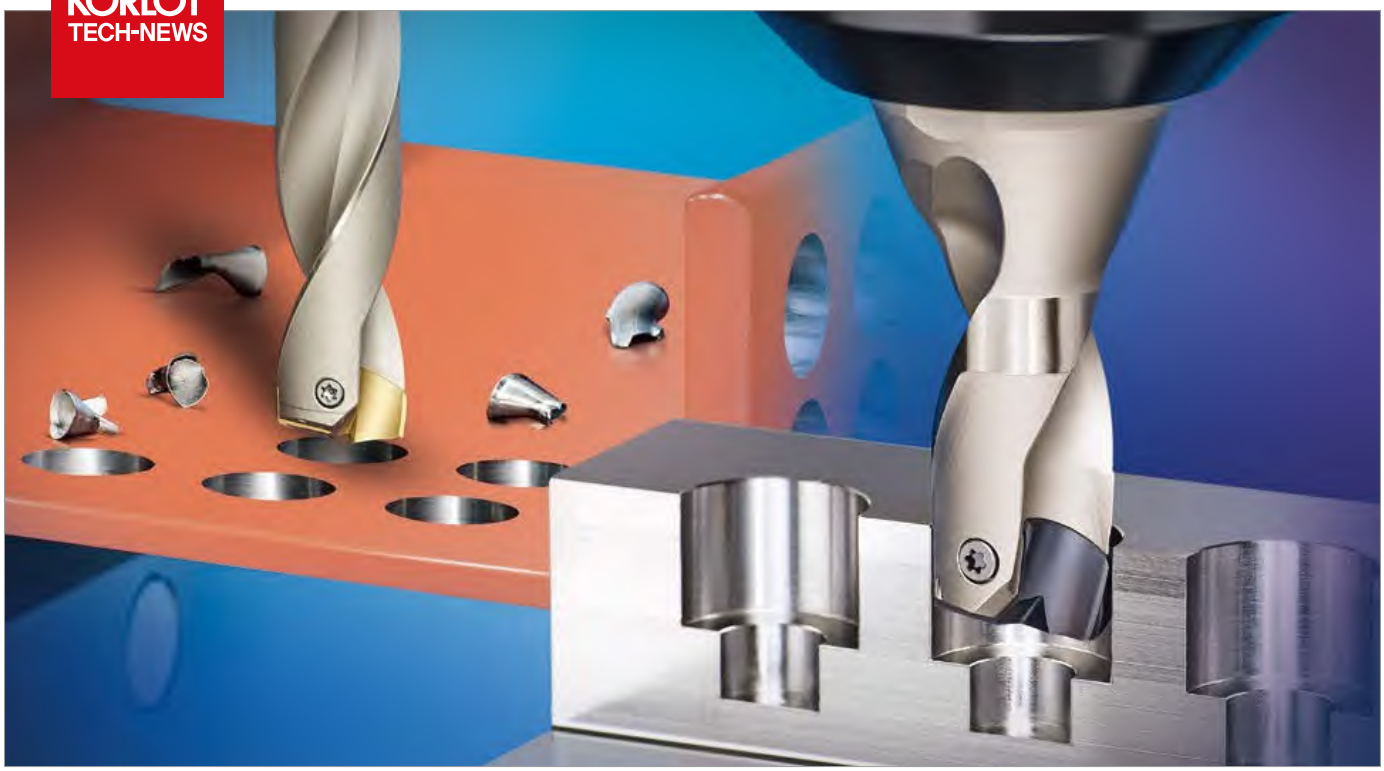
Highly precise and efficient top solid indexable drill

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.

KORLOY

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

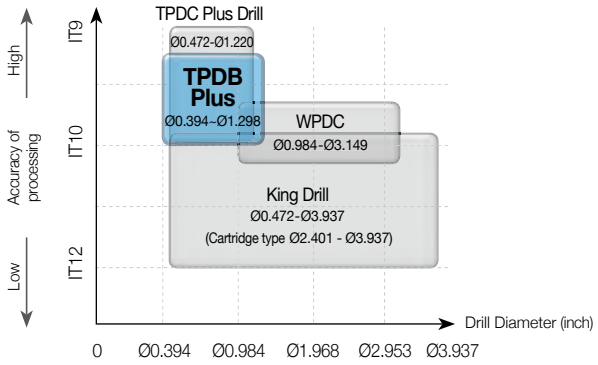
- Fine drilling performance with exclusive edge per application
- Enhanced chip evacuation with high helix angle

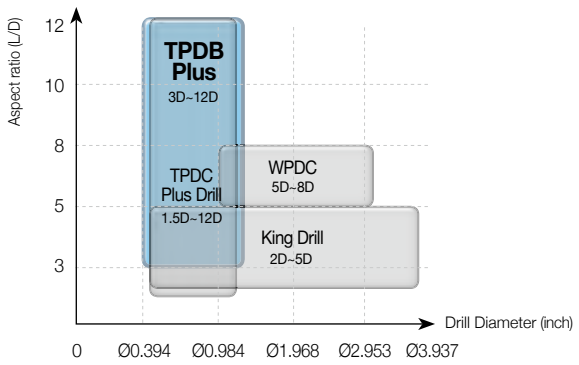
Increased productivity

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

TPDB Plus

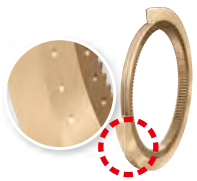
Application range





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	0.394-1.298 inch	3, 5, 8, 10, 12	h7	IT10	≤ 78.74 μin	P, K

Applicable industries

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

Code system

【Holder】

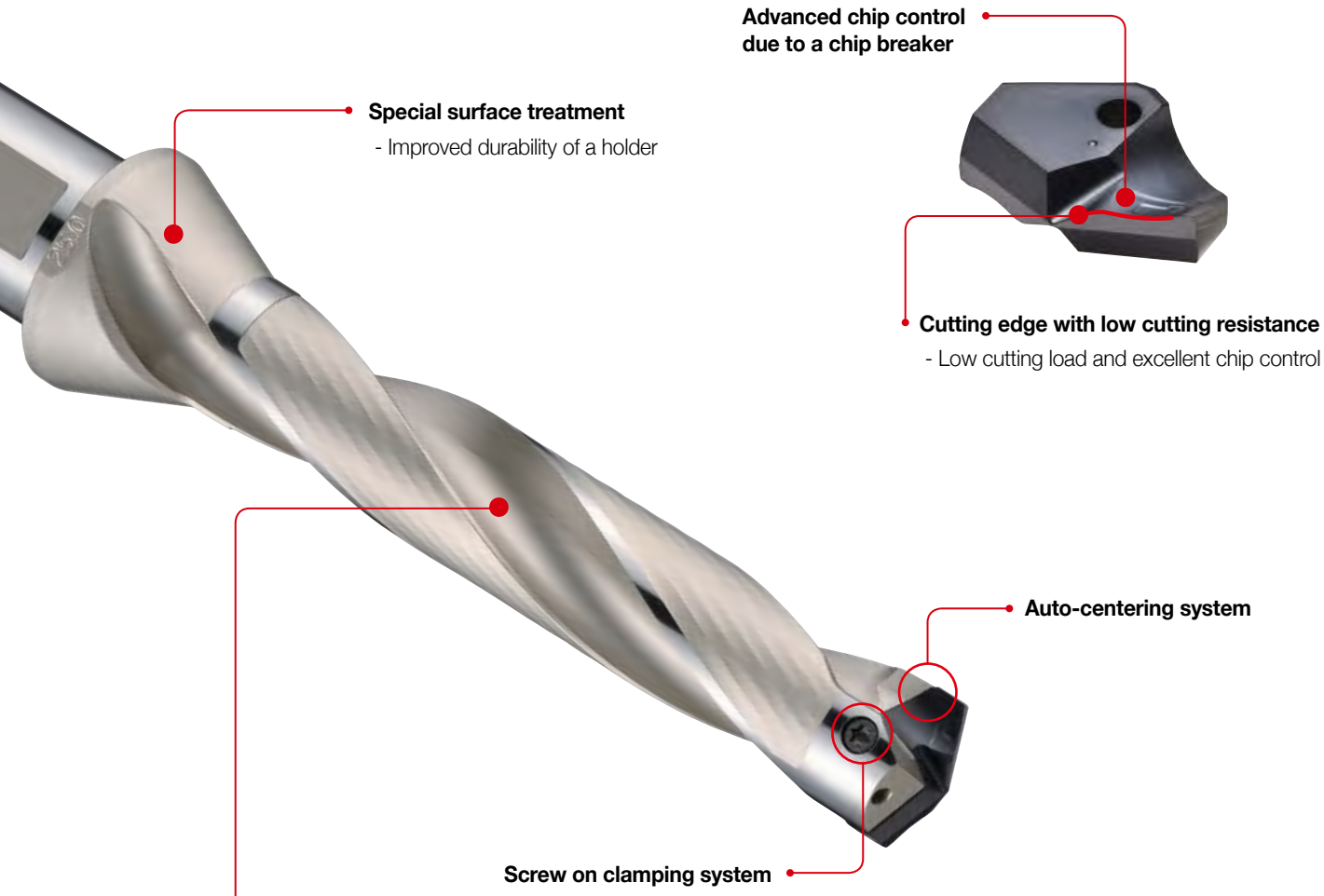
TPD	B	A	0610	-	075	-	5	-	P
Top solid Piercing Drill	Insert type B: Blade type	A: Inch type No code: Metric type	Drill dia. 0610: Ø0.610 inch		Shank dia. 0.75: Ø0.75 inch		Aspect ratio (L/D) 3D, 5D, 8D, 10D, 12D		Plus

【Insert】

TPD	0610	B	A
Top solid Piercing Drill	Drill dia. 0610: Ø0.610 inch	Insert type B: Blade type	Type A: Inch type No code: Metric type

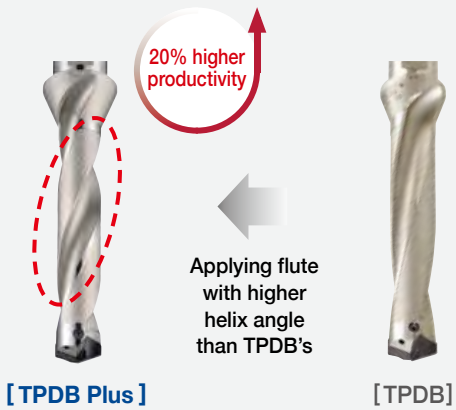
Features

- **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



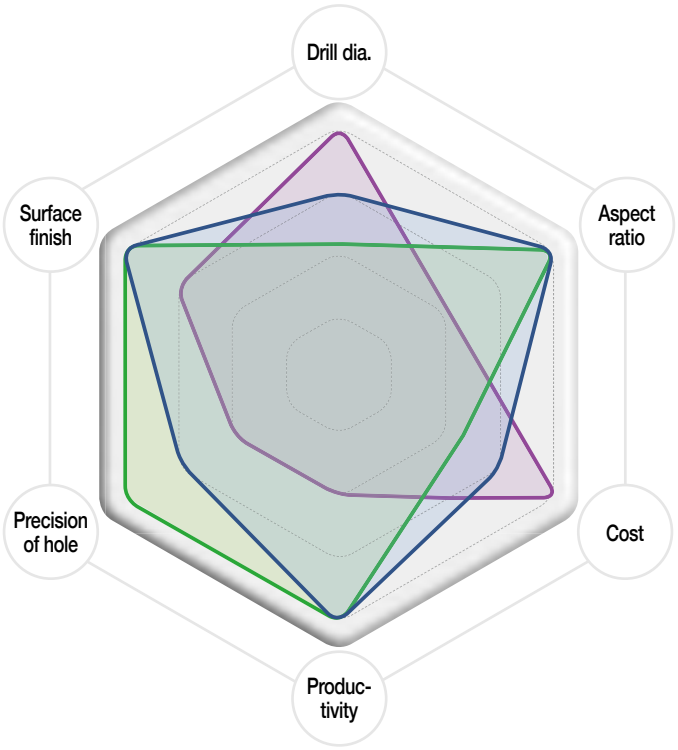
High helix angle

- **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

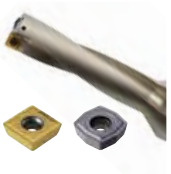
- Good surface finish
- High productivity
- 3D, 5D, 8D, 10D, 12D

TPDC Plus Drill new

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

King Drill

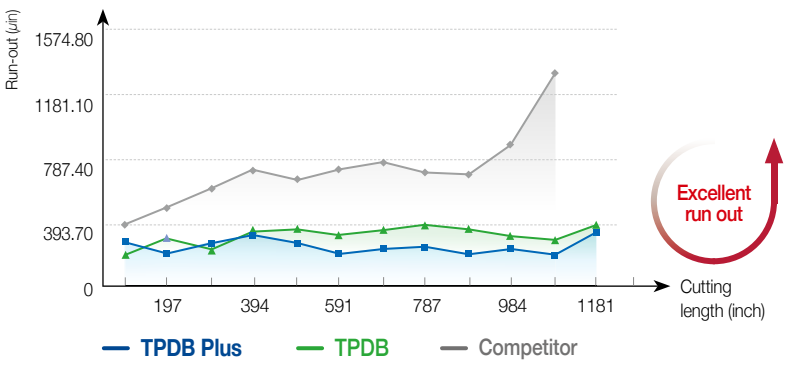
- 4 corners (central and peripheral)
- 2D, 3D, 4D, 5D



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

Run-out

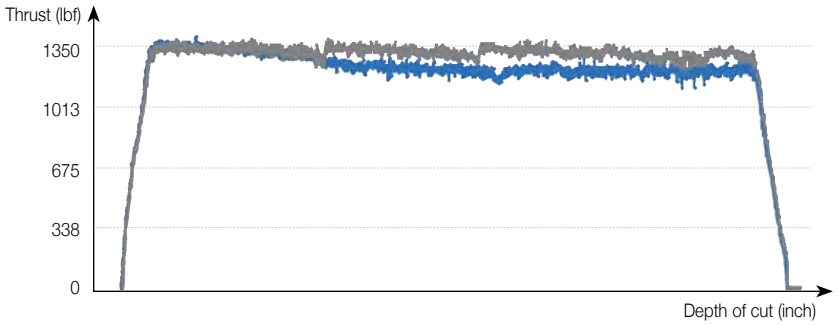
- **Workpiece** Alloy steel (4140)
- **Cutting conditions** vc (sfm) = 295
  fn (ipr) = 0.0098
  ap (inch) = 4.7244
  wet (20 bar)
- **Tools**
  Insert TPD0984BA (PC5300)
  Holder TPDBA0984-125-5-P
  (Drill dia. = Ø0.984 inch)



Performance evaluation

Cutting load

- **Workpiece** Alloy steel (4140)
- **Cutting conditions** vc (sfm) = 394, fn (ipr) = 0.0098, ap (inch) = 4.7244, wet (20 bar)
- **Tools** **Insert** TPD0984BA (PC5300) **Holder** TPDBA0984-125-5-P (Drill dia. = Ø0.984 inch)



10% lower cutting load

— TPDB Plus
Average thrust 1125.5 lbf

— Competitor
Average thrust 1235.7 lbf

Surface finish

- **Workpiece** Alloy steel (4140)
- **Cutting conditions** vc (sfm) = 394
  fn (ipr) = 0.0138
  ap (inch) = 4.7244
  wet (20 bar)
- **Tools** **Insert** TPD0984BA (PC5300)
  Holder TPDBA0984-125-5-P
  (Drill dia. = Ø0.984 inch)

7% better surface finish

[TPDB Plus]
Ra = 21.33 μin

[Competitor]
Ra = 22.40 μin

Chip control

- **Workpiece** Alloy steel (4140)
- **Cutting conditions** vc (sfm) = 394
  fn (ipr) = 0.0138
  ap (inch) = 4.7244
  wet (20 bar)
- **Tools** **Insert** TPD0984BA (PC5300)
  Holder TPDBA0984-125-5-P
  (Drill dia. = Ø0.984 inch)

Regular chip shape and size

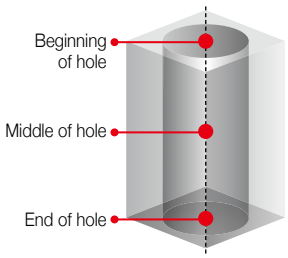
[TPDB Plus]

[Competitor]

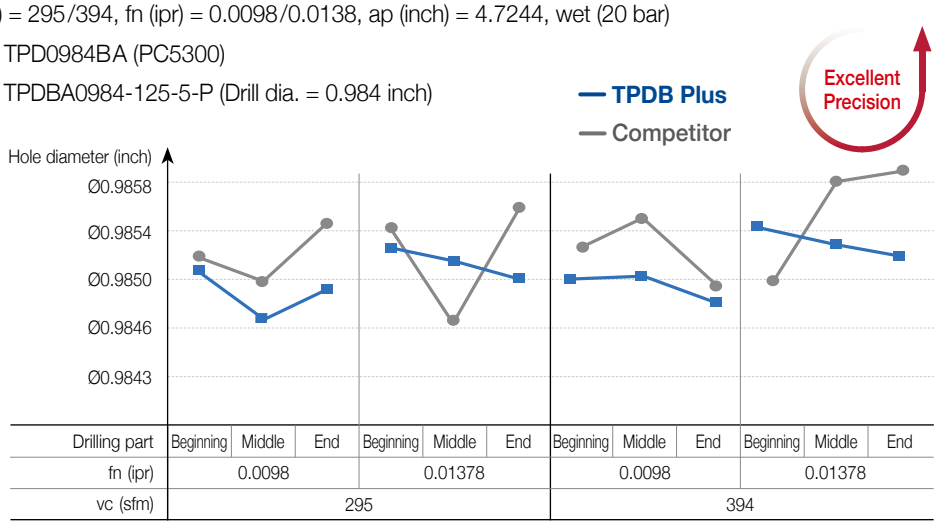
Performance evaluation

Precision

- **Workpiece** Alloy steel (4140)
- **Cutting conditions** vc (sfm) = 295/394, fn (ipr) = 0.0098/0.0138, ap (inch) = 4.7244, wet (20 bar)
- **Tools** **Insert** TPD0984BA (PC5300)
  Holder TPDBA0984-125-5-P (Drill dia. = 0.984 inch)



[Drilling part]



Drilling part	Beginning	Middle	End	Beginning	Middle	End	Beginning	Middle	End	Beginning	Middle	End
fn (ipr)	0.0098			0.01378			0.0098			0.01378		
vc (sfm)	295						394					

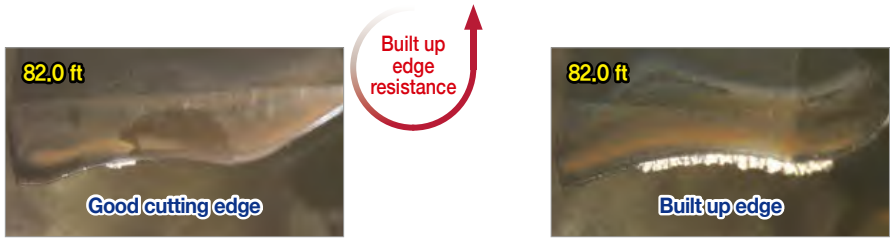
Wear resistance

- **Workpiece** Alloy steel (4140)
- **Cutting conditions** vc (sfm) = 328, fn (ipr) = 0.0118, ap (inch) = 3.937, wet (30 bar)
- **Tools** **Insert** TPD0984BA (PC5300) **Holder** TPDBA0984-125-5-P (Drill dia. = Ø0.984 inch)

[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.

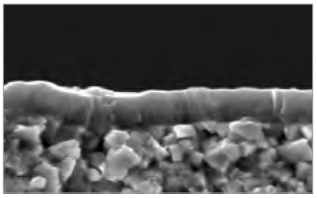
- **Workpiece** Carbon steel (1045)
- **Cutting conditions** vc (sfm) = 328, fn (ipr) = 0.0118, ap (inch) = 3.937, wet (30 bar)
- **Tools** **Insert** TPD0984BA (PC5335) **Holder** TPDBA0984-125-5-P (Drill dia. = Ø0.984 inch)



[TPDB Plus] [Competitor]

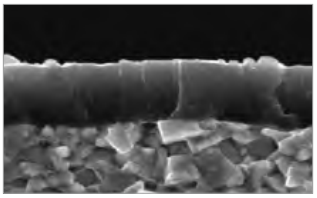
▶ Sharper cutting edge than competitor's improves built up edge resistance and tool life.

Grade features



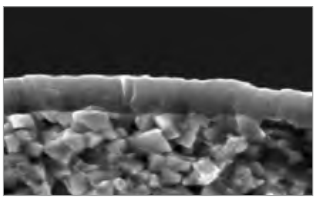
PC5300

- 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.)

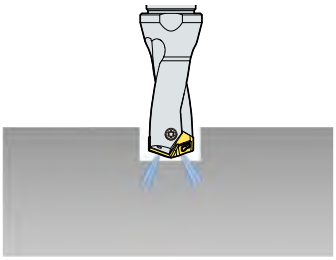
Recommended cutting conditions

Workpiece			Grade	vc (sfm)	Aspect ratio (L/D) = 3D, 5D Feed rate (ipr) per drill dia. (inch)		
ISO	Workpiece materials	HB			Ø0.3937-Ø0.6299	Ø0.6300-Ø0.9842	Ø0.9843-Ø1.1772
P Carbon steel	Low carbon steel	80-120	PC5335 PC330P	**365** (265-464)	0.0059-0.0118	0.0079-0.0138	0.0098-0.0157
	High carbon steel	180-280	PC5335 PC330P	**332** (232-431)	0.0059-0.0118	0.0079-0.0138	0.0098-0.0157
P Alloy steel	Low alloy steel	140-260	PC5300	**365** (265-464)	0.0071-0.0138	0.0091-0.0150	0.0110-0.0169
	Low alloy heat treated steel	200-400	PC5300	**249** (166-332)	0.0071-0.0138	0.0091-0.0150	0.0110-0.0169
	High alloy steel	50-260	PC5300	**232** (166-298)	0.0071-0.0118	0.0079-0.0138	0.0098-0.0157
	High alloy heat treated steel	220-450	PC5300	**199** (133-265)	0.0071-0.0118	0.0079-0.0138	0.0098-0.0157
K Cast iron	Gray cast iron	150-230	PC5300	**365** (265-464)	0.0071-0.0138	0.0079-0.0157	0.0098-0.0177
	Ductile cast iron	160-260	PC5300	**332** (232-431)	0.0071-0.0138	0.0079-0.0157	0.0098-0.0177

※ 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 0.0039-0.0059 machining around the interrupted part.
※ Refer to the 'Recommended drilling method' on the page 10 for drilling of 10D-12D.

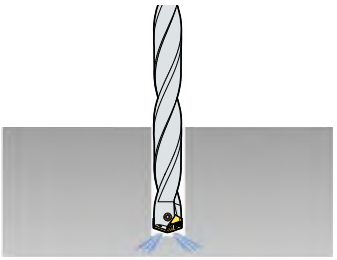
Recommended drilling method (10D, 12D)

Machine a pilot hole (with a pilot drill)

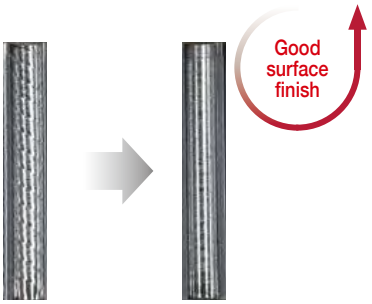


- Machine a pilot hole with the depth of cut as 0.5D and at 30% lower speed using a 1.5D or 3D drill.

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

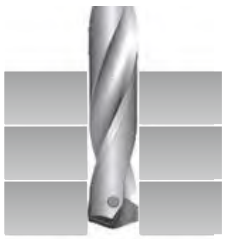
Result of recommended drilling

Precaution in drilling

Angled surface drilling

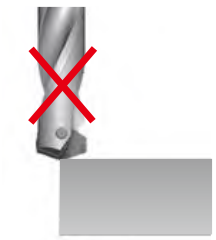
- The approach angle between drill and the workpiece at the beginning and the end should be less than 6°.
- Reduce the feed (fn) to 30-50% than general cutting conditions at the beginning and the end of angled surface.

Stacked plates drilling



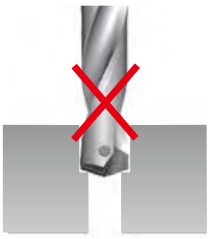
- Gap between the plates could make wrong chip evacuation causing fracture of the drill.
- Place stacked plates without any gap between each.

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.

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

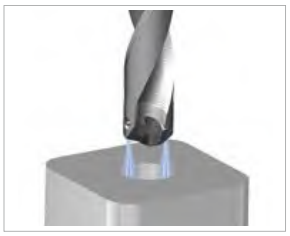
① Unscrew and separate the used insert from the holder.
② As the **[Pic.2]**, clean the insert seat.
③ Put a new insert on the tip seat.
④ As the **[Pic.3]**, clamp the insert pushing it with a hand not to separate from the holder.

Check point in drilling

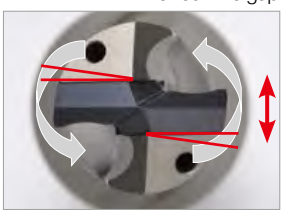
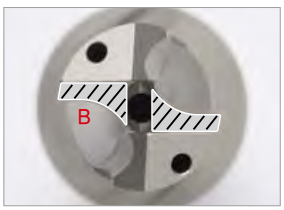
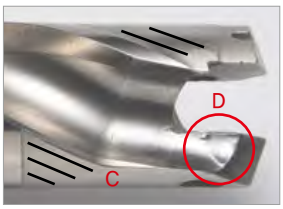
- Condition of the clamped workpiece
- Revolution of the main axis of the machine
- Condition of the holder
- Run-out of the clamped drill (Max. 1181 μin)
- Condition of supplying coolant (pressure, flow, concentration)
- Chip evacuation

Supply of coolant

- Supply enough coolant to the beginning of the hole.
- Minimum pressure of oil coolant: 5 bar
- Minimum flow of coolant: 1.321 gal/min



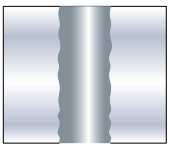
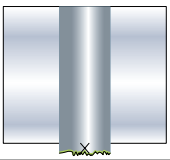
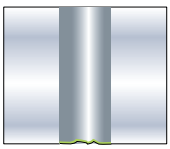
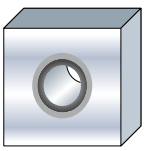
Replacement of holders and screws

Worn part	How to check	Description
[Pic.1] 	[Pic.2] Check the gap 	• 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.
[Pic.3] 	[Pic.4] Check the moving 	• 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.
[Pic.5] 	Check the moving 	• 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.
[Pic.6] ① Check the 'C' and 'D' parts as shown in the **[Pic.6]** ② Check whether the chips are getting longer or not.		• 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	• 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 1181 μin) • 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 1181 μin)
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 1181 μin)

Types of damage to workpiece and check points

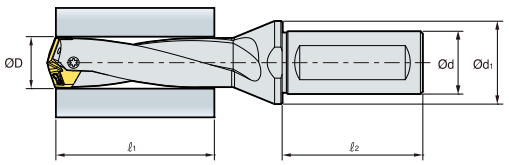
Poor surface finish (rough, scratch, etc.)		
	Factors	• Low rigidity of machine and improperly clamped workpiece • Large concentricity and lack of coolant
	Solutions	• Clamp the workpiece properly and check the concentricity. • Increase the amount and pressure of coolant
Remained lots of burr at the 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.

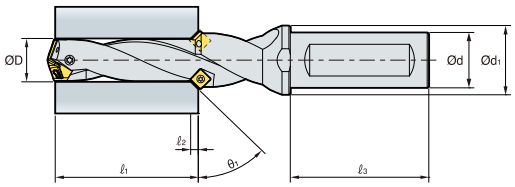
Solutions for troubles

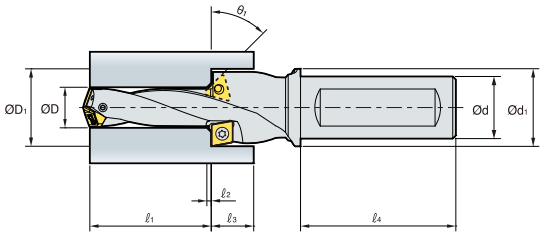
↑ Increase ↓ Decrease ○ Use

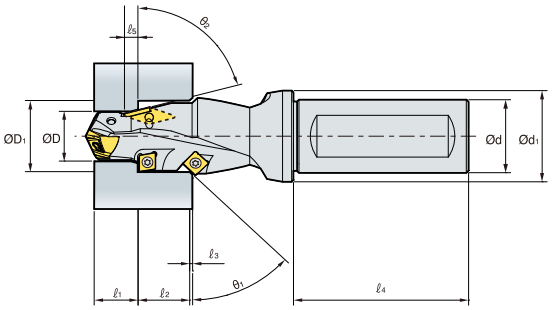
Trouble	Designation	Solutions															
		Cutting conditions					Tool shape					Grade		The others			
		vc	fn	Coolant	fn (in the beginning)	Depth of cut	Relief angle	Point angle	Thinning angle	Honing	Flute width rate	Toughness	Hardness	Rigidity of machine	Chattering of machine	Fixing workpiece	Overhang
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)	↑	↓											↑	↓		↓

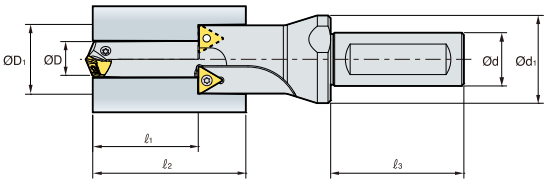
Special drill order form











Hole type

☐ Blind hole ☐ Through hole

Coolant type

☐ Internal ☐ External

Special note

- Currently using tool:
- Current cutting condition
  - n (rpm) or vc (sfm):
  - vf (ipm) or fn (ipr):
  - Depth of cut, ap (inch):
- Standard of measuring tool life:
- Currently using machine
  - Machining center:
  - General lathe:
  - CNC lathe:

Shank type

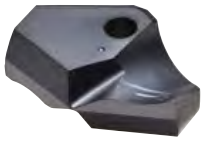
☐  Plain type

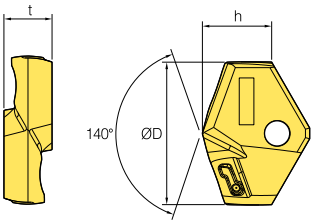
☐  Flat type

☐  Weldon type

☐  Whistle notch type

Insert





(inch)

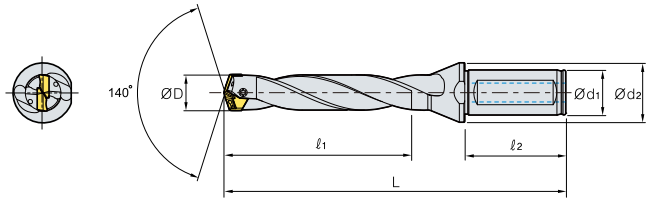
Designation		Coated			ØD	h	t
		PC5300	PC5335	PC330P			
TPD	0394BA				0.394	0.217	0.138
	0413BA				0.413	0.217	0.138
	0433BA				0.433	0.228	0.138
	0453BA				0.453	0.228	0.138
	0472BA				0.472	0.248	0.138
	0492BA				0.492	0.248	0.138
	0512BA				0.512	0.256	0.157
	0531BA				0.531	0.256	0.157
	0551BA				0.551	0.268	0.157
	0571BA				0.571	0.268	0.157
	0591BA				0.591	0.276	0.157
	0610BA				0.610	0.276	0.157
	0630BA				0.630	0.303	0.217
	0650BA				0.650	0.303	0.217
	0669BA				0.669	0.311	0.217
	0689BA				0.689	0.311	0.217
	0709BA				0.709	0.319	0.236
	0728BA				0.728	0.319	0.236
	0748BA				0.748	0.327	0.236
	0768BA				0.768	0.327	0.236
	0787BA				0.787	0.382	0.256
	0807BA				0.807	0.382	0.256
	0827BA				0.827	0.370	0.256
	0846BA				0.846	0.370	0.256
	0866BA				0.866	0.378	0.276
	0886BA				0.886	0.378	0.276
	0906BA				0.906	0.386	0.276
	0925BA				0.925	0.386	0.276
	0945BA				0.945	0.421	0.295
	0965BA				0.965	0.421	0.295
	0984BA				0.984	0.429	0.295
	1004BA				1.004	0.429	0.295
	1024BA				1.024	0.433	0.335
	1043BA				1.043	0.433	0.335
	1063BA				1.063	0.465	0.335
	1083BA				1.083	0.465	0.335
	1102BA				1.102	0.496	0.374
	1122BA				1.122	0.496	0.374
	1142BA				1.142	0.508	0.374
	1161BA				1.161	0.508	0.374
	1181BA				1.181	0.512	0.394
	1201BA				1.201	0.512	0.394
	1220BA				1.220	0.520	0.394
	1240BA				1.240	0.520	0.394
	1260BA				1.260	0.528	0.394
	1280BA				1.280	0.528	0.394

※ We can provide nonstock items with Ø0.394 - Ø1.298 ●: Stock item

Parts

Designation		Drill diameter ØD (inch)	Screw	Wrench	Torque (ibf·ft)
TPD	0394BA-0511BA	0.394 - 0.511	FTNB0209	TW06P	0.595
	0512BA-0590BA	0.512 - 0.590	FTNB02512	TW07S	1.191
	0591BA-0708BA	0.591 - 0.708	FTNB02514	TW07S	1.191
	0709BA-0786BA	0.709 - 0.786	FTNB0316	TW09S	1.786
	0787BA-0944BA	0.787 - 0.944	FTNB0319	TW09S	1.786
	0945BA-1023BA	0.945 - 1.023	FTNB03522	TW15S	4.464
	1024BA-1101BA	1.024 - 1.101	FTNB03524	TW15S	4.464
	1102BA-1180BA	1.102 - 1.180	FTNB0426	TW15S	4.464
	1181BA-1298BA	1.181 - 1.298	FTNB0528	TW20-100	5.952

TPDB Plus (3D)

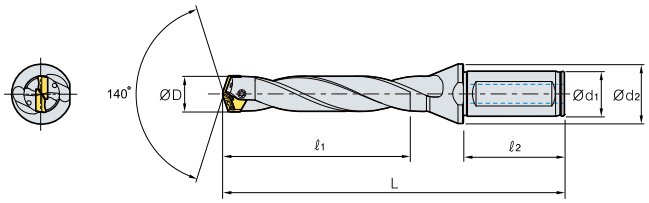


(inch)

Designation		Stock	ØD	Ød1	Ød2	ℓ1	ℓ2	L	Insert
TPDBA	0394-063-3-P		0.394-0.412	0.625	0.787	1.181	1.890	3.803	TPD0394BA-0412BA
	0413-063-3-P		0.413-0.432	0.625	0.787	1.240	1.890	3.843	TPD0413BA-0432BA
	0433-063-3-P		0.433-0.452	0.625	0.787	1.299	1.890	3.925	TPD0433BA-0452BA
	0453-063-3-P		0.453-0.471	0.625	0.787	1.358	1.890	3.965	TPD0453BA-0471BA
	0472-063-3-P		0.472-0.491	0.625	0.787	1.417	1.890	4.091	TPD0472BA-0491BA
	0492-063-3-P		0.492-0.511	0.625	0.787	1.476	1.890	4.169	TPD0492BA-0511BA
	0512-063-3-P		0.512-0.530	0.625	0.787	1.535	1.890	4.303	TPD0512BA-0530BA
	0531-063-3-P		0.531-0.550	0.625	0.787	1.594	1.890	4.382	TPD0531BA-0550BA
	0551-063-3-P		0.551-0.570	0.625	0.787	1.654	1.890	4.469	TPD0551BA-0570BA
	0571-063-3-P		0.571-0.590	0.625	0.787	1.713	1.890	4.587	TPD0571BA-0590BA
	0591-075-3-P		0.591-0.609	0.750	0.984	1.772	1.969	4.752	TPD0591BA-0609BA
	0610-075-3-P		0.610-0.629	0.750	0.984	1.831	1.969	4.831	TPD0610BA-0629BA
	0630-075-3-P		0.630-0.649	0.750	0.984	1.890	1.969	4.917	TPD0630BA-0649BA
	0650-075-3-P		0.650-0.668	0.750	0.984	1.949	1.969	4.996	TPD0650BA-0668BA
	0669-075-3-P		0.669-0.688	0.750	0.984	2.008	1.969	5.122	TPD0669BA-0688BA
	0689-075-3-P		0.689-0.708	0.750	0.984	2.067	1.969	5.201	TPD0689BA-0708BA
	0709-100-3-P		0.709-0.727	1.000	1.299	2.126	2.205	5.520	TPD0709BA-0727BA
	0728-100-3-P		0.728-0.747	1.000	1.299	2.185	2.205	5.598	TPD0728BA-0747BA
	0748-100-3-P		0.748-0.767	1.000	1.299	2.244	2.205	5.720	TPD0748BA-0767BA
	0768-100-3-P		0.768-0.786	1.000	1.299	2.303	2.205	5.799	TPD0768BA-0786BA
	0787-100-3-P		0.787-0.806	1.000	1.299	2.362	2.205	5.886	TPD0787BA-0806BA
	0807-100-3-P		0.807-0.826	1.000	1.299	2.421	2.205	5.965	TPD0807BA-0826BA
	0827-100-3-P		0.827-0.845	1.000	1.299	2.480	2.362	6.091	TPD0827BA-0845BA
	0846-100-3-P		0.846-0.865	1.000	1.299	2.539	2.362	6.169	TPD0846BA-0865BA
	0866-100-3-P		0.866-0.885	1.000	1.299	2.598	2.362	6.256	TPD0866BA-0885BA
	0886-100-3-P		0.886-0.905	1.000	1.299	2.657	2.362	6.335	TPD0886BA-0905BA
	0906-100-3-P		0.906-0.924	1.000	1.299	2.717	2.362	6.461	TPD0906BA-0924BA
	0925-100-3-P		0.925-0.944	1.000	1.299	2.776	2.362	6.539	TPD0925BA-0944BA
	0945-125-3-P		0.945-0.964	1.250	1.693	2.835	2.362	6.783	TPD0945BA-0964BA
	0965-125-3-P		0.965-0.983	1.250	1.693	2.894	2.362	6.862	TPD0965BA-0983BA
	0984-125-3-P		0.984-1.003	1.250	1.693	2.953	2.362	6.988	TPD0984BA-1003BA
	1004-125-3-P		1.004-1.023	1.250	1.693	3.012	2.362	7.067	TPD1004BA-1023BA
	1024-125-3-P		1.024-1.062	1.250	1.693	3.071	2.362	7.154	TPD1024BA-1062BA
	1063-125-3-P		1.063-1.101	1.250	1.693	3.189	2.362	7.358	TPD1063BA-1101BA
	1102-125-3-P		1.102-1.141	1.250	1.693	3.307	2.362	7.520	TPD1102BA-1141BA
	1142-125-3-P		1.142-1.180	1.250	1.693	3.425	2.362	7.724	TPD1142BA-1180BA
	1181-125-3-P		1.181-1.219	1.250	1.693	3.543	2.362	7.850	TPD1181BA-1219BA
	1220-125-3-P		1.220-1.259	1.250	1.693	3.661	2.362	8.055	TPD1220BA-1259BA
	1260-125-3-P		1.260-1.298	1.250	1.693	3.780	2.362	8.142	TPD1260BA-1299BA

●: Stock item

TPDB Plus (5D)

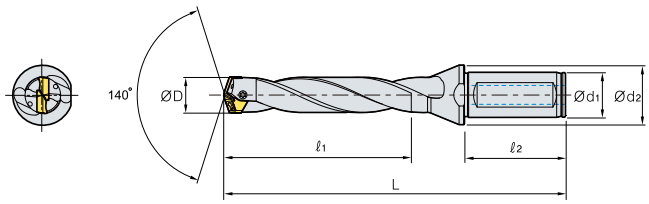


(inch)

Designation		Stock	ØD	Ød1	Ød2	ℓ1	ℓ2	L	Insert
TPDBA	0394-063-5-P		0.394-0.412	0.625	0.787	1.969	1.890	4.591	TPD0394BA-0412BA
	0413-063-5-P		0.413-0.432	0.625	0.787	2.067	1.890	4.669	TPD0413BA-0432BA
	0433-063-5-P		0.433-0.452	0.625	0.787	2.165	1.890	4.791	TPD0433BA-0452BA
	0453-063-5-P		0.453-0.471	0.625	0.787	2.264	1.890	4.909	TPD0453BA-0471BA
	0472-063-5-P		0.472-0.491	0.625	0.787	2.362	1.890	5.043	TPD0472BA-0491BA
	0492-063-5-P		0.492-0.511	0.625	0.787	2.461	1.890	5.165	TPD0492BA-0511BA
	0512-063-5-P		0.512-0.530	0.625	0.787	2.559	1.890	5.327	TPD0512BA-0530BA
	0531-063-5-P		0.531-0.550	0.625	0.787	2.657	1.890	5.449	TPD0531BA-0550BA
	0551-063-5-P		0.551-0.570	0.625	0.787	2.756	1.890	5.571	TPD0551BA-0570BA
	0571-063-5-P		0.571-0.590	0.625	0.787	2.854	1.890	5.732	TPD0571BA-0590BA
	0591-075-5-P		0.591-0.609	0.750	0.984	2.953	1.969	5.933	TPD0591BA-0609BA
	0610-075-5-P		0.610-0.629	0.750	0.984	3.051	1.969	6.051	TPD0610BA-0629BA
	0630-075-5-P		0.630-0.649	0.750	0.984	3.150	1.969	6.177	TPD0630BA-0649BA
	0650-075-5-P		0.650-0.668	0.750	0.984	3.248	1.969	6.295	TPD0650BA-0668BA
	0669-075-5-P		0.669-0.688	0.750	0.984	3.346	1.969	6.461	TPD0669BA-0688BA
	0689-075-5-P		0.689-0.708	0.750	0.984	3.445	1.969	6.579	TPD0689BA-0708BA
	0709-100-5-P		0.709-0.727	1.000	1.299	3.543	2.205	6.937	TPD0709BA-0727BA
	0728-100-5-P		0.728-0.747	1.000	1.299	3.642	2.205	7.055	TPD0728BA-0747BA
	0748-100-5-P		0.748-0.767	1.000	1.299	3.740	2.205	7.217	TPD0748BA-0767BA
	0768-100-5-P		0.768-0.786	1.000	1.299	3.839	2.205	7.335	TPD0768BA-0786BA
	0787-100-5-P		0.787-0.806	1.000	1.299	3.937	2.205	7.461	TPD0787BA-0806BA
	0807-100-5-P		0.807-0.826	1.000	1.299	4.035	2.205	7.579	TPD0807BA-0826BA
	0827-100-5-P		0.827-0.845	1.000	1.299	4.134	2.362	7.744	TPD0827BA-0845BA
	0846-100-5-P		0.846-0.865	1.000	1.299	4.232	2.362	7.862	TPD0846BA-0865BA
	0866-100-5-P		0.866-0.885	1.000	1.299	4.331	2.362	7.988	TPD0866BA-0885BA
	0886-100-5-P		0.886-0.905	1.000	1.299	4.429	2.362	8.106	TPD0886BA-0905BA
	0906-100-5-P		0.906-0.924	1.000	1.299	4.528	2.362	8.272	TPD0906BA-0924BA
	0925-100-5-P		0.925-0.944	1.000	1.299	4.626	2.362	8.390	TPD0925BA-0944BA
	0945-125-5-P		0.945-0.964	1.250	1.693	4.724	2.362	8.673	TPD0945BA-0964BA
	0965-125-5-P		0.965-0.983	1.250	1.693	4.823	2.362	8.791	TPD0965BA-0983BA
	0984-125-5-P		0.984-1.003	1.250	1.693	4.921	2.362	8.957	TPD0984BA-1003BA
	1004-125-5-P		1.004-1.023	1.250	1.693	5.020	2.362	9.075	TPD1004BA-1023BA
	1024-125-5-P		1.024-1.062	1.250	1.693	5.118	2.362	9.201	TPD1024BA-1062BA
	1063-125-5-P		1.063-1.101	1.250	1.693	5.315	2.362	9.484	TPD1063BA-1101BA
	1102-125-5-P		1.102-1.141	1.250	1.693	5.512	2.362	9.724	TPD1102BA-1141BA
	1142-125-5-P		1.142-1.180	1.250	1.693	5.709	2.362	10.008	TPD1142BA-1180BA
	1181-125-5-P		1.181-1.219	1.250	1.693	5.906	2.362	10.213	TPD1181BA-1219BA
	1220-125-5-P		1.220-1.259	1.250	1.693	6.102	2.362	10.496	TPD1220BA-1259BA
	1260-125-5-P		1.260-1.298	1.250	1.693	6.299	2.362	10.661	TPD1260BA-1299BA

●: Stock item

TPDB Plus (8D)

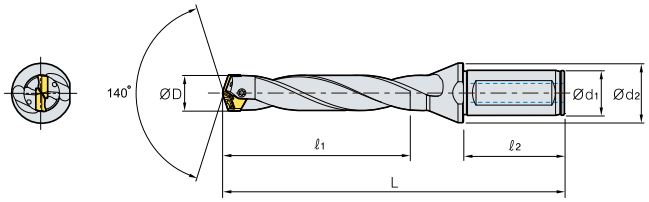


(inch)

Designation		Stock	ØD	Ød1	Ød2	ℓ1	ℓ2	L	Insert
TPDBA	0394-063-8-P		0.394-0.412	0.625	0.787	3.150	1.890	5.772	TPD0394BA-0412BA
	0413-063-8-P		0.413-0.432	0.625	0.787	3.307	1.890	5.929	TPD0413BA-0432BA
	0433-063-8-P		0.433-0.452	0.625	0.787	3.465	1.890	6.091	TPD0433BA-0452BA
	0453-063-8-P		0.453-0.471	0.625	0.787	3.622	1.890	6.248	TPD0453BA-0471BA
	0472-063-8-P		0.472-0.491	0.625	0.787	3.780	1.890	6.461	TPD0472BA-0491BA
	0492-063-8-P		0.492-0.511	0.625	0.787	3.937	1.890	6.642	TPD0492BA-0511BA
	0512-063-8-P		0.512-0.530	0.625	0.787	4.094	1.890	6.862	TPD0512BA-0530BA
	0531-063-8-P		0.531-0.550	0.625	0.787	4.252	1.890	7.043	TPD0531BA-0550BA
	0551-063-8-P		0.551-0.570	0.625	0.787	4.409	1.890	7.224	TPD0551BA-0570BA
	0571-063-8-P		0.571-0.590	0.625	0.787	4.567	1.890	7.445	TPD0571BA-0590BA
	0591-075-8-P		0.591-0.609	0.750	0.984	4.724	1.969	7.705	TPD0591BA-0609BA
	0610-075-8-P		0.610-0.629	0.750	0.984	4.882	1.969	7.882	TPD0610BA-0629BA
	0630-075-8-P		0.630-0.649	0.750	0.984	5.039	1.969	8.067	TPD0630BA-0649BA
	0650-075-8-P		0.650-0.668	0.750	0.984	5.197	1.969	8.244	TPD0650BA-0668BA
	0669-075-8-P		0.669-0.688	0.750	0.984	5.354	1.969	8.469	TPD0669BA-0688BA
	0689-075-8-P		0.689-0.708	0.750	0.984	5.512	1.969	8.646	TPD0689BA-0708BA
	0709-100-8-P		0.709-0.727	1.000	1.299	5.669	2.205	9.063	TPD0709BA-0727BA
	0728-100-8-P		0.728-0.747	1.000	1.299	5.827	2.205	9.240	TPD0728BA-0747BA
	0748-100-8-P		0.748-0.767	1.000	1.299	5.984	2.205	9.461	TPD0748BA-0767BA
	0768-100-8-P		0.768-0.786	1.000	1.299	6.142	2.205	9.638	TPD0768BA-0786BA
	0787-100-8-P		0.787-0.806	1.000	1.299	6.299	2.205	9.823	TPD0787BA-0806BA
	0807-100-8-P		0.807-0.826	1.000	1.299	6.457	2.205	10.000	TPD0807BA-0826BA
	0827-100-8-P		0.827-0.845	1.000	1.299	6.614	2.362	10.224	TPD0827BA-0845BA
	0846-100-8-P		0.846-0.865	1.000	1.299	6.772	2.362	10.402	TPD0846BA-0865BA
	0866-100-8-P		0.866-0.885	1.000	1.299	6.929	2.362	10.587	TPD0866BA-0885BA
	0886-100-8-P		0.886-0.905	1.000	1.299	7.087	2.362	10.772	TPD0886BA-0905BA
	0906-100-8-P		0.906-0.924	1.000	1.299	7.244	2.362	10.988	TPD0906BA-0924BA
	0925-100-8-P		0.925-0.944	1.000	1.299	7.402	2.362	11.165	TPD0925BA-0944BA
	0945-125-8-P		0.945-0.964	1.250	1.693	7.559	2.362	11.508	TPD0945BA-0964BA
	0965-125-8-P		0.965-0.983	1.250	1.693	7.717	2.362	11.685	TPD0965BA-0983BA
	0984-125-8-P		0.984-1.003	1.250	1.693	7.874	2.362	11.909	TPD0984BA-1003BA
	1004-125-8-P		1.004-1.023	1.250	1.693	8.031	2.362	12.087	TPD1004BA-1023BA
	1024-125-8-P		1.024-1.062	1.250	1.693	8.189	2.362	12.272	TPD1024BA-1062BA
	1063-125-8-P		1.063-1.101	1.250	1.693	8.504	2.362	12.673	TPD1063BA-1101BA
	1102-125-8-P		1.102-1.141	1.250	1.693	8.819	2.362	13.031	TPD1102BA-1141BA
	1142-125-8-P		1.142-1.180	1.250	1.693	9.134	2.362	13.433	TPD1142BA-1180BA
	1181-125-8-P		1.181-1.219	1.250	1.693	9.449	2.362	13.756	TPD1181BA-1219BA
	1220-125-8-P		1.220-1.259	1.250	1.693	9.764	2.362	14.157	TPD1220BA-1259BA
	1260-125-8-P		1.260-1.298	1.250	1.693	10.079	2.362	14.441	TPD1260BA-1299BA

●: Stock item

TPDB Plus (10D)

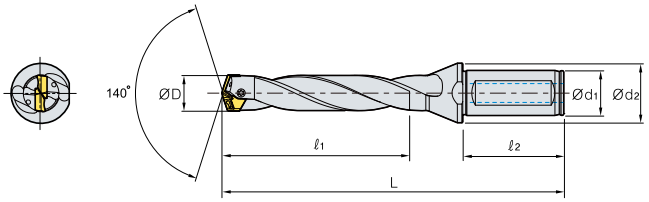


(inch)

Designation		Stock	ØD	Ød1	Ød2	ℓ1	ℓ2	L	Insert
TPDBA	0394-063-10-P		0.394-0.412	0.625	0.787	3.937	1.890	6.559	TPD0394BA-0412BA
	0413-063-10-P		0.413-0.432	0.625	0.787	4.134	1.890	6.756	TPD0413BA-0432BA
	0433-063-10-P		0.433-0.452	0.625	0.787	4.331	1.890	6.957	TPD0433BA-0452BA
	0453-063-10-P		0.453-0.471	0.625	0.787	4.528	1.890	7.154	TPD0453BA-0471BA
	0472-063-10-P		0.472-0.491	0.625	0.787	4.724	1.890	7.406	TPD0472BA-0491BA
	0492-063-10-P		0.492-0.511	0.625	0.787	4.921	1.890	7.626	TPD0492BA-0511BA
	0512-063-10-P		0.512-0.530	0.625	0.787	5.118	1.890	7.886	TPD0512BA-0530BA
	0531-063-10-P		0.531-0.550	0.625	0.787	5.315	1.890	8.106	TPD0531BA-0550BA
	0551-063-10-P		0.551-0.570	0.625	0.787	5.512	1.890	8.327	TPD0551BA-0570BA
	0571-063-10-P		0.571-0.590	0.625	0.787	5.709	1.890	8.587	TPD0571BA-0590BA
	0591-075-10-P		0.591-0.609	0.750	0.984	5.906	1.969	8.886	TPD0591BA-0609BA
	0610-075-10-P		0.610-0.629	0.750	0.984	6.102	1.969	9.102	TPD0610BA-0629BA
	0630-075-10-P		0.630-0.649	0.750	0.984	6.299	1.969	9.327	TPD0630BA-0649BA
	0650-075-10-P		0.650-0.668	0.750	0.984	6.496	1.969	9.543	TPD0650BA-0668BA
	0669-075-10-P		0.669-0.688	0.750	0.984	6.693	1.969	9.807	TPD0669BA-0688BA
	0689-075-10-P		0.689-0.708	0.750	0.984	6.890	1.969	10.024	TPD0689BA-0708BA
	0709-100-10-P		0.709-0.727	1.000	1.299	7.087	2.205	10.480	TPD0709BA-0727BA
	0728-100-10-P		0.728-0.747	1.000	1.299	7.283	2.205	10.697	TPD0728BA-0747BA
	0748-100-10-P		0.748-0.767	1.000	1.299	7.480	2.205	10.957	TPD0748BA-0767BA
	0768-100-10-P		0.768-0.786	1.000	1.299	7.677	2.205	11.173	TPD0768BA-0786BA
	0787-100-10-P		0.787-0.806	1.000	1.299	7.874	2.205	11.398	TPD0787BA-0806BA
	0807-100-10-P		0.807-0.826	1.000	1.299	8.071	2.205	11.614	TPD0807BA-0826BA
	0827-100-10-P		0.827-0.845	1.000	1.299	8.268	2.362	11.878	TPD0827BA-0845BA
	0846-100-10-P		0.846-0.865	1.000	1.299	8.465	2.362	12.094	TPD0846BA-0865BA
	0866-100-10-P		0.866-0.885	1.000	1.299	8.661	2.362	12.319	TPD0866BA-0885BA
	0886-100-10-P		0.886-0.905	1.000	1.299	8.858	2.362	12.543	TPD0886BA-0905BA
	0906-100-10-P		0.906-0.924	1.000	1.299	9.055	2.362	12.799	TPD0906BA-0924BA
	0925-100-10-P		0.925-0.944	1.000	1.299	9.252	2.362	13.016	TPD0925BA-0944BA
	0945-125-10-P		0.945-0.964	1.250	1.693	9.449	2.362	13.398	TPD0945BA-0964BA
	0965-125-10-P		0.965-0.983	1.250	1.693	9.646	2.362	13.614	TPD0965BA-0983BA
	0984-125-10-P		0.984-1.003	1.250	1.693	9.843	2.362	13.878	TPD0984BA-1003BA
	1004-125-10-P		1.004-1.023	1.250	1.693	10.039	2.362	14.094	TPD1004BA-1023BA
	1024-125-10-P		1.024-1.062	1.250	1.693	10.236	2.362	14.319	TPD1024BA-1062BA
	1063-125-10-P		1.063-1.101	1.250	1.693	10.640	2.362	14.799	TPD1063BA-1101BA
	1102-125-10-P		1.102-1.141	1.250	1.693	11.043	2.362	15.236	TPD1102BA-1141BA
	1142-125-10-P		1.142-1.180	1.250	1.693	11.447	2.362	15.717	TPD1142BA-1180BA
	1181-125-10-P		1.181-1.219	1.250	1.693	11.850	2.362	16.118	TPD1181BA-1219BA
	1220-125-10-P		1.220-1.259	1.250	1.693	12.254	2.362	16.598	TPD1220BA-1259BA
	1260-125-10-P		1.260-1.298	1.250	1.693	12.657	2.362	16.961	TPD1260BA-1299BA

●: Stock item

TPDB Plus (12D)



(inch)

Designation		Stock	ØD	Ød1	Ød2	ℓ1	ℓ2	L	Insert
TPDBA	0394-063-12-P		0.394-0.412	0.625	0.787	4.724	1.890	7.346	TPD0394BA-0412BA
	0413-063-12-P		0.413-0.432	0.625	0.787	4.961	1.890	7.583	TPD0413BA-0432BA
	0433-063-12-P		0.433-0.452	0.625	0.787	5.197	1.890	7.823	TPD0433BA-0452BA
	0453-063-12-P		0.453-0.471	0.625	0.787	5.433	1.890	8.059	TPD0453BA-0471BA
	0472-063-12-P		0.472-0.491	0.625	0.787	5.669	1.890	8.350	TPD0472BA-0491BA
	0492-063-12-P		0.492-0.511	0.625	0.787	5.906	1.890	8.610	TPD0492BA-0511BA
	0512-063-12-P		0.512-0.530	0.625	0.787	6.142	1.890	8.909	TPD0512BA-0530BA
	0531-063-12-P		0.531-0.550	0.625	0.787	6.378	1.890	9.169	TPD0531BA-0550BA
	0551-063-12-P		0.551-0.570	0.625	0.787	6.614	1.890	9.429	TPD0551BA-0570BA
	0571-063-12-P		0.571-0.590	0.625	0.787	6.850	1.890	9.728	TPD0571BA-0590BA
	0591-075-12-P		0.591-0.609	0.750	0.984	7.087	1.969	10.067	TPD0591BA-0609BA
	0610-075-12-P		0.610-0.629	0.750	0.984	7.323	1.969	10.323	TPD0610BA-0629BA
	0630-075-12-P		0.630-0.649	0.750	0.984	7.559	1.969	10.587	TPD0630BA-0649BA
	0650-075-12-P		0.650-0.668	0.750	0.984	7.795	1.969	10.843	TPD0650BA-0668BA
	0669-075-12-P		0.669-0.688	0.750	0.984	8.031	1.969	11.146	TPD0669BA-0688BA
	0689-075-12-P		0.689-0.708	0.750	0.984	8.268	1.969	11.402	TPD0689BA-0708BA
	0709-100-12-P		0.709-0.727	1.000	1.299	8.504	2.205	11.898	TPD0709BA-0727BA
	0728-100-12-P		0.728-0.747	1.000	1.299	8.740	2.205	12.154	TPD0728BA-0747BA
	0748-100-12-P		0.748-0.767	1.000	1.299	8.976	2.205	12.453	TPD0748BA-0767BA
	0768-100-12-P		0.768-0.786	1.000	1.299	9.213	2.205	12.709	TPD0768BA-0786BA
	0787-100-12-P		0.787-0.806	1.000	1.299	9.449	2.205	12.972	TPD0787BA-0806BA
	0807-100-12-P		0.807-0.826	1.000	1.299	9.685	2.205	13.228	TPD0807BA-0826BA
	0827-100-12-P		0.827-0.845	1.000	1.299	9.921	2.362	13.531	TPD0827BA-0845BA
	0846-100-12-P		0.846-0.865	1.000	1.299	10.157	2.362	13.787	TPD0846BA-0865BA
	0866-100-12-P		0.866-0.885	1.000	1.299	10.394	2.362	14.051	TPD0866BA-0885BA
	0886-100-12-P		0.886-0.905	1.000	1.299	10.630	2.362	14.315	TPD0886BA-0905BA
	0906-100-12-P		0.906-0.924	1.000	1.299	10.866	2.362	14.610	TPD0906BA-0924BA
	0925-100-12-P		0.925-0.944	1.000	1.299	11.102	2.362	14.866	TPD0925BA-0944BA
	0945-125-12-P		0.945-0.964	1.250	1.693	11.339	2.362	15.287	TPD0945BA-0964BA
	0965-125-12-P		0.965-0.983	1.250	1.693	11.575	2.362	15.543	TPD0965BA-0983BA
	0984-125-12-P		0.984-1.003	1.250	1.693	11.811	2.362	15.846	TPD0984BA-1003BA
	1004-125-12-P		1.004-1.023	1.250	1.693	12.047	2.362	16.102	TPD1004BA-1023BA
	1024-125-12-P		1.024-1.062	1.250	1.693	12.283	2.362	16.366	TPD1024BA-1062BA
	1063-125-12-P		1.063-1.101	1.250	1.693	12.766	2.362	16.925	TPD1063BA-1101BA
	1102-125-12-P		1.102-1.141	1.250	1.693	13.248	2.362	17.441	TPD1102BA-1141BA
	1142-125-12-P		1.142-1.180	1.250	1.693	13.730	2.362	18.000	TPD1142BA-1180BA
	1181-125-12-P		1.181-1.219	1.250	1.693	14.213	2.362	18.480	TPD1181BA-1219BA
	1220-125-12-P		1.220-1.259	1.250	1.693	14.695	2.362	19.039	TPD1220BA-1259BA
	1260-125-12-P		1.260-1.298	1.250	1.693	15.177	2.362	19.480	TPD1260BA-1299BA

●: Stock item

TPDB-F

Code system

【Holder】

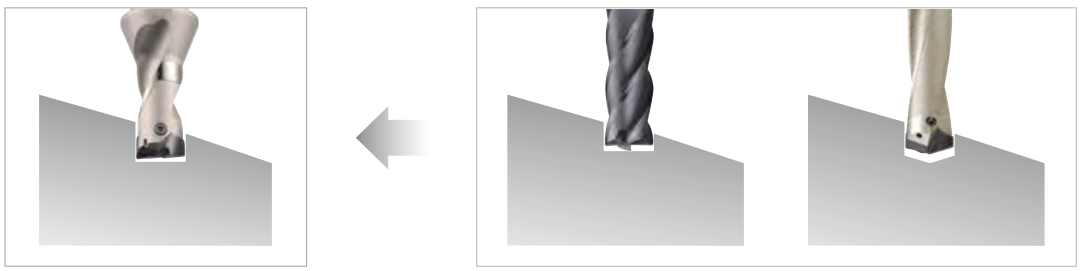
TPD	B	A	0866	-	100	-	1.5	-	F
Top solid Piercing Drill	Insert type B: Blade type	Type A: Inch type No code: Metric type	Drill dia. 0866: Ø0.866 inch		Shank dia. 100: Ø1.00 inch		Aspect ratio (L/D) 1.5D		Flat

【Insert】

TPD	0866	B	A	-	F
Top solid Piercing Drill	Drill dia. 0866: Ø0.866 inch	Insert type B: Blade type	Type A: Inch type No code: Metric type		Cutting edge F: Flat FC: Flat Candle

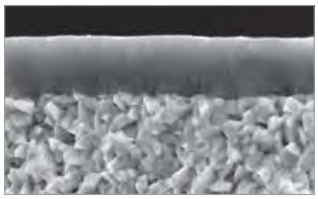
Features

- **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



[Endmill + Drill] [Endmill] [Drill]

Grade features



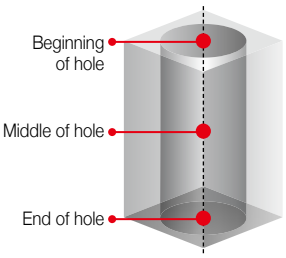
PC5400

- 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

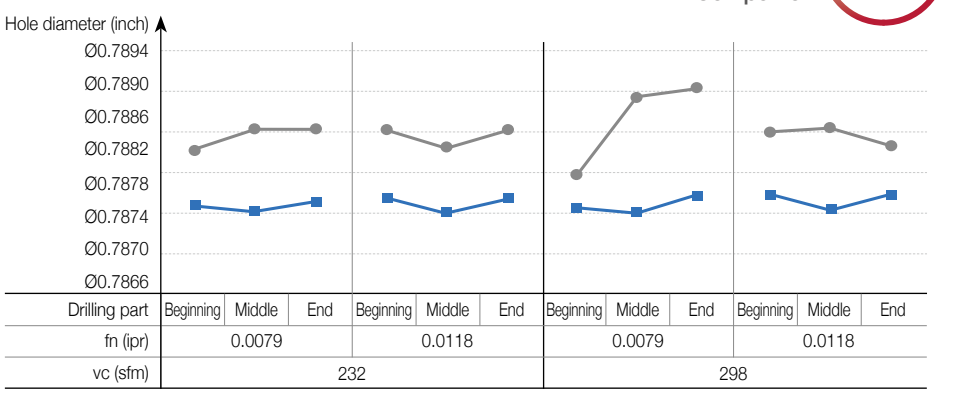
Performance evaluation

Precision

- **Workpiece** Alloy steel (4140, HRC22)
- **Cutting conditions** vc (sfm) = 232/298, fn (ipr) = 0.0079/0.0118, ap (inch) = 1.1811, wet (20 bar)
- **Tools** **Insert** TPD0787BA-F (PC5400)
  Holder TPDBA0787-100-1.5-F (Drill dia. = Ø0.787 inch)



[Drilling part]

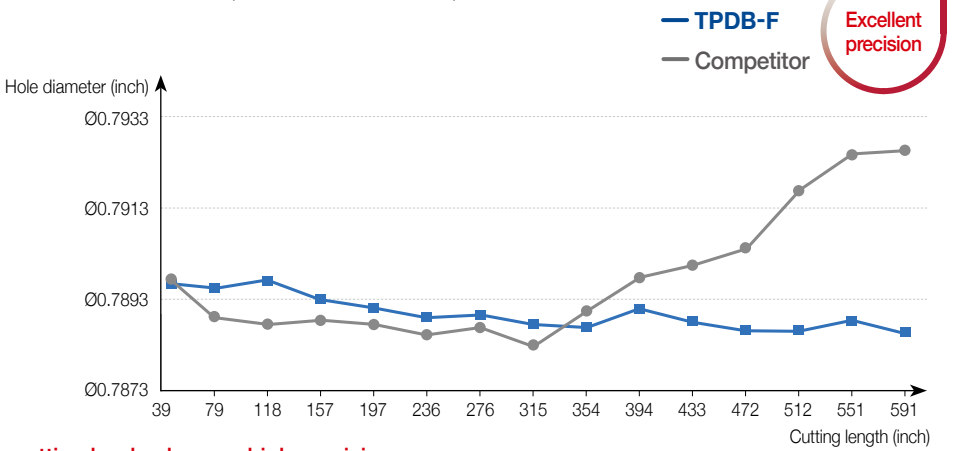


Drilling part	Beginning	Middle	End	Beginning	Middle	End	Beginning	Middle	End	Beginning	Middle	End
fn (ipr)	0.0079			0.0118			0.0079			0.0118		
vc (sfm)	232						298					

▶ Cutting edge with low cutting load enhances high precision.

- **Workpiece** Alloy steel (4140, HRC22), Angled surface 15°
- **Cutting conditions** vc (sfm) = 232, fn (ipr) = 0.0083, ap (inch) = 0.7874, wet (20 bar)
- **Tools** **Insert** TPD0787BA-F (PC5400)
  Holder TPDBA0787-100-1.5-F (Drill dia. = Ø0.787 inch)

[Angled surface drilling]



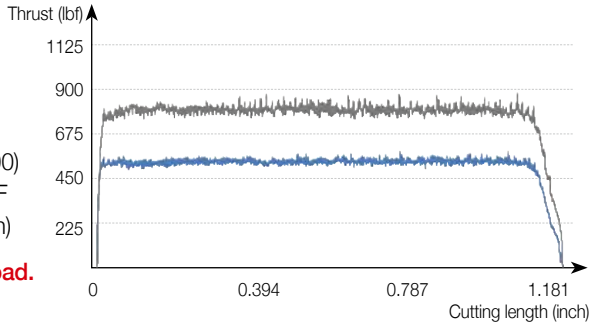
▶ Cutting edge with low cutting load enhances high precision.

Performance evaluation

Cutting load

- **Workpiece** Alloy steel (4140, HRC22)
- **Cutting conditions** vc (sfm) = 232
  fn (ipr) = 0.0098
  ap (inch) = 1.1811
  wet (20 bar)
- **Tools** **Insert** TPD0787BA-F (PC5400)
  Holder TPDBA0787-100-1.5-F
  (Drill dia. = Ø0.787 inch)

▶ The sharp point shape reduces cutting load.



Wear resistance

- **Workpiece** Alloy steel (4140, HRC22), Angled surface 15°
- **Cutting conditions** vc (sfm) = 232
  fn (ipr) = 0.0083
  ap (inch) = 0.7874
  wet (20 bar)
- **Tools** **Insert** TPD0787BA-F (PC5400)
  Holder TPDBA0787-100-1.5-F
  (Drill dia. = Ø0.787 inch)

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

[TPDB-F]

[Competitor]

Excellent wear resistance and chipping resistance

Surface finish

- **Workpiece** Alloy steel (4140, HRC22), Angled surface 15°
- **Cutting conditions** vc (sfm) = 298
  fn (ipr) = 0.0071
  ap (inch) = 0.7874
  wet (20bar)
- **Tools** **Insert** TPD0591BA-F (PC5400)
  Holder TPDBA591-75-1.5-F
  (Drill dia. = Ø0.591 inch)

▶ Low cutting load cutting edge ensures good surface finish.

[TPDB-F]

Enhanced surface finish

[Competitor]

Chip control

- **Workpiece** Carbon steel (1045, HRC18)
- **Cutting conditions** vc (sfm) = 298
  fn (ipr) = 0.0098
  ap (inch) = 1.1811
  wet (20 bar)
- **Tools** **Insert** TPD0787BA-F (PC5400)
  Holder TPDBA0787-100-1.5-F
  (Drill dia. = Ø0.787 inch)

▶ Stable chip curling controls chip shape.

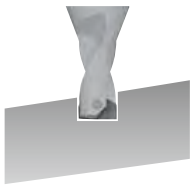
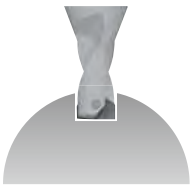
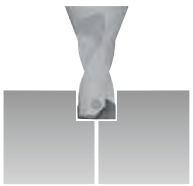
[TPDB-F]

Excellent chip control

[Competitor]

Recommended cutting condition

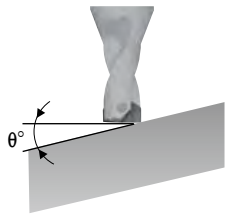
Workpiece			Grade	vc (sfm)	Aspect ratio (L/D) = 1.5D Feed rate (ipr) per drill dia. (inch)	
ISO	Workpiece	HB			Ø0.551- Ø0.865	Ø0.866- Ø1.219
P Carbon steel	Low carbon steel (1010, 1020 etc)	80 - 120	PC5400	**265** (198-332)	0.0079-0.0118	0.0087-0.0126
	High carbon steel (1045, 1049 etc)	180 - 280		**232** (166-298)	0.0079-0.0118	0.0087-0.0126
P Alloy steel	Low alloy steel (4140, 4142 etc)	140 - 260		**232** (166-298)	0.0079-0.0118	0.0087-0.0126
	High alloy steel (4137, 4145 etc)	260 - 320		**198** (131-265)	0.0079-0.0118	0.0087-0.0126

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.

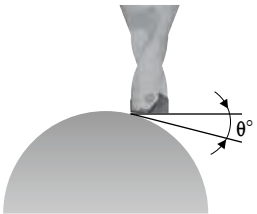
Precaution in drilling

Angled surface drilling



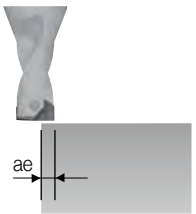
- Reduce the feed (fn) to 30% than general cutting conditions at the beginning and the end of angled surface. (In case, θ is over 30˚, reduce it to 50%.)

Curved surface drilling



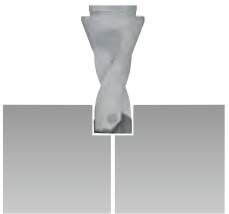
- Reduce the feed (fn) to 30% than general cutting conditions at the beginning of curved surface. (In case, θ is over 30˚, reduce it to 50%.)

Plunging



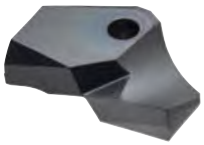
- Reduce the depth of cut (ae) to shorter than 1/2 of drill diameter.
- In case, the depth of cut is longer than drill diameter, plunge with divided depth of cut.

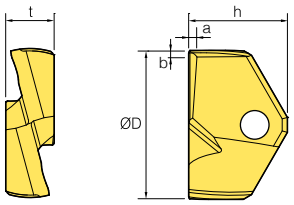
Boring



- Reduce the feed (fn) to 30% than general cutting conditions at the beginning of boring.
- Start with 0.078 inch stepping before boring to prevent long chip.

Insert





(inch)

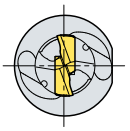
Designation		Coated PC5400	ØD	h	t	a	b
TPD	0551BA-F		0.551	0.344	0.157	0.0026	0.0022
	0571BA-F		0.571	0.344	0.157	0.0026	0.0022
	0591BA-F		0.591	0.364	0.157	0.0026	0.0022
	0610BA-F		0.610	0.364	0.157	0.0026	0.0022
	0630BA-F		0.630	0.404	0.217	0.0026	0.0022
	0650BA-F		0.650	0.404	0.217	0.0026	0.0022
	0669BA-F		0.669	0.423	0.217	0.0026	0.0022
	0689BA-F		0.689	0.423	0.217	0.0026	0.0022
	0709BA-F		0.709	0.463	0.236	0.0026	0.0022
	0728BA-F		0.728	0.463	0.236	0.0026	0.0022
	0748BA-F		0.748	0.482	0.236	0.0026	0.0022
	0768BA-F		0.768	0.482	0.236	0.0026	0.0022
	0787BA-F		0.787	0.502	0.256	0.0026	0.0022
	0807BA-F		0.807	0.502	0.256	0.0026	0.0022
	0827BA-F		0.827	0.522	0.256	0.0026	0.0022
	0846BA-F		0.846	0.522	0.256	0.0026	0.0022
	0866BA-F		0.866	0.541	0.276	0.0026	0.0022
	0886BA-F		0.886	0.541	0.276	0.0026	0.0022
	0906BA-F		0.906	0.561	0.276	0.0026	0.0022
	0925BA-F		0.925	0.561	0.276	0.0026	0.0022
	0945BA-F		0.945	0.581	0.295	0.0026	0.0022
	0965BA-F		0.965	0.581	0.295	0.0026	0.0022
	0984BA-F		0.984	0.600	0.295	0.0026	0.0022
	1004BA-F		1.004	0.600	0.295	0.0026	0.0022
	1024BA-F		1.024	0.620	0.335	0.0026	0.0022
	1043BA-F		1.043	0.620	0.335	0.0026	0.0022
	1063BA-F		1.063	0.659	0.335	0.0026	0.0022
	1083BA-F		1.083	0.659	0.335	0.0026	0.0022
	1102BA-F		1.102	0.699	0.374	0.0026	0.0022
	1122BA-F		1.122	0.699	0.374	0.0026	0.0022
	1142BA-F		1.142	0.719	0.374	0.0026	0.0022
	1161BA-F		1.161	0.719	0.374	0.0026	0.0022
	1181BA-F		1.181	0.738	0.394	0.0026	0.0022
	1201BA-F		1.201	0.738	0.394	0.0026	0.0022

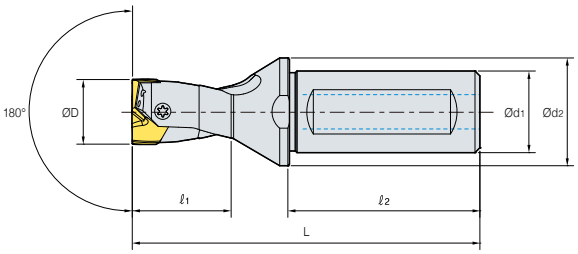
※ We can provide nonstock items with Ø0.551 - Ø1.219 ●: Stock item

Parts

Designation		Drill diameter ØD (inch)	Screw	Wrench	Torque (ibf·ft)
TPD	0551BA-F ~ 0590BA-F	0.551 - 0.590	FTNB02512-P	TW07S	0.590
	0591BA-F ~ 0708BA-F	0.591 - 0.708	FTNB02514-P	TW07S	0.590
	0709BA-F ~ 0786BA-F	0.709 - 0.786	FTNB0316-P	TW09S	0.886
	0787BA-F ~ 0944BA-F	0.787 - 0.944	FTNB0319	TW09S	0.886
	0945BA-F ~ 1023BA-F	0.945 - 1.023	FTNB03522	TW15S	2.214
	1024BA-F ~ 1101BA-F	1.024 - 1.101	FTNB03524	TW15S	2.214
	1102BA-F ~ 1180BA-F	1.102 - 1.180	FTNB0426	TW15S	2.214
	1181BA-F ~ 1219BA-F	1.181 - 1.219	FTNB0528	TW20-100	2.952

TPDB-F (1.5D)





(inch)

Designation		Stock	ØD	Ød1	Ød2	ℓ1	ℓ2	L	Insert
TPDBA	0551-063-1.5-F		0.551 - 0.570	0.625	0.787	1.102	1.890	3.386	TPD0551BA-F~TPD0570BA-F
	0571-063-1.5-F		0.571 - 0.590	0.625	0.787	1.142	1.890	3.425	TPD0571BA-F~TPD0590BA-F
	0591-075-1.5-F		0.591 - 0.609	0.750	0.984	1.181	1.969	3.661	TPD0591BA-F~TPD0609BA-F
	0610-075-1.5-F		0.610 - 0.629	0.750	0.984	1.220	1.969	3.701	TPD0610BA-F~TPD0629BA-F
	0630-075-1.5-F		0.630 - 0.649	0.750	0.984	1.260	1.969	3.740	TPD0630BA-F~TPD0649BA-F
	0650-075-1.5-F		0.650 - 0.668	0.750	0.984	1.300	1.969	3.780	TPD0650BA-F~TPD0668BA-F
	0669-075-1.5-F		0.669 - 0.688	0.750	0.984	1.339	1.969	3.819	TPD0669BA-F~TPD0688BA-F
	0689-075-1.5-F		0.689 - 0.708	0.750	0.984	1.378	1.969	3.858	TPD0689BA-F~TPD0708BA-F
	0709-075-1.5-F		0.709 - 0.727	0.750	0.984	1.417	1.969	3.898	TPD0709BA-F~TPD0727BA-F
	0728-075-1.5-F		0.728 - 0.747	0.750	0.984	1.457	1.969	3.937	TPD0728BA-F~TPD0747BA-F
	0748-100-1.5-F		0.748 - 0.767	1.000	1.299	1.496	2.205	3.976	TPD0748BA-F~TPD0767BA-F
	0768-100-1.5-F		0.768 - 0.786	1.000	1.299	1.535	2.205	4.016	TPD0768BA-F~TPD0786BA-F
	0787-100-1.5-F		0.787 - 0.806	1.000	1.299	1.575	2.205	4.567	TPD0787BA-F~TPD0806BA-F
	0807-100-1.5-F		0.807 - 0.826	1.000	1.299	1.614	2.205	4.606	TPD0807BA-F~TPD0826BA-F
	0827-100-1.5-F		0.827 - 0.845	1.000	1.299	1.654	2.205	4.646	TPD0827BA-F~TPD0845BA-F
	0846-100-1.5-F		0.846 - 0.865	1.000	1.299	1.693	2.205	4.685	TPD0846BA-F~TPD0865BA-F
	0866-100-1.5-F		0.866 - 0.885	1.000	1.299	1.732	2.205	4.724	TPD0866BA-F~TPD0885BA-F
	0886-100-1.5-F		0.886 - 0.905	1.000	1.299	1.772	2.205	4.764	TPD0886BA-F~TPD0905BA-F
	0906-100-1.5-F		0.906 - 0.924	1.000	1.299	1.811	2.205	4.803	TPD0906BA-F~TPD0924BA-F
	0925-100-1.5-F		0.925 - 0.944	1.000	1.299	1.850	2.205	4.843	TPD0925BA-F~TPD0944BA-F
	0945-125-1.5-F		0.945 - 0.964	1.250	1.693	1.890	2.362	5.059	TPD0945BA-F~TPD0964BA-F
	0965-125-1.5-F		0.965 - 0.983	1.250	1.693	1.929	2.362	5.098	TPD0965BA-F~TPD0983BA-F
	0984-125-1.5-F		0.984 - 1.003	1.250	1.693	1.969	2.362	5.138	TPD0984BA-F~TPD1003BA-F
	1004-125-1.5-F		1.004 - 1.023	1.250	1.693	2.008	2.362	5.177	TPD1004BA-F~TPD1023BA-F
	1024-125-1.5-F		1.024 - 1.042	1.250	1.693	2.047	2.362	5.217	TPD1024BA-F~TPD1042BA-F
	1043-125-1.5-F		1.043 - 1.062	1.250	1.693	2.087	2.362	5.256	TPD1043BA-F~TPD1062BA-F
	1063-125-1.5-F		1.063 - 1.082	1.250	1.693	2.126	2.362	5.295	TPD1063BA-F~TPD1082BA-F
	1083-125-1.5-F		1.083 - 1.101	1.250	1.693	2.165	2.362	5.335	TPD1083BA-F~TPD1101BA-F
	1102-125-1.5-F		1.102 - 1.121	1.250	1.693	2.205	2.362	5.374	TPD1102BA-F~TPD1121BA-F
	1122-125-1.5-F		1.122 - 1.141	1.250	1.693	2.244	2.362	5.413	TPD1122BA-F~TPD1141BA-F
	1142-125-1.5-F		1.142 - 1.160	1.250	1.693	2.283	2.362	5.423	TPD1142BA-F~TPD1160BA-F
	1161-125-1.5-F		1.161 - 1.180	1.250	1.693	2.323	2.362	5.492	TPD1161BA-F~TPD1180BA-F
	1181-125-1.5-F		1.181 - 1.200	1.250	1.693	2.362	2.362	5.531	TPD1181BA-F~TPD1200BA-F
	1201-125-1.5-F		1.201 - 1.219	1.250	1.693	2.402	2.362	5.571	TPD1201BA-F~TPD1219BA-F

●: Stock item

TPDB-H

Code system

【Holder】

TPD	B	A	0610	-	075	-	4	-	H
Top solid Piercing Drill	Insert type B: Blade type	Type A: Inch type No code: Metric type	Drill dia. 0610: Ø0.610 inch		Shank dia. 075: Ø0.75 inch		Aspect ratio (L/D) 3D, 4D, 8D ※ Flange shank (8F) for 8D		H-Beam

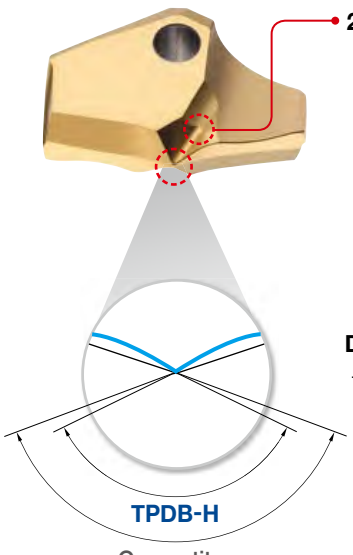
【Insert】

TPD	0945	B	A	-	H
Top solid Piercing Drill	Drill dia. 0945: Ø0.945 inch	Insert type B: Blade type	Type A: Inch type No code: Metric type		H-Beam

Features

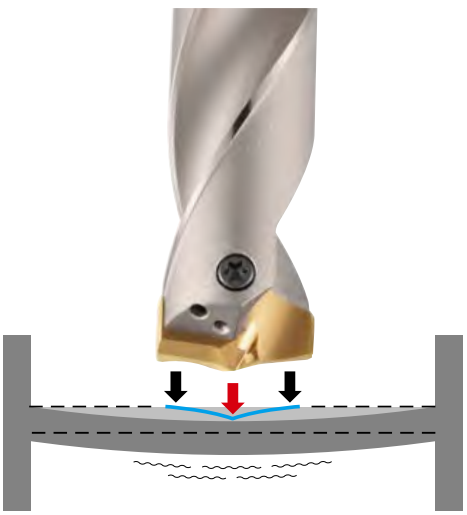
- **High precision clamping system** - High precision clamping due highly precise grinding and auto-centering
- **Screw on clamping system** - Easy to replace insert
- **Edge design with excellent centering** - Low cutting load and good chip control
- **High durability holder** - Improved wear resistance 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



2-step thinning shape
- Good chip control

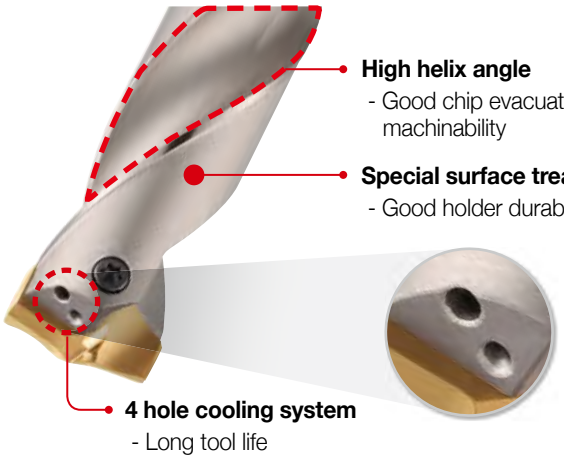
Double R point cutting edge
- Stable centering and machinability



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



High helix angle
- Good chip evacuation and machinability

Special surface treatment
- Good holder durability

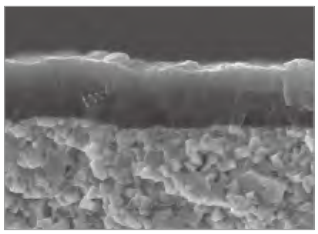
4 hole cooling system
- Long tool life

[TPDB-H]

[Competitor]

Concentrated coolant injection on delicate cutting edge increases tool life.

Grade features



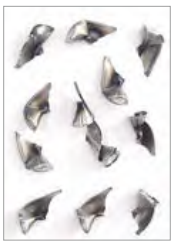
PC340Q new

- 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 (A36, A572)
- **Cutting conditions** vc (sfm) = 263
  fn (ipr) = 0.0079
  ap (inch) = 1.1811
  wet
- **Tools** **Insert** TPD1063BA-H (PC340Q)
  Holder TPDBA1063-125-4-H
  (Drill dia. = Ø1.063 inch)



[A36]

[A572]

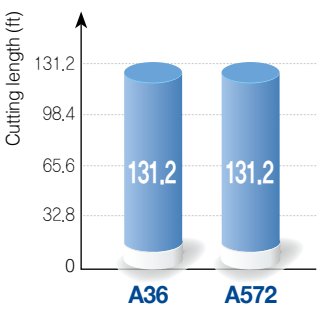
Wear resistance

- **Workpiece** Carbon steel (A36)
- **Cutting conditions** vc (sfm) = 213, fn (ipr) = 0.0098,
  ap (inch) = 1.1811, wet
- **Tools** **Insert** TPD0866BA-H (PC340Q)
  Holder TPDBA0866-100-4-H
  (Drill dia. = Ø0.866 inch)

[A36]

- **Workpiece** Carbon steel (A572)
- **Cutting conditions** vc (sfm) = 230, fn (ipr) = 0.0098,
  ap (inch) = 1.1811, wet
- **Tools** **Insert** TPD1063BA-H (PC340Q)
  Holder TPDBA1063-125-4-H
  (Drill dia. = Ø1.063 inch)

[A572]



▶ Normal wear and still usable

Workpiece and recommended cutting conditions

ISO	Workpiece		Workpiece materials	Grade	vc (sfm)	Aspect ratio (L/D) = 3D, 4D Feed rate (ipr) per drill dia. (inch)	
						Ø14.0-Ø21.0	Ø22.0-Ø30.0
P Carbon steel	H-Beam		A36 A572	PC340Q	**213** (197-246)	0.0079-0.0098	0.0079-0.0118
	Angle						
	Plate						
	Plate (Stacked)				**197** (180-213)	0.0059-0.0098	0.0059-0.0098

Precaution in drilling

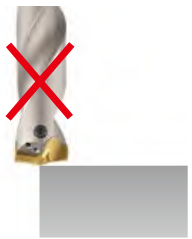
Angled surface drilling

- The approach angle between drill and the workpiece at the beginning and the end should be less than 6˚.
- Reduce the feed (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.

Application examples

Carbon steel (A572)

- **Cutting conditions** vc (sfm) = 197, fn (ipr) = 0.0098, ap (inch) = 1.9685, wet
- **Tools** **Insert** TPD0945BA-H (PC340Q)
  Holder TPDBA0945-125-3-H
  (Drill dia. = Ø0.945 inch)
- **Tool life** 196.9 ft (Normal wear)

▶ Stable chip evacuation ensures tool life as 196.9 ft in even machining with over 1.57 inch thickness.

Carbon steel (A572)

- **Cutting conditions** vc (sfm) = 230, fn (ipr) = 0.0098, ap (inch) = 0.9449, wet
- **Tools** **Insert** TPD1063BA-H (PC340Q)
  Holder TPDBA1063-125-3-H
  (Drill dia. = Ø1.063 inch)
- **Tool life** 131.2 ft (Normal wear)

▶ High speed and high feed machining saves machining hours.

Carbon steel (A36)

- **Cutting conditions** vc (sfm) = 197, fn (ipr) = 0.0079, ap (inch) = 0.4724, wet
- **Tools** **Insert** TPD0866BA-H (PC340Q)
  Holder TPDBA0866-100-3-H
  (Drill dia. = Ø0.866 inch)
- **Tool life** 114.8 ft (Normal wear)

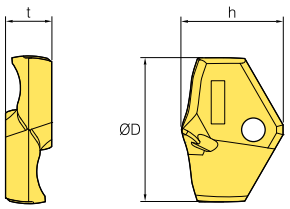
▶ Stable machinability and long tool life are realized in machining various workpieces such as A572, A36 etc.

Carbon steel (A572)

- **Cutting conditions** vc (sfm) = 213, fn (ipr) = 0.0079, ap (inch) = 0.8661, wet
- **Tools** **Insert** TPD0945BA-H (PC340Q)
  Holder TPDBA0945-125-3-H
  (Drill dia. = Ø0.945 inch)
- **Tool life** 131.2 ft (Normal wear)

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

Insert



(inch)

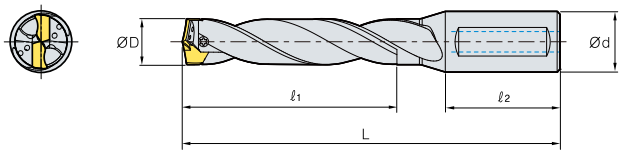
Designation		Coated PC340Q	ØD	h	t
TPD	0551BA-H		0.551	0.394	0.157
	0571BA-H		0.571	0.394	0.157
	0591BA-H		0.591	0.413	0.157
	0610BA-H		0.610	0.413	0.157
	0630BA-H		0.630	0.453	0.217
	0650BA-H		0.650	0.453	0.217
	0669BA-H		0.669	0.472	0.217
	0689BA-H		0.689	0.472	0.217
	0709BA-H		0.709	0.512	0.236
	0728BA-H		0.728	0.512	0.236
	0748BA-H		0.748	0.531	0.236
	0768BA-H		0.768	0.531	0.236
	0787BA-H		0.787	0.571	0.256
	0807BA-H		0.807	0.571	0.256
	0827BA-H		0.827	0.591	0.256
	0846BA-H		0.846	0.591	0.256
	0866BA-H		0.866	0.610	0.276
	0886BA-H		0.886	0.610	0.276
	0906BA-H		0.906	0.630	0.276
	0925BA-H		0.925	0.630	0.276
	0945BA-H		0.945	0.650	0.295
	0965BA-H		0.965	0.650	0.295
	0984BA-H		0.984	0.669	0.295
	1004BA-H		1.004	0.669	0.295
	1024BA-H		1.024	0.689	0.335
	1043BA-H		1.043	0.689	0.335
	1063BA-H		1.063	0.728	0.335
	1083BA-H		1.083	0.728	0.335
	1102BA-H		1.102	0.768	0.374
	1122BA-H		1.122	0.768	0.374
	1142BA-H		1.142	0.787	0.374
	1161BA-H		1.161	0.787	0.374
	1181BA-H		1.181	0.807	0.394
	1201BA-H		1.201	0.807	0.394

※ We can provide nonstock items with Ø0.551 - Ø1.219 ●: Stock item

Parts

Designation		Drill diameter ØD (inch)	Screw	Wrench	Torque (ibf·ft)
TPD	0551BA-H~0590BA-H	0.551-0.590	FTNB02512-P	TW07S	0.590
	0591BA-H~0708BA-H	0.591-0.708	FTNB02514-P	TW07S	0.590
	0709BA-H~0786BA-H	0.709-0.786	FTNB0316-P	TW09S	0.886
	0787BA-H~0944BA-H	0.787-0.944	FTNB0319	TW09S	0.886
	0945BA-H~1023BA-H	0.945-1.023	FTNB03522	TW15S	2.214
	1024BA-H~1101BA-H	1.024-1.101	FTNB03524	TW15S	2.214
	1102BA-H~1180BA-H	1.102-1.180	FTNB0426	TW15S	2.214
	1181BA-H~1219BA-H	1.181-1.219	FTNB0528	TW20-100	2.952

TPDB-H (3D)

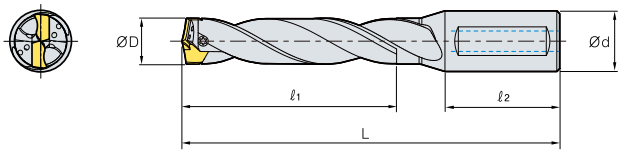


(inch)

Designation		Stock	ØD	Ød	ℓ1	ℓ2	L	Insert
TPDBA	0551-063-3-H		0.551 - 0.570	0.625	1.654	1.890	3.888	0551BA-H~0570BA-H
	0571-063-3-H		0.571 - 0.590	0.625	1.713	1.890	3.967	0571BA-H~0590BA-H
	0591-075-3-H		0.591 - 0.609	0.750	1.772	1.969	4.109	0591BA-H~0609BA-H
	0610-075-3-H		0.610 - 0.629	0.750	1.831	1.969	4.187	0610BA-H~0629BA-H
	0630-075-3-H		0.630 - 0.649	0.750	1.890	1.969	4.250	0630BA-H~0649BA-H
	0650-075-3-H		0.650 - 0.668	0.750	1.949	1.969	4.329	0650BA-H~0668BA-H
	0669-075-3-H		0.669 - 0.688	0.750	2.008	1.969	4.391	0669BA-H~0688BA-H
	0689-075-3-H		0.689 - 0.708	0.750	2.067	1.969	4.470	0689BA-H~0708BA-H
	0709-075-3-H		0.709 - 0.727	0.750	2.126	1.969	4.532	0709BA-H~0727BA-H
	0728-075-3-H		0.728 - 0.747	0.750	2.185	1.969	4.611	0728BA-H~0747BA-H
	0748-075-3-H		0.748 - 0.767	0.750	2.244	1.969	4.674	0748BA-H~0767BA-H
	0768-075-3-H		0.768 - 0.786	0.750	2.303	1.969	4.753	0768BA-H~0786BA-H
	0787-100-3-H		0.787 - 0.806	1.000	2.362	2.205	5.051	0787BA-H~0806BA-H
	0807-100-3-H		0.807 - 0.826	1.000	2.421	2.205	5.130	0807BA-H~0826BA-H
	0827-100-3-H		0.827 - 0.845	1.000	2.480	2.205	5.193	0827BA-H~0845BA-H
	0846-100-3-H		0.846 - 0.865	1.000	2.539	2.205	5.272	0846BA-H~0865BA-H
	0866-100-3-H		0.866 - 0.885	1.000	2.598	2.205	5.335	0866BA-H~0885BA-H
	0886-100-3-H		0.886 - 0.905	1.000	2.657	2.205	5.413	0886BA-H~0905BA-H
	0906-100-3-H		0.906 - 0.924	1.000	2.717	2.205	5.476	0906BA-H~0924BA-H
	0925-100-3-H		0.925 - 0.944	1.000	2.776	2.205	5.555	0925BA-H~0944BA-H
	0945-125-3-H		0.945 - 0.964	1.250	2.835	2.362	5.780	0945BA-H~0964BA-H
	0965-125-3-H		0.965 - 0.983	1.250	2.894	2.362	5.858	0965BA-H~0983BA-H
	0984-125-3-H		0.984 - 1.003	1.250	2.953	2.362	5.917	0984BA-H~1003BA-H
	1004-125-3-H		1.004 - 1.023	1.250	3.012	2.362	5.996	1004BA-H~1023BA-H
	1024-125-3-H		1.024 - 1.042	1.250	3.071	2.362	6.055	1024BA-H~1042BA-H
	1043-125-3-H		1.043 - 1.062	1.250	3.130	2.362	6.134	1043BA-H~1062BA-H
	1063-125-3-H		1.063 - 1.082	1.250	3.189	2.362	6.201	1063BA-H~1082BA-H
	1083-125-3-H		1.083 - 1.101	1.250	3.248	2.362	6.280	1083BA-H~1101BA-H
	1102-125-3-H		1.102 - 1.121	1.250	3.307	2.362	6.339	1102BA-H~1121BA-H
	1122-125-3-H		1.122 - 1.141	1.250	3.366	2.362	6.417	1122BA-H~1141BA-H
	1142-125-3-H		1.142 - 1.160	1.250	3.425	2.362	6.480	1142BA-H~1160BA-H
	1161-125-3-H		1.161 - 1.180	1.250	3.484	2.362	6.559	1161BA-H~1180BA-H
	1181-125-3-H		1.181 - 1.219	1.250	3.543	2.362	6.622	1181BA-H~1219BA-H

●: Stock item

TPDB-H (4D)

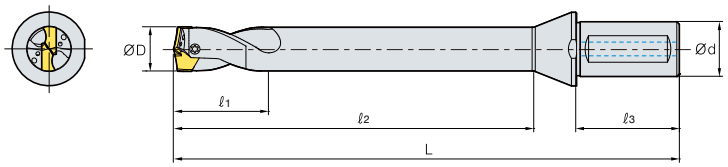


(inch)

Designation		Stock	ØD	Ød	ℓ1	ℓ2	L	Insert
TPDBA	0551-063-4-H		0.551 - 0.570	0.625	2.205	1.890	4.440	0551BA-H~0570BA-H
	0571-063-4-H		0.571 - 0.590	0.625	2.283	1.890	4.538	0571BA-H~0590BA-H
	0591-075-4-H		0.591 - 0.609	0.750	2.362	1.969	4.699	0591BA-H~0609BA-H
	0610-075-4-H		0.610 - 0.629	0.750	2.441	1.969	4.797	0610BA-H~0629BA-H
	0630-075-4-H		0.630 - 0.649	0.750	2.520	1.969	4.880	0630BA-H~0649BA-H
	0650-075-4-H		0.650 - 0.668	0.750	2.598	1.969	4.978	0650BA-H~0668BA-H
	0669-075-4-H		0.669 - 0.688	0.750	2.677	1.969	5.060	0669BA-H~0688BA-H
	0689-075-4-H		0.689 - 0.708	0.750	2.756	1.969	5.159	0689BA-H~0708BA-H
	0709-075-4-H		0.709 - 0.727	0.750	2.835	1.969	5.241	0709BA-H~0727BA-H
	0728-075-4-H		0.728 - 0.747	0.750	2.913	1.969	5.339	0728BA-H~0747BA-H
	0748-075-4-H		0.748 - 0.767	0.750	2.992	1.969	5.422	0748BA-H~0767BA-H
	0768-075-4-H		0.768 - 0.786	0.750	3.071	1.969	5.521	0768BA-H~0786BA-H
	0787-100-4-H		0.787 - 0.806	1.000	3.150	2.205	5.839	0787BA-H~0806BA-H
	0807-100-4-H		0.807 - 0.826	1.000	3.228	2.205	5.937	0807BA-H~0826BA-H
	0827-100-4-H		0.827 - 0.845	1.000	3.307	2.205	6.020	0827BA-H~0845BA-H
	0846-100-4-H		0.846 - 0.865	1.000	3.386	2.205	6.118	0846BA-H~0865BA-H
	0866-100-4-H		0.866 - 0.885	1.000	3.465	2.205	6.201	0866BA-H~0885BA-H
	0886-100-4-H		0.886 - 0.905	1.000	3.543	2.205	6.299	0886BA-H~0905BA-H
	0906-100-4-H		0.906 - 0.924	1.000	3.622	2.205	6.382	0906BA-H~0924BA-H
	0925-100-4-H		0.925 - 0.944	1.000	3.701	2.205	6.480	0925BA-H~0944BA-H
	0945-125-4-H		0.945 - 0.964	1.250	3.780	2.362	6.724	0945BA-H~0964BA-H
	0965-125-4-H		0.965 - 0.983	1.250	3.858	2.362	6.823	0965BA-H~0983BA-H
	0984-125-4-H		0.984 - 1.003	1.250	3.937	2.362	6.902	0984BA-H~1003BA-H
	1004-125-4-H		1.004 - 1.023	1.250	4.016	2.362	7.000	1004BA-H~1023BA-H
	1024-125-4-H		1.024 - 1.042	1.250	4.094	2.362	7.079	1024BA-H~1042BA-H
	1043-125-4-H		1.043 - 1.062	1.250	4.173	2.362	7.177	1043BA-H~1062BA-H
	1063-125-4-H		1.063 - 1.082	1.250	4.252	2.362	7.264	1063BA-H~1082BA-H
	1083-125-4-H		1.083 - 1.101	1.250	4.331	2.362	7.362	1083BA-H~1101BA-H
	1102-125-4-H		1.102 - 1.121	1.250	4.409	2.362	7.441	1102BA-H~1121BA-H
	1122-125-4-H		1.122 - 1.141	1.250	4.488	2.362	7.539	1122BA-H~1141BA-H
	1142-125-4-H		1.142 - 1.160	1.250	4.567	2.362	7.622	1142BA-H~1160BA-H
	1161-125-4-H		1.161 - 1.180	1.250	4.646	2.362	7.720	1161BA-H~1180BA-H
	1181-125-4-H		1.181 - 1.219	1.250	4.724	2.362	7.803	1181BA-H~1219BA-H

● : Stock item

TPDB-H (8D)



(inch)

Designation		Stock	ØD	Ød	ℓ1	ℓ2	ℓ3	L	Insert
TPDBA	0551-063-8F-H		0.551 - 0.570	0.625	1.969	4.409	1.890	6.940	0551BA-H~0570BA-H
	0571-063-8F-H		0.571 - 0.590	0.625	1.969	4.567	1.890	7.097	0571BA-H~0590BA-H
	0591-075-8F-H		0.591 - 0.609	0.750	1.969	4.724	1.969	7.376	0591BA-H~0609BA-H
	0610-075-8F-H		0.610 - 0.629	0.750	1.969	4.882	1.969	7.534	0610BA-H~0629BA-H
	0630-075-8F-H		0.630 - 0.649	0.750	1.969	5.039	1.969	7.734	0630BA-H~0649BA-H
	0650-075-8F-H		0.650 - 0.668	0.750	1.969	5.197	1.969	7.892	0650BA-H~0668BA-H
	0669-075-8F-H		0.669 - 0.688	0.750	1.969	5.354	1.969	8.092	0669BA-H~0688BA-H
	0689-075-8F-H		0.689 - 0.708	0.750	1.969	5.512	1.969	8.249	0689BA-H~0708BA-H
	0709-075-8F-H		0.709 - 0.727	0.750	1.969	5.669	1.969	8.489	0709BA-H~0727BA-H
	0728-075-8F-H		0.728 - 0.747	0.750	1.969	5.827	1.969	8.647	0728BA-H~0747BA-H
	0748-075-8F-H		0.748 - 0.767	0.750	1.969	5.984	1.969	8.808	0748BA-H~0767BA-H
	0768-075-8F-H		0.768 - 0.786	0.750	1.969	6.142	1.969	8.966	0768BA-H~0786BA-H
	0787-100-8F-H		0.787 - 0.806	1.000	1.969	6.299	2.205	9.362	0787BA-H~0806BA-H
	0807-100-8F-H		0.807 - 0.826	1.000	1.969	6.457	2.205	9.520	0807BA-H~0826BA-H
	0827-100-8F-H		0.827 - 0.845	1.000	1.969	6.614	2.205	9.681	0827BA-H~0845BA-H
	0846-100-8F-H		0.846 - 0.865	1.000	1.969	6.772	2.205	9.839	0846BA-H~0865BA-H
	0866-100-8F-H		0.866 - 0.885	1.000	1.969	6.929	2.205	10.000	0866BA-H~0885BA-H
	0886-100-8F-H		0.886 - 0.905	1.000	1.969	7.087	2.205	10.354	0886BA-H~0905BA-H
	0906-100-8F-H		0.906 - 0.924	1.000	1.969	7.244	2.205	10.516	0906BA-H~0924BA-H
	0925-100-8F-H		0.925 - 0.944	1.000	1.969	7.402	2.205	10.673	0925BA-H~0944BA-H
	0945-125-8F-H		0.945 - 0.964	1.250	1.969	7.559	2.362	10.996	0945BA-H~0964BA-H
	0965-125-8F-H		0.965 - 0.983	1.250	1.969	7.717	2.362	11.154	0965BA-H~0983BA-H
	0984-125-8F-H		0.984 - 1.003	1.250	1.969	7.874	2.362	11.311	0984BA-H~1003BA-H
	1004-125-8F-H		1.004 - 1.023	1.250	1.969	8.031	2.362	11.469	1004BA-H~1023BA-H
	1024-125-8F-H		1.024 - 1.042	1.250	1.969	8.189	2.362	11.626	1024BA-H~1042BA-H
	1043-125-8F-H		1.043 - 1.062	1.250	1.969	8.346	2.362	11.783	1043BA-H~1062BA-H
	1063-125-8F-H		1.063 - 1.082	1.250	1.969	8.504	2.362	11.949	1063BA-H~1082BA-H
	1083-125-8F-H		1.083 - 1.101	1.250	1.969	8.661	2.362	12.106	1083BA-H~1101BA-H
	1102-125-8F-H		1.102 - 1.121	1.250	1.969	8.819	2.362	12.343	1102BA-H~1121BA-H
	1122-125-8F-H		1.122 - 1.141	1.250	1.969	8.976	2.362	12.500	1122BA-H~1141BA-H
	1142-125-8F-H		1.142 - 1.160	1.250	1.969	9.134	2.362	12.701	1142BA-H~1160BA-H
	1161-125-8F-H		1.161 - 1.180	1.250	1.969	9.291	2.362	12.858	1161BA-H~1180BA-H
	1181-125-8F-H		1.181 - 1.219	1.250	1.969	9.449	2.362	13.020	1181BA-H~1219BA-H

●: Stock item

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