holder】

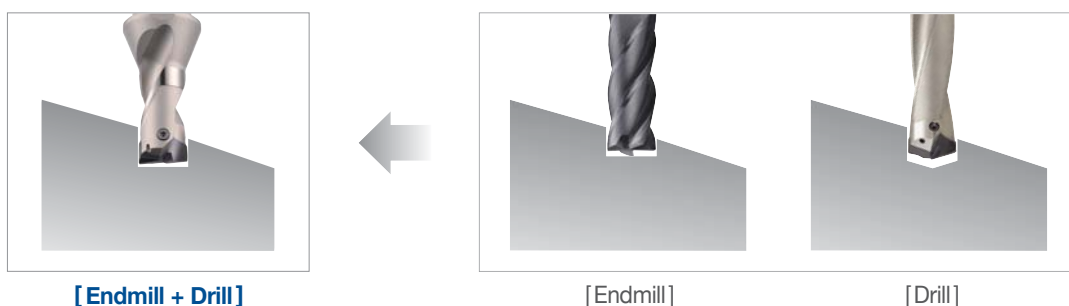
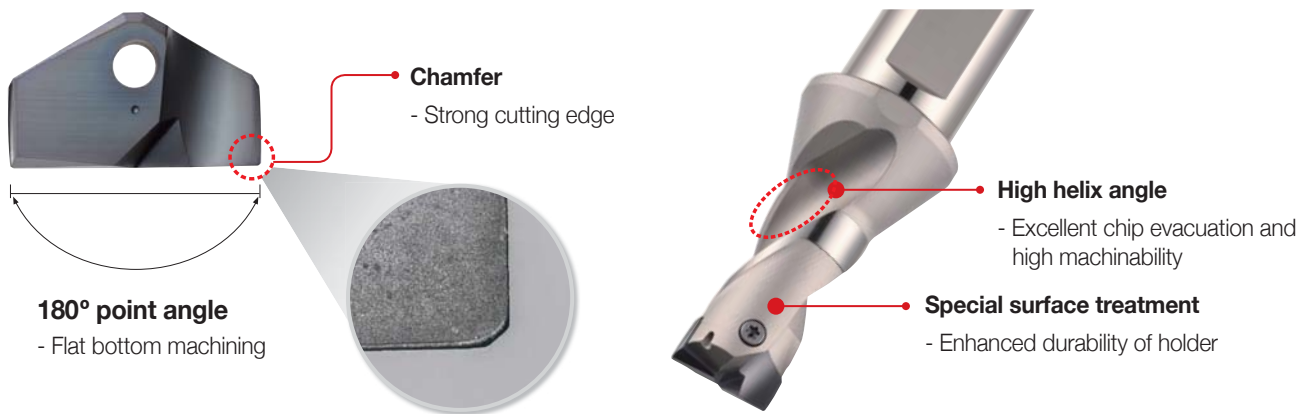
TPD	B	220	-	25	-	1.5	-	F
Top solid Piercing Drill	Insert type B: Blade type	Drill dia. 220: Ø22.0		Shank dia. 25: Ø25		Aspect ratio (L/D) 1.5D		Flat

【Insert】

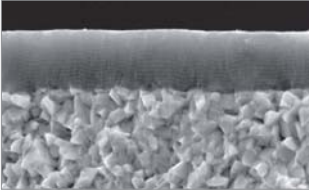
TPD	200	B	-	F
Top solid Piercing Drill	Drill dia. 200: Ø20.0	Insert type B: Blade type		Cutting edge F: Flat FC: Flat Candle

Features

- **High precision clamping system** - High precision clamping due to high precise grinding and auto-centering
- **Screw on clamping system** - Easy to replace insert
- **Cutting edge with 180° point angle** - Flat bottom machining
- **Low cutting load cutting edge** - Low cutting load and excellent chip control
- **High durability holder** - Improved wear resistance and durability with special surface treatment implementation
- **Holder with good chip evacuation** - Good chip evacuation and reduced cutting load with high helix angle



Grade features



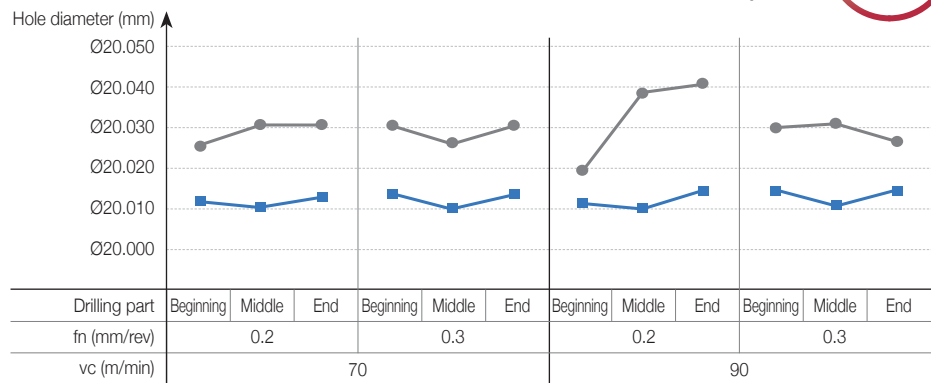
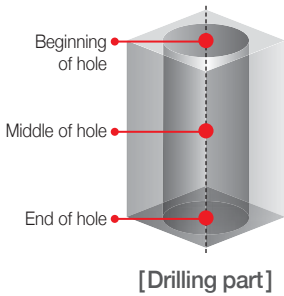
PC5400

- PVD coating technology with high lubrication, built up edge resistance and chipping resistance
- Excellent chipping resistance due to high toughness coating with high adhesive strength
- Enhanced fracture resistance and stable machinability due to ultra-fine substrate with high toughness substrate

Performance evaluation

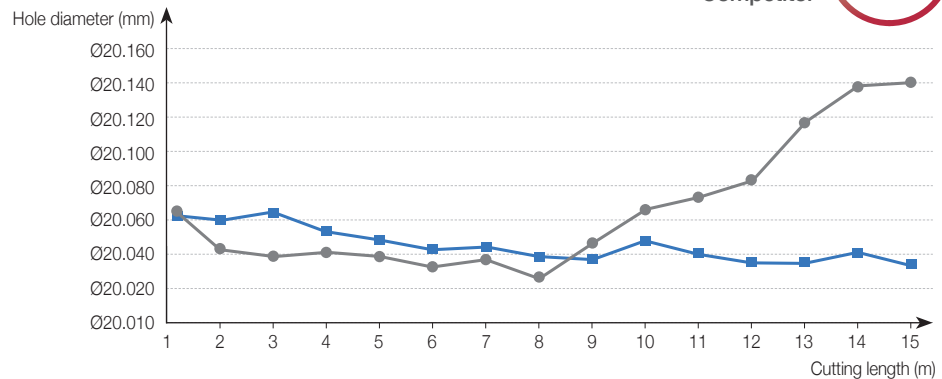
Precision

- **Workpiece** Alloy steel (42CrMo4, HRC22)
- **Cutting conditions** vc (m/min) = 70/90, fn (mm/rev) = 0.2/0.3, ap (mm) = 30, wet (20 bar)
- **Tools**
 - Insert TPDB200B-F (PC5400)
 - Holder TPDB200-25-1.5-F (Drill dia. = $\varnothing 20$ mm)



▶ Cutting edge with low cutting load enhances high precision.

- **Workpiece** Alloy steel (42CrMo4, HRC22), Angled surface 15°
- **Cutting conditions** vc (m/min) = 70, fn (mm/rev) = 0.21, ap (mm) = 20, wet (20 bar)
- **Tools**
 - Insert TPDB200B-F (PC5400)
 - Holder TPDB200-25-1.5-F (Drill dia. = $\varnothing 20$ mm)

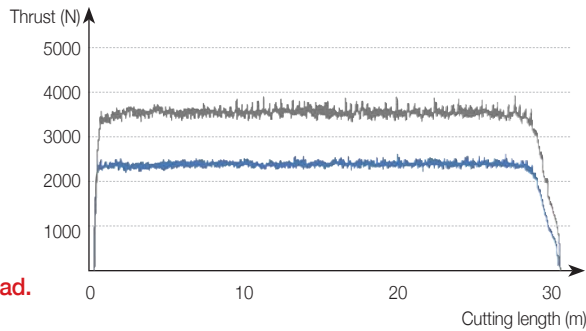


▶ Cutting edge with low cutting load enhances high precision.

Performance evaluation

Cutting load

- **Workpiece** Alloy steel (42CrMo4, HRC22)
- **Cutting conditions**
 - vc (m/min) = 70
 - fn (mm/rev) = 0.25
 - ap (mm) = 30
 - wet (20 bar)
- **Tools**
 - Insert** TPD200B-F (PC5400)
 - Holder** TPDB200-25-1.5-F (Drill dia. = Ø20 mm)



30% lower cutting load

- **TPDB-F**
Average thrust 2392N
- **Competitor**
Average thrust 3560N

▶ The sharp point shape reduces cutting load.

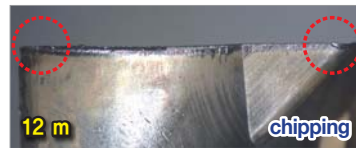
Wear resistance

- **Workpiece** Alloy steel (42CrMo4, HRC22), Angled surface 15°
- **Cutting conditions**
 - vc (m/min) = 70
 - fn (mm/rev) = 0.21
 - ap (mm) = 20
 - wet (20 bar)
- **Tools**
 - Insert** TPD200B-F (PC5400)
 - Holder** TPDB200-25-1.5-F (Drill dia. = Ø20 mm)



[TPDB-F]

Excellent wear resistance and chipping resistance



[Competitor]

▶ Enhanced chipping resistance increases tool life due to stable wear on the cutting edge.

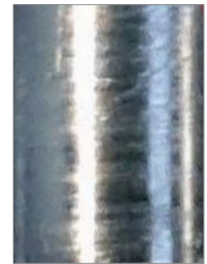
Surface finish

- **Workpiece** Alloy steel (42CrMo4, HRC22), Angled surface 15°
- **Cutting conditions**
 - vc (m/min) = 90
 - fn (mm/rev) = 0.18
 - ap (mm) = 20
 - wet (20bar)
- **Tools**
 - Insert** TPD150B-F (PC5400)
 - Holder** TPDB150-16-1.5-F (Drill dia. = Ø15 mm)



[TPDB-F]

Enhanced surface finish



[Competitor]

▶ Low cutting load cutting edge ensures good surface finish.

Chip control

- **Workpiece** Carbon steel (C45, HRC18)
- **Cutting conditions**
 - vc (m/min) = 90
 - fn (mm/rev) = 0.25
 - ap (mm) = 30
 - wet (20 bar)
- **Tools**
 - Insert** TPD200B-F (PC5400)
 - Holder** TPDB200-25-1.5-F (Drill dia. = Ø20 mm)



[TPDB-F]

Excellent chip control

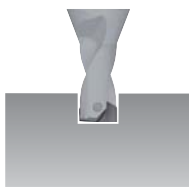
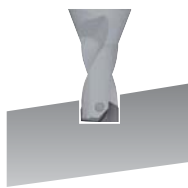
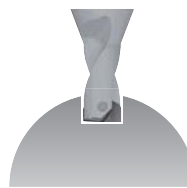

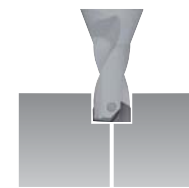


[Competitor]

▶ Stable chip curling controls chip shape.

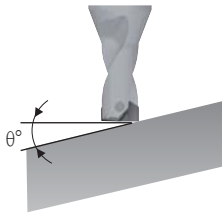
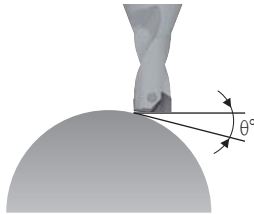
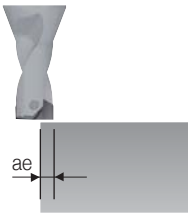
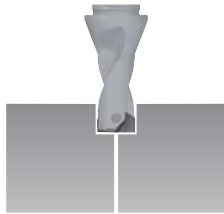
Recommended cutting condition

Workpiece			Grade	vc (m/min)	Aspect ratio (L/D) = 1.5D Feed rate (mm/rev) per drill dia. (mm)	
ISO	Workpiece	HB			Ø14.0 - Ø21.9	Ø22.0 - Ø30.9
P Carbon steel	Low carbon steel (C10, C25 etc)	80-120	PC5400	80 (60-100)	0.2-0.3	0.22-0.32
	High carbon steel (C45, C50 etc)	180-280		70 (50-90)	0.2-0.3	0.22-0.32
P Alloy steel	Low alloy steel (18CrMo4, 42CrMo4 etc)	140-260		70 (50-90)	0.2-0.3	0.22-0.32
	High alloy steel (34CrMo4 etc)	260-320		60 (40-80)	0.2-0.3	0.22-0.32

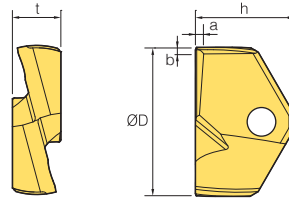
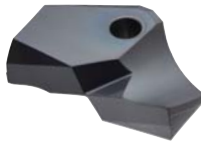
Machining	Flat surface drilling	Angled surface drilling	Curved surface drilling	Plunging	Boring
Pic.					
1.5D	○	○	○	○	○

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

Precaution in drilling

Angled surface drilling	Curved surface drilling	Plunging	Boring
			
<ul style="list-style-type: none"> Reduce the feed (fn) to 30% than general cutting conditions at the beginning and the end of angled surface. (In case, θ is over 30°, reduce it to 50%.) 	<ul style="list-style-type: none"> 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%.) 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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.

Insert





(mm)

Designation	Coated	ØD	h	t	a	b
	PC5400					
TPD	140B-F	14.0	8.75	4.0	0.065	0.055
	145B-F	14.5	8.75	4.0	0.065	0.055
	150B-F	15.0	9.25	4.0	0.065	0.055
	155B-F	15.5	9.25	4.0	0.065	0.055
	160B-F	16.0	10.25	5.5	0.065	0.055
	165B-F	16.5	10.25	5.5	0.065	0.055
	170B-F	17.0	10.75	5.5	0.065	0.055
	175B-F	17.5	10.75	5.5	0.065	0.055
	180B-F	18.0	11.75	6.0	0.065	0.055
	185B-F	18.5	11.75	6.0	0.065	0.055
	190B-F	19.0	12.25	6.0	0.065	0.055
	195B-F	19.5	12.25	6.0	0.065	0.055
	200B-F	20.0	12.75	6.5	0.065	0.055
	205B-F	20.5	12.75	6.5	0.065	0.055
	210B-F	21.0	13.25	6.5	0.065	0.055
	215B-F	21.5	13.25	6.5	0.065	0.055
	220B-F	22.0	13.75	7.0	0.065	0.055
	225B-F	22.5	13.75	7.0	0.065	0.055
	230B-F	23.0	14.25	7.0	0.065	0.055
	235B-F	23.5	14.25	7.0	0.065	0.055
	240B-F	24.0	14.75	7.5	0.065	0.055
	245B-F	24.5	14.75	7.5	0.065	0.055
	250B-F	25.0	15.25	7.5	0.065	0.055
	255B-F	25.5	15.25	7.5	0.065	0.055
	260B-F	26.0	15.75	8.5	0.065	0.055
	265B-F	26.5	15.75	8.5	0.065	0.055
	270B-F	27.0	16.75	8.5	0.065	0.055
	275B-F	27.5	16.75	8.5	0.065	0.055
	280B-F	28.0	17.75	9.5	0.065	0.055
	285B-F	28.5	17.75	9.5	0.065	0.055
	290B-F	29.0	18.25	9.5	0.065	0.055
	295B-F	29.5	18.25	9.5	0.065	0.055
	300B-F	30.0	18.75	10.0	0.065	0.055
	305B-F	30.5	18.75	10.0	0.065	0.055

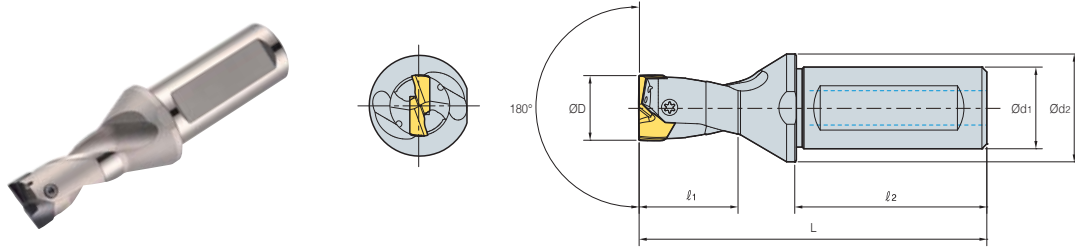
※ We can provide nonstock items with Ø14.00 - Ø30.99

●: Stock item

Parts

Designation	Drill diameter ØD (mm)	Screw 	Wrench 	Torque (N·m)
TPD 140B-F ~ 149B-F	14.0 - 14.9	FTNB02512-P	TW07S	0.8
150B-F ~ 179B-F	15.0 - 17.9	FTNB02514-P	TW07S	0.8
180B-F ~ 199B-F	18.0 - 19.9	FTNB0316-P	TW09S	1.2
200B-F ~ 239B-F	20.0 - 23.9	FTNB0319	TW09S	1.2
240B-F ~ 259B-F	24.0 - 25.9	FTNB03522	TW15S	3.0
260B-F ~ 279B-F	26.0 - 27.9	FTNB03524	TW15S	3.0
280B-F ~ 299B-F	28.0 - 29.9	FTNB0426	TW15S	3.0
300B-F ~ 309B-F	30.0 - 30.9	FTNB0528	TW20-100	4.0

TPDB-F (1.5D)



(mm)

Designation	Stock	ØD	Ød1	Ød2	ℓ1	ℓ2	L	Insert
TPDB	140-16-1.5-F	14.0 - 14.4	16	20	28.0	48	86.0	TPD140B-F~TPD144B-F
	145-16-1.5-F	14.5 - 14.9	16	20	29.0	48	87.0	TPD145B-F~TPD149B-F
	150-20-1.5-F	15.0 - 15.4	20	25	30.0	50	93.0	TPD150B-F~TPD154B-F
	155-20-1.5-F	15.5 - 15.9	20	25	31.0	50	94.0	TPD155B-F~TPD159B-F
	160-20-1.5-F	16.0 - 16.4	20	25	32.0	50	95.0	TPD160B-F~TPD164B-F
	165-20-1.5-F	16.5 - 16.9	20	25	33.0	50	96.0	TPD165B-F~TPD169B-F
	170-20-1.5-F	17.0 - 17.4	20	25	34.0	50	97.0	TPD170B-F~TPD174B-F
	175-20-1.5-F	17.5 - 17.9	20	25	35.0	50	98.0	TPD175B-F~TPD179B-F
	180-20-1.5-F	18.0 - 18.4	20	25	36.0	50	99.0	TPD180B-F~TPD184B-F
	185-20-1.5-F	18.5 - 18.9	20	25	37.0	50	100.0	TPD185B-F~TPD189B-F
	190-25-1.5-F	19.0 - 19.4	25	33	38.0	56	101.0	TPD190B-F~TPD194B-F
	195-25-1.5-F	19.5 - 19.9	25	33	39.0	56	102.0	TPD195B-F~TPD199B-F
	200-25-1.5-F	20.0 - 20.4	25	33	40.0	56	116.0	TPD200B-F~TPD204B-F
	205-25-1.5-F	20.5 - 20.9	25	33	41.0	56	117.0	TPD205B-F~TPD209B-F
	210-25-1.5-F	21.0 - 21.4	25	33	42.0	56	118.0	TPD210B-F~TPD214B-F
	215-25-1.5-F	21.5 - 21.9	25	33	43.0	56	119.0	TPD215B-F~TPD219B-F
	220-25-1.5-F	22.0 - 22.4	25	33	44.0	56	120.0	TPD220B-F~TPD224B-F
	225-25-1.5-F	22.5 - 22.9	25	33	45.0	56	121.0	TPD225B-F~TPD229B-F
	230-25-1.5-F	23.0 - 23.4	25	33	46.0	56	122.0	TPD230B-F~TPD234B-F
	235-25-1.5-F	23.5 - 23.9	25	33	47.0	56	123.0	TPD235B-F~TPD239B-F
	240-32-1.5-F	24.0 - 24.4	32	43	48.0	60	128.5	TPD240B-F~TPD244B-F
	245-32-1.5-F	24.5 - 24.9	32	43	49.0	60	129.5	TPD245B-F~TPD249B-F
	250-32-1.5-F	25.0 - 25.4	32	43	50.0	60	130.5	TPD250B-F~TPD254B-F
	255-32-1.5-F	25.5 - 25.9	32	43	51.0	60	131.5	TPD255B-F~TPD259B-F
	260-32-1.5-F	26.0 - 26.4	32	43	52.0	60	132.5	TPD260B-F~TPD264B-F
	265-32-1.5-F	26.5 - 26.9	32	43	53.0	60	133.5	TPD265B-F~TPD269B-F
	270-32-1.5-F	27.0 - 27.4	32	43	54.0	60	134.5	TPD270B-F~TPD274B-F
	275-32-1.5-F	27.5 - 27.9	32	43	55.0	60	135.5	TPD275B-F~TPD279B-F
	280-32-1.5-F	28.0 - 28.4	32	43	56.0	60	136.5	TPD280B-F~TPD284B-F
	285-32-1.5-F	28.5 - 28.9	32	43	57.0	60	137.5	TPD285B-F~TPD289B-F
	290-32-1.5-F	29.0 - 29.4	32	43	58.0	60	138.5	TPD290B-F~TPD294B-F
	295-32-1.5-F	29.5 - 29.9	32	43	59.0	60	139.5	TPD295B-F~TPD299B-F
300-32-1.5-F	30.0 - 30.4	32	43	60.0	60	140.5	TPD300B-F~TPD304B-F	
305-32-1.5-F	30.5 - 30.9	32	43	61.0	60	141.5	TPD305B-F~TPD309B-F	

●: Stock item

TPDB-H

Code system

【Holder】

TPD	B	220	-	25	-	4	-	H
Top solid Piercing Drill	Insert type B: Blade type	Drill dia. 220: Ø22.0		Shank dia. 25: Ø25		Aspect ratio (L/D) 3D, 4D, 8D ※ Flange shank (8F) for 8D		H-Beam

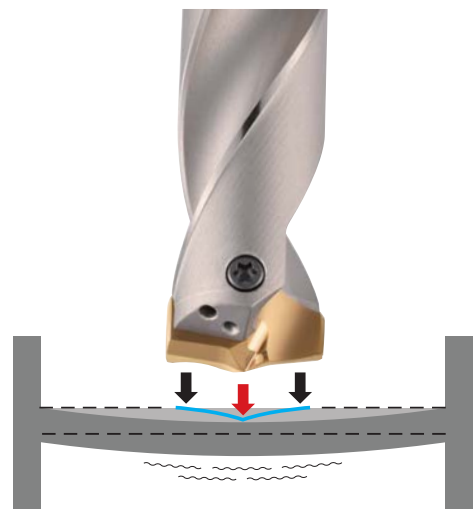
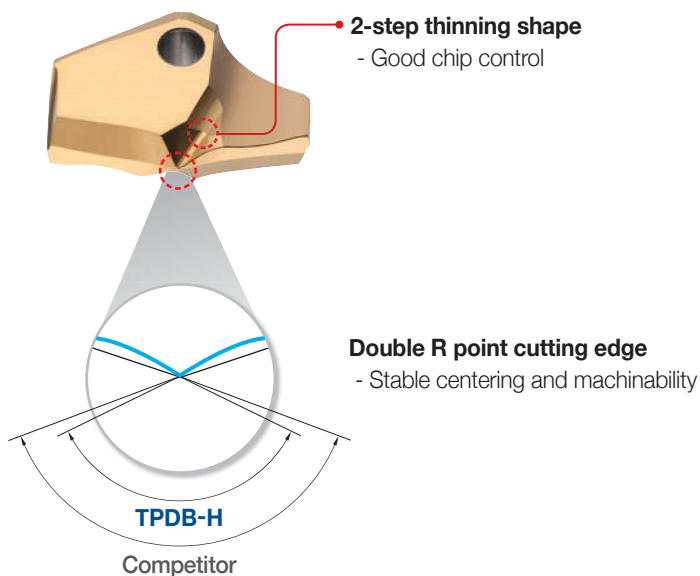
【Insert】

TPD	200	B	-	H
Top solid Piercing Drill	Drill dia. 200: Ø20.0	Insert type B: Blade type		H-Beam

Features

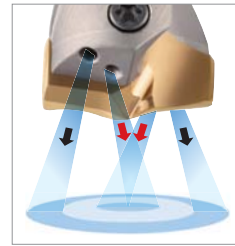
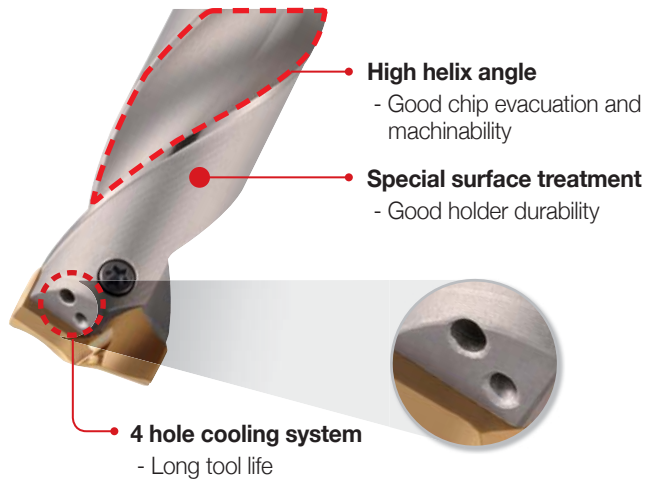
- **High precision clamping system** - High precision clamping due highly precise grinding and auto-centering
- **Screw on clamping system** - Easy to replace insert
- **Edge design with excellent centering** - Low cutting load and good chip control
- **High durability holder** - Improved wear resistance and durability with special surface treatment implementation
- **Holder with good chip evacuation** - Good chip evacuation and reduced cutting load with high helix angle
- **Optimally designed oil hole** - Long tool life

Insert features



- ↓ Applied Double R point edge design is optimized for excellent centering and stable machinability.
- ↓ Machinability and productivity are improved by minimizing both workpiece's bending and chipping at edge corner section.

Holder features



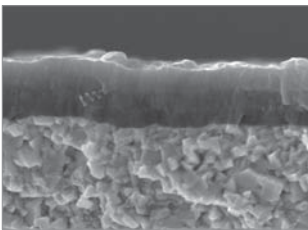
[TPDB-H]



[Competitor]

Concentrated coolant injection on delicate cutting edge increases tool life.

Grade features



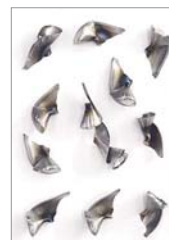
PC340Q new

- Application of high hardness lubricative PVD coating technology with excellent resistance on wear, built up edge and chipping.
- The special surface treatment improves chip evacuation and reduces wear on the rake face and relief face.
- High hardness ultra-fine substrate ensures high rigidity of cutting edge and good chipping resistance.

Performance evaluation

Chip control

- **Workpiece** Carbon steel (SS275, SM355A)
- **Cutting conditions** vc (m/min) = 80
fn (mm/rev) = 0.2
ap (mm) = 30
wet
- **Tools** **Insert** TPD270B-H (PC340Q)
Holder TPDB270-32-4-H
(Drill dia. = Ø27 mm)



[SS275]



[SM355A]

Good chip control

Wear resistance

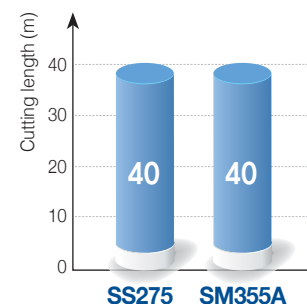
- **Workpiece** Carbon steel (SS275)
- **Cutting conditions** vc (m/min) = 65, fn (mm/rev) = 0.25,
ap (mm) = 30, wet
- **Tools** **Insert** TPD220B-H (PC340Q)
Holder TPDB220-25-4-H
(Drill dia. = Ø22 mm)
- **Workpiece** Carbon steel (SM355A)
- **Cutting conditions** vc (m/min) = 70, fn (mm/rev) = 0.25,
ap (mm) = 30, wet
- **Tools** **Insert** TPD270B-H (PC340Q)
Holder TPDB270-32-4-H
(Drill dia. = Ø27 mm)



[SS275]


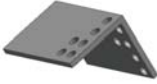

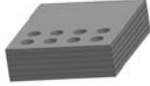


[SM355A]



Normal wear and still usable

Workpiece and recommended cutting conditions

ISO	Workpiece		Workpiece materials	Grade	vc (m/min)	Aspect ratio (L/D) = 3D, 4D Feed rate (mm/rev) per drill dia. (mm)	
						Ø14.0-Ø21.0	Ø22.0-Ø30.0
P Carbon steel	H-Beam		SS275 (SS400*) SM355 (SM490*) SHN355 (SHN490*)	PC340Q	65 (60-75)	0.2-0.25	0.2-0.3
	Angle						
	Plate						
	Plate (Stacked)				60 (55-65)	0.15-0.25	0.15-0.25

* : Old symbol

Precaution in drilling

Angled surface drilling



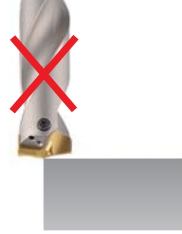
- The approach angle between drill and the workpiece at the beginning and the end should be less than 6°.
- Reduce the feed (f_n) to 30-50% than general cutting conditions at the beginning and the end of angled surface.

Stacked plates drilling



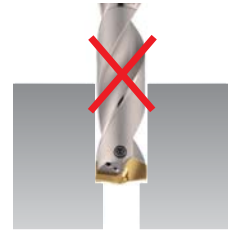
- Gap between the plates could make wrong chip evacuation causing fracture of the drill.
- Place stacked plates without any gap between each.

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.

Application examples

Carbon steel (SM355)



- **Cutting conditions** vc (m/min) = 60, fn (mm/rev) = 0.25, ap (mm) = 50, wet
- **Tools**
Insert TPD240B-H (PC340Q)
Holder TPDB240-32-3-H
(Drill dia. = Ø24 mm)
- **Tool life** 60 m (Normal wear)

► Stable chip evacuation ensures tool life as 60 m in even machining with over 40 mm thickness.

Carbon steel (SM355)



- **Cutting conditions** vc (m/min) = 70, fn (mm/rev) = 0.25, ap (mm) = 24, wet
- **Tools**
Insert TPD270B-H (PC340Q)
Holder TPDB270-32-3-H
(Drill dia. = Ø27 mm)
- **Tool life** 40 m (Normal wear)

► High speed and high feed machining saves machining hours.

Carbon steel (SS275)



- **Cutting conditions** vc (m/min) = 60, fn (mm/rev) = 0.20, ap (mm) = 12, wet
- **Tools**
Insert TPD220B-H (PC340Q)
Holder TPDB220-32-3-H
(Drill dia. = Ø22 mm)
- **Tool life** 35 m (Normal wear)

► Stable machinability and long tool life are realized in machining various workpieces such as SM355, SS275, SHN355 etc.

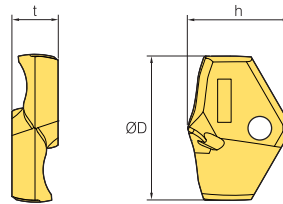
Carbon steel (SM355)



- **Cutting conditions** vc (m/min) = 65, fn (mm/rev) = 0.20, ap (mm) = 22, wet
- **Tools**
Insert TPD240B-H (PC340Q)
Holder TPDB240-32-3-H
(Drill dia. = Ø24 mm)
- **Tool life** 40 m (Normal wear)

► Minimized cutting load in horizontal machining ensures high quality machining.

Insert





(mm)

Designation	Coated	ØD	h	t
	PC340Q			
TPD	140B-H	14.0	10.0	4.0
	145B-H	14.5	10.0	4.0
	150B-H	15.0	10.5	4.0
	155B-H	15.5	10.5	4.0
	160B-H	16.0	11.5	5.5
	165B-H	16.5	11.5	5.5
	170B-H	17.0	12.0	5.5
	175B-H	17.5	12.0	5.5
	180B-H	18.0	13.0	6.0
	185B-H	18.5	13.0	6.0
	190B-H	19.0	13.5	6.0
	195B-H	19.5	13.5	6.0
	200B-H	20.0	14.5	6.5
	205B-H	20.5	14.5	6.5
	210B-H	21.0	15.0	6.5
	215B-H	21.5	15.0	6.5
	220B-H	22.0	15.5	7.0
	225B-H	22.5	15.5	7.0
	230B-H	23.0	16.0	7.0
	235B-H	23.5	16.0	7.0
	240B-H	24.0	16.5	7.5
	245B-H	24.5	16.5	7.5
	250B-H	25.0	17.0	7.5
	255B-H	25.5	17.0	7.5
	260B-H	26.0	17.5	8.5
	265B-H	26.5	17.5	8.5
	270B-H	27.0	18.5	8.5
	275B-H	27.5	18.5	8.5
	280B-H	28.0	19.5	9.5
	285B-H	28.5	19.5	9.5
290B-H	29.0	20.0	9.5	
295B-H	29.5	20.0	9.5	
300B-H	30.0	20.5	10.0	
305B-H	30.5	20.5	10.0	

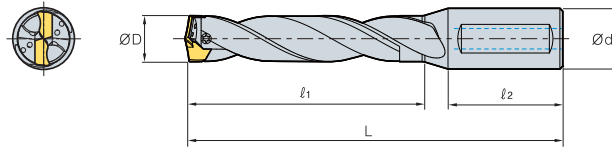
※ We can provide nonstock items with Ø14.00 - Ø30.99

●: Stock item

Parts

Designation	Drill diameter ØD (mm)	Screw 	Wrench 	Torque (N·m)
TPD	140B-H ~ 149B-H	FTNB02512-P	TW07S	0.8
	150B-H ~ 179B-H	FTNB02514-P	TW07S	0.8
	180B-H ~ 199B-H	FTNB0316-P	TW09S	1.2
	200B-H ~ 239B-H	FTNB0319	TW09S	1.2
	240B-H ~ 259B-H	FTNB03522	TW15S	3.0
	260B-H ~ 279B-H	FTNB03524	TW15S	3.0
	280B-H ~ 299B-H	FTNB0426	TW15S	3.0
	300B-H ~ 309B-H	FTNB0528	TW20-100	4.0

TPDB-H (3D)

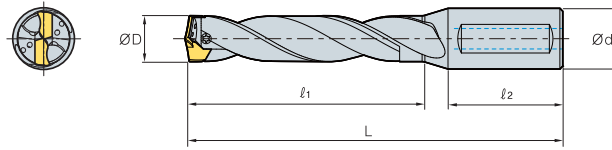


(mm)

Designation	Stock	ØD	Ød	ℓ ₁	ℓ ₂	L	Insert
TPDB 140-16-3-H		14.0 - 14.4	16	42	48	97.5	TPD140B-144B-H
145-16-3-H		14.5 - 14.9	16	43.5	48	99.5	TPD145B-149B-H
150-20-3-H		15.0 - 15.4	20	45	50	103.0	TPD150B-154B-H
155-20-3-H		15.5 - 15.9	20	46.5	50	105.0	TPD155B-159B-H
160-20-3-H		16.0 - 16.4	20	48	50	106.5	TPD160B-164B-H
165-20-3-H		16.5 - 16.9	20	49.5	50	108.5	TPD165B-169B-H
170-20-3-H		17.0 - 17.4	20	51	50	110.0	TPD170B-174B-H
175-20-3-H		17.5 - 17.9	20	52.5	50	112.0	TPD175B-179B-H
180-20-3-H		18.0 - 18.4	20	54	50	113.5	TPD180B-184B-H
185-20-3-H		18.5 - 18.9	20	55.5	50	115.5	TPD185B-189B-H
190-20-3-H		19.0 - 19.4	20	57	50	117.0	TPD190B-194B-H
195-20-3-H		19.5 - 19.9	20	58.5	50	119.0	TPD195B-199B-H
200-25-3-H		20.0 - 20.4	25	60	56	126.5	TPD200B-204B-H
205-25-3-H		20.5 - 20.9	25	61.5	56	128.5	TPD205B-209B-H
210-25-3-H		21.0 - 21.4	25	63	56	130.0	TPD210B-214B-H
215-25-3-H		21.5 - 21.9	25	64.5	56	132.0	TPD215B-219B-H
220-25-3-H		22.0 - 22.4	25	66	56	133.5	TPD220B-224B-H
225-25-3-H		22.5 - 22.9	25	67.5	56	135.5	TPD225B-229B-H
230-25-3-H		23.0 - 23.4	25	69	56	137.0	TPD230B-234B-H
235-25-3-H		23.5 - 23.9	25	70.5	56	139.0	TPD235B-239B-H
240-32-3-H		24.0 - 24.4	32	72	60	144.5	TPD240B-244B-H
245-32-3-H		24.5 - 24.9	32	73.5	60	146.5	TPD245B-249B-H
250-32-3-H		25.0 - 25.4	32	75	60	148.0	TPD250B-254B-H
255-32-3-H		25.5 - 25.9	32	76.5	60	150.0	TPD255B-259B-H
260-32-3-H		26.0 - 26.4	32	78	60	151.5	TPD260B-264B-H
265-32-3-H		26.5 - 26.9	32	79.5	60	153.5	TPD265B-269B-H
270-32-3-H		27.0 - 27.4	32	81	60	155.0	TPD270B-274B-H
275-32-3-H		27.5 - 27.9	32	82.5	60	157.0	TPD275B-279B-H
280-32-3-H		28.0 - 28.4	32	84	60	158.5	TPD280B-284B-H
285-32-3-H		28.5 - 28.9	32	85.5	60	160.5	TPD285B-289B-H
290-32-3-H		29.0 - 29.4	32	87	60	162.0	TPD290B-294B-H
295-32-3-H		29.5 - 29.9	32	88.5	60	164.0	TPD295B-299B-H
300-32-3-H		30.0 - 30.9	32	90	60	165.5	TPD300B-309B-H

● : Stock item

TPDB-H (4D)

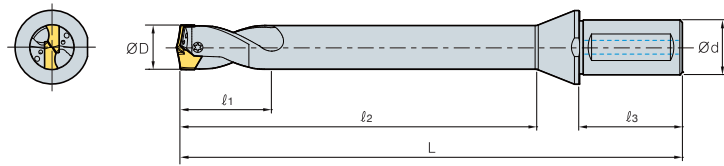


(mm)

Designation	Stock	ØD	Ød	ℓ ₁	ℓ ₂	L	Insert
TPDB	140-16-4-H	14.0 - 14.4	16	56	48	111.5	TPD140B-144B-H
	145-16-4-H	14.5 - 14.9	16	58	48	114.0	TPD145B-149B-H
	150-20-4-H	15.0 - 15.4	20	60	50	118.0	TPD150B-154B-H
	155-20-4-H	15.5 - 15.9	20	62	50	120.5	TPD155B-159B-H
	160-20-4-H	16.0 - 16.4	20	64	50	122.5	TPD160B-164B-H
	165-20-4-H	16.5 - 16.9	20	66	50	125.0	TPD165B-169B-H
	170-20-4-H	17.0 - 17.4	20	68	50	127.0	TPD170B-174B-H
	175-20-4-H	17.5 - 17.9	20	70	50	129.5	TPD175B-179B-H
	180-20-4-H	18.0 - 18.4	20	72	50	131.5	TPD180B-184B-H
	185-20-4-H	18.5 - 18.9	20	74	50	134.0	TPD185B-189B-H
	190-20-4-H	19.0 - 19.4	20	76	50	136.0	TPD190B-194B-H
	195-20-4-H	19.5 - 19.9	20	78	50	138.5	TPD195B-199B-H
	200-25-4-H	20.0 - 20.4	25	80	56	146.5	TPD200B-204B-H
	205-25-4-H	20.5 - 20.9	25	82	56	149.0	TPD205B-209B-H
	210-25-4-H	21.0 - 21.4	25	84	56	151.0	TPD210B-214B-H
	215-25-4-H	21.5 - 21.9	25	86	56	153.5	TPD215B-219B-H
	220-25-4-H	22.0 - 22.4	25	88	56	155.5	TPD220B-224B-H
	225-25-4-H	22.5 - 22.9	25	90	56	158.0	TPD225B-229B-H
	230-25-4-H	23.0 - 23.4	25	92	56	160.0	TPD230B-234B-H
	235-25-4-H	23.5 - 23.9	25	94	56	162.5	TPD235B-239B-H
	240-32-4-H	24.0 - 24.4	32	96	60	168.5	TPD240B-244B-H
	245-32-4-H	24.5 - 24.9	32	98	60	171.0	TPD245B-249B-H
	250-32-4-H	25.0 - 25.4	32	100	60	173.0	TPD250B-254B-H
	255-32-4-H	25.5 - 25.9	32	102	60	175.5	TPD255B-259B-H
	260-32-4-H	26.0 - 26.4	32	104	60	177.5	TPD260B-264B-H
	265-32-4-H	26.5 - 26.9	32	106	60	180.0	TPD265B-269B-H
	270-32-4-H	27.0 - 27.4	32	108	60	182.0	TPD270B-274B-H
	275-32-4-H	27.5 - 27.9	32	110	60	184.5	TPD275B-279B-H
	280-32-4-H	28.0 - 28.4	32	112	60	186.5	TPD280B-284B-H
	285-32-4-H	28.5 - 28.9	32	114	60	189.0	TPD285B-289B-H
	290-32-4-H	29.0 - 29.4	32	116	60	191.0	TPD290B-294B-H
	295-32-4-H	29.5 - 29.9	32	118	60	193.5	TPD295B-299B-H
300-32-4-H	30.0 - 30.9	32	120	60	195.5	TPD300B-309B-H	

●: Stock item

TPDB-H (8D)



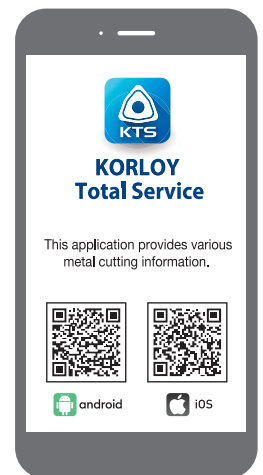
(mm)

Designation	Stock	ØD	Ød	l ₁	l ₂	l ₃	L	Insert
TPDB	140-16-8F-H	14.0 - 14.4	16	50	112	48	175.0	TPD140B-144B-H
	145-16-8F-H	14.5 - 14.9	16	50	116	48	179.0	TPD145B-149B-H
	150-20-8F-H	15.0 - 15.4	20	50	120	50	186.0	TPD150B-154B-H
	155-20-8F-H	15.5 - 15.9	20	50	124	50	190.0	TPD155B-159B-H
	160-20-8F-H	16.0 - 16.4	20	50	128	50	195.0	TPD160B-164B-H
	165-20-8F-H	16.5 - 16.9	20	50	132	50	199.0	TPD165B-169B-H
	170-20-8F-H	17.0 - 17.4	20	50	136	50	204.0	TPD170B-174B-H
	175-20-8F-H	17.5 - 17.9	20	50	140	50	208.0	TPD175B-179B-H
	180-20-8F-H	18.0 - 18.4	20	50	144	50	214.0	TPD180B-184B-H
	185-20-8F-H	18.5 - 18.9	20	50	148	50	218.0	TPD185B-189B-H
	190-20-8F-H	19.0 - 19.4	20	50	152	50	222.0	TPD190B-194B-H
	195-20-8F-H	19.5 - 19.9	20	50	156	50	226.0	TPD195B-199B-H
	200-25-8F-H	20.0 - 20.4	25	50	160	56	236.0	TPD200B-204B-H
	205-25-8F-H	20.5 - 20.9	25	50	164	56	240.0	TPD205B-209B-H
	210-25-8F-H	21.0 - 21.4	25	50	168	56	244.0	TPD210B-214B-H
	215-25-8F-H	21.5 - 21.9	25	50	172	56	248.0	TPD215B-219B-H
	220-25-8F-H	22.0 - 22.4	25	50	176	56	252.0	TPD220B-224B-H
	225-25-8F-H	22.5 - 22.9	25	50	180	56	261.0	TPD225B-229B-H
	230-25-8F-H	23.0 - 23.4	25	50	184	56	265.0	TPD230B-234B-H
	235-25-8F-H	23.5 - 23.9	25	50	188	56	269.0	TPD235B-239B-H
	240-32-8F-H	24.0 - 24.4	32	50	192	60	277.0	TPD240B-244B-H
	245-32-8F-H	24.5 - 24.9	32	50	196	60	281.0	TPD245B-249B-H
	250-32-8F-H	25.0 - 25.4	32	50	200	60	285.0	TPD250B-254B-H
	255-32-8F-H	25.5 - 25.9	32	50	204	60	289.0	TPD255B-259B-H
	260-32-8F-H	26.0 - 26.4	32	50	208	60	293.0	TPD260B-264B-H
	265-32-8F-H	26.5 - 26.9	32	50	212	60	297.0	TPD265B-269B-H
	270-32-8F-H	27.0 - 27.4	32	50	216	60	301.0	TPD270B-274B-H
	275-32-8F-H	27.5 - 27.9	32	50	220	60	305.0	TPD275B-279B-H
	280-32-8F-H	28.0 - 28.4	32	50	224	60	311.0	TPD280B-284B-H
	285-32-8F-H	28.5 - 28.9	32	50	228	60	315.0	TPD285B-289B-H
	290-32-8F-H	29.0 - 29.4	32	50	232	60	320.0	TPD290B-294B-H
	295-32-8F-H	29.5 - 29.9	32	50	236	60	324.0	TPD295B-299B-H
	300-32-8F-H	30.0 - 30.9	32	50	240	60	328.0	TPD300B-309B-H

※ The maximum length of flute could be l_2 .

●: Stock item

www.korloy.com



Holystar B/D, 1350, Nambusunhwan-ro, Geumcheon-gu, Seoul, 08536, Korea
Tel: +82-2-522-3181 Fax: +82-2-522-3184, +82-2-3474-4744 Web: www.korloy.com E-mail: sales.khq@korloy.com

KORLOY AMERICA

620 Maple Avenue, Torrance, CA 90503, USA
Tel: +1-310-782-3800 Toll Free: +1-888-711-0001 Fax: +1-310-782-3885
E-mail: sales.kai@korloy.com

KORLOY INDIA

Plot No. 415, Sector 8, IMT Manesar, Gurgaon 122051, Haryana, India
Tel: +91-124-4391790 Fax: +91-124-4050032
E-mail: sales.kip@korloy.com

KORLOY TURKEY

Serifali Mahallesi, Burhan Sokak NO: 34
Dudullu OSB/Umraniye/Istanbul, 34775, Turkey
Tel: +90-216-415-8874 E-mail: sales.ktl@korloy.com

KORLOY RUSSIA

Krasivy Dom office No. 305, Bld. 5, Novovladykinskiy proezd 8, 127106,
Moscow, Russia
Tel: +7-495-280-1458 Fax: +7-495-280-1459 E-mail: sales.krc@korloy.com

KORLOY FACTORY QINGDAO

Ground Dongjing Road 56(B) District Free Trade Zone. Qingdao, China
Tel: +86-532-86959880 Fax: +86-532-86760651
E-mail: pro.kfq@korloy.com

KORLOY EUROPE

Gablonzer Str. 25-27, 61440 Oberursel, Germany
Tel: +49-6171-277-83-0 Fax: +49-6171-277-83-59
E-mail: sales.keg@korloy.com

KORLOY BRASIL

Av. Aruana 280, conj.12, WLC, Alphaville, Barueri,
CEP06460-010, SP, Brasil
Tel: +55-11-4193-3810 E-mail: sales.kbl@korloy.com

KORLOY CHILE

Av. Providencia 1650, Office 1009, 7500027
Providencia-Santiago, Chile
Tel: +56-229-295-490 E-mail: sales.kcs@korloy.com

KORLOY MEXICO

Queretaro, Mexico
E-mail: sales.kml@korloy.com

KORLOY FACTORY INDIA

Plot No. 415, Sector 8, IMT Manesar, Gurgaon 122051, Haryana, India
Tel: +91-124-4391790 Fax: +91-124-4050032
E-mail: pro.kim@korloy.com