

DrillLine



TUNGDRILLTWISTED

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Tungaloy Report No. 377-G

Rich line-up of indexable drills for various machining needs



INDUSTRY 4.0
FEED the SPEED!



ACCELERATED MACHINING



DrillLine

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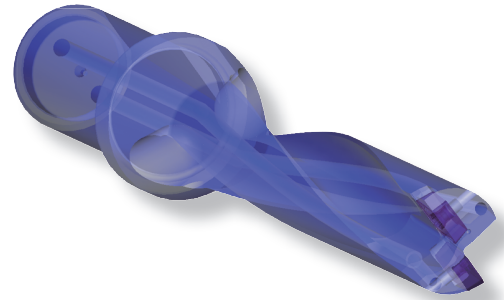
Excellent surface finish and stable chip evacuation due to increased coolant flow with twisted drill body

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Rich line-up of drills

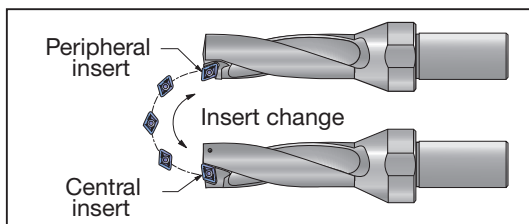
Drill diameter: $\varnothing 12.5 - \varnothing 54.0$ mm

L/D = 2, 3, 4, 5



High stability

Stable machining and reduced tool cost due to parallelogram-shaped insert with 4 cutting edges

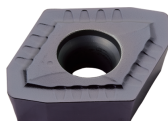


Suitable for various applications

A wide variety of chipbreakers and grades offers high versatility.



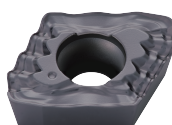
DJ type



DS type



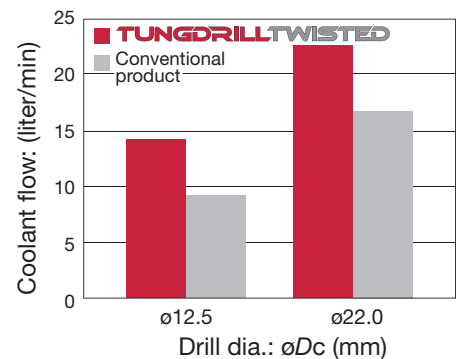
DW type



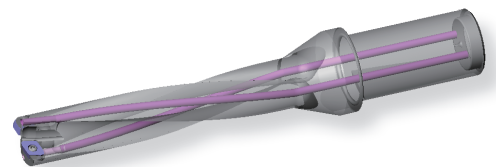
DG type

Excellent chip evacuation

Coolant hole increases coolant flow by 1.5 times, which improves chip evacuation, resulting in excellent surface finish.



Machine : Vertical machining center
Coolant pressure : 2 MPa



Extremely durable drill body

Special tool steel with high hardness increases durability.

New bodies with high rigidity

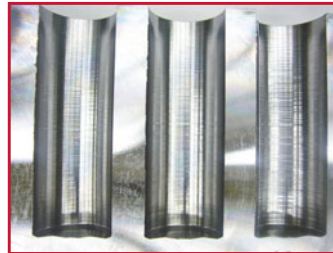
Newly designed drill bodies are added to the series.

- Short overhang length drastically improves its rigidity.
- TORX PLUS® screw enhances clamping force. (Available in tool diameter $\varnothing 12.5$ - $\varnothing 26.0$ mm)

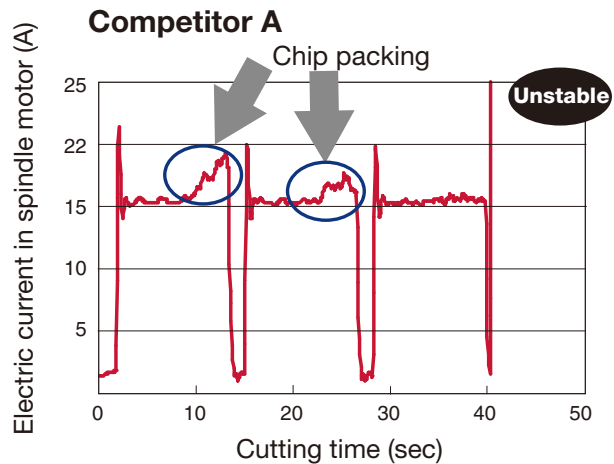
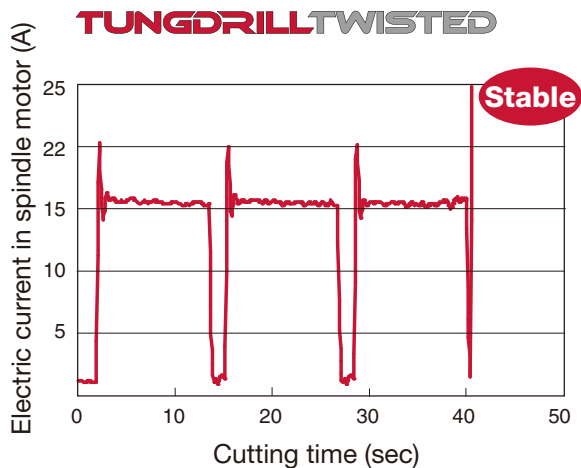
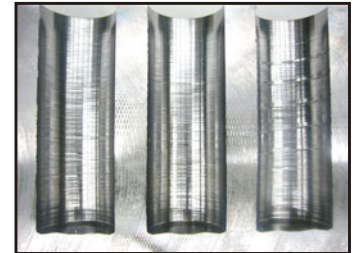
Surface finish with high quality

Drastically increased coolant flow delivers smooth chip evacuation, which improves the stability and efficiency in machining as well as surface finish compared to the conventional products.

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Competitor A



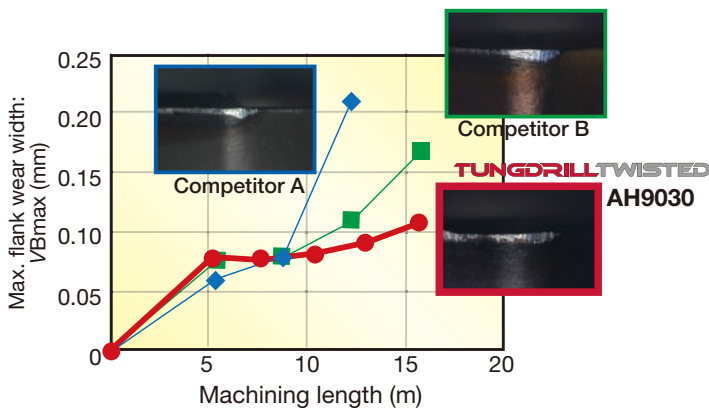
Drill : $\varnothing 22$ mm, L/D = 3
 Workpiece : SCM440 / 42CrMo4
 Cutting speed : $V_c = 180$ m/min
 Feed : $f = 0.13$ mm/rev

Drilling depth : $H = 66$ mm (Blind hole)
 Machine : Vertical M/C
 Coolant : Wet

CUTTING PERFORMANCE

Comparison of tool life measured by damages on the peripheral cutting edge

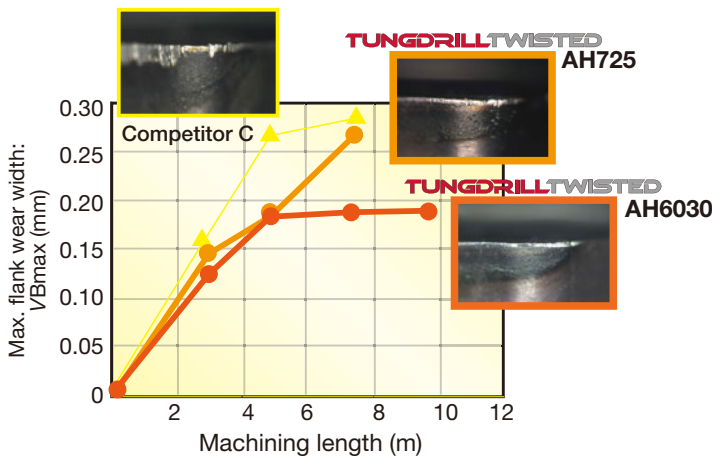
■ High carbon steel



Drill : $\phi 20$ mm, L/D = 3
 Insert : XPMT06X308R-DJ
 Grade : AH9030
 Workpiece : S55C / C55
 Cutting speed : $V_c = 150$ m/min
 Feed : $f = 0.08$ mm/rev
 Drilling depth : $H = 60$ mm
 Coolant : Wet (Internal supply)

- Dramatically improved wear resistance due to thick coating with oxide layer.
- Chipping caused by wear is prevented.

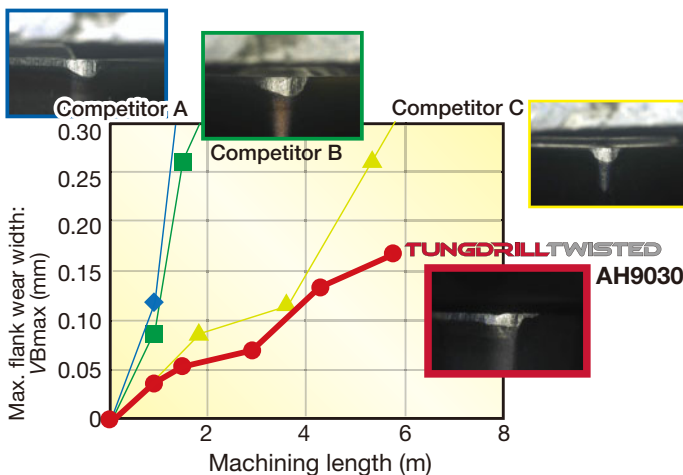
■ Stainless steel



Drill : $\phi 20$ mm, L/D = 3
 Insert : XPMT06X308R-DS
 Grade : AH725 / AH6030
 Workpiece : SUS304 / X5CrNi18-10
 Cutting speed : $V_c = 200$ m/min
 Feed : $f = 0.08$ mm/rev
 Drilling depth : $H = 50$ mm
 Coolant : Wet (Internal supply)

- Improved wear resistance even in high-speed machining.
- No chipping on the edge of AH6030 grade insert due to the strong chipping resistance and improved chip evacuation.

■ Ductile cast iron



Drill : $\phi 20$ mm, L/D = 3
 Insert : XPMT06X308R-DJ
 Grade : AH9030
 Workpiece : FCD600 / 600-3
 Cutting speed : $V_c = 250$ m/min
 Feed : $f = 0.08$ mm/rev
 Drilling depth : $H = 60$ mm
 Coolant : Wet (Internal supply)

- Long tool life even in high-speed machining due to excellent wear resistance delivered by thick coating with oxide layer.

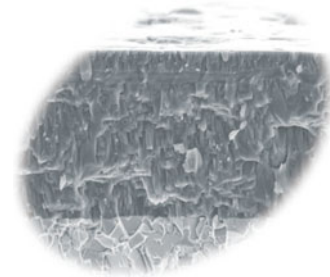
INSERT GRADES

Expansion of new grades for long tool life!

Special Surface Technology

PREMIUMTEC
TUNGALOY

New grades AH9030 and AH6030 achieve long tool life due to thick PVD coating including oxide layer.



AH6030 **P M S H**
Steel Stainless Superalloys Hard Materials

- Smooth insert surface prevents chip welding and improves chip control.
- New PVD coating has adhesion strength, which prevents fracture caused by chip welding.
- Fine-grained carbide substrate prevents sudden damage on edges due to high fracture resistance.

AH9030 **P K**
Steel Cast iron

- Smooth insert surface prevents chip welding and provides good chip flow.
- Newly developed PVD coating with strong resistance to wear and oxidation provides stable, long tool life.
- Carbide substrate with high heat resistance prevents crater wear.

Application	Grade	Substrate			Coating layer		Features
	Application code	Specific gravity	Hardness (HRA)	T.R.S. (GPa)	Main Composition	Thickness (μm)	
P M S H	AH6030	14.4	91.5	3.0	Flash-Coating (Ti,Al)N base	5	Versatile grade for various workpiece materials. Well-balanced between wear and fracture resistance.
	P30 - P40 M30 - M40						
P K	AH9030	14.5	90.8	2.8	Flash-Coating (Ti,Al)N base	5	Suitable for steel and cast iron. Strong resistance to wear, heat, and chipping
	P15 - P35						


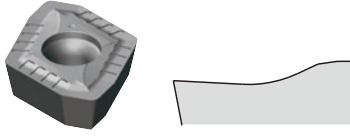

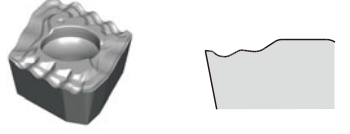
AH725 **P M**
Steel Stainless

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

T1115 **K**
Cast iron











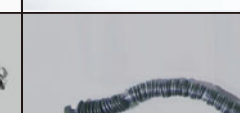


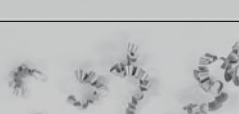


- Strong resistance to wear due to hard carbide substrate and multi-layered compound coating.
- Ideal grade for drilling of cast iron.

CHIPBREAKERS

Chipbreaker Appearance / Cross section	ISO	Features
DJ 	P K N H	Versatile chipbreaker for a wide range of drilling applications. Optimum design reduces cutting force and delivers stable chip control.
DS 	M S	Excellent chip control in machining of gummy materials, such as stainless steel and low carbon steel.
DW 	P K H	Provides better surface finish than conventional inserts even in high-feed machining.
DG 	P M N	Specially designed for chip control in mild steel machining. Prevents long, entangled chips in operations with low cutting speed.

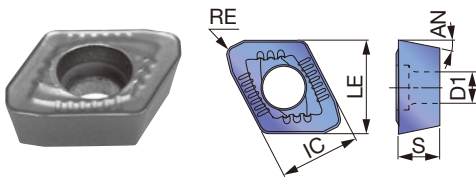
■ Comparison of chip control for various workpiece materials (Drill dia.: ø 22 mm, Vertical M/C)

TungdrillTwisted with excellent chipbreakers delivers good chip control in machining various workpiece materials.

Workpiece material	P SCM440 / 42CrMo4	M SUS304 / X5CrNi18-10	P SS400 / st42-1	P S55C / C55
Cutting Speed Feed	Vc = 100 m/min f = 0.1 mm/rev	Vc = 150 m/min f = 0.12 mm/rev	Vc = 80 m/min f = 0.08 mm/rev	Vc = 200 m/min f = 0.2 mm/rev
TUNGDRILLTWISTED	Central Good  DJ type	 DS type	 DG type	 DW type
	Peripheral 			
Competitor A	Central 	Unstable 		
	Peripheral 			

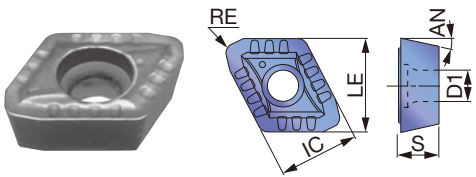
INSERTS

DJ



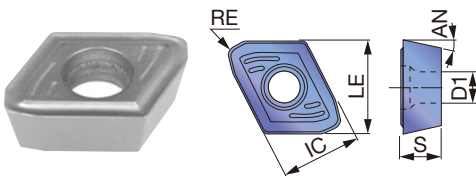
Designation	Coated				IC	LE	S	D1	RE	DC
	AH9030	AH6030	AH725	T1115						
XPMT040104R-DJ	●	●	●	●	4.3	4.5	1.59	2.3	0.4	ø12.5 - ø14.5
XPMT050204R-DJ	●	●	●	●	5.2	5.4	2.38	2.3	0.4	ø15 - ø17
XPMT06X308R-DJ	●	●	●	●	6	7	3.15	2.5	0.8	ø17.5 - ø21.5
XPMT07H308R-DJ	●	●	●	●	7	8.2	3.6	2.8	0.8	ø22 - ø26
XPMT08T308R-DJ	●	●	●	●	8.5	9.9	3.97	3.4	0.8	ø27 - ø32
XPMT110412R-DJ	●	●	●	●	11.2	12.5	4.76	4.4	1.2	ø33 - ø41
XPMT150512R-DJ	●	●	●	●	15	16.1	5.56	5.5	1.2	ø42 - ø54

DS



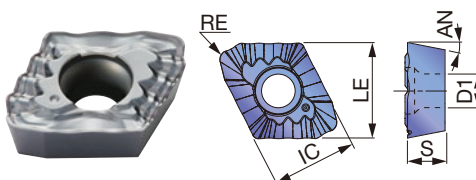
Designation	Coated		IC	LE	S	D1	RE	DC
	AH6030	AH725						
XPMT040104R-DS	●	●	4.3	4.5	1.59	2.3	0.4	ø12.5 - ø14.5
XPMT050204R-DS	●	●	5.2	5.4	2.38	2.3	0.4	ø15 - ø17
XPMT06X308R-DS	●	●	6	7	3.15	2.5	0.8	ø17.5 - ø21.5
XPMT07H308R-DS	●	●	7	8.2	3.6	2.8	0.8	ø22 - ø26
XPMT08T308R-DS	●	●	8.5	9.9	3.97	3.4	0.8	ø27 - ø32
XPMT110412R-DS	●	●	11.2	12.5	4.76	4.4	1.2	ø33 - ø41
XPMT150512R-DS	●	●	15	16.1	5.56	5.5	1.2	ø42 - ø54

DW



Designation	Coated			IC	LE	S	D1	RE	DC
	AH9030	AH6030	AH725						
XPMT040104R-DW	●	●	●	4.3	4.5	1.59	2.3	0.4	ø12.5 - ø14.5
XPMT050204R-DW	●	●	●	5.2	5.4	2.38	2.3	0.4	ø15 - ø17
XPMT06X308R-DW	●	●	●	6	7	3.15	2.5	0.8	ø17.5 - ø21.5
XPMT07H308R-DW	●	●	●	7	8.2	3.6	2.8	0.8	ø22 - ø26
XPMT08T308R-DW	●	●	●	8.5	9.9	3.97	3.4	0.8	ø27 - ø32
XPMT110412R-DW	●	●	●	11.2	12.5	4.76	4.4	1.2	ø33 - ø41
XPMT150512R-DW	●	●	●	15	16.1	5.56	5.5	1.2	ø42 - ø54

DG

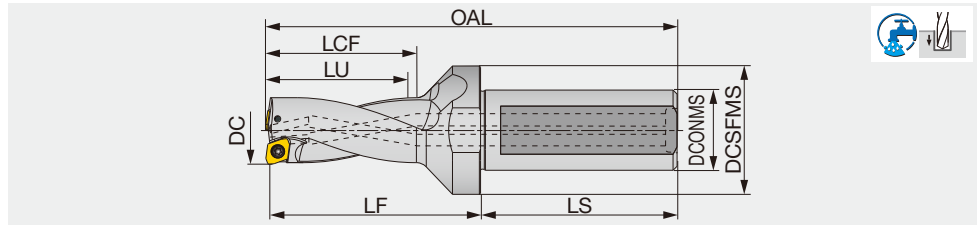


Designation	Coated	IC	LE	S	D1	RE	DC
	AH725						
XPMT08T308R-DG	●	8.5	9.9	3.97	3.4	0.8	ø27 - ø32
XPMT110412R-DG	●	11.2	12.5	4.76	4.4	1.2	ø33 - ø41
XPMT150512R-DG	●	15	16.1	5.56	5.5	1.2	ø42 - ø54

●: Stocked items

TDX-F L/D=2

L/D = 2, flat, tool diameter $\phi 12.5 - \phi 54$ mm



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

Designation	DC	DCONMS	DCSFMS	LU	LS	LCF	LF	OAL	Max. offset (radial)	WT(kg)	Insert
TDX410F40-2	41	40	50	83.1	69	87.7	117.6	187.7	0.2	1.5	XPMT110412R-D*
TDX420F40-2	42	40	55	85.6	69	90.6	120	190.6	3.1	1.6	XPMT150512R-D*
TDX430F40-2	43	40	55	87.6	69	92.6	123	193.6	2.9	1.6	XPMT150512R-D*
TDX440F40-2	44	40	55	89.6	69	94.6	125	195.6	2.6	1.7	XPMT150512R-D*
TDX450F40-2	45	40	55	91.6	69	96.6	128	198.6	2.3	1.7	XPMT150512R-D*
TDX460F40-2	46	40	55	93.6	69	98.6	131	201.6	2.1	1.8	XPMT150512R-D*
TDX470F40-2	47	40	55	95.6	69	100.6	133	203.6	1.8	1.9	XPMT150512R-D*
TDX480F40-2	48	40	55	97.6	69	102.6	136	206.6	1.5	1.9	XPMT150512R-D*
TDX490F40-2	49	40	55	99.6	69	104.6	138	208.6	1.3	1.9	XPMT150512R-D*
TDX500F40-2	50	40	55	101.6	69	106.6	141	211.6	1	2	XPMT150512R-D*
TDX510F40-2	51	40	55	103.6	69	108.6	145	215.6	0.7	2.1	XPMT150512R-D*
TDX520F40-2	52	40	55	105.6	69	110.6	147	217.6	0.5	2.2	XPMT150512R-D*
TDX530F40-2	53	40	55	107.6	69	112.6	150	220.6	-	2.3	XPMT150512R-D*
TDX540F40-2	54	40	55	109.6	69	114.6	152	222.6	-	2.4	XPMT150512R-D*

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

SPARE PARTS



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

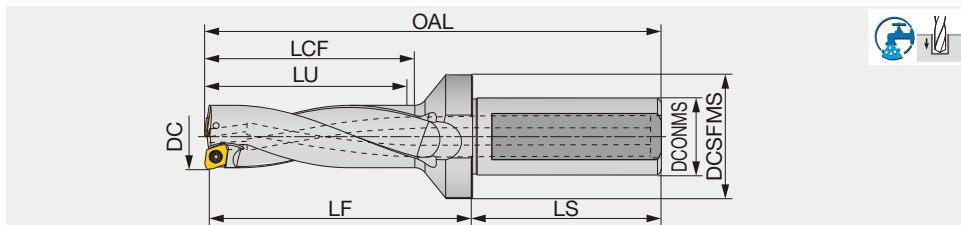
*Torque: Recommended torque (N·m) for clamping.
 CSPB-2H/CSPB-2L043=0.7,
 CSPB-2.2=1, CSPB-2.5=1.3, CSTB-3=2.3,
 CSTB-4=3.5, CSTB-5=5

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TDX-F L/D=3

L/D = 3, flat, tool diameter $\phi 12.5 - \phi 54$ mm



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

Designation	DC	DCONMS	DCSFMS	LU	LS	LCF	LF	OAL	Max. offset (radial)	WT(kg)	Insert
TDX410F40-3	41	40	50	124.1	69	128.7	157.6	227.7	0.2	1.7	XPMT110412R-D*
TDX420F40-3	42	40	55	127.6	69	132.6	161	231.6	3.1	1.8	XPMT150512R-D*
TDX430F40-3	43	40	55	130.6	69	135.6	165	235.6	2.9	1.8	XPMT150512R-D*
TDX440F40-3	44	40	55	133.6	69	138.6	168	238.6	2.6	1.9	XPMT150512R-D*
TDX450F40-3	45	40	55	136.6	69	141.6	173	243.6	2.3	2	XPMT150512R-D*
TDX460F40-3	46	40	55	139.6	69	144.6	177	247.6	2.1	2.1	XPMT150512R-D*
TDX470F40-3	47	40	55	142.6	69	147.6	180	250.6	1.8	2.2	XPMT150512R-D*
TDX480F40-3	48	40	55	145.6	69	150.6	184	254.6	1.5	2.3	XPMT150512R-D*
TDX490F40-3	49	40	55	148.6	69	153.6	187	257.6	1.3	2.3	XPMT150512R-D*
TDX500F40-3	50	40	55	151.6	69	156.6	191	261.6	1	2.4	XPMT150512R-D*
TDX510F40-3	51	40	55	154.6	69	159.6	195	265.6	0.7	2.5	XPMT150512R-D*
TDX520F40-3	52	40	55	157.6	69	162.6	198	268.6	0.5	2.6	XPMT150512R-D*
TDX530F40-3	53	40	55	160.6	69	165.6	202	272.6	-	2.7	XPMT150512R-D*
TDX540F40-3	54	40	55	163.6	69	168.6	205	275.6	-	2.9	XPMT150512R-D*

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

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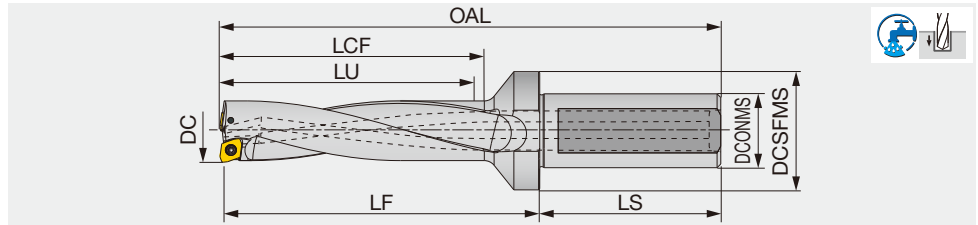
Designation	Clamping screw	Wrench
TDX125 - 145	CSPB-2H	IP-6DB
TDX150 - 170	CSPB-2L043	IP-6DB
TDX175 - 215	CSPB-2.2	IP-7D
TDX220 - 260	CSPB-2.5	IP-8D
TDX270 - 320	CSTB-3	T-9D
TDX330 - 410	CSTB-4	T-15D
TDX420 - 540	CSTB-5	T-20D

*Torque: Recommended torque (N·m) for clamping.

CSPB-2H/CSPB-2L043=0.7,
CSPB-2.2=1, CSPB-2.5=1.3, CSTB-3=2.3,
CSTB-4=3.5, CSTB-5=5

TDX-F L/D=4

L/D = 4, flat, tool diameter $\phi 12.5 - \phi 54$ mm



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

Designation	DC	DCONMS	DCSFMS	LU	LS	LCF	LF	OAL	Max. offset (radial)	WT(kg)	Insert
TDX410F40-4	41	40	50	165.1	69	169.1	198	268.1	0.2	1.9	XPMT110412R-D*
TDX420F40-4	42	40	55	169.6	69	173.6	202	272.6	3.1	2	XPMT150512R-D*
TDX430F40-4	43	40	55	173.6	69	177.6	207	277.6	2.9	2	XPMT150512R-D*
TDX440F40-4	44	40	55	177.6	69	181.6	211	281.6	2.6	2.1	XPMT150512R-D*
TDX450F40-4	45	40	55	181.6	69	185.6	217	287.6	2.3	2.3	XPMT150512R-D*
TDX460F40-4	46	40	55	185.6	69	189.6	222	292.6	2.1	2.4	XPMT150512R-D*
TDX470F40-4	47	40	55	189.6	69	193.6	226	296.6	1.8	2.5	XPMT150512R-D*
TDX480F40-4	48	40	55	193.6	69	197.6	231	301.6	1.5	2.7	XPMT150512R-D*
TDX490F40-4	49	40	55	197.6	69	201.6	235	305.6	1.3	2.7	XPMT150512R-D*
TDX500F40-4	50	40	55	201.6	69	205.6	240	310.6	1	2.8	XPMT150512R-D*
TDX510F40-4	51	40	55	205.6	69	209.6	245	315.6	0.7	2.9	XPMT150512R-D*
TDX520F40-4	52	40	55	209.6	69	213.6	249	319.6	0.5	3	XPMT150512R-D*
TDX530F40-4	53	40	55	213.6	69	217.6	254	324.6	-	3.1	XPMT150512R-D*
TDX540F40-4	54	40	55	217.6	69	221.6	258	328.6	-	3.4	XPMT150512R-D*

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

SPARE PARTS



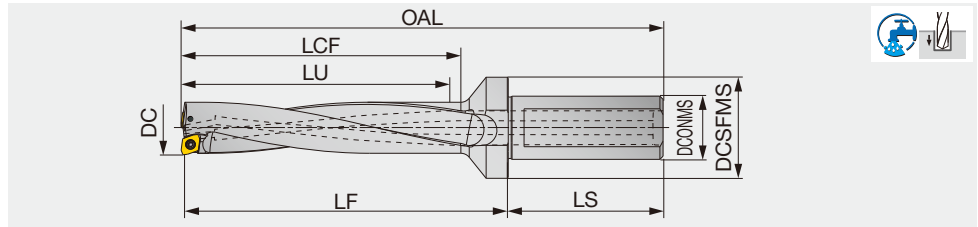
Designation	Clamping screw	Wrench
TDX125 - 145	CSPB-2H	IP-6DB
TDX150 - 170	CSPB-2L043	IP-6DB
TDX175 - 215	CSPB-2.2	IP-7D
TDX220 - 260	CSPB-2.5	IP-8D
TDX270 - 320	CSTB-3	T-9D
TDX330 - 410	CSTB-4	T-15D
TDX420 - 540	CSTB-5	T-20D

*Torque: Recommended torque (N·m) for clamping.

CSPB-2H/CSPB-2L043=0.7,
CSPB-2.2=1, CSPB-2.5=1.3, CSTB-3=2.3,
CSTB-4=3.5, CSTB-5=5

TDX-F L/D=5

L/D = 5, flat, tool diameter $\phi 12.5 - \phi 54$ mm



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

Designation	DC	DCONMS	DCSFMS	LU	LS	LCF	LF	OAL	Max. offset (radial)	WT(kg)	Insert
TDX410F40-5	41	40	50	206.1	69	210.1	239	309.1	0.2	2.1	XPMT110412R-D*
TDX420F40-5	42	40	55	211.6	69	215.6	244	314.6	3.1	2.2	XPMT150512R-D*
TDX430F40-5	43	40	55	216.6	69	220.6	250	320.6	2.9	2.2	XPMT150512R-D*
TDX440F40-5	44	40	55	221.6	69	225.6	255	325.6	2.6	2.3	XPMT150512R-D*
TDX450F40-5	45	40	55	226.6	69	230.6	262	332.6	2.3	2.6	XPMT150512R-D*
TDX460F40-5	46	40	55	231.6	69	235.6	268	338.6	2.1	2.7	XPMT150512R-D*
TDX470F40-5	47	40	55	236.6	69	240.6	273	343.6	1.8	2.8	XPMT150512R-D*
TDX480F40-5	48	40	55	241.6	69	245.6	279	349.6	1.5	3.1	XPMT150512R-D*
TDX490F40-5	49	40	55	246.6	69	250.6	284	354.6	1.3	3.1	XPMT150512R-D*
TDX500F40-5	50	40	55	251.6	69	255.6	290	360.6	1	3.2	XPMT150512R-D*
TDX510F40-5	51	40	55	256.6	69	260.6	296	366.6	0.7	3.3	XPMT150512R-D*
TDX520F40-5	52	40	55	261.6	69	265.6	301	371.6	0.5	3.4	XPMT150512R-D*
TDX530F40-5	53	40	55	266.6	69	270.6	307	377.6	-	3.5	XPMT150512R-D*
TDX540F40-5	54	40	55	271.6	69	275.6	312	382.6	-	3.9	XPMT150512R-D*

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

SPARE PARTS

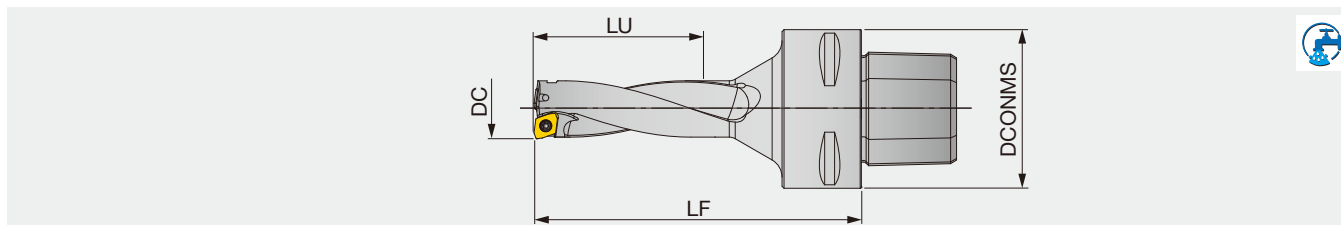


Designation	Clamping screw	Wrench
TDX125 - 145	CSPB-2H	IP-6DB
TDX150 - 170	CSPB-2L043	IP-6DB
TDX175 - 215	CSPB-2.2	IP-7D
TDX220 - 260	CSPB-2.5	IP-8D
TDX270 - 320	CSTB-3	T-9D
TDX330 - 410	CSTB-4	T-15D
TDX420 - 540	CSTB-5	T-20D

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

C-TDX

Drill



Designation	DC	DCONMS	LU	LF	Max. offset (radial)	Insert
C4TDX150L082-3	15	40	45	82	0.9	XPMT050204R-D*
C4TDX200L101-3	20	40	60	101	0.5	XPMT06X308R-D*
C4TDX250L125-3	25	40	75	125	0.4	XPMT07H308R-D*
C4TDX300L139-3	30	40	90	139	0.7	XPMT08T308R-D*
C6TDX200L101-3	20	63	60	101	0.5	XPMT06X308R-D*
C6TDX250L121-3	25	63	75	121	0.4	XPMT07H308R-D*
C6TDX300L139-3	30	63	90	139	0.7	XPMT08T308R-D*
C6TDX350L159-3	35	63	105	159	1.8	XPMT110412R-D*
C6TDX400L177-3	40	63	120	177	0.5	XPMT110412R-D*

SPARE PARTS



Designation	Clamping screw	Wrench
C4TDX150L082-3	CSPB-2L043	IP-6DB
C4TDX200L101-3	CSPB-2.2	IP-6DB
C4TDX250L125-3	CSPB-2.5	IP-8D
C4TDX300L139-3	CSTB-3	T-9D
C6TDX200L101-3	CSPB-2.2	IP-7D
C6TDX250L121-3	CSPB-2.5	IP-8D
C6TDX300L139-3	CSTB-3	T-9D
C6TDX350L159-3	CSTB-4	T-15D
C6TDX400L177-3	CSTB-4	T-15D

RECOMMENDED INSERTS

ISO	Workpiece materials	First choice	High feed	High speed	Troubleshooting			
					Chipping resistance	Wear resistance	Surface finish	Chip control
P	Low carbon steel (C ≤ 0.3%)	DS, AH6030	-	-	DS, AH725	-	DW, AH6030	DG, AH725
	Carbon steel (C > 0.3%) Alloy steels	DJ, AH6030	DW, AH6030	DJ, AH9030	DW, AH725	DJ, AH9030	DW, AH6030	-
	Low alloy steel	DS, AH6030	-	-	DS, AH725	-	DW, AH6030	-
M	Stainless steel	DS, AH6030	-	-	DS, AH725	-	DW, AH6030	DG, AH725
K	Grey cast iron	DJ, AH9030	DW, AH9030	DJ, T1115	DW, AH725	-	DW, AH9030	-
	Ductile cast iron	DJ, AH9030	DW, AH9030	-	DW, AH725	-	DW, AH9030	-
N	Aluminium alloys	DJ, AH725	DW, AH725	DS, AH6030	-	-	DW, AH725	DG, AH725
S	Titanium alloys Heat-resistant alloys	DS, AH6030	-	-	DW, AH725	-	DW, AH725	DG, AH725
H	Hardened steel	DJ, AH9030	DW, AH9030	-	DW, AH725	-	DW, AH9030	-

STANDARD CUTTING CONDITIONS

ISO	Workpiece materials	Cutting speed Vc (m/min)	Series L/D	Feed: f (mm/rev)				
				ø12.5 ~ ø14.5	ø15 ~ ø17	ø17.5 ~ ø26	ø27 ~ ø32	ø33 ~ ø54
P	Low carbon steel (C ≤ 0.3%) SS400, SM490, S25C, etc. (St42-1, St52-3, C25, etc.)	160 - 320	2D, 3D	0.02 - 0.06	0.02 - 0.06	0.04 - 0.1	0.04 - 0.1	0.04 - 0.1
			4D, 5D	0.02 - 0.06	0.02 - 0.06	0.04 - 0.1	0.04 - 0.1	0.04 - 0.1
	Carbon steel (C > 0.3%) S45C, S55C, etc. (C45, C55, etc.)	80 - 250	2D, 3D	0.04 - 0.1	0.04 - 0.12	0.06 - 0.13	0.06 - 0.15	0.08 - 0.18
			4D, 5D	0.04 - 0.08	0.04 - 0.08	0.06 - 0.1	0.06 - 0.12	0.08 - 0.14
M	Low alloy steel SCM415, etc.	160 - 250	2D, 3D	0.04 - 0.08	0.04 - 0.08	0.06 - 0.12	0.06 - 0.12	0.06 - 0.14
			4D, 5D	0.04 - 0.08	0.04 - 0.08	0.06 - 0.12	0.06 - 0.12	0.06 - 0.14
	Alloy steel SCM440, SCr420, etc. (42CrMo4, 20Cr4, etc.)	80 - 200	2D, 3D	0.04 - 0.1	0.04 - 0.12	0.06 - 0.13	0.06 - 0.15	0.08 - 0.18
			4D, 5D	0.04 - 0.08	0.04 - 0.08	0.06 - 0.1	0.06 - 0.12	0.08 - 0.14
K	Stainless steel (Austenitic) SUS304, SUS316, etc. (X5CrNi18-9, X5CrNiMo17-12-2, etc.)	100 - 200	2D, 3D	0.02 - 0.08	0.02 - 0.08	0.04 - 0.1	0.04 - 0.12	0.04 - 0.12
			4D, 5D	0.02 - 0.08	0.02 - 0.08	0.04 - 0.1	0.04 - 0.12	0.04 - 0.12
	Stainless steel (Martensitic, Ferritic) SUS430, SUS416, etc. (X5CrNi18-9, X5CrNiMo17-12-2, etc.)	100 - 220	2D, 3D	0.02 - 0.08	0.02 - 0.08	0.04 - 0.1	0.04 - 0.12	0.04 - 0.12
4D, 5D			0.02 - 0.08	0.02 - 0.08	0.04 - 0.1	0.04 - 0.12	0.04 - 0.12	
N	Stainless steel (Precipitation hardening) SUS630, etc. (X5CrNiCuNb16-4, etc.)	80 - 120	2D, 3D	0.04 - 0.08	0.04 - 0.08	0.04 - 0.08	0.04 - 0.1	0.06 - 0.1
			4D, 5D	0.04 - 0.08	0.04 - 0.08	0.04 - 0.08	0.04 - 0.1	0.06 - 0.1
S	Grey cast iron FC250, etc. (GG25, etc.)	80 - 250	2D, 3D	0.06 - 0.12	0.06 - 0.12	0.06 - 0.15	0.06 - 0.18	0.08 - 0.2
			4D, 5D	0.06 - 0.1	0.06 - 0.1	0.06 - 0.12	0.06 - 0.14	0.08 - 0.16
H	Ductile cast iron FCD700, etc. (GGG70, etc.)	80 - 200	2D, 3D	0.04 - 0.12	0.04 - 0.12	0.06 - 0.15	0.06 - 0.18	0.08 - 0.2
			4D, 5D	0.04 - 0.1	0.04 - 0.1	0.06 - 0.12	0.06 - 0.14	0.08 - 0.16
N	Aluminium alloys A2017, ADC12, etc.	200 - 400	2D, 3D	0.1 - 0.12	0.1 - 0.15	0.15 - 0.2	0.15 - 0.2	0.15 - 0.25
			4D, 5D	0.08 - 0.12	0.08 - 0.12	0.12 - 0.16	0.12 - 0.16	0.12 - 0.2
S	Heat-resistant alloys Inconel 718, etc.	20 - 60	2D, 3D	0.04 - 0.08	0.04 - 0.08	0.04 - 0.1	0.04 - 0.1	0.04 - 0.1
			4D, 5D	0.04 - 0.08	0.04 - 0.08	0.04 - 0.1	0.04 - 0.1	0.04 - 0.1
H	Titanium alloys Ti-6Al-4V, etc.	40 - 120	2D, 3D	0.06 - 0.1	0.06 - 0.1	0.06 - 0.12	0.06 - 0.12	0.06 - 0.12
			4D, 5D	0.06 - 0.08	0.06 - 0.08	0.06 - 0.1	0.06 - 0.1	0.06 - 0.1
H	Hardened steel ≥ 40HRC	40 - 100	2D, 3D	0.04 - 0.08	0.04 - 0.08	0.04 - 0.1	0.04 - 0.1	0.04 - 0.1
			4D, 5D	0.04 - 0.08	0.04 - 0.08	0.04 - 0.08	0.04 - 0.08	0.04 - 0.08

STANDARD CUTTING CONDITIONS FOR DG TYPE CHIPBREAKER

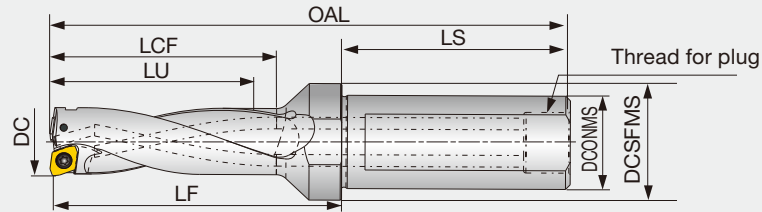
ISO	Workpiece materials	Cutting speed Vc (m/min)	Series L/D	Feed: f (mm/rev)	
				ø27 ~ ø32	ø33 ~ ø54
P	Low carbon steel (C ≤ 0.3%) SS400, SM490, S25C, etc. (st42-1, St52-3, C25, etc.)	60 - 180	2D, 3D 4D, 5D	0.04 - 0.1	

- For small drill diameters, lower feed rate should be applied.
 - In case of workpiece materials with hardness of more than 40 HRC, the feed rate should be less than 50% of the recommended feed.
 - For difficult-to-cut materials, such as heat-resistant alloys, that generate high volume of cutting heat during machining, the cutting speed should be less than 20% of the recommended value for carbon steel.

- For high-feed machining with DW type chipbreaker, the feed rate should be approximately 1.5 times higher than the standard rate shown above.
 - High-speed machining applies to operation with the cutting speed more than 150 m/min.
 - When using DW type chipbreaker for troubleshooting, the operation should be within the range of standard cutting conditions.
 - DG type chipbreaker is suitable for large-sized machines with low-RPM spindle. If chattering occurs, the feed rate should be lowered.

TDX-F**J L/D = 2 (With back port)

L/D = 2, flat, tool diameter $\phi 12.5 - \phi 32$ mm



Designation	DC	DCONMS	DCSFMS	LU	LS	LCF	LF	OAL	Max. offset (radial)	WT(kg)	Insert
TDX125F20J-2	12.5	20	25	25.4	49	28.4	41	90.4	0.8	0.2	XPMT040104R-D*
TDX130F20J-2	13	20	25	26.4	49	29.4	42	91.4	0.7	0.2	XPMT040104R-D*
TDX135F20J-2	13.5	20	25	27.4	49	30.4	43	92.4	0.6	0.2	XPMT040104R-D*
TDX140F20J-2	14	20	25	28.4	49	31.4	44	93.4	0.5	0.2	XPMT040104R-D*
TDX145F20J-2	14.5	20	25	29.4	49	32.4	46	95.4	0.4	0.2	XPMT040104R-D*
TDX150F20J-2	15	20	25	30.4	49	33.4	47	96.4	0.9	0.2	XPMT050204R-D*
TDX155F20J-2	15.5	20	32	31.4	49	34.4	49	98.4	0.8	0.2	XPMT050204R-D*
TDX160F20J-2	16	20	32	32.4	49	35.4	51	100.4	0.6	0.2	XPMT050204R-D*
TDX165F20J-2	16.5	20	32	33.4	49	36.4	52	101.4	0.5	0.2	XPMT050204R-D*
TDX170F20J-2	17	20	32	34.4	49	37.4	53	102.4	0.4	0.2	XPMT050204R-D*
TDX175F25J-2	17.5	25	32	35.5	54	38.5	55	109.5	1.2	0.3	XPMT06X308R-D*
TDX180F25J-2	18	25	32	36.5	54	39.5	56	110.5	1.1	0.3	XPMT06X308R-D*
TDX185F25J-2	18.5	25	32	37.5	54	40.5	57	111.5	0.9	0.3	XPMT06X308R-D*
TDX190F25J-2	19	25	32	38.5	54	41.5	58	112.5	0.8	0.3	XPMT06X308R-D*
TDX195F25J-2	19.5	25	32	39.5	54	42.5	60	114.5	0.7	0.3	XPMT06X308R-D*
TDX200F25J-2	20	25	32	40.5	54	45.5	61	115.5	0.5	0.3	XPMT06X308R-D*
TDX205F25J-2	20.5	25	32	41.5	54	46.5	62.5	117	0.4	0.3	XPMT06X308R-D*
TDX210F25J-2	21	25	32	42.5	54	47.5	64	118.5	0.3	0.3	XPMT06X308R-D*
TDX215F25J-2	21.5	25	32	43.5	54	48.5	65	119.5	0.2	0.3	XPMT06X308R-D*
TDX220F25J-2	22	25	32	44.6	54	49.6	66	120.6	1.2	0.3	XPMT07H308R-D*
TDX225F25J-2	22.5	25	37	45.6	54	50.6	67.5	122.1	1.1	0.3	XPMT07H308R-D*
TDX230F25J-2	23	25	37	46.6	54	51.6	69	123.6	0.9	0.4	XPMT07H308R-D*
TDX235F25J-2	23.5	25	37	47.6	54	52.6	70	124.6	0.8	0.4	XPMT07H308R-D*
TDX240F25J-2	24	25	37	48.6	54	53.6	71	125.6	0.7	0.4	XPMT07H308R-D*
TDX245F25J-2	24.5	25	37	49.6	54	54.6	72.5	127.1	0.5	0.4	XPMT07H308R-D*
TDX250F25J-2	25	25	37	50.6	54	55.6	74	128.6	0.4	0.4	XPMT07H308R-D*
TDX255F25J-2	25.5	25	37	51.6	54	56.6	75.5	130.1	0.3	0.4	XPMT07H308R-D*
TDX260F25J-2	26	25	37	52.6	54	57.6	77	131.6	0.2	0.4	XPMT07H308R-D*
TDX270F32J-2	27	32	40	54.7	59	59.7	79	138.7	1.5	0.6	XPMT08T308R-D*
TDX280F32J-2	28	32	40	56.7	59	61	82.3	142	1.2	0.6	XPMT08T308R-D*
TDX290F32J-2	29	32	40	58.7	59	63	84.3	144	1	0.7	XPMT08T308R-D*
TDX300F32J-2	30	32	40	60.7	59	65	87.3	147	0.7	0.7	XPMT08T308R-D*
TDX310F32J-2	31	32	40	62.7	59	67	90.3	150	0.4	0.7	XPMT08T308R-D*
TDX320F32J-2	32	32	40	64.7	59	69	92.3	152	0.2	0.8	XPMT08T308R-D*

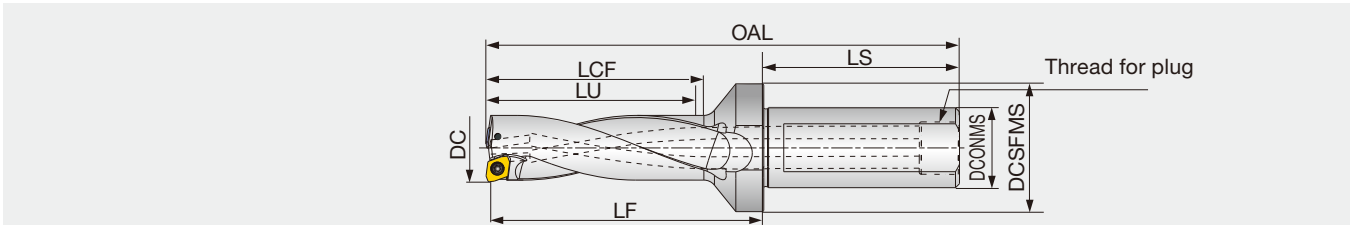
SPARE PARTS

Designation	Clamping screw	Wrench	Plug
TDX125F - 145F	CSPB-2H	IP-6DB	SL20M
TDX150F - 170F	CSPB-2L043	IP-6DB	SL20M
TDX175F - 215F	CSPB-2.2	IP-7D	SL25M
TDX220F - 260F	CSPB-2.5	IP-8D	SL25M
TDX270F - 320F	CSTB-3	T-9D	SL32M

* The above items are made-to-order products.

TDX-F**J L/D = 3 (With back port)

L/D = 3, flat, tool diameter $\phi 12.5 - \phi 32$ mm



Designation	DC	DCONMS	DCSFMS	LU	LS	LCF	LF	OAL	Max. offset (radial)	WT(kg)	Insert
TDX125F20J-3	12.5	20	25	37.9	49	40.9	53	102.4	0.8	0.2	XPMT040104R-D*
TDX130F20J-3	13	20	25	39.4	49	42.4	55	104.4	0.7	0.2	XPMT040104R-D*
TDX135F20J-3	13.5	20	25	40.9	49	43.9	56	105.4	0.6	0.2	XPMT040104R-D*
TDX140F20J-3	14	20	25	42.4	49	45.4	58	107.4	0.5	0.2	XPMT040104R-D*
TDX145F20J-3	14.5	20	25	43.9	49	46.9	60	109.4	0.4	0.2	XPMT040104R-D*
TDX150F20J-3	15	20	25	45.4	49	48.4	62	111.4	0.9	0.2	XPMT050204R-D*
TDX155F20J-3	15.5	20	32	46.9	49	49.9	64	113.4	0.8	0.2	XPMT050204R-D*
TDX160F20J-3	16	20	32	48.4	49	51.4	66	115.4	0.6	0.2	XPMT050204R-D*
TDX165F20J-3	16.5	20	32	49.9	49	52.9	68	117.4	0.5	0.2	XPMT050204R-D*
TDX170F20J-3	17	20	32	51.4	49	54.4	69	118.4	0.4	0.2	XPMT050204R-D*
TDX175F25J-3	17.5	25	32	53	54	56	72	126.5	1.2	0.3	XPMT06X308R-D*
TDX180F25J-3	18	25	32	54.5	54	57.5	73	127.5	1.1	0.3	XPMT06X308R-D*
TDX185F25J-3	18.5	25	32	56	54	59	75	129.5	0.9	0.3	XPMT06X308R-D*
TDX190F25J-3	19	25	32	57.5	54	60.5	76	130.5	0.8	0.3	XPMT06X308R-D*
TDX195F25J-3	19.5	25	32	59	54	62	79	133.5	0.7	0.3	XPMT06X308R-D*
TDX200F25J-3	20	25	32	60.5	54	65.5	81	135.5	0.5	0.3	XPMT06X308R-D*
TDX205F25J-3	20.5	25	32	62	54	67	82	136.5	0.4	0.3	XPMT06X308R-D*
TDX210F25J-3	21	25	32	63.5	54	68.5	84	138.5	0.3	0.3	XPMT06X308R-D*
TDX215F25J-3	21.5	25	32	65	54	70	86	140.5	0.2	0.4	XPMT06X308R-D*
TDX220F25J-3	22	25	32	66.6	54	71.6	87	141.6	1.2	0.4	XPMT07H308R-D*
TDX225F25J-3	22.5	25	37	68.1	54	73.1	90	144.6	1.1	0.4	XPMT07H308R-D*
TDX230F25J-3	23	25	37	69.6	54	74.6	91	145.6	0.9	0.4	XPMT07H308R-D*
TDX235F25J-3	23.5	25	37	71.1	54	76.1	93	147.6	0.8	0.4	XPMT07H308R-D*
TDX240F25J-3	24	25	37	72.6	54	77.6	95	149.6	0.7	0.4	XPMT07H308R-D*
TDX245F25J-3	24.5	25	37	74.1	54	79.1	97	151.6	0.5	0.5	XPMT07H308R-D*
TDX250F25J-3	25	25	37	75.6	54	80.6	99	153.6	0.4	0.5	XPMT07H308R-D*
TDX255F25J-3	25.5	25	37	77.1	54	82.1	100	154.6	0.3	0.5	XPMT07H308R-D*
TDX260F25J-3	26	25	37	78.6	54	83.6	102	156.6	0.2	0.5	XPMT07H308R-D*
TDX270F32J-3	27	32	40	81.7	59	86.7	105	164.7	1.5	0.6	XPMT08T308R-D*
TDX280F32J-3	28	32	40	84.7	59	89	109.3	169	1.2	0.7	XPMT08T308R-D*
TDX290F32J-3	29	32	40	87.7	59	92	112.3	172	1	0.7	XPMT08T308R-D*
TDX300F32J-3	30	32	40	90.7	59	95	117.3	177	0.7	0.8	XPMT08T308R-D*
TDX310F32J-3	31	32	40	93.7	59	98	121.3	181	0.4	0.8	XPMT08T308R-D*
TDX320F32J-3	32	32	40	96.7	59	101	124.3	184	0.2	0.9	XPMT08T308R-D*

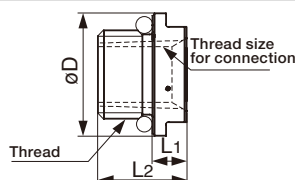
SPARE PARTS



* The above items are made-to-order products.

Designation	Clamping screw	Wrench	Plug
TDX125F - 145F	CSPB-2H	IP-6DB	SL20M
TDX150F - 170F	CSPB-2L043	IP-6DB	SL20M
TDX175F - 215F	CSPB-2.2	IP-7D	SL25M
TDX220F - 260F	CSPB-2.5	IP-8D	SL25M
TDX270F - 320F	CSTB-3	T-9D	SL32M

Plug



Applicable drill dia. øDc (mm)	Cat. No.	Stock	Thread size on plug	Thread size for connection	Dimensions (mm)			
					øD	L1	L2	L3
ø12.5 - ø17.0	SL20M	●	M13×1.0	Rc 1/8	18	5	13	14
ø17.5 - ø26.0	SL25M	●	M16×1.5	Rc 1/8	22	5	17	17
ø27.0 - ø32.0	SL32M	●	M22×2.0	Rc 1/4	29	6	21	22

● : Stocked items

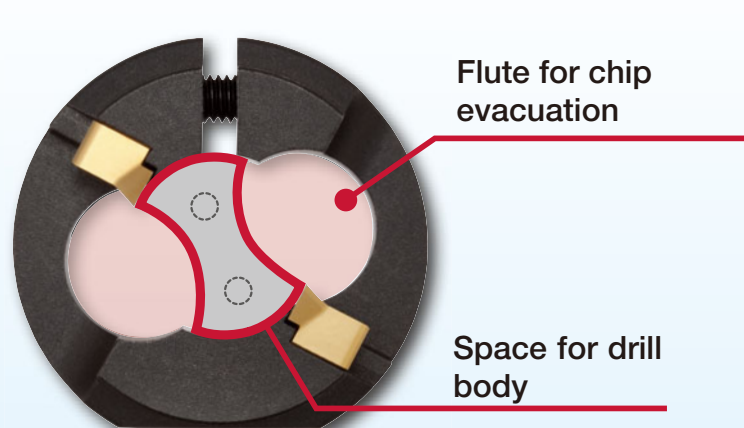
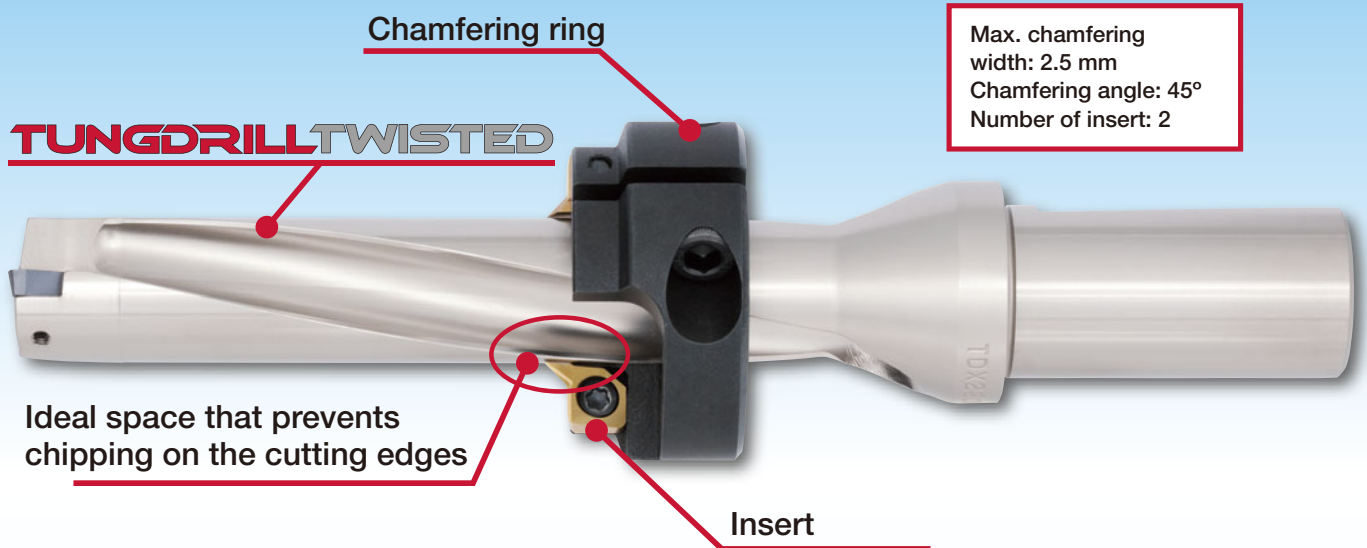
New chamfering tool «TDXCF Series»

- Applicable for all TungdrillTwisted tools
- Simultaneous operation of drilling and chamfering reduces the number of machining processes



Features

- Operation with two inserts maximizes productivity. (TDXCF can be used with only one insert also.)
- Ideal space between the drill body and chamfering inserts prevents fracture on the cutting edges.

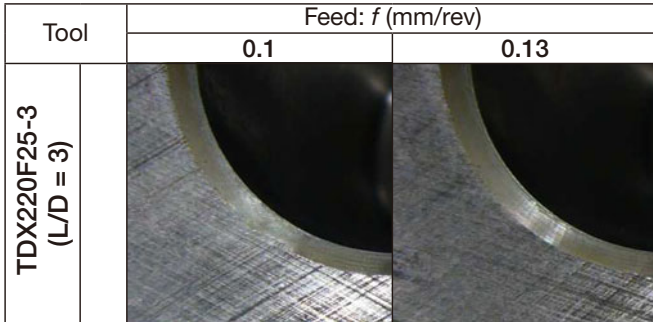


- GH130 grade with TiCNO PVD coating for chamfer insert
- Suitable for steel, stainless steel, and cast iron



Cutting performance

Surface finish



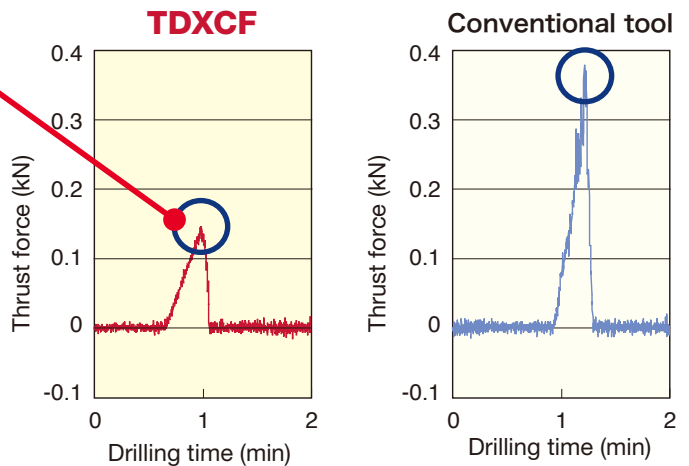
Tool : TDXCF220L25
 Workpiece : Carbon steel
 S55C / C55 (245HB)
 Cutting speed : $V_c = 140$ m/min
 Chamfering width : $C = 2.0$ mm
 Machine : Vertical M/C, BT40
 Coolant : Wet

● Stable machining and excellent surface finish are delivered even at increased feed rate.

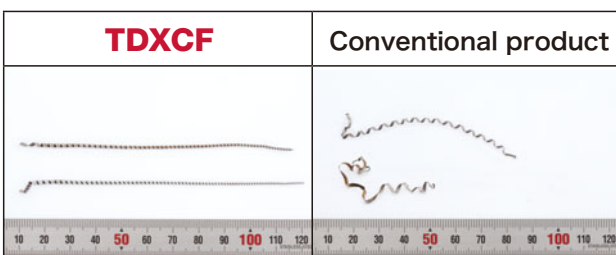
Cutting force

Sharp cutting edge decreases cutting force by 50%!

Tool : TDXCF220L25
 Workpiece : Carbon steel
 S55C / C55 (245HB)
 Cutting speed : $V_c = 140$ m/min
 Feed : $f = 0.10$ m/rev
 Chamfering width : $C = 2.0$ mm
 Machine : Vertical M/C, BT40
 Coolant : Wet



Chip control



Tool : TDXCF220L25
 Workpiece : Carbon steel
 S55C / C55 (245HB)
 Cutting speed : $V_c = 140$ m/min
 Chamfering width : $C = 2.0$ mm
 Machine : Vertical M/C, BT40
 Coolant : Wet

● TDXCF forms stable spiral chips that do not wind around the drill body.

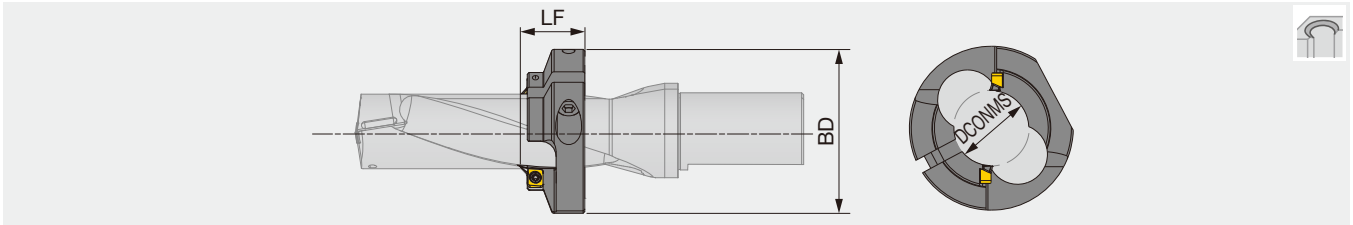
Insert, spare parts

Cat. No.	Insert	Grade	Clamping screw for insert	Wrench for insert	Torque for insert (N·m)	Clamping screw for ring	Wrench for ring	Torque for ring (N·m)
		GH130						
TDXCF130L25 - TDXCF250L25	XHGX090700R-45A	●	CSPB-4S	T-15D	3.5	CM6X16	P-5	7.0
TDXCF260L30 - TDXCF540L30						CM8 x 20		8.0

● : Stocked items

TDXCF chamfering tool

Chamfering tool for TungDrillTwisted and TungSix-Drill



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

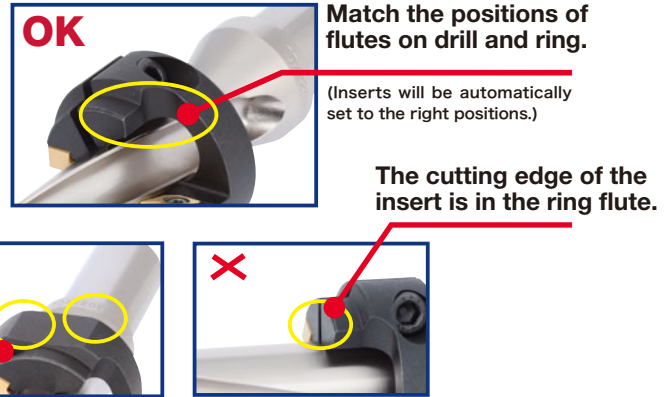
SPARE PARTS

Designation	Screw for insert	Screw for ring	Wrench for insert	Wrench for ring
TDXCF130 - 250	CSPB-4S	CM6X16	IP-15D	P-5
TDXCF260 - 540	CSPB-4S	CM8X1.25X20-A	IP-15D	P-6

*Torque: Recommended torque (N·m) for clamping.
CSPB-4S=3.5

Caution in mounting the chamfering tool on the drill body

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



TUNGBORE

■ TUNGDRILLTWISTED Range of adjustable drill diameter with TungBore

Drill diameter øDc (mm)	Adjustable range (mm)		Drill diameter øDc (mm)	Adjustable range (mm)		Drill diameter øDc (mm)	Adjustable range (mm)	
	Min. dia. ø	Max. dia. ø		Min. dia. ø	Max. dia. ø		Min. dia. ø	Max. dia. ø
12.5	12.5	13.8	22.0	22.0	23.3	37	37	38.3
13.0	13.0	14.3	22.5	22.5	23.8	38	38	39.3
13.5	13.5	14.5	23.0	23.0	24.3	39	39	40.3
14.0	14.0	14.8	23.5	23.5	24.8	40	40	41.0
14.5	14.5	15.1	24.0	24.0	25.3	41	41	41.4
15.0	15.0	16.3	24.5	24.5	25.5	42	42	43.3
15.5	15.5	16.8	25.0	25.0	25.8	43	43	44.3
16.0	16.0	17.2	25.5	25.5	26.1	44	44	45.3
16.5	16.5	17.5	26.0	26.0	26.4	45	45	46.3
17.0	17.0	17.8	27.0	27.0	28.3	46	46	47.3
17.5	17.5	18.8	28.0	28.0	29.3	47	47	48.3
18.0	18.0	19.3	29.0	29.0	30.3	48	48	49.3
18.5	18.5	19.8	30.0	30.0	31.3	49	49	50.3
19.0	19.0	20.3	31.0	31.0	31.8	50	50	51.3
19.5	19.5	20.8	32.0	32.0	32.4	51	51	52.3
20.0	20.0	21.0	33.0	33.0	34.3	52	52	53.0
20.5	20.5	21.3	34.0	34.0	35.3	53	53	53.0
21.0	21.0	21.6	35.0	35.0	36.3	54	54	54.0
21.5	21.5	21.9	36.0	36.0	37.3			

For instructions on adjusting drill diameters with TungBore, please refer to the TungHold brochure (No. 389-E)

EZ sleeve (Eccentric sleeve for TungdrillTwisted)

● The function of EZ sleeve

Hole diameter adjustment on the milling machine

Adjusting the hole diameter in tool-rotating applications on machining centers, milling machines, etc.

Drilling diameter can be adjusted in the range from +0.6 mm to -0.2 mm.



Scale for adjusting drilling diameter on machining center (on the side of the sleeve)

Adjusting the cutting edge height on lathes

Adjusting the cutting edge height in work-rotating applications on lathes.

Height of cutting edge can be adjusted in the range from +0.3 mm to -0.2 mm, which eliminates troubles caused by improper setting.



Scale for adjusting cutting edge height on lathes (on the front face of the sleeve)

Directions on setting EZ sleeve on the machine

Adjusting hole diameter on M/C

Set EZ sleeve between the drill shank and the toolholder. Align the scale on the side of the sleeve to the center of the flat area on the flange. (Fig. 1)

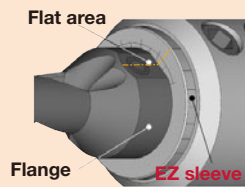


Fig. 1

In Fig.2, the sleeve is set so that the hole diameter will be increased by 0.4 mm.

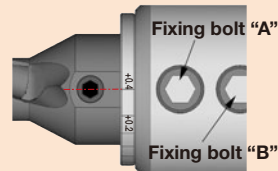
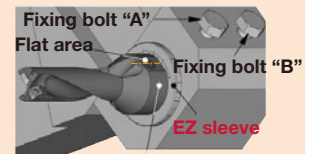


Fig. 2

Adjusting cutting edge height on lathes

Set EZ sleeve between the drill shank and the tool block. Align the scale on the front face of the sleeve to the center of the flat area on the flange. (Fig.3)



Flange
Fig. 3

In Fig.4, the sleeve is set so that the center of the drill will shift by 0.1 mm in the plus (+) direction.

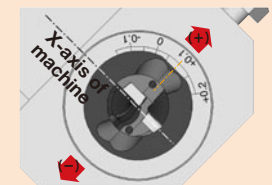


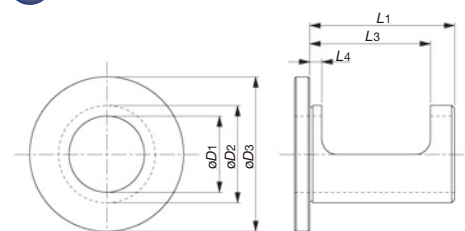
Fig. 4

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

Caution

- The scale is only a rough guide, so be sure to measure the actual drilling diameter to confirm the result. Especially in turning, test machining is recommended as the drilling diameter will vary according to the adjustment.
- For operations on the machining center, use side-lock holders. Collet chuck holders and milling chucks are not applicable.
- If severe vibration occurs during machining, reduce the feed rate (ex. drilling with L/D = 4 or over, machining with large adjustment, etc.)
- If there is an excessive adjustment of drilling diameter in the minus (-) direction, the drill body may interfere with the machined hole. The adjustment in the minus (-) direction should be used only when the drilling diameter is larger than the drill diameter and small changes are needed.

Specifications



Sleeve Cat. No.	Stock	øD1	øD2	øD3	L1	L2	L3	L4	Adjusting range of finishing diameter	Adjusting range of cutting edge height
EZ2025	●	20	25	46	49	5	32.5	4	+0.4 - -0.2	+0.2 - -0.15
EZ2532	●	25	32	51	52	5	38.0	4	+0.4 - -0.2	+0.2 - -0.15
EZ3240	●	32	40	54	62	5	43.0	4	+0.4 - -0.2	+0.2 - -0.15
EZ4050	●	40	50	69	63	5	55.0	4	+0.6 - -0.2	+0.3 - -0.2

※Note: The diameters of the drill body (øDs) and EZ sleeve (øD1) need to be the same.

Caution

Using TungdrillTwisted

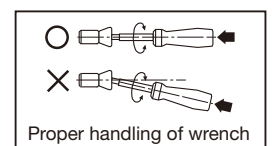
- Use a machine that has enough rigidity and motor output for the operation.
- Do not drill stacked plates as tool may be damaged.
- Proper alignment is necessary in case of work-rotating operations.

Coolant

- Use internal coolant supply.
- Use water-soluble coolant.
- Coolant pressure needs to be over 1 MPa and flow rate around 7 liter/min. For 4D and 5D types, it is recommended to use coolant pressure over 1.5 MPa and flow rate over 10 liter/min.

Setting inserts

- Clear chips and dust from the pocket before attaching the insert on the drill body.
- Do not leave any gap between the bottom face of the insert and the insert pocket.
- Wrench must be used in line with the screw. Misalignment may result in deformation of the screw or the tip of the wrench.
- If the screw has excessive wear and deformation due to long-term use, replace it with a new one.

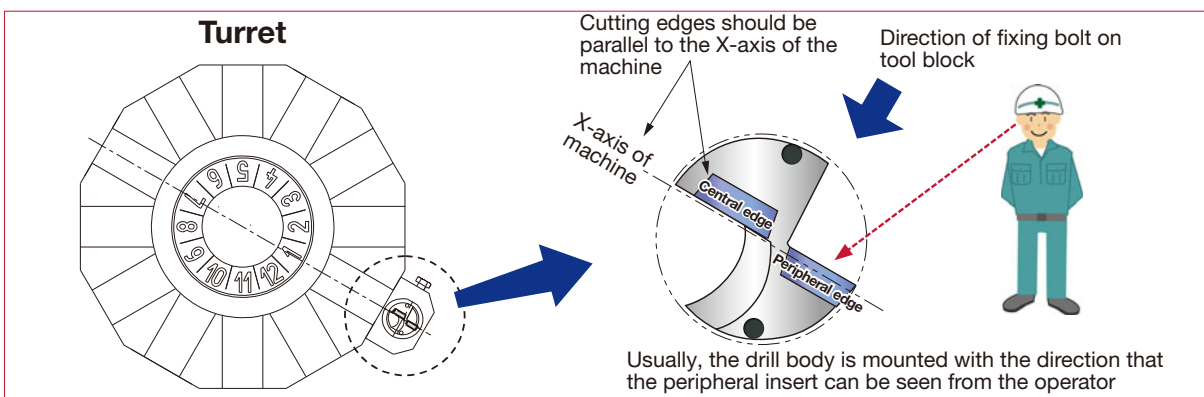


Use of TungSix-Drill on lathes

Setting of drill body is an important point for stable machining

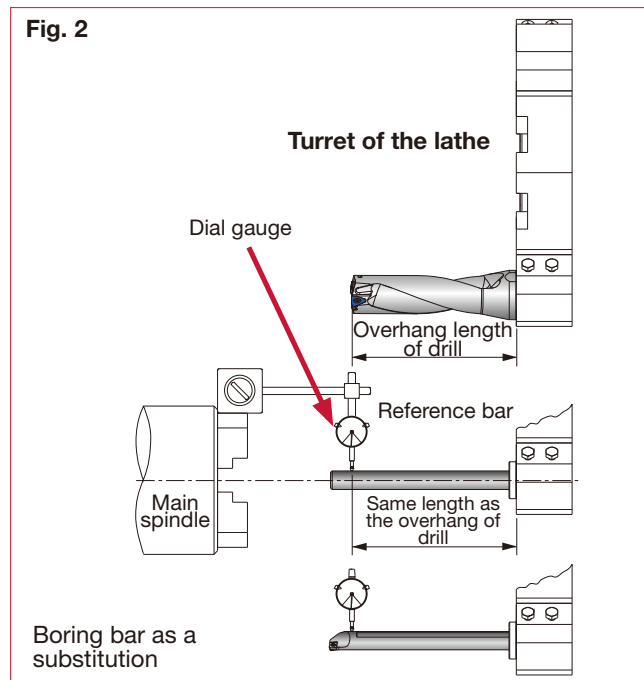
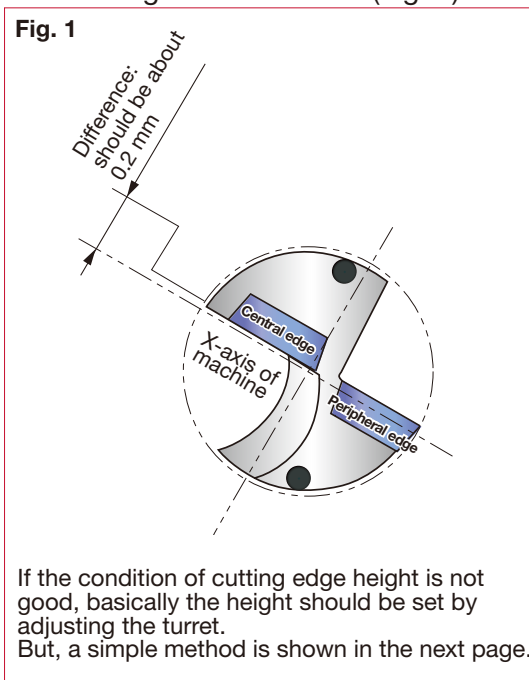
Mounting the drill on turret (tool post)

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



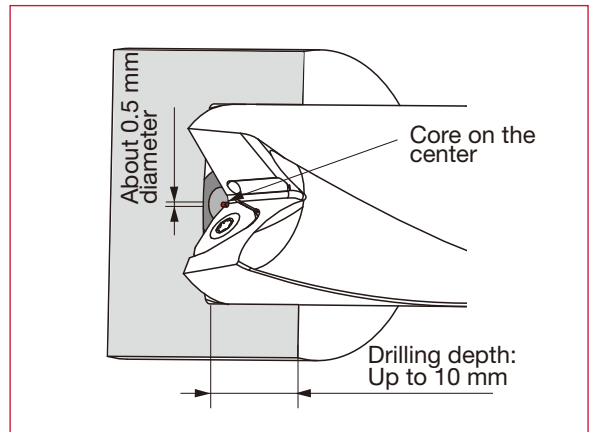
Checking of cutting edge height

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



Checking of setting conditions by trial cutting

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



Adjusting of cutting edge height

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

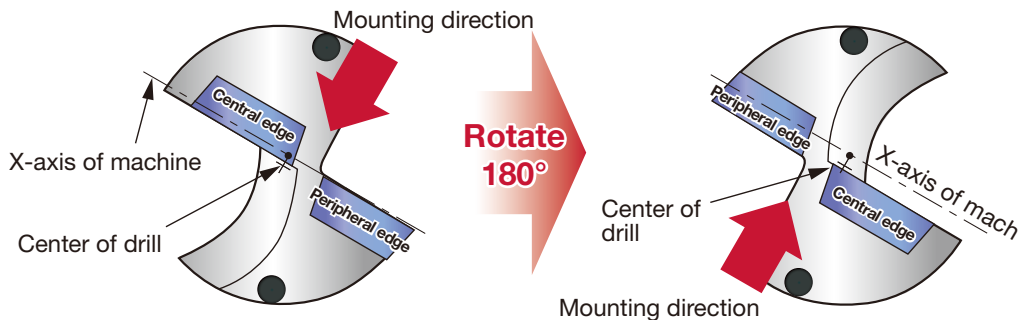
① In the case of “above-center”

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

Solution #1: Change the mounting direction.

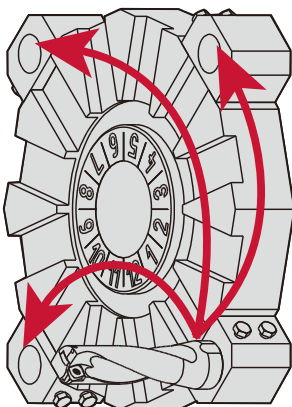
Solution #2: Rotate drill body 180°

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



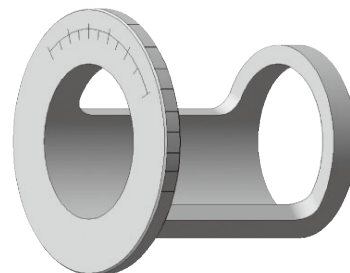
② In the case of “slightly above-center” (about 0.05 mm)

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



③ In the case of “excessive below-center” (0.2 mm or more)

When this occurs, the large diameter of the core remains and heavy vibration may occur. To improve this situation: Use EZ sleeve (the eccentric sleeve) and adjust the cutting edge height to correct value. Information on EZ sleeve, is on page 14.



Drilling with an offset on the lathe

Holes larger than the drill diameter can be machined!

● Drilling with offset

- For work-rotating operations, the hole diameter can be adjusted by offsetting the drill body along the X-axis of the machine.
- Set the drill body so that the cutting edge of the inserts are located parallel to the X-axis of the machine.

Interference
Offset for small diameters
Offset value must be less than 0.1 mm.

Small diameters
X-axis of machine

Large diameters

Offset for large diameters
Offset value (+) depends on the drill diameter.

Approximate hole diameter =
Drill diameter + offset value x 2

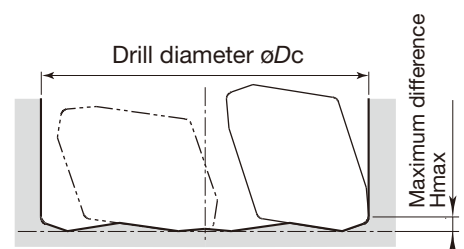
Example:
Drill diameter: ø30 mm
Offset value: 0.2 mm
Drilled hole diameter = $30 + 0.2 \times 2 = \text{ø}30.4 \text{ mm}$

Shape of the hole bottom


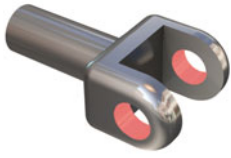
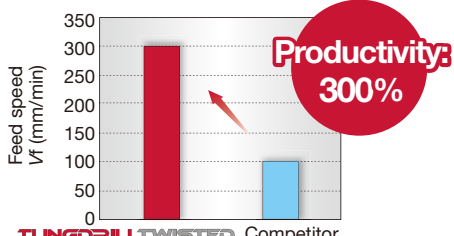
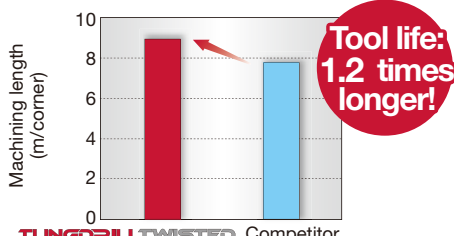


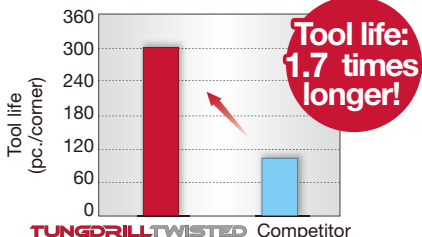

The shape of the hole bottom machined with TungdrillTwisted is closer to being flat compared to the result of HSS drills.

Drill diameter øDc (mm)	ø12.5 - 14.5	ø15 - 17	ø17.5 - 21.5	ø22 - 26	ø27 - 32	ø33 - 41	ø42 - 54
Insert	XPMT 04...	XPMT 05...	XPMT 06...	XPMT 07...	XPMT 08...	XPMT 11...	XPMT 15...
Hmax (mm)	0.6	0.8	1.0	1.1	1.3	1.9	2.3



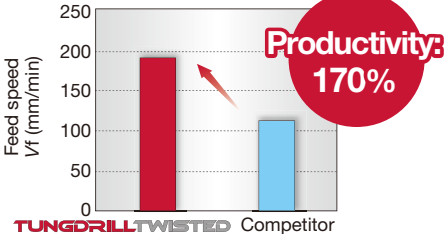
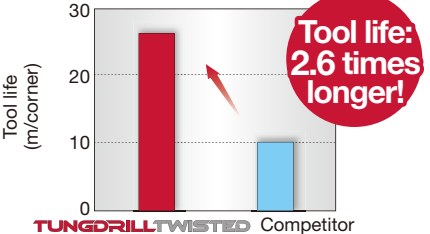


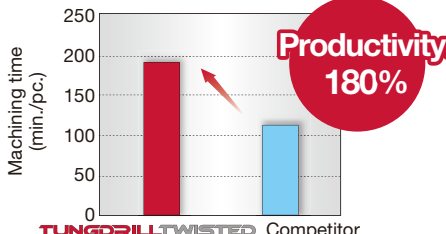
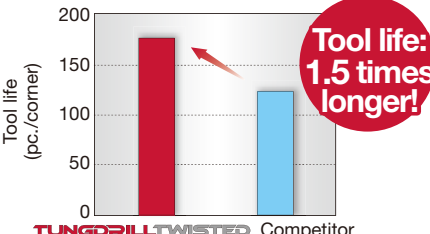
■ Bottom shape of the hole machined with TungdrillTwisted



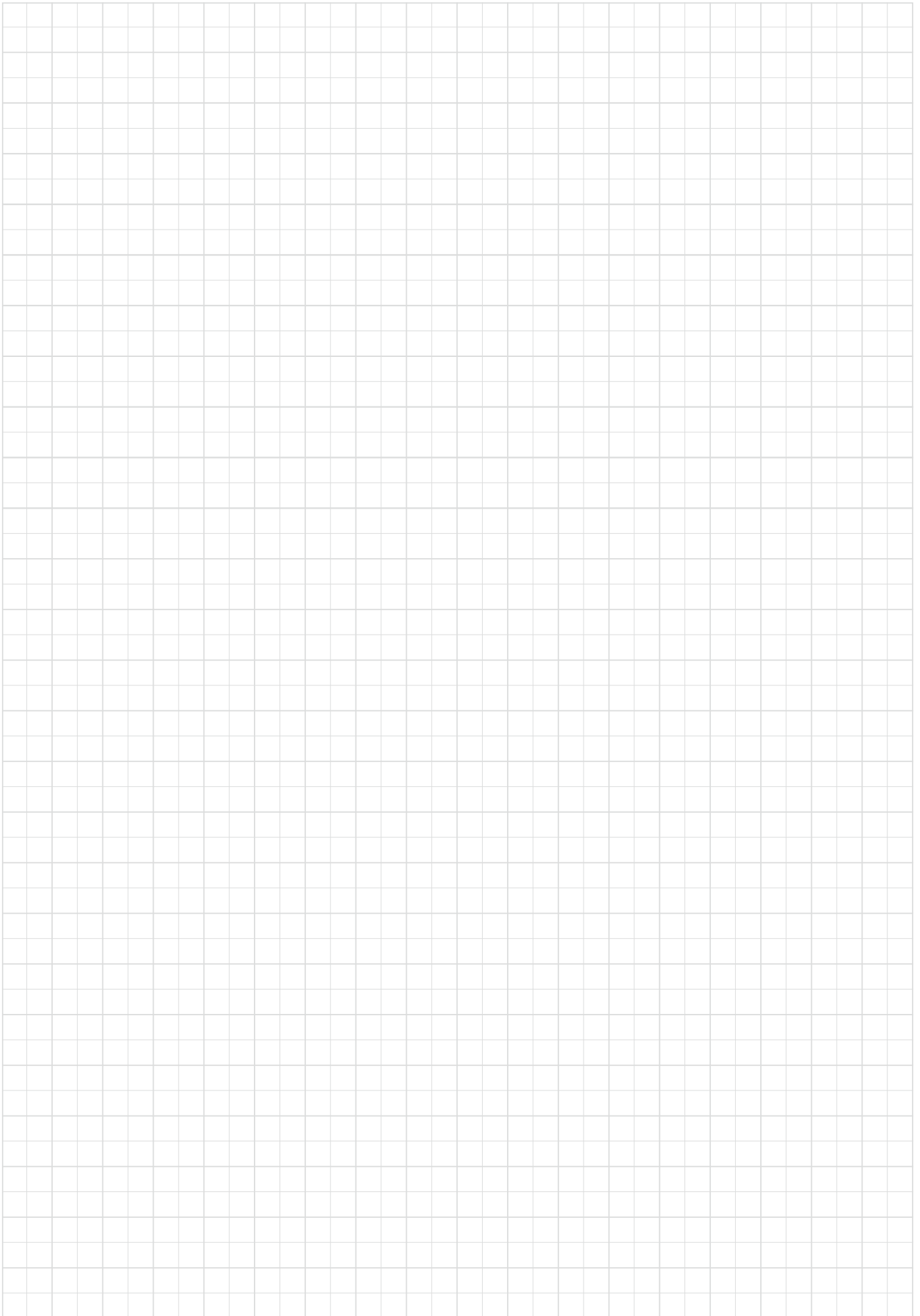
Practical examples

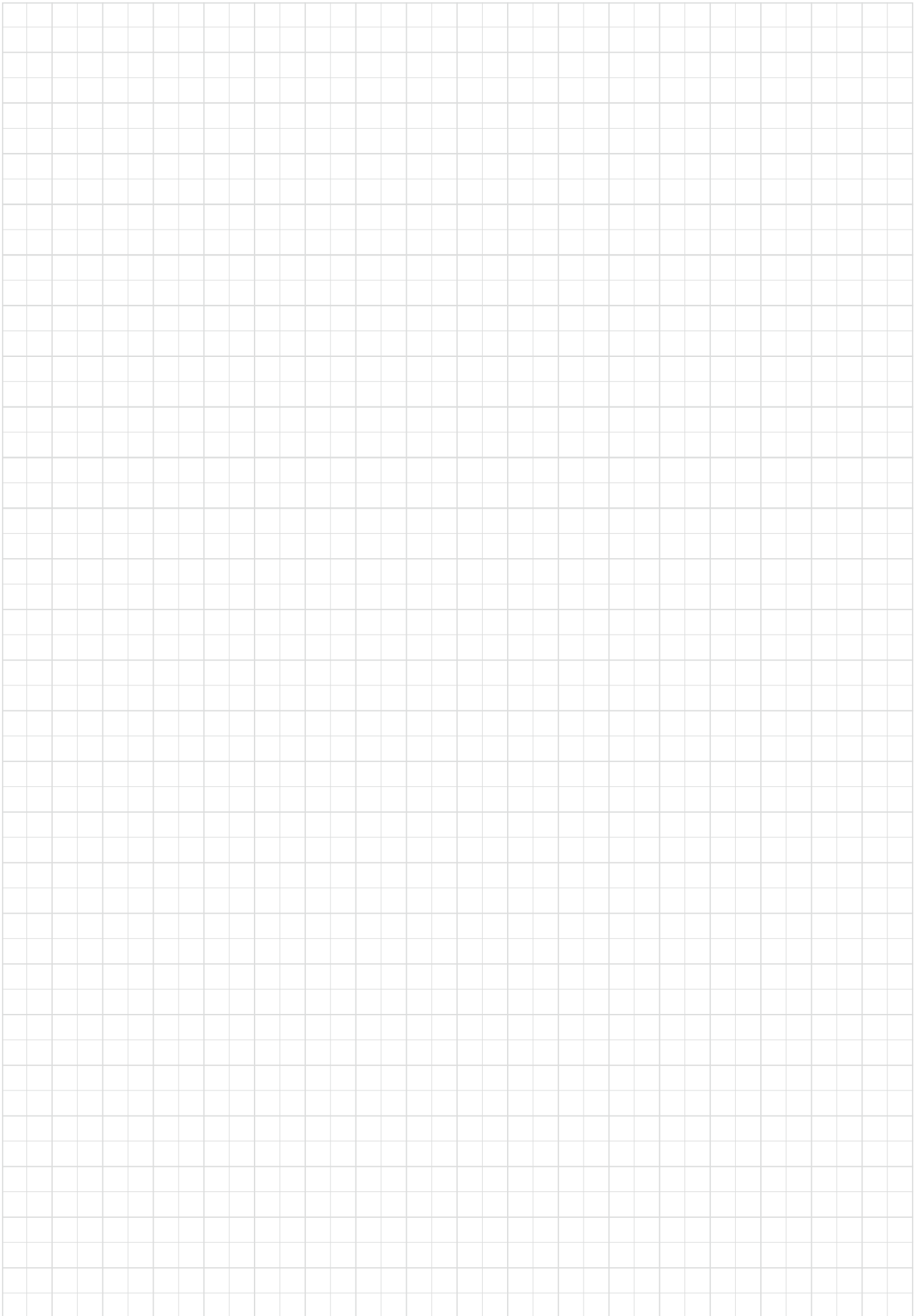
Workpiece type		Pinion	York
Drill		TDX185F25-2	TDX200F25-3
Insert		XPMT06X308R-DW	XPMT06X308R-DJ
Grade		AH9030	AH725
Workpiece material		SCM435 / 34CrMo4	S33C
		 P	 P
Cutting conditions	Cutting speed: V_c (m/min)	160	138
	Feed: f (mm/rev)	0.11	0.06
	Feed speed: V_f (mm/min)	300	132
	Drilling depth: H (mm)	18	25
	Machine	NC lathe	Special-purpose machine
Coolant		Wet	Wet
Results		 <p>Productivity: 300%</p> <p>TUNGDRILLTWISTED Competitor</p> <p>Due to strong resistance against oxidation at high temperature, coating layer prevents damages on tools from expanding even at increased feed. Therefore, productivity is improved without shortening the tool life of cutting edges.</p>	 <p>Tool life: 1.2 times longer!</p> <p>TUNGDRILLTWISTED Competitor</p> <p>Competitor's tool had a problem with frequent insert chipping because of low clamping rigidity. However, stable machining is possible with AH725 due to its excellent balance between wear and fracture resistance.</p>
		<p>Results</p>	
Workpiece type		Connecting rod	Bearing cover
Drill		TDX200F25-3	TDX180F25-2
Insert		XPMT06X308R-DW	XPMT06X308R-DS
Grade		AH725	AH6030
Workpiece material			S45C / C45
		 P	 P
Cutting conditions	Cutting speed: V_c (m/min)	90	140
	Feed: f (mm/rev)	0.06	0.06
	Feed speed: V_f (mm/min)	86	148
	Drilling depth: H (mm)	22	13
	Machine	Special-purpose machine	Vertical lathe
Coolant		Wet	Wet
Results		 <p>Tool life: 1.7 times longer!</p> <p>TUNGDRILLTWISTED Competitor</p> <p>DW chipbreaker with tough cutting edges provides stability even during interrupted machining upon hole entry and exit. Sudden insert damages are drastically reduced and tool life is 1.7 times longer than the competitor.</p>	 <p>Productivity: 600%</p> <p>TUNGDRILLTWISTED Competitor</p> <p>DS chipbreaker's good hole entry enables stable machining of workpiece materials with low rigidity. Even at doubled cutting speed and tripled feed, no problem occurs in the operation and tool life is increased by 3 times.</p>
		<p>Results</p>	

Practical examples

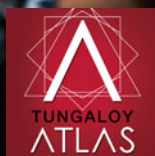
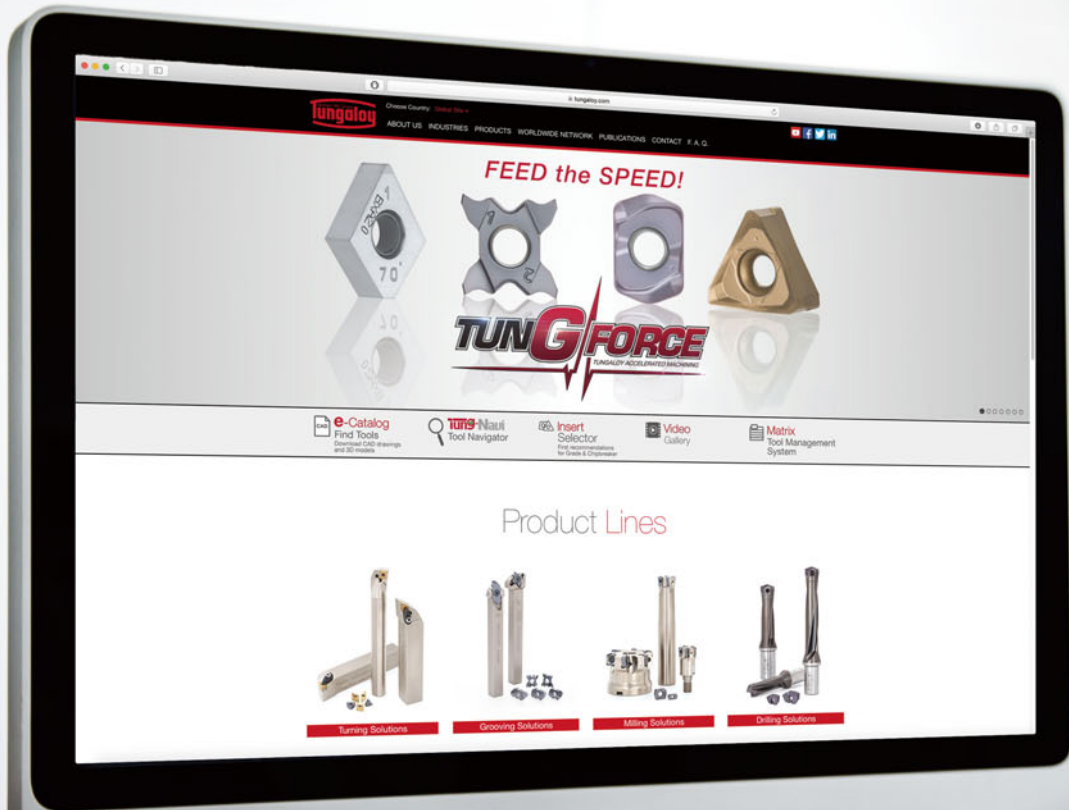
Workpiece type		Link	Shaft
Drill		TDX230F25-3	TDX190F20-3
Insert		XPMT07H308R-DW	XPMT06X308R-DJ
Grade		AH6030	AH6030
Workpiece material		S45C / C45	SUS316L
		 P	 M
Cutting conditions	Cutting speed: V_c (m/min)	150	150
	Feed: f (mm/rev)	0.10	0.12
	Feed speed: V_f (mm/min)	208	310
	Drilling depth: H (mm)	34	33
	Machine	Vertical M/C	NC lathe
Coolant		Wet	Wet
Results		 <p>Productivity: 170%</p> <p>DW chipbreaker with tough cutting edges prevents damages on tools in the operation of casting skin. Compared to the competitor, the feed in machining is increased by 1.7 times, resulting in drastically improved productivity.</p>	 <p>Tool life: 2.6 times longer!</p> <p>AH6030 with thick coating and oxide layer prevents wear and welding on tools and achieves 2.6 times longer tool life than the competitor.</p>
Workpiece type		Valve	Brake rotor
Drill		TDX230F25-2	TDX235F25-2
Insert		XPMT07H308R-DS	XPMT07H308R-DJ
Grade		AH725	AH9030
Workpiece material		SUS316L	FC250 / 250
		 M	 K
Cutting conditions	Cutting speed: V_c (m/min)	140	148
	Feed: f (mm/rev)	0.10	0.08
	Feed speed: V_f (mm/min)	194	160
	Drilling depth: H (mm)	25	35
	Machine	NC lathe	Vertical M/C
Coolant		Wet	Wet
Results		 <p>Productivity: 180%</p> <p>Special surface technology, PremiumTec, and DS chipbreaker extremely improves chip evacuation. Also, lowered cutting force enables the operation with increased speed (1.4 times) and feed (1.25 times), resulting in machining efficiency which is 1.8 times higher than the competitor.</p>	 <p>Tool life: 1.5 times longer!</p> <p>The combination of highly rigid body and DJ chipbreaker with low cutting force prevents unusual damages on cutting edges. These features lead to long and stable tool life.</p>

MEMO

A large grid of graph paper, consisting of 20 columns and 30 rows of small squares, intended for writing a memo. The grid is empty and occupies most of the page.



Check our site and our App to get more info!



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