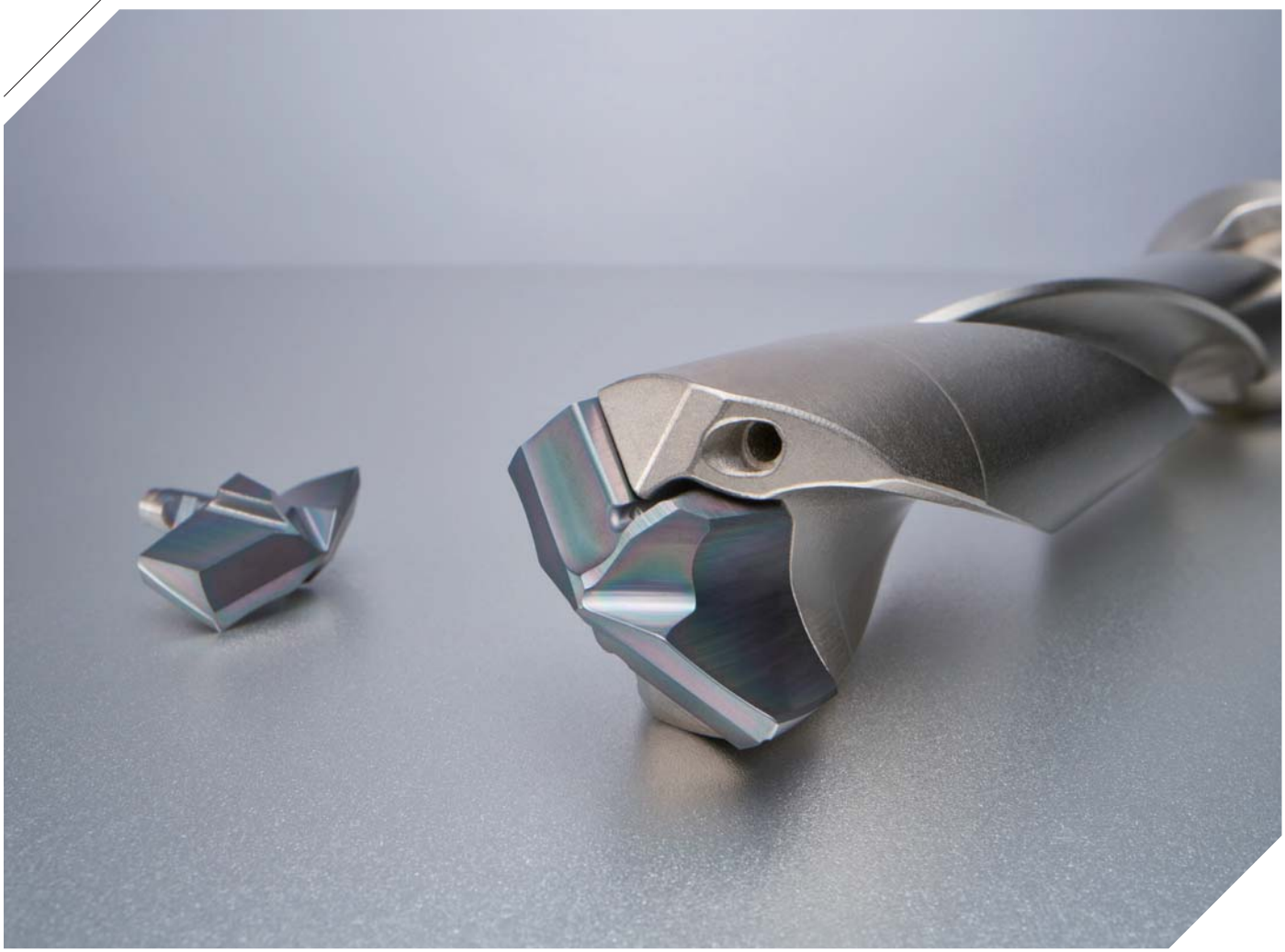
KORLOY
TECH-NEWS

TPDK

New clamping structure Top Solid Indexable Drill

- Ensuring stable machining quality proprietary DTF™ robust clamping structure
- Improved customer productivity through enhanced machining efficiency



Since 1966

KORLOY

KORLOY TECH-NEWS

New clamping structure Top Solid Indexable Drill

TPDK

KORLOY introduces the Top Solid Indexable Drill **TPDK**, delivering unwavering stability even in high-load machining environments.

The **TPDK** offers a proprietary DTF™ (Dura Taper Fit) clamping system based on a taper-shaped post design, providing exceptional rigidity and durability for stable machining performance under demanding conditions such as stacked plate processing. Its optimized point angle and flute cutting edge design enable smooth chip formation and efficient chip evacuation, enhancing overall machining efficiency.

Featuring a headless bolt design, the DTF™ clamping method improves clamping convenience compared to conventional screws and enables rapid insert replacement, significantly reducing setup time. Additionally, periodic replacement of the headless bolt helps to extend holder's tool life.

The **TPDK** holder incorporates a variable web thickness structure that reinforces clamping rigidity and improves chip management performance. Spiral oil holes and treated flute surfaces maximize chip evacuation stability. Furthermore, a dedicated grade utilizing an ultra-fine substrate and lubricative thin-film coating suppresses cutting edge damage and enhances wear resistance, ensuring longer tool life and consistently stable machining quality.
TPDK improves customer productivity and reduces manufacturing costs through impoved tool life and machining efficiency.

Strong clamping structure (DTF™ Clamping System)

- Ensures excellent holder durability due to the proprietary DTF clamping structure
- Enhanced productivity through multi-layer stacked plate machining of 4 or more layers

Optimized chip control

- Excellent chip curling with extended insert flute design
- Spiral oil holes and flute polishing enhance chip evacuation

Excellent work productivity

- Reduces setup time through easy insert replacement
- Ensures stability and consistency across multiple cycles.

Excellent tool life

- Applied exclusive grade an ultra-fine grain substrate and lubricative thin-film coating
- Excellent chipping resistance due to the optimized cutting edge geometry



Code system

» Insert

TPD	2000	K	P
Top solid Piercing Drill	Machining diameter 2000 : Ø20.00mm	Type K : Key Clamp System	Applicable workpiece material P : Steel K : Cast iron

» Holder

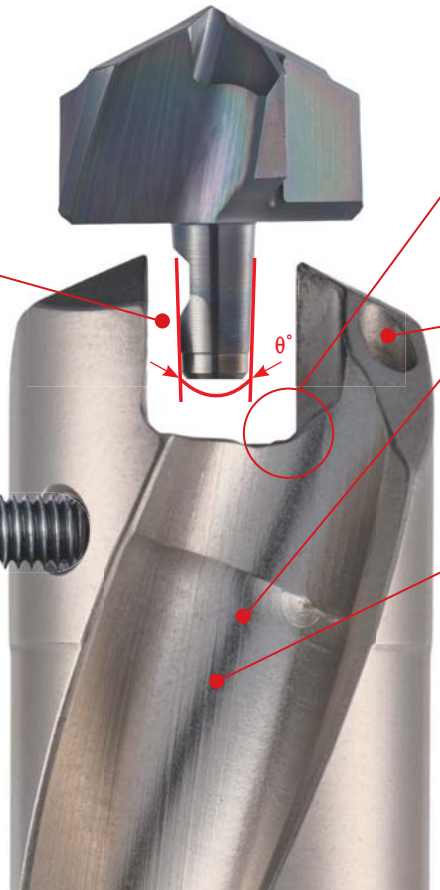
TPDK	5D	-	200	-	25	-	100
Top solid Piercing Drill KEY	Depth of cut (L/D) 3D,5D,8D		Drill diameter 200 : Ø20.00~20.99mm		Shank diameter 25 : Ø25mm		Usable length 100 : 100mm

Insert features

Picture	Application range	Tool diameter(mm)	Feature
 **TPDK** For P and K	P K	Ø14~20.99	• Optimized cutting edge design ensures stable cutting performance. • Extended flute design promotes smooth chip curling and efficient chip evacuation. • Dedicated grade with excellent lubricity improves tool life.

Holder features

• **DTF™ (Dura Taper Fit) Clamping system -** Strong clamping force and stable machining performance



Taper post design (DTF™)

- Enhances clamping rigidity and repeatability

Easy insert replacement structure

- Reduces insert replacement time

High-rigidity pocket chamfer geometry

- Prevents damage to the holder entrance and improves durability

Application of spiral oil holes

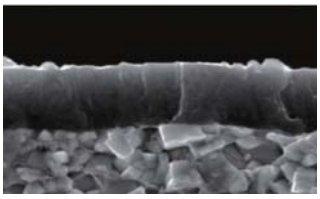
- Enhances chip evacuation stability

Step-shaped flute design (Tri-step™ Flute)

- Enhances holder rigidity and improves chip evacuation stability.

Grade features

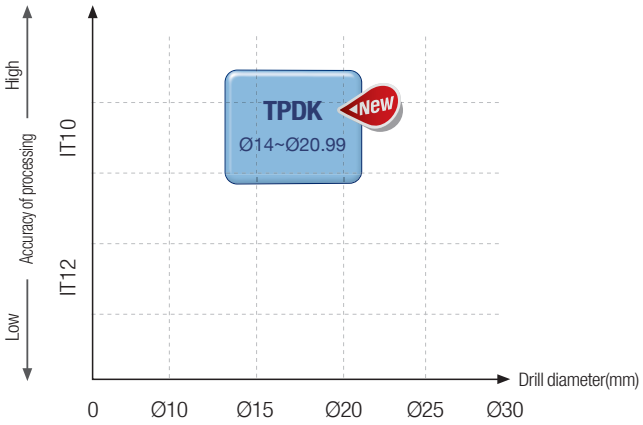
PC5335

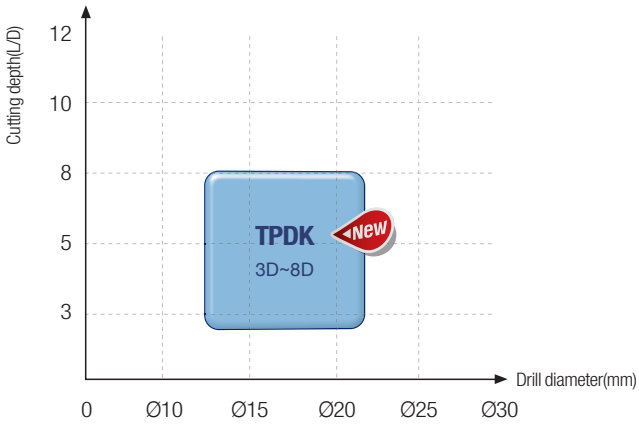


- Excellent machining stability with an ultra-fine, high-toughness substrate
- Excellent performance in severe adhesion conditions and when machining materials prone to adhesion, with a lubricious thin-film coating
- Versatile grade optimized for various drilling applications

Application range

Tool	Drill diameter DC(mm)	Depth of cut(L/D)	Drill diameter tolerance	Hole tolerance	Hole surface finish(RA)	Workpiece
TPDK	14~20.99mm	3,5,8	h7	IT10	~3.0㎛	P K



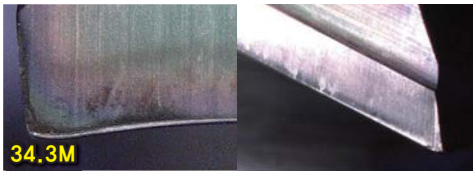


Performance evaluation

Impact resistance

Workpiece	Weldable structural steel stacked plates(SM355A, HRC20), 500(L) × 300(W) × 15(H) x 4EA
Cutting condition	vc(m/min) = 80, fn(mm/rev) = 0.30, ap(mm) = 60, Wet
Tool	**Insert** TPD1800KP(PC5335) **Holder** TPDK5D-18025-90

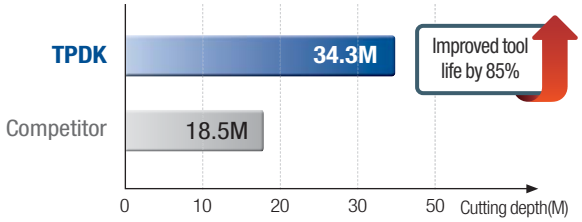




[TPDK]



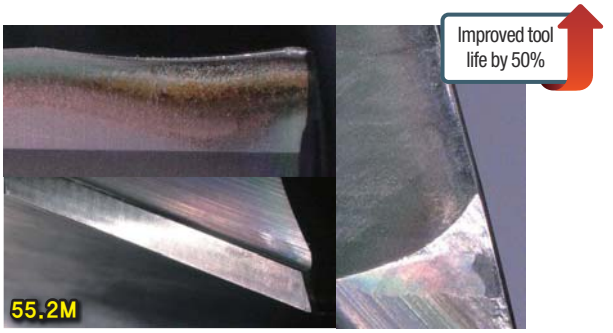
[Competitor]



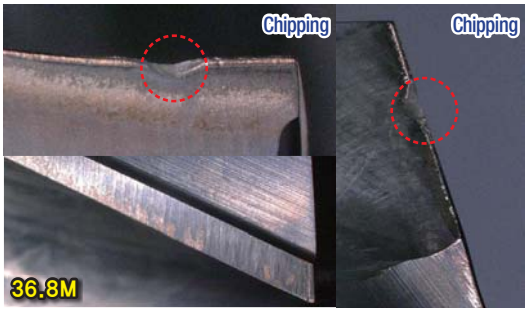
Performance evaluation

Wear resistance

Workpiece	Alloy steel for mechanical structures(SCM440, HRC22), 300(L) × 200(W) × 100(H)
Cutting condition	vc(m/min) = 100, fn(mm/rev) = 0.30, ap(mm) = 50, Wet
Tool	**Insert** TPD1500KP(PC5335) **Holder** TPDK5D-15020-75



[TPDK]

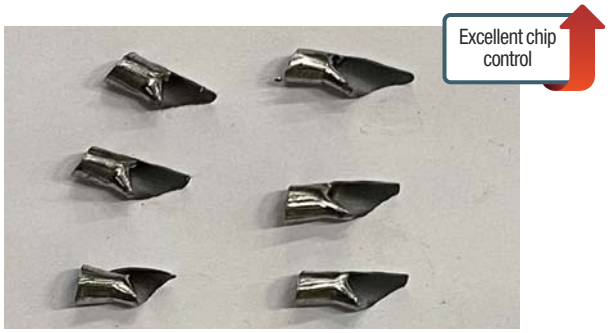


[Competitor]

Chip control

Workpiece	Weldable structural steel stacked plates(SM355A, HRC20), 500(L) × 300(W) × 15(H) x 4EA
Cutting condition	vc(m/min) = 120, fn(mm/rev) = 0.30, ap(mm) = 60, Wet
Tool	**Insert** TPD1800KP(PC5335) **Holder** TPDK5D-18025-90





[TPDK]



[Competitor]

Hole surface finish

Workpiece	Alloy steel for mechanical structures(SCM440, HRC22), 300(L) × 200(W) × 100(H)
Cutting condition	vc(m/min) = 100, fn(mm/rev) = 0.30, ap(mm) = 50, Wet
Tool	**Insert** TPD1500KP(PC5335) **Holder** TPDK5D-15020-75



[TPDK]



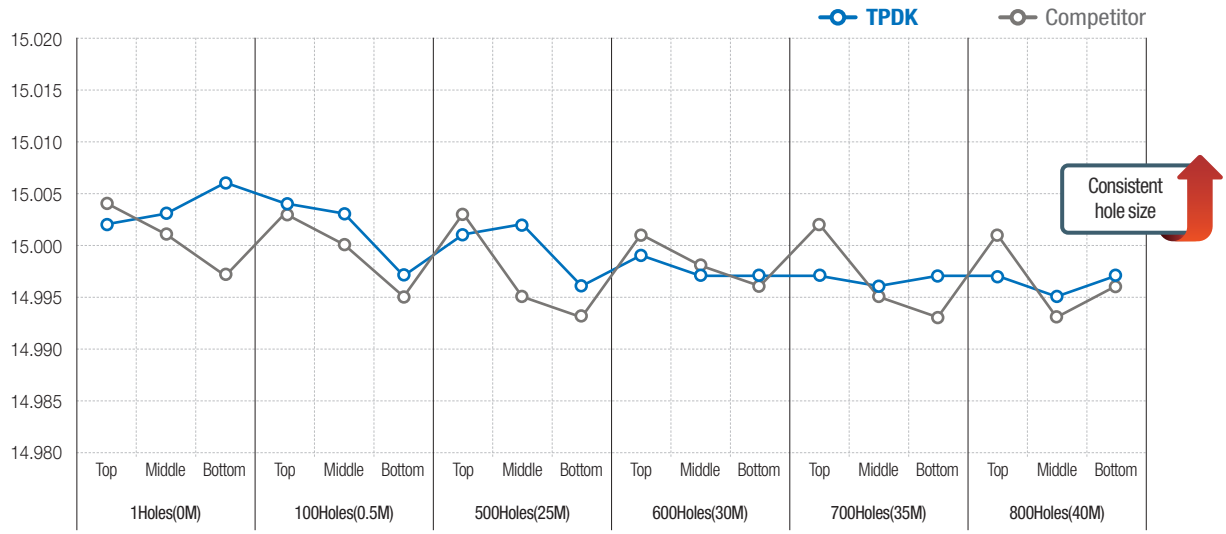
[Competitor]

Surface finish after machining 800 holes (40M)

Performance evaluation

Hole size

Workpiece	Alloy steel for mechanical structures(SCM440, HRC22), 300(L) × 200(W) × 100(H)
Cutting condition	vc(m/min) = 100, fn(mm/rev) = 0.30, ap(mm) = 50, Wet
Tool	**Insert** TPD1500KP(PC5335) **Holder** TPDK5D-15020-75

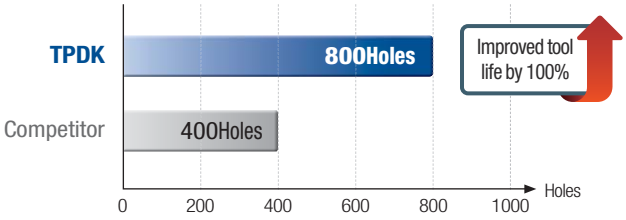


Application examples

Carbon steel (SM20C)

Workpiece	Hydraulic components (ROTOR SHAFT)
Cutting condition	vc(m/min) = 72, fn(mm/rev) = 0.12, ap(mm) = 80, Wet
Tool	**Insert** TPD1900KP(PC5335) **Holder** TPDK5D-19025-95







[TPDK]

Surface finish after machining 300 holes



[Competitor]

Surface finish after machining 100 holes

Productivity Comparison Case

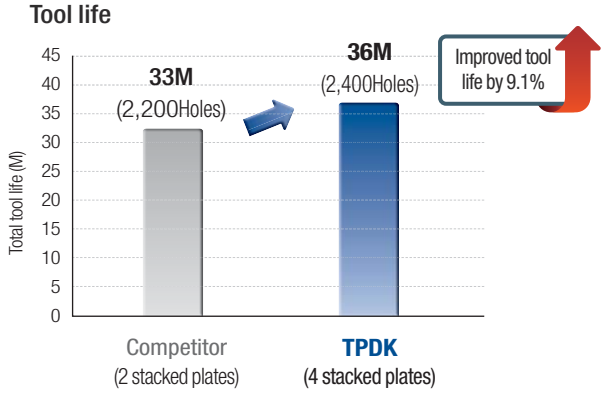
Tube sheet machining

Industry			Power generation	
Workpiece			Tube sheet	
Material			SM355A	
Product			**TPDK**	Competitor
Cutting condition	Drill diameter DC(mm)		19.9	19.9
	Depth of cut ap(mm)		60 (15Tx4plates)	30 (15Tx2plates)
	Speed	vc(m/min)	80	80
		RPM	1,280	1,280
	Feed	fn(mm/rev)	0.3	0.25
		vf(mm/min)	384	320
Tool life			2,400Holes(Approx. 36m)	2,200Holes(Approx. 33m)
Total machining time			224min	284min

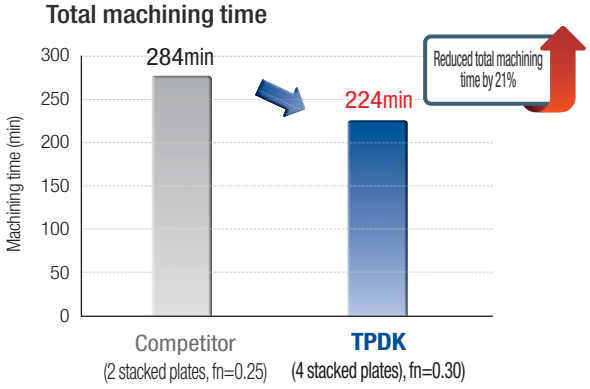


※ **Machining time calculation**
1. Competitor: 2 cycles × (2-plate setup: 60 min + 2-plate drilling: 52 min + 2-plate disassembly: 30 min)
2. TPDK: 1 cycle × (4-plate setup: 90 min + 4-plate drilling: 94 min + 4-plate disassembly: 40 min)

Tool life



Total machining time

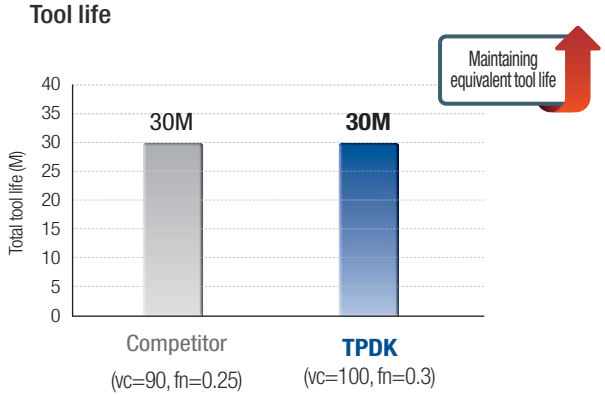


Shaft machining

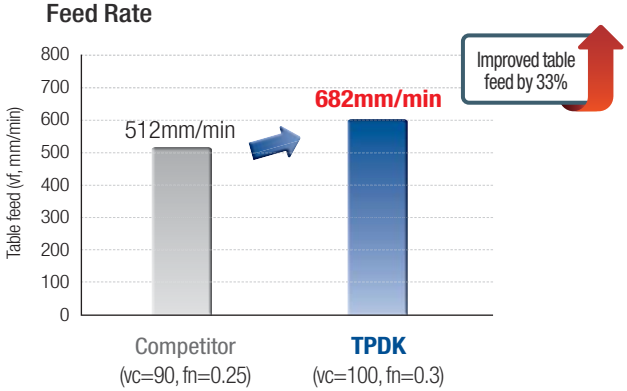
Industry			Automotive	
Workpiece			Shaft	
Material			SCM420	
Product			**TPDK**	Competitor
Cutting condition	Drill diameter DC(mm)		14	14
	Depth of cut ap(mm)		100	100
	Speed	vc(m/min)	100	90
		RPM	2,274	2,046
	Feed	fn(mm/rev)	0.3	0.25
		vf(mm/min)	682	512
Tool life			30M	30M
Machining efficiency(vf)			682	512



Tool life

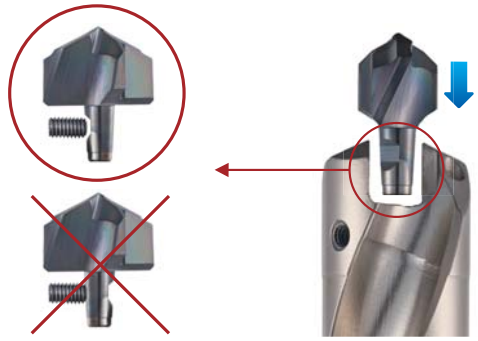
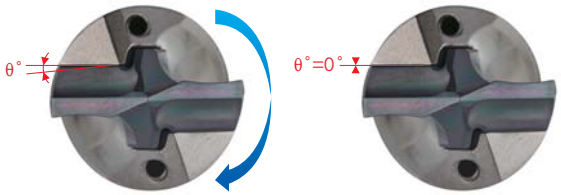
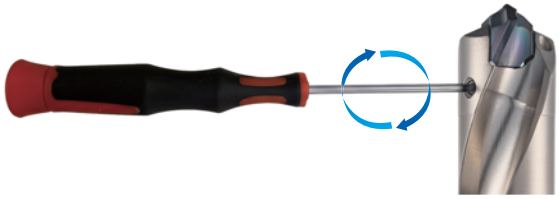


Feed Rate



Fastening Method

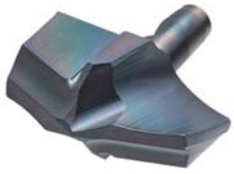
• Quick and precise fastening in 4 simple steps

Item	Description
[Pic 1] 	• Remove foreign substances using an air gun.
[Pic 2] 	• Insert into the holder while checking the slot orientation.
[Pic 3] 	• Securely seat the insert in the tight-fitting position.
[Pic 4] 	• Tighten the headless bolt to the specified torque to securely clamp the insert.

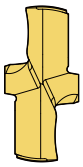
※ Notice

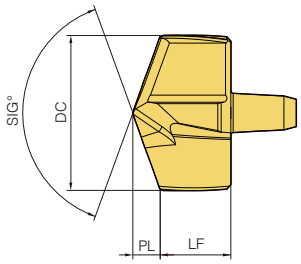
1. It is recommended to replace the headless bolt after approximately 10 insert replacements.
2. When replacing the insert, loosen the headless bolt and gently rotate the insert 2~3 times for easier removal.

Insert



TPDK-P (Steel/Cast iron)





(mm)

Designation		Coated PC5335	DC	LF	PL	SIG(°)
TPD	1400KP	●	14	6.22	2.48	140
	1420KP	●	14.2	6.18	2.52	140
	1450KP	●	14.5	6.13	2.57	140
	1500KP	●	15	6.85	2.65	140
	1530KP	●	15.3	6.79	2.71	140
	1550KP	●	15.5	6.75	2.75	140
	1560KP	●	15.6	6.73	2.77	140
	1600KP	●	16	7.17	2.83	140
	1630KP	●	16.3	7.12	2.88	140
	1650KP	●	16.5	7.08	2.92	140
	1670KP	●	16.7	7.04	2.96	140
	1700KP	●	17	7.42	3.08	140
	1750KP	●	17.5	7.33	3.17	140
	1770KP	●	17.7	7.29	3.21	140
	1800KP	●	18	8.32	3.18	140
	1850KP	●	18.5	8.23	3.27	140
	1900KP	●	19	8.65	3.35	140
	1950KP	●	19.5	8.55	3.45	140
	1960KP	●	19.6	8.54	3.46	140
	1990KP	●	19.9	8.48	3.52	140
	2000KP	●	20	8.97	3.53	140
	2050KP	●	20.5	8.88	3.62	140
	2090KP	●	20.9	8.8	3.7	140

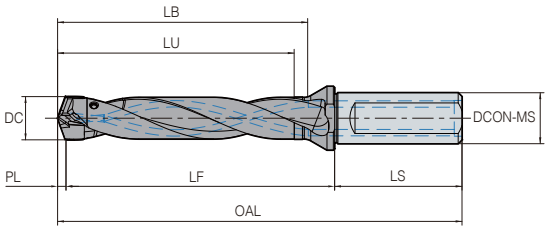
※ TPD Inserts not list above within the range of Ø14.00 ~ Ø20.99 can be made to order ● : Stock item

Parts

Designation		Drill diameter DC(mm)	Screw	Wrench	Torque (N · m)
TPD	1400KP~1599KP	Ø14~Ø15.99	KHMB02505	HW13S	0.5
	1600KP~1999KP	Ø16~Ø19.99	KHMB0306	HW15S	0.8
	2000KP~2099KP	Ø20~Ø20.99	KHMB03506	HW15S	0.8

TPDK(3D, 5D, 8D)





(mm)

	Designation	Stock	DC	DCON-MS	LU	LF	LB	LS	OAL	PL	Applicable insert
TPDK	3D-14016-42	●	14-14.99	16	44.48	59.2	52.88	48	109.68	2.48	TPD1400KP~1499KP
	3D-15020-45	●	15-15.99	20	47.65	66.27	56.65	50	118.92	2.65	TPD1500KP~1599KP
	3D-16020-48	●	16-16.99	20	50.83	69	60.43	50	121.83	2.83	TPD1600KP~1699KP
	3D-17020-51	●	17-17.99	20	54.08	71.65	64.20	50	124.73	3.08	TPD1700KP~1799KP
	3D-18025-54	●	18-18.99	25	57.18	81.4	67.98	56	140.58	3.18	TPD1800KP~1899KP
	3D-19025-57	●	19-19.99	25	60.35	84.13	71.75	56	143.48	3.35	TPD1900KP~1999KP
	3D-20025-60	●	20-20.99	25	63.53	86.87	75.53	56	146.40	3.53	TPD2000KP~2099KP
	5D-14016-70	●	14-14.99	16	72.48	87.2	80.88	48	137.68	2.48	TPD1400KP~1499KP
	5D-15020-75	●	15-15.99	20	77.65	96.27	86.65	50	148.92	2.65	TPD1500KP~1599KP
	5D-16020-80	●	16-16.99	20	82.83	101	92.43	50	153.83	2.83	TPD1600KP~1699KP
	5D-17020-85	●	17-17.99	20	88.08	105.65	98.20	50	158.73	3.08	TPD1700KP~1799KP
	5D-18025-90	●	18-18.99	25	93.18	117.4	103.98	56	176.58	3.18	TPD1800KP~1899KP
	5D-19025-95	●	19-19.99	25	98.35	122.13	109.75	56	181.48	3.35	TPD1900KP~1999KP
	5D-20025-100	●	20-20.99	25	103.53	126.87	115.53	56	186.40	3.53	TPD2000KP~2099KP
	8D-14016-112		14-14.99	16	114.48	132	125.68	48	182.48	2.48	TPD1400KP~1499KP
	8D-15020-120		15-15.99	20	122.65	144.27	134.65	50	196.92	2.65	TPD1500KP~1599KP
	8D-16020-128		16-16.99	20	130.83	152.2	143.63	50	205.03	2.83	TPD1600KP~1699KP
	8D-17020-136		17-17.99	20	139.08	158.35	150.90	50	211.43	3.08	TPD1700KP~1799KP
	8D-18025-144		18-18.99	25	147.18	173.2	159.78	56	232.38	3.18	TPD1800KP~1899KP
	8D-19025-152		19-19.99	25	155.35	181.03	168.65	56	240.38	3.35	TPD1900KP~1999KP
	8D-20025-160		20-20.99	25	163.53	188.87	177.53	56	248.40	3.53	TPD2000KP~2099KP

● : Stock item

Recommended Cutting conditions _ 3D machining

Workpiece				Grade	Cutting speed (m/min)	Feed (Cutting depth: 3D) Feed (mm/rev) for drill diameter (mm)	
ISO			Hardness(HB)			Ø14.00~Ø17.99	Ø18.00~Ø20.99
P	Carbon steel	Low carbon steel	80~120	PC5335	110(80~140)	0.30(0.25~0.35)	0.32(0.27~0.37)
		High carbon steel	180~280	PC5335	90(70~110)		
	Low alloy steel	Low alloy steel	140~260	PC5335	90(70~110)	0.30(0.25~0.35)	0.32(0.27~0.37)
		Low alloy heat treatment steel	200~400	PC5335	70(50~90)		
		High alloy steel	260~320	PC5335	70(50~90)	0.25(0.20~0.30)	0.27(0.22~0.32)
		High alloy heat treatment steel	300~450	PC5335	60(40~80)		
K	Cast iron	Gray cast iron	150-230	PC5335	125(90~160)	0.30(0.25~0.35)	0.32(0.22~0.37)
		Ductile cast iron	160-260	PC5335	110(80~140)		

· In the case of interrupted machining, please reduce the feed rate to 0.1 to 0.15 near the interrupted section.

Recommended Cutting conditions _ 5D machining

Workpiece				Grade	Cutting speed (m/min)	Feed (Cutting depth: 5D) Feed (mm/rev) for drill diameter (mm)	
ISO			Hardness(HB)			Ø14.00~Ø17.99	Ø18.00~Ø20.99
P	Carbon steel	Low carbon steel	80~120	PC5335	110(80~140)	0.30(0.25~0.35)	0.32(0.27~0.37)
		High carbon steel	180~280	PC5335	90(70~110)		
	Low alloy steel	Low alloy steel	140~260	PC5335	90(70~110)	0.30(0.25~0.35)	0.32(0.27~0.37)
		Low alloy heat treatment steel	200~400	PC5335	70(50~90)		
		High alloy steel	260~320	PC5335	70(50~90)	0.25(0.20~0.30)	0.27(0.22~0.32)
		High alloy heat treatment steel	300~450	PC5335	60(40~80)		
K	Cast iron	Gray cast iron	150-230	PC5335	125(90~160)	0.30(0.25~0.35)	0.32(0.22~0.37)
		Ductile cast iron	160-260	PC5335	110(80~140)		

· In the case of interrupted machining, please reduce the feed rate to 0.1 to 0.15 near the interrupted section.

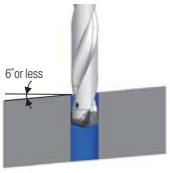
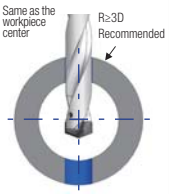
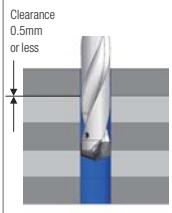
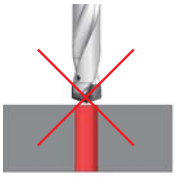
Recommended Cutting conditions _ 8D machining

Workpiece				Grade	Cutting speed (m/min)	Feed (Cutting depth: 8D) Feed (mm/rev) for drill diameter (mm)	
ISO			Hardness(HB)			Ø14.00~Ø17.99	Ø18.00~Ø20.99
P	Carbon steel	Low carbon steel	80~120	PC5335	110(80~140)	0.25(0.20~0.30)	0.27(0.22~0.32)
		High carbon steel	180~280	PC5335	90(70~110)		
	Low alloy steel	Low alloy steel	140~260	PC5335	90(70~110)	0.25(0.20~0.30)	0.27(0.27~0.37)
		Low alloy heat treatment steel	200~400	PC5335	70(50~90)		
		High alloy steel	260~320	PC5335	70(50~90)	0.20(0.15~0.25)	0.22(0.17~0.27)
		High alloy heat treatment steel	300~450	PC5335	60(40~80)		
K	Cast iron	Gray cast iron	150-230	PC5335	125(90~160)	0.25(0.20~0.30)	0.27(0.27~0.37)
		Ductile cast iron	160-260	PC5335	110(80~140)		

· In the case of interrupted machining, please reduce the feed rate to 0.1 to 0.15 near the interrupted section.

· For 8D, we recommend using a pilot drill.

Applicable Machining Types

Designation		○	○	○	○	○	X
		Flat surface	Inclined surface	Curved surface	Cross-hole	Stacked plate	Boring
Machining shape							
Recommended holder		All (8D or less)	5D or less	5D or less	5D or less	5D or less	Not machinable
Cutting speed	Entry (0.2D)	100%					-
	Middle						
	Exit (0.2D)						
Feed	Entry (0.2D)	100%	70%	70%	50%	100%	-
	Middle	100%	100%	100%	100%	100%	-
	Exit (0.2D)	100%	70%	70%	50%	100%	-

※ [Calculation Method for Entry/Exit Sections] Feed reduction section = Drill diameter (D) × 0.2
(Example: When using a Ø14 drill, entry/exit feed reduction distance = 14 × 0.2 = 2.8 mm)

User Guide for Optimal Performance

Tool Management

- Maintaining clean of the clamping surfaces ⟶ Ensures precision and runout stability
- Applying the recommended tightening torque ⟶ Maintains stable clamping force and extends tool life
- Recommended to replace the headless bolt after approximately 10 insert replacements

Equipment and Fixing

- Maintaining runout below 0.03 mm ⟶ Stabilizes quality and tool life
- Ensuring equipment rigidity and securely fix the workpiece ⟶ Suppresses vibration
- By applying high-precision tool holder ⟶ improves machining stability.

Machining Conditions

- Applying the recommended cutting conditions ⟶ Prevents cutting edge from damage and breakage
- Reducing the feed rate during interrupted cutting ⟶ Minimizes impact
- Recommended to utilize a pilot drill when machining beyond 8D

Chip Evacuation and Cooling

- Ensuring smooth chip evacuation ⟶ Prevents tool damage and quality degradation
- Supplying sufficient cutting fluid ⟶ Reduces heat concentration and improves tool life
- Recommended internal coolant with a pressure above 20 bar for machining beyond 8D

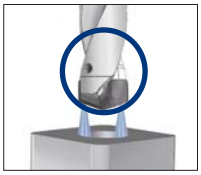
Basic checklist for the Drilling operations

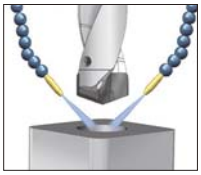
- Workpiece clamping condition
- Spindle rotation status of the machine
- Holder condition
- Clamped drill's Run-out : Max. 0.03 mm
- Coolant supply condition (pressure, flow rate, concentration)
- Chip evacuation condition

Coolant application system

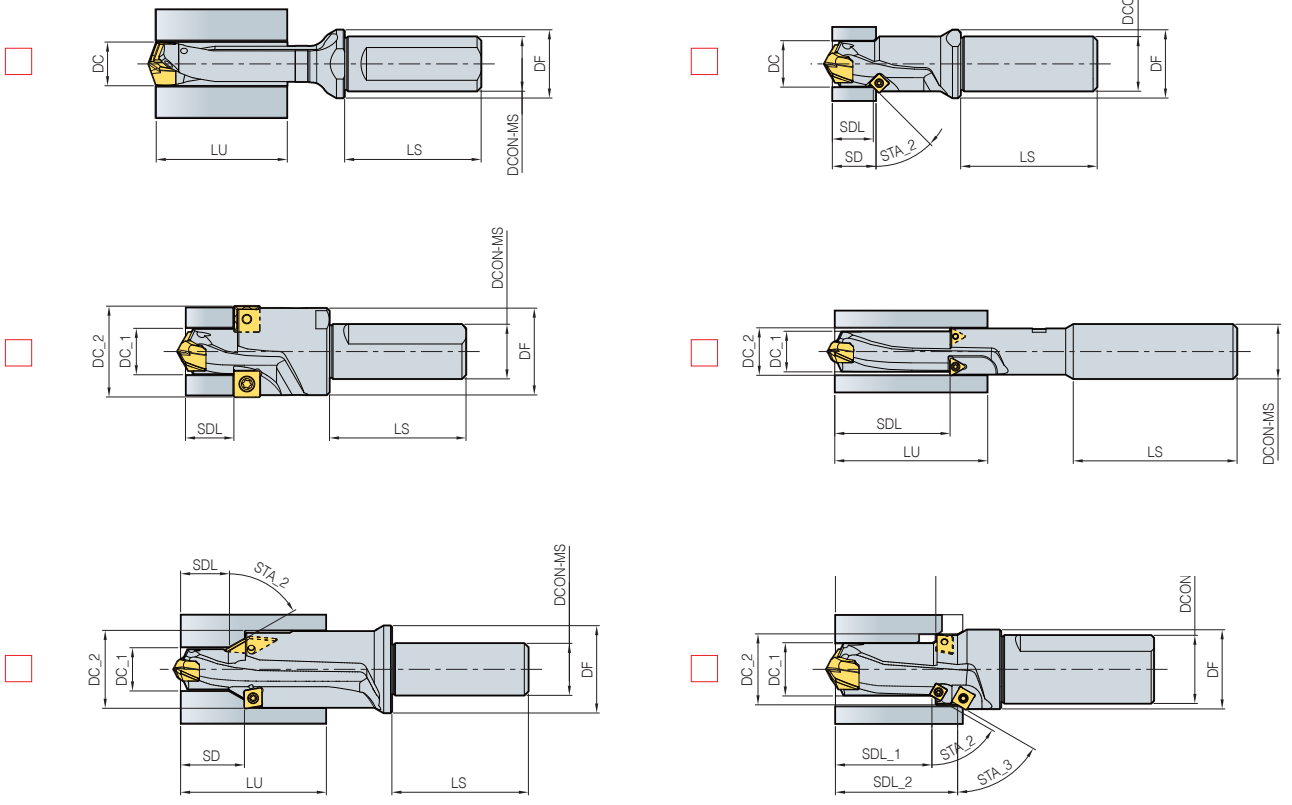
- Adequate supply of cutting fluid at the entrance of the hole
- Minimum cutting fluid pressure : 5 bar or above
- Minimum flow rate : 5L/min or above


[Dry]


[Internal coolant]


[External coolant]

Special Drill Order Form



Tooling type

☐ Blind hole ☐ Through hole

Coolant type

☐ Internal coolant type ☐ External coolant type

Special notes

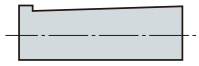
- Current using tool :
- Current operating/machining conditions :
  - n(rpm) or cutting speed, vc(m/min) :
  - Feed rate per minute mm/min or feed per revolution mm/rev :
  - Depth of cut :
- Standard of measuring tool life :
- Currently using machine
  - Machining center :
  - General-purpose lathe :
  - CNC lathe :

Shank type

☐  Plain type

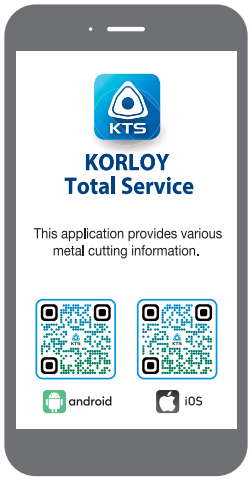
☐  Flat type

☐  Weldon type

☐  Whistle notch type

⚠ For the safe metalcutting

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



KORLOY

Head Office: Holystar B/D, 326, Seocho-daero, Seocho-gu, Seoul, 06633, Republic of 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 / +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 TURKIYE
Ziya Gokalp, Mah. Seyit Onbasi Cad. No:36, 3 Kat,
iC Kapi No : 5 Basaksehir/Istanbul, Turkiye
Tel : +90-212-813-8874 E-mail : sales.ktl@korloy.com

KORLOY RUSSIA
115280, Moscow, vn.ter.g. municipal district Danilovsky,
street Masterkova, house 4, premises 1/2
Tel : +7-495-280-1458 Fax : +7-495-280-1459 E-mail : sales.krc@korloy.com

KORLOY UK
Unit B2, Loades Ecoparc, Blackhorse Road, Exhall CV7 9FW
Tel : +44 7931 085478 E-mail : sales.kul@korloy.com

KORLOY EUROPE
Gablonzer Str. 25-27, 61440 Oberursel, Germany
Tel : +49-6171-27783-0 Fax : +49-6171-27783-59
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 Fax : +55-11-4193-5837
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
Avenida de las Ciencias, No. 3015, Interior 406, Juriquilla Santa Fe,
C.P.76230 Querétaro, Mexico
Tel : +52-442-193-3600 E-mail : sales.kml@korloy.com

KORLOY CENTRAL EUROPE
Unit B03005, Repuloteri ut 2a, Budapest, 1112, Hungary
E-mail : sales.kce@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

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