



Indexable drill

TUNGDRILLTWISTED

Tungaloy Report No. 377-US

Indexable drills with 4 edge inserts now offer an **increased range of insert grades dedicated to drilling applications**







TUNGDRILL TWISTED



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

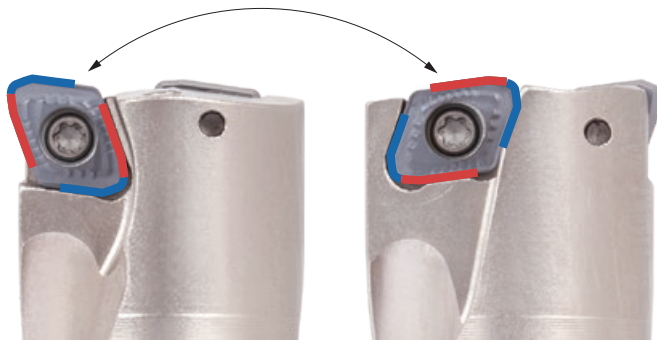
Extremely versatile indexable drills

- Light-cutting 4-edge positive inserts
- Drilling diameters from 0.500" to 2.125"
- Drilling depths of 2xD, 3xD, 4xD, and 5xD
- Multiple grades for various material groups

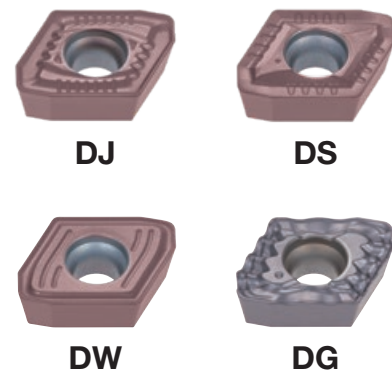


Features

- 1** A single insert is interchangeable for the center cutting edge and peripheral cutting edge. This reduces tool inventory and investment.

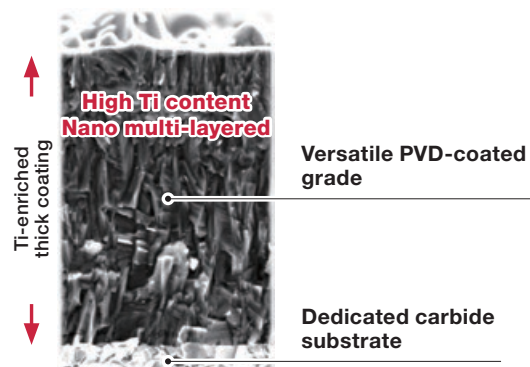
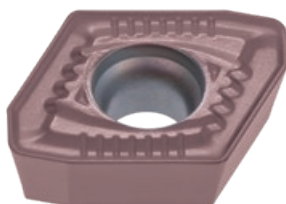


- 2** Four different styles of chipbreakers to cover various applications.



- 3** New insert grades developed specifically for drilling applications for prolonged insert tool life.

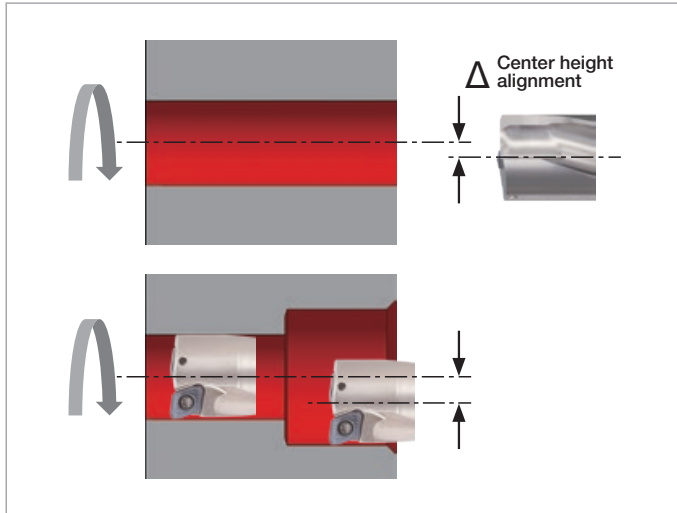
New AH7020, AH7030



■ Versatility and stability for reduced tool investment and inventory

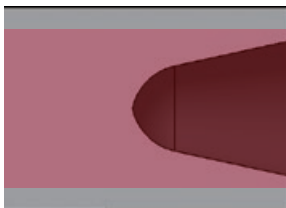
The combination of a strong tool body and light-cutting geometry provides versatility and stability, making **TungDrillTwisted** an all-rounder indexable drill solution for various hole-making applications, from standard drilling to single-point boring operations.

■ Stable solution for drilling on lathe machine

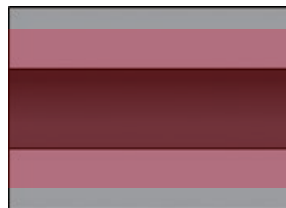


- Sufficient alignment of the drill with the center line of the machine is critical for successful non-rotating drilling applications on a lathe or turning center.
- **TungDrillTwisted** allows much easier drill center height alignment with the work center, compared with solid or exchangeable-head drills.
- By offsetting the drill using X-axis of the machine, fine adjustments of the drill diameter can be achieved. This allows the indexable drill to be used for boring operations, enabling a single tool to perform multiple operations.

■ Machining of cast or pre-drilled holes



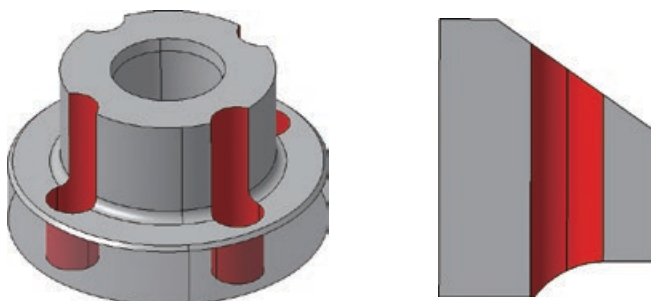
Opening a hole into a pre-cast or pre-forged hole or concave surface



Enlarging a pre-drilled hole

- **TungDrillTwisted** enables drilling to concave or convex surfaces or enlarging of the cast or pre-drilled holes.
- The chipbreaker optimizes chip control and evacuation.

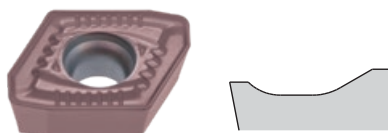
■ Drilling irregular or asymmetric surfaces



- **TungDrillTwisted** can drill irregular surfaces, such as inclined entry/exit, convex or concave surfaces, and edge plunging.
- Due to extremely high body stiffness, the drill is able to engage in the material with no or little body deflection. Strong insert geometry also contributes to tool life stability during machining involving aggressive interruptions.

4 styles of chipbreakers for optimal chip control and maximum machining stability

DJ



First-choice chipbreaker for a wide range of applications in ISO P and M material groups, featuring light cutting action with stability.

P SCM440 / 42CrMo4 Drill diameter: 20 mm
Machine : Vertical M/C

Cutting speed: Vc (sfm)	656			
	492			
	328			
		0.003	0.004	0.006
		Feed: f (ipr)		

P SCM420 / 18CrMo4 Drill diameter: 20 mm
Machine : Lathe

Cutting speed: Vc (sfm)	656			
	492			
	328			
		0.003	0.004	0.006
		Feed: f (ipr)		

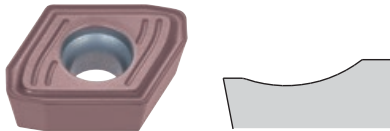
M SUS304 / X5CrNi18-9 Drill diameter: 20 mm
Machine : Vertical M/C

Cutting speed: Vc (sfm)	656			
	492			
	328			
		0.0016	0.003	0.005
		Feed: f (ipr)		

P SS400 / E275A Drill diameter: 20 mm
Machine : Vertical M/C

Cutting speed: Vc (sfm)	820			
	656			
	492			
		0.0016	0.002	0.004
		Feed: f (ipr)		

Not recommended

DW

Produces tightly-curved chips compared with DJ chipbreaker. Wiper creates excellent surface quality and enables higher feed rates. Superior resistance to fracture.

P SCM440 / 42CrMo4

Drill diameter: 20 mm
Machine : Vertical M/C

Cutting speed: Vc (sfm)	656			
	492			
	328			
		0.003	0.004	0.006
Feed: f (mm/rev)				

P SCM420 / 18CrMo4

Drill diameter: 20 mm
Machine : Lathe

Cutting speed: Vc (sfm)	656			
	492			
	328			
		0.003	0.004	0.006
Feed: f (mm/rev)				

DS

Developed specifically for machining stainless steel, DS can handle heat-resistant superalloys. Performs best when used in turning applications.

DG

Developed for soft steel machining. The unique geometry eliminates chip bird-nesting. Delivers excellent performance when used at low feed rates.

M SUS304 / X5CrNi18-9

Drill diameter: 20 mm
Machine : Vertical M/C

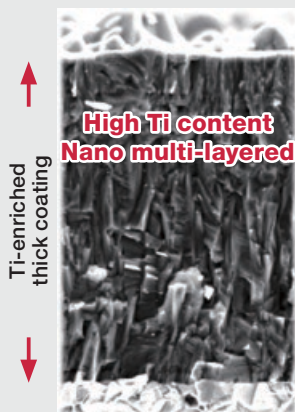
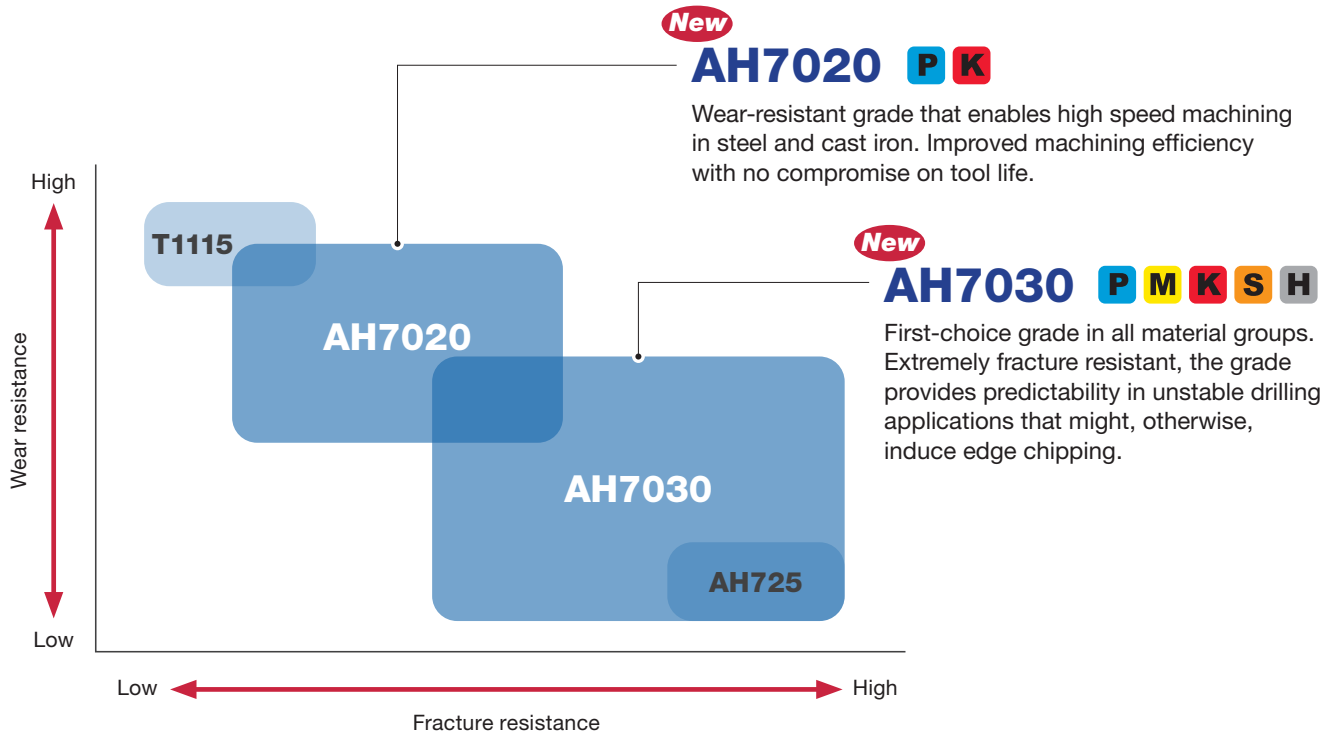
Cutting speed: Vc (sfm)	656			
	492			
	328			
		0.0016	0.003	0.005
Feed: f (mm/rev)				

P SS400 / E275A

Drill diameter: 20 mm
Machine : Vertical M/C

Cutting speed: Vc (sfm)	492			
	328			
	197			
		0.0016	0.002	0.004
Feed: f (mm/rev)				

New insert grades developed specifically for drilling applications bring increased tool life and reduced cost per part



Versatile PVD-coated grade

Ti-enriched coating

- Thick Ti-enriched PVD coating for enhanced thermal shock resistance.
- Reduced crater wear.

High Ti-content nano-structured multilayer coating

The outer layer consists of a high Ti-content nano-structured multilayer made possible by Tungaloy's latest coating technology. Its high hardness and nano structure provide the grade with a good balance of wear and fracture resistance, enhancing tool life and predictability.

Dedicated carbide substrate

AH7020

Thanks to high thermal conductivity of the substrate, heat generated during machining is dissipated, efficiently reducing temperature on the cutting edge. This provides edge toughness, while reducing plastic deformation of the cutting edge. Ideal for continuous cuts.

AH7030

AH7030 incorporates a tough substrate that provides process security during interrupted machining. This tough substrate provides the grade with added reliability during interrupted cuts.

AH725 P M

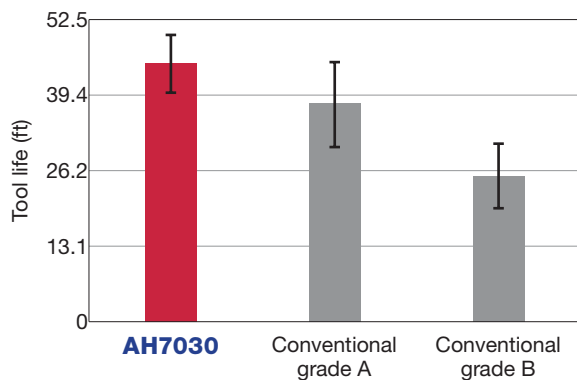
- Excellent wear and fracture resistance delivered by (Ti, Al)N coating and tough substrate.
- Suitable for steel and stainless steel machining.

T1115 K

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

CUTTING PERFORMANCE

■ Tool life test results in peck drilling application



AH7030

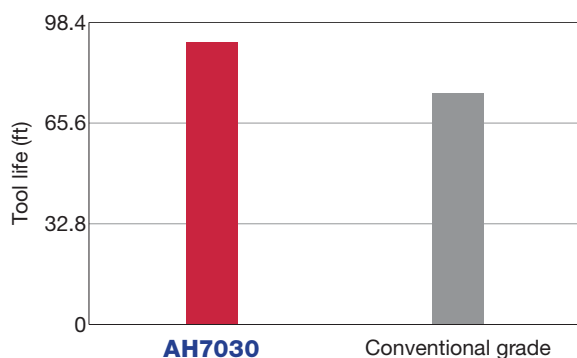


Conventional grade A

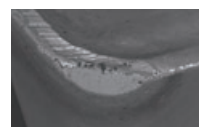
P	Drill	: TDX250F25-3
	Insert	: XPMT07H308R-DJ AH7030
	Workpiece material	: Alloy steel (30HRC)
	Cutting speed	: $V_c = 492$ sfm
	Feed	: $f = 0.005$ ipr
	Drilling depth	: 2.36 in
	Coolant	: Wet (Internal supply)
	Peck cycle	: 0.079 in/peck

Increased wear and chipping resistance compared to conventional tools. Improved tool life stability.

■ Tool life test results in stainless steel



AH7030

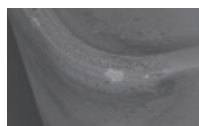
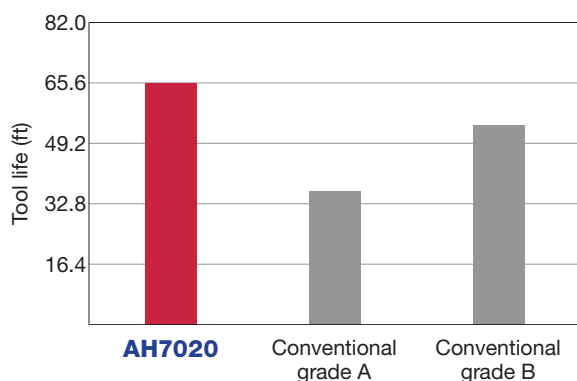


Conventional grade

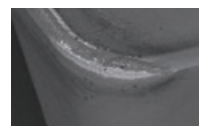
M	Drill	: TDX250F25-3
	Insert	: XPMT07H308R-DS AH7030
	Workpiece material	: Austenitic stainless steel
	Cutting speed	: $V_c = 492$ sfm
	Feed	: $f = 0.003$ ipr
	Drilling depth	: 2.56 in
	Coolant	: Wet (Internal supply)

Provided wear and fracture resistance in stainless steel and increased tool life.

■ Wear resistance



AH7020



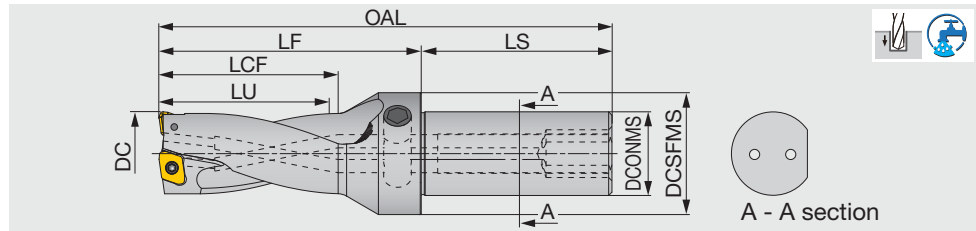
Conventional grade A

P	Drill	: TDX250F25-3
	Insert	: XPMT07H308R-DJ AH7020
	Workpiece material	: Carbon steel
	Cutting speed	: $V_c = 656$ sfm
	Feed	: $f = 0.003$ ipr
	Drilling depth	: 2.56 in
	Coolant	: Wet (Internal supply)

New coated grade provided improved wear resistance and long tool life at an increased cutting speed.

TDXU-FS L/D=2

Indexable drill, L/D = 2, flat shank with side port



Inch	DC	DCONMS	DCSFMS	LU	LS	LCF	LF	OAL	Max. offset** (radial)	WT(lb)	Insert
TDXU-0500FS-02	0.500	0.750	1.250	1.015	1.015	1.130	2.019	4.034	0.030	0.440	XPMT040104R-D*
TDXU-0531FS-02	0.531	0.750	1.250	1.077	1.077	1.200	2.089	4.104	0.024	0.450	XPMT040104R-D*
TDXU-0562FS-02	0.562	0.750	1.250	1.139	1.139	1.260	2.152	4.167	0.018	0.450	XPMT040104R-D*
TDXU-0625FS-02	0.625	0.750	1.250	1.271	1.271	1.390	2.283	4.304	0.026	0.460	XPMT050204R-D*
TDXU-0687FS-02	0.687	1.000	1.457	1.393	1.393	1.510	2.471	4.770	0.048	0.790	XPMT06X308R-D*
TDXU-0750FS-02	0.75	1.000	1.457	1.519	1.519	1.640	2.591	4.890	0.027	0.820	XPMT06X308R-D*
TDXU-0812FS-02	0.812	1.000	1.457	1.643	1.643	1.760	2.729	5.028	0.015	0.850	XPMT06X308R-D*
TDXU-0875FS-02	0.875	1.000	1.457	1.773	1.773	1.890	2.849	5.152	0.045	0.880	XPMT07H308R-D*
TDXU-0937FS-02	0.937	1.000	1.457	1.897	1.897	2.020	2.991	5.294	0.029	0.930	XPMT07H308R-D*
TDXU-1000FS-02	1.000	1.000	1.457	2.023	2.023	2.140	3.111	5.414	0.013	0.960	XPMT07H308R-D*
TDXU-1062FS-02	1.062	1.250	1.575	2.153	2.153	2.270	3.401	5.710	0.059	1.300	XPMT08T308R-D*
TDXU-1125FS-02	1.125	1.250	1.575	2.279	2.279	2.400	3.541	5.850	0.043	1.380	XPMT08T308R-D*
TDXU-1187FS-02	1.187	1.250	1.575	2.403	2.403	2.520	3.658	5.967	0.026	1.450	XPMT08T308R-D*
TDXU-1250FS-02	1.250	1.250	1.575	2.529	2.529	2.650	3.783	6.092	0.010	1.520	XPMT08T308R-D*
TDXU-1312FS-02	1.312	1.500	1.969	2.667	2.667	2.790	4.013	6.744	0.088	2.250	XPMT110412R-D*
TDXU-1375FS-02	1.375	1.500	1.969	2.793	2.793	2.910	4.155	6.886	0.072	2.320	XPMT110412R-D*
TDXU-1437FS-02	1.437	1.500	1.969	2.917	2.917	3.040	4.272	7.003	0.055	2.340	XPMT110412R-D*
TDXU-1500FS-02	1.500	1.500	1.969	3.043	3.043	3.160	4.413	7.144	0.038	2.530	XPMT110412R-D*
TDXU-1562FS-02	1.562	1.500	1.969	3.167	3.167	3.290	4.553	7.284	0.022	2.540	XPMT110412R-D*
TDXU-1625FS-02	1.625	1.500	2.165	3.311	3.311	3.430	4.728	7.477	0.128	2.850	XPMT150512R-D*
TDXU-1687FS-02	1.687	1.500	2.165	3.435	3.435	3.550	4.868	7.617	0.115	3.020	XPMT150512R-D*
TDXU-1750FS-02	1.750	1.500	2.165	3.561	3.561	3.680	4.986	7.735	0.097	3.140	XPMT150512R-D*
TDXU-1812FS-02	1.812	1.500	2.165	3.685	3.685	3.810	5.128	7.877	0.082	3.300	XPMT150512R-D*
TDXU-1875FS-02	1.875	1.500	2.165	3.811	3.811	3.930	5.251	8.000	0.063	3.490	XPMT150512R-D*
TDXU-1937FS-02	1.937	1.500	2.165	3.935	3.935	4.050	5.385	8.134	0.049	3.610	XPMT150512R-D*
TDXU-2000FS-02	2.000	1.500	2.165	4.061	4.061	4.180	5.510	8.259	0.030	3.820	XPMT150512R-D*
TDXU-2125FS-02	2.125	1.500	2.165	4.311	4.311	4.430	5.790	8.548	-	4.240	XPMT150512R-D*

** For offsetting on lathe

Tool diameter (in)	Tool diameter tolerance (in)	Hole diameter tolerance (in)
ø0.500" - ø0.625"	+ 0.004" / 0	+ 0.010" / 0
ø0.687" - ø2.125"	+ 0.008" / 0	+ 0.012" / 0

*Just for reference

SPARE PARTS

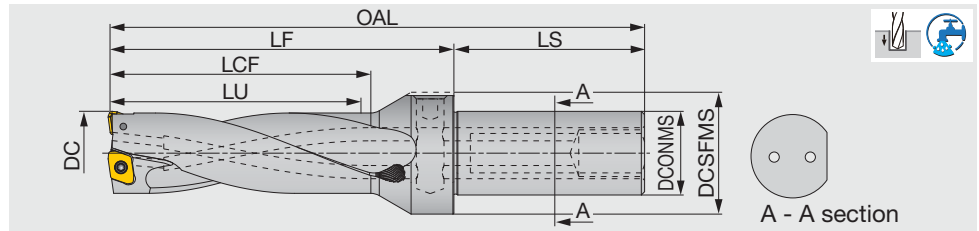


Designation	Clamping screw	Torx driver	Plug *	
			Side port	Rear port (Optional parts)
TDXU500 - TDXU0562	CSPB-2H	IP-6DB	NPTF1/8	(NPTF1/4)
TDXU-0625FS-02	CSPB-2L043	IP-6DB	NPTF1/8	(NPTF1/4)
TDXU0687 - TDXU0812	CSPB-2.2	IP-7D	NPTF1/8	(SL25IN)
TDXU0875 - TDXU1000	CSPB-2.5	IP-8D	NPTF1/8	(SL25IN)
TDXU1062 - TDXU1250	CSTB-3	T-9D	NPTF1/4	(SL32IN)
TDXU1312 - TDXU1562	CSTB-4	T-15D	NPTF1/4	(SL38IN)
TDXU1625 - TDXU2125	CSTB-5	T-20D	NPTF1/4	(SL38IN)

Recommended clamping torque: CSPB-2H/CSPB-2L043= 0.52 lb-ft, CSPB-2.2= 0.74 lb-ft, CSPB-2.5= 0.96 lb-ft, CSTB-3= 1.70 lb-ft, CSTB-4= 2.58 lb-ft, CSTB-5= 3.69 lb-ft

TDXU-F L/D=3

Indexable drill, L/D = 3, flat shank with side port



Inch	DC	DCONMS	DCSFMS	LU	LS	LCF	LF	OAL	Max. offset** (radial)	WT(lb)	Insert
TDXU-0500FS-03	0.500	0.750	1.250	1.515	2.000	1.630	2.519	4.534	0.030	0.450	XPMT040104R-D*
TDXU-0531FS-03	0.531	0.750	1.250	1.608	2.000	1.730	2.620	4.635	0.024	0.460	XPMT040104R-D*
TDXU-0562FS-03	0.562	0.750	1.250	1.701	2.000	1.820	2.715	4.730	0.018	0.470	XPMT040104R-D*
TDXU-0625FS-03	0.625	0.750	1.250	1.896	2.000	2.020	2.909	4.930	0.026	0.490	XPMT050204R-D*
TDXU-0687FS-03	0.687	1.000	1.457	2.080	2.280	2.200	3.159	5.458	0.048	0.830	XPMT06X308R-D*
TDXU-0750FS-03	0.750	1.000	1.457	2.269	2.280	2.390	3.341	5.640	0.027	0.870	XPMT06X308R-D*
TDXU-0812FS-03	0.812	1.000	1.457	2.455	2.280	2.580	3.542	5.841	0.015	0.910	XPMT06X308R-D*
TDXU-0875FS-03	0.875	1.000	1.457	2.648	2.280	2.770	3.724	6.027	0.045	0.950	XPMT07H308R-D*
TDXU-0937FS-03	0.937	1.000	1.457	2.834	2.280	2.960	3.929	6.232	0.029	1.030	XPMT07H308R-D*
TDXU-1000FS-03	1.000	1.000	1.457	3.023	2.280	3.210	4.111	6.314	0.013	1.050	XPMT07H308R-D*
TDXU-1062FS-03	1.062	1.250	1.575	3.215	2.280	3.340	4.464	6.773	0.059	1.430	XPMT08T308R-D*
TDXU-1125FS-03	1.125	1.250	1.575	3.404	2.280	3.520	4.666	6.975	0.043	1.520	XPMT08T308R-D*
TDXU-1187FS-03	1.187	1.250	1.575	3.590	2.280	3.710	4.845	7.154	0.026	1.620	XPMT08T308R-D*
TDXU-1250FS-03	1.250	1.250	1.575	3.779	2.280	3.900	5.033	7.342	0.010	1.740	XPMT08T308R-D*
TDXU-1312FS-03	1.312	1.500	1.969	3.979	2.688	4.100	5.325	8.056	0.088	2.510	XPMT110412R-D*
TDXU-1375FS-03	1.375	1.500	1.969	4.168	2.688	4.290	5.530	8.261	0.072	2.610	XPMT110412R-D*
TDXU-1437FS-03	1.437	1.500	1.969	4.354	2.688	4.470	5.709	8.440	0.055	2.630	XPMT110412R-D*
TDXU-1500FS-03	1.500	1.500	1.969	4.543	2.688	4.660	5.913	8.644	0.038	2.860	XPMT110412R-D*
TDXU-1562FS-03	1.562	1.500	1.969	4.729	2.688	4.850	6.115	8.846	0.022	2.920	XPMT110412R-D*
TDXU-1625FS-03	1.625	1.500	2.165	4.936	2.688	5.050	6.353	9.102	0.128	3.330	XPMT150512R-D*
TDXU-1687FS-03	1.687	1.500	2.165	5.122	2.688	5.240	6.555	9.304	0.115	3.570	XPMT150512R-D*
TDXU-1750FS-03	1.750	1.500	2.165	5.311	2.688	5.430	6.736	9.485	0.097	3.740	XPMT150512R-D*
TDXU-1812FS-03	1.812	1.500	2.165	5.497	2.688	5.620	6.941	9.690	0.082	3.950	XPMT150512R-D*
TDXU-1875FS-03	1.875	1.500	2.165	5.686	2.688	5.800	7.126	9.875	0.063	4.220	XPMT150512R-D*
TDXU-1937FS-03	1.937	1.500	2.165	5.872	2.688	5.990	7.322	10.071	0.049	4.410	XPMT150512R-D*
TDXU-2000FS-03	2.000	1.500	2.165	6.061	2.688	6.180	7.510	10.259	0.030	4.60	XPMT150512R-D*
TDXU-2125FS-03	2.125	1.500	2.165	6.436	2.688	6.550	7.915	10.664	-	5.310	XPMT150512R-D*

** For offsetting on lathe

Tool diameter (in)	Tool diameter tolerance (in)	Hole diameter tolerance (in)*
ø0.500" - ø0.625"	+ 0.004" / 0	+ 0.010" / 0
ø0.687" - ø2.125"	+ 0.008" / 0	+ 0.012" / 0

*Just for reference

SPARE PARTS

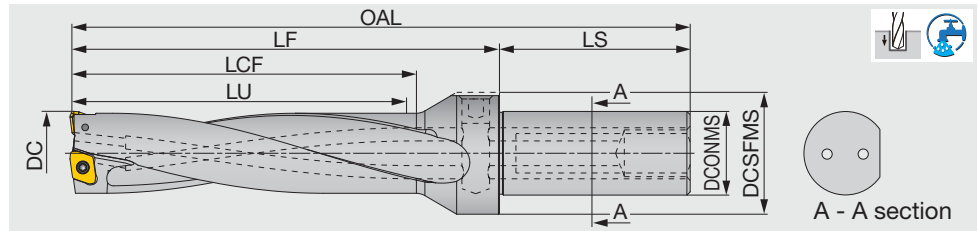


Designation	Clamping screw	Torx driver	Plug *	
			Side port	Rear port (Optional parts)
TDXU500 - TDXU0562	CSPB-2H	IP-6DB	NPTF1/8	(NPTF1/4)
TDXU-0625FS-03	CSPB-2L043	IP-6DB	NPTF1/8	(NPTF1/4)
TDXU0687-TDXU0812	CSPB-2.2	IP-7D	NPTF1/8	(SL25IN)
TDXU0875 - TDXU1000	CSPB-2.5	IP-8D	NPTF1/8	(SL25IN)
TDXU1062 - TDXU1250	CSTB-3	T-9D	NPTF1/4	(SL32IN)
TDXU1312 - TDXU1562	CSTB-4	T-15D	NPTF1/4	(SL38IN)
TDXU1625 - TDXU2125	CSTB-5	T-20D	NPTF1/4	(SL38IN)

Recommended clamping torque: CSPB-2H/CSPB-2L043 = 0.52 lb-ft, CSPB-2.2 = 0.74 lb-ft, CSPB-2.5 = 0.96 lb-ft, CSTB-3 = 1.70 lb-ft, CSTB-4 = 2.58 lb-ft, CSTB-5 = 3.69 lb-ft

TDXU-F L/D=4

Indexable drill, L/D = 4, flat shank with side port



Inch	DC	DCONMS	DCSFMS	LU	LS	LCF	LF	OAL	Max. offset** (radial)	WT(lb)	Insert
TDXU-0500FS-04	0.500	0.750	1.250	2.015	2.000	2.130	3.019	5.034	0.030	0.460	XPMT040104R-D*
TDXU-0531FS-04	0.531	0.750	1.250	2.139	2.000	2.260	3.151	5.166	0.024	0.480	XPMT040104R-D*
TDXU-0562FS-04	0.562	0.750	1.250	2.263	2.000	2.390	3.278	5.293	0.018	0.490	XPMT040104R-D*
TDXU-0625FS-04	0.625	0.750	1.250	2.521	2.000	2.640	3.535	5.556	0.026	0.520	XPMT050204R-D*
TDXU-0687FS-04	0.687	1.000	1.457	2.767	2.280	2.890	3.847	6.146	0.048	0.860	XPMT06X308R-D*
TDXU-0750FS-04	0.750	1.000	1.457	3.019	2.280	3.140	4.091	6.390	0.027	0.920	XPMT06X308R-D*
TDXU-0812FS-04	0.812	1.000	1.457	3.267	2.280	3.390	4.355	6.654	0.015	0.960	XPMT06X308R-D*
TDXU-0875FS-04	0.875	1.000	1.457	3.523	2.280	3.640	4.599	6.902	0.045	1.030	XPMT07H308R-D*
TDXU-0937FS-04	0.937	1.000	1.457	3.771	2.280	3.890	4.867	7.170	0.029	1.130	XPMT07H308R-D*
TDXU-1000FS-04	1.000	1.000	1.457	4.023	2.280	4.140	5.111	7.414	0.013	1.140	XPMT07H308R-D*
TDXU-1062FS-04	1.062	1.250	1.575	4.277	2.280	4.400	5.527	7.836	0.059	1.560	XPMT08T308R-D*
TDXU-1125FS-04	1.125	1.250	1.575	4.529	2.280	4.650	5.791	8.100	0.043	1.660	XPMT08T308R-D*
TDXU-1187FS-04	1.187	1.250	1.575	4.777	2.280	4.900	6.032	8.341	0.026	1.800	XPMT08T308R-D*
TDXU-1250FS-04	1.250	1.250	1.575	5.029	2.280	5.150	6.283	8.592	0.010	1.950	XPMT08T308R-D*
TDXU-1312FS-04	1.312	1.500	1.969	5.291	2.688	5.410	6.637	9.368	0.088	2.770	XPMT110412R-D*
TDXU-1375FS-04	1.375	1.500	1.969	5.543	2.688	5.660	6.905	9.636	0.072	2.900	XPMT110412R-D*
TDXU-1437FS-04	1.437	1.500	1.969	5.791	2.688	5.910	7.146	9.877	0.055	2.930	XPMT110412R-D*
TDXU-1500FS-04	1.500	1.500	1.969	6.043	2.688	6.160	7.413	10.144	0.038	3.180	XPMT110412R-D*
TDXU-1562FS-04	1.562	1.500	1.969	6.291	2.688	6.410	7.677	10.408	0.022	3.310	XPMT110412R-D*
TDXU-1625FS-04	1.625	1.500	2.165	6.561	2.688	6.680	7.978	10.727	0.128	3.820	XPMT150512R-D*
TDXU-1687FS-04	1.687	1.500	2.165	6.809	2.688	6.930	8.242	10.991	0.115	4.120	XPMT150512R-D*
TDXU-1750FS-04	1.750	1.500	2.165	7.061	2.688	7.180	8.486	11.235	0.097	4.340	XPMT150512R-D*
TDXU-1812FS-04	1.812	1.500	2.165	7.309	2.688	7.430	8.754	11.503	0.082	4.600	XPMT150512R-D*
TDXU-1875FS-04	1.875	1.500	2.165	7.561	2.688	7.680	9.001	11.750	0.063	4.950	XPMT150512R-D*
TDXU-1937FS-04	1.937	1.500	2.165	7.809	2.688	7.930	9.259	12.008	0.049	5.210	XPMT150512R-D*
TDXU-2000FS-04	2.000	1.500	2.165	8.061	2.688	8.180	9.510	12.259	0.030	5.370	XPMT150512R-D*
TDXU-2125FS-04	2.125	1.500	2.165	8.561	2.688	8.680	10.040	12.789	-	6.390	XPMT150512R-D*

** For offsetting on lathe

Tool diameter (in)	Tool diameter tolerance (in)	Hole diameter tolerance (in)
ø0.500" - ø0.625"	+ 0.004" / 0	+ 0.016" / 0
ø0.687" - ø2.125"	+ 0.008" / 0	+ 0.018" / 0

*Just for reference

SPARE PARTS

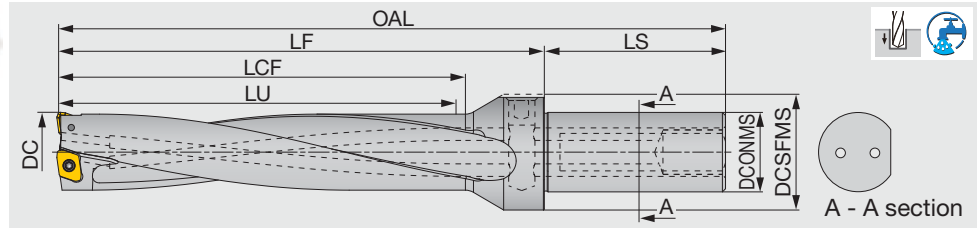


Designation	Clamping screw	Torx driver	Plug *	
			Side port	Rear port (Optional parts)
TDXU500 - TDXU0562	CSPB-2H	IP-6DB	NPTF1/8	(NPTF1/4)
TDXU-0625FS-04	CSPB-2L043	IP-6DB	NPTF1/8	(NPTF1/4)
TDXU0687 - TDXU0812	CSPB-2.2	IP-7D	NPTF1/8	(SL25IN)
TDXU0875 - TDXU1000	CSPB-2.5	IP-8D	NPTF1/8	(SL25IN)
TDXU1062 - TDXU1250	CSTB-3	T-9D	NPTF1/4	(SL32IN)
TDXU1312 - TDXU1562	CSTB-4	T-15D	NPTF1/4	(SL38IN)
TDXU1625 - TDXU2000	CSTB-5	T-20D	NPTF1/4	(SL38IN)

Recommended clamping torque: CSPB-2H/CSPB-2L043 = 0.52 lb-ft, CSPB-2.2 = 0.74 lb-ft, CSPB-2.5 = 0.96 lb-ft, CSTB-3 = 1.70 lb-ft, CSTB-4 = 2.58 lb-ft, CSTB-5 = 3.69 lb-ft

TDXU-F L/D=5

Indexable drill, L/D = 5, flat shank with side port



Inch	DC	DCONMS	DCSFMS	LU	LS	LCF	LF	OAL	Max. offset** (radial)	WT(lb)	Insert
TDXU-0500FS-05	0.500	0.750	1.250	2.515	2.000	2.630	3.519	5.534	0.030	0.470	XPMT040104R-D*
TDXU-0531FS-05	0.531	0.750	1.250	2.670	2.000	2.790	3.682	5.697	0.024	0.500	XPMT040104R-D*
TDXU-0562FS-05	0.562	0.750	1.250	2.825	2.000	2.950	3.841	5.856	0.018	0.510	XPMT040104R-D*
TDXU-0625FS-05	0.625	0.750	1.250	3.146	2.000	3.270	4.161	6.182	0.026	0.550	XPMT050204R-D*
TDXU-0687FS-05	0.687	1.000	1.457	3.454	2.280	3.580	4.535	6.834	0.048	0.900	XPMT06X308R-D*
TDXU-0750FS-05	0.750	1.000	1.457	3.769	2.280	3.890	4.841	7.140	0.027	0.960	XPMT06X308R-D*
TDXU-0812FS-05	0.812	1.000	1.457	4.079	2.280	4.200	5.168	7.467	0.015	1.020	XPMT06X308R-D*
TDXU-0875FS-05	0.875	1.000	1.457	4.398	2.280	4.520	5.474	7.777	0.045	1.100	XPMT07H308R-D*
TDXU-0937FS-05	0.937	1.000	1.457	4.708	2.280	4.830	5.805	8.108	0.029	1.220	XPMT07H308R-D*
TDXU-1000FS-05	1.000	1.000	1.457	5.023	2.280	5.140	6.111	8.414	0.013	1.230	XPMT07H308R-D*
TDXU-1062FS-05	1.062	1.250	1.575	5.339	2.280	5.460	6.590	8.899	0.059	1.690	XPMT08T308R-D*
TDXU-1125FS-05	1.125	1.250	1.575	5.654	2.280	5.770	6.916	9.225	0.043	1.810	XPMT08T308R-D*
TDXU-1187FS-05	1.187	1.250	1.575	5.964	2.280	6.080	7.219	9.528	0.026	1.970	XPMT08T308R-D*
TDXU-1250FS-05	1.250	1.250	1.575	6.279	2.280	6.400	7.533	9.842	0.010	2.160	XPMT08T308R-D*
TDXU-1312FS-05	1.312	1.500	1.969	6.603	2.688	6.720	7.949	10.680	0.088	3.030	XPMT110412R-D*
TDXU-1375FS-05	1.375	1.500	1.969	6.918	2.688	7.040	8.280	11.011	0.072	3.190	XPMT110412R-D*
TDXU-1437FS-05	1.437	1.500	1.969	7.228	2.688	7.350	8.583	11.314	0.055	3.220	XPMT110412R-D*
TDXU-1500FS-05	1.500	1.500	1.969	7.543	2.688	7.660	8.913	11.644	0.038	3.510	XPMT110412R-D*
TDXU-1562FS-05	1.562	1.500	1.969	7.853	2.688	7.970	9.239	11.970	0.022	3.700	XPMT110412R-D*
TDXU-1625FS-05	1.625	1.500	2.165	8.186	2.688	8.300	9.603	12.352	0.128	4.300	XPMT150512R-D*
TDXU-1687FS-05	1.687	1.500	2.165	8.496	2.688	8.610	9.929	12.678	0.115	4.670	XPMT150512R-D*
TDXU-1750FS-05	1.750	1.500	2.165	8.811	2.688	8.930	10.236	12.985	0.097	4.940	XPMT150512R-D*
TDXU-1812FS-05	1.812	1.500	2.165	9.121	2.688	9.240	10.567	13.316	0.082	5.250	XPMT150512R-D*
TDXU-1875FS-05	1.875	1.500	2.165	9.436	2.688	9.550	10.876	13.625	0.063	5.680	XPMT150512R-D*
TDXU-1937FS-05	1.937	1.500	2.165	9.746	2.688	9.860	11.196	13.945	0.049	6.010	XPMT150512R-D*
TDXU-2000FS-05	2.000	1.500	2.165	10.061	2.688	10.180	11.510	14.259	0.030	6.140	XPMT150512R-D*
TDXU-2125FS-05	2.125	1.500	2.165	10.686	2.688	10.800	12.165	14.914	-	7.460	XPMT150512R-D*

** For offsetting on lathe

Tool diameter (in)	Tool diameter tolerance (in)	Hole diameter tolerance (in)
ø0.500" - ø0.625"	+ 0.004" / 0	+ 0.016" / 0
ø0.687" - ø2.125"	+ 0.008" / 0	+ 0.018" / 0

*Just for reference

SPARE PARTS

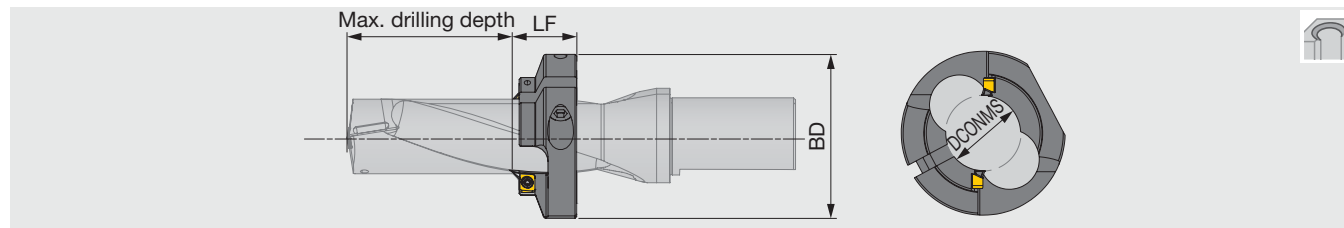


Designation	Clamping screw	Torx driver	Plug *	
			Side port	Rear port (Optional parts)
TDXU500 - TDXU0562	CSPB-2H	IP-6DB	NPTF1/8	(NPTF1/4)
TDXU-0625FS-05	CSPB-2L043	IP-6DB	NPTF1/8	(NPTF1/4)
TDXU0687 - TDXU0812	CSPB-2.2	IP-7D	NPTF1/8	(SL25IN)
TDXU0875 - TDXU1000	CSPB-2.5	IP-8D	NPTF1/8	(SL25IN)
TDXU1062 - TDXU1250	CSTB-3	T-9D	NPTF1/4	(SL32IN)
TDXU1312 - TDXU1562	CSTB-4	T-15D	NPTF1/4	(SL38IN)
TDXU1625 - TDXU2000	CSTB-5	T-20D	NPTF1/4	(SL38IN)

Recommended clamping torque: CSPB-2H/CSPB-2L043 = 0.52 lb-ft, CSPB-2.2 = 0.74 lb-ft, CSPB-2.5 = 0.96 lb-ft, CSTB-3 = 1.70 lb-ft, CSTB-4 = 2.58 lb-ft, CSTB-5 = 3.69 lb-ft

TDXCF chamfering tool

Chamfering tool for TungDrillTwisted and TungSix-Drill



Inch	DCONMS	BD	LF	Application Drill	L/D = 2		L/D = 3		L/D = 4	
					TDX***F	TDX***W	TDX***F	TDX***W	TDX***F	TDX***W
TDXCF180L25	0.681	1.929	0.984	TDX185*25-*	0.591	0.831	1.319	1.559	2.047	2.287
TDXCF190L25	0.713	1.929	0.984	TDX190*25-*	0.630	0.874	1.378	1.622	2.126	2.370
TDXCF210L25	0.791	1.929	0.984	TDX195*25-*	0.669	0.921	1.437	1.689	2.205	2.457
TDXCF230L25	0.870	1.929	0.984	TDX200*25-*	0.787	0.965	1.575	1.752	2.323	2.539
TDXCF240L25	0.909	1.929	0.984	TDX205*25-*	0.827	1.012	1.634	1.819	2.402	2.626
TDXCF260L30	0.982	2.520	1.181	TDX210*25-*	0.866	1.055	1.693	1.882	2.480	2.709
TDXCF270L30	1.020	2.520	1.181	TDX215*25-*	0.906	1.102	1.752	1.949	2.559	2.795
TDXCF290L30	1.098	2.520	1.181	TDX220*25-*	0.945	1.146	1.811	2.012	2.638	2.878
TDXCF300L30	1.138	2.520	1.181	TDX225*25-*	0.984	1.193	1.870	2.079	2.717	2.965
TDXCF320L30	1.217	2.520	1.181	TDX230*25-*	1.024	1.236	1.929	2.142	2.795	3.047

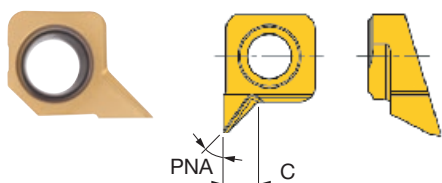
SPARE PARTS

SPARE PARTS				
Designation	Screw for insert			
TDXCF200... - TDXCF250...	CSPB-4S	CM6X16	IP-15D	P-5
TDXCF260... - TDXCF320...	CSPB-4S	CM8X1.25X20-A	IP-15D	P-6

Recommended clamping torque (N·m): CSPB-4S = 3.5

INSERT

XHGX-45A

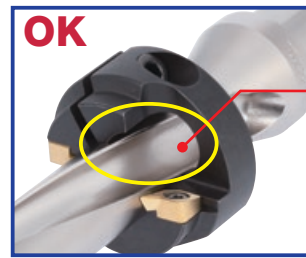
[illegible]

★ : First choice
☆ : Second choice

●: Line up

■ 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.



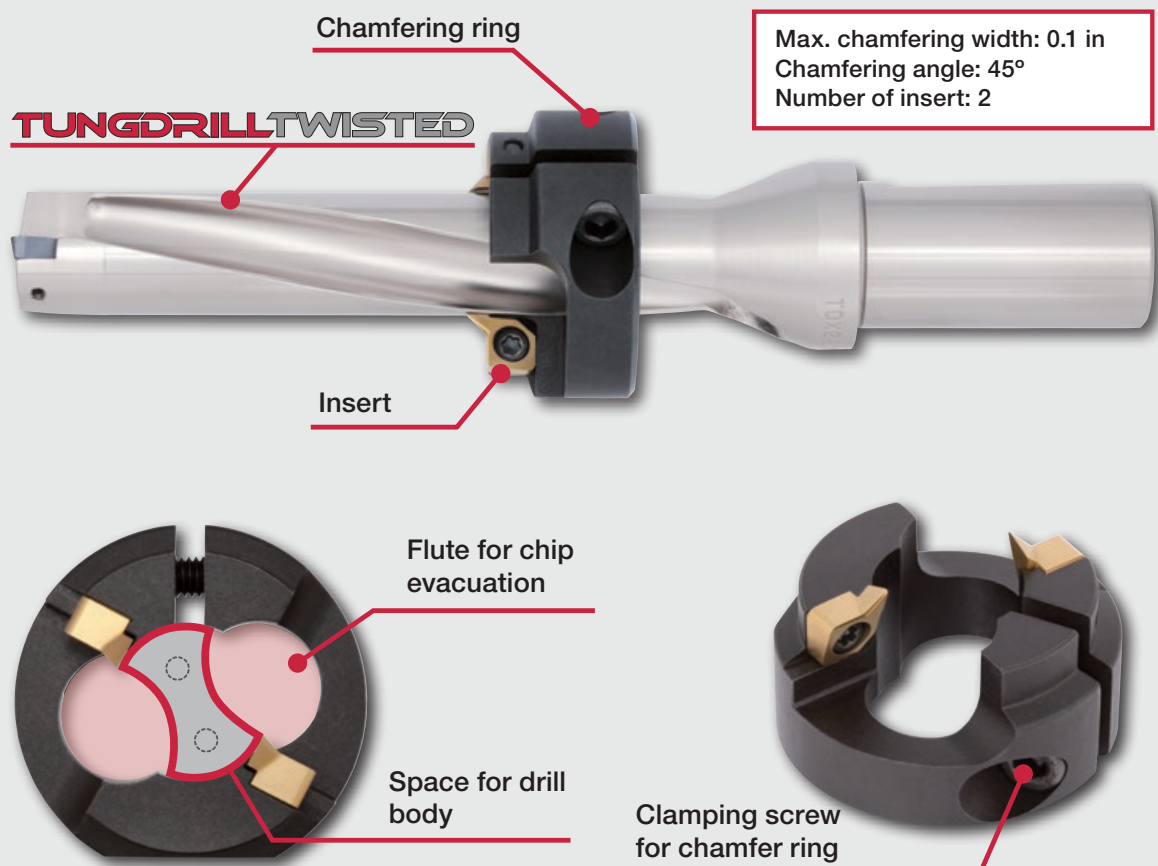
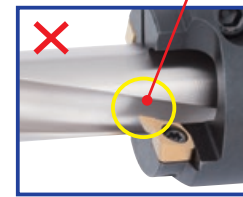
Match the positions of flutes on drill and ring.

(Inserts will be automatically set to the right positions.)

The cutting edge of the insert is in the ring flute.



The flutes on drill and ring do not match.



■ EZ sleeve (Eccentric sleeve)

The function of EZ sleeves

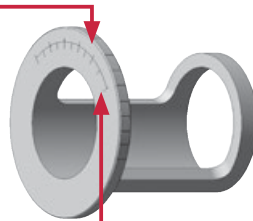
Adjusting the hole diameter when drilling

Adjusting the hole diameter in tool-rotating applications.

By using EZ sleeve, the hole diameter can be adjusted in the range from **+0.024" to -0.008"**.



Scale for adjusting the hole diameter in milling machine (Periphery of sleeve)



Adjusting cutting edge height on lathe

Adjusting the cutting edge height in rotating work applications.

By using EZ sleeve, the cutting edge height can be adjusted in the range from **+0.012" to -0.008"**. That reduces troubles caused by improper cutting-edge height.

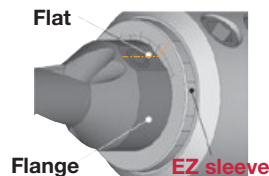


Scale for adjusting cutting edge height in turning (Front face of sleeve)

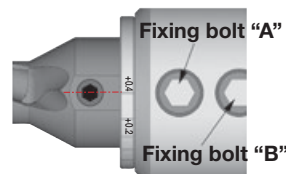
Setting of EZ sleeve

Adjusting the hole diameter on M/C

Set the EZ sleeve between the drill shank and the holder. Align the scale on the periphery of EZ sleeve with the center of the flat on drill flange.



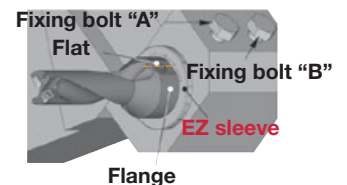
In the figure shown on right, the sleeve is set and the hole diameter will be increased by 0.016".



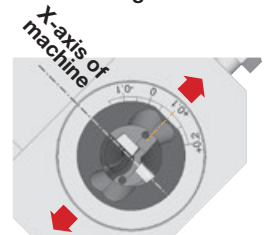
When rotating EZ sleeve, fixing bolts "A" and "B" have to be loosened. After setting the hole diameter, fix the drill body with bolt "A". Then lightly tighten the bolt "B" to fix EZ sleeve. If the bolt "B" is over tightened, EZ sleeve may be damaged.

Adjusting cutting edge height on lathe

Set the EZ sleeve between the drill shank and the toolblock. Align the scale on the front face of the EZ sleeve with the center of the flat on drill flange.



In the figure shown on right, the sleeve is set and the center of the drill will shift by 0.004" to the plus (+) direction.

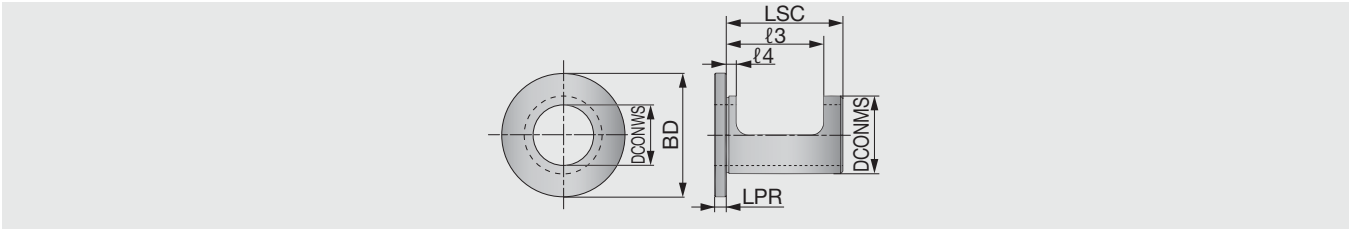


Cautious points

- Cannot be used for collet chuck holders.
- For adjustments over $L/D = 4$, please reduce feed rate.
- For smaller adjustment, the drill itself will interfere with the hole diameter. It is recommended that the hole diameter should be adjusted to a larger diameter than the drill diameter.

EZ sleeve

Eccentric sleeve for TungDrillTwisted and TungSix-Drill

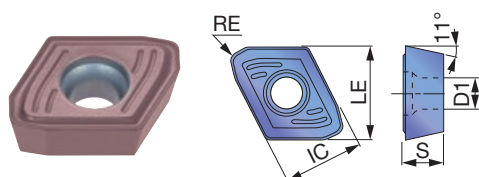


Inch	DCONWS	DCONMS	BD	LSC	LPR	l3	l4	Hole diameter adjustment	Cutting edge height adjustment
EZ0.75-1.25	0.750	1.250	1.750	2.000	0.200	1.575	0.375	+0.016 ~ - 0.008	+0.008 ~ - 0.006
EZ1.00-1.50	1.000	1.500	2.000	2.500	0.200	1.965	0.375	+0.016 ~ - 0.008	+0.008 ~ - 0.006
EZ1.25-2.00	1.250	2.000	2.500	2.700	0.200	1.965	0.375	+0.016 ~ - 0.008	+0.008 ~ - 0.006
EZ1.50-2.00	1.500	2.000	2.750	2.900	0.200	1.965	0.375	+0.024 ~ - 0.008	+0.012 ~ - 0.008

SPARE PARTS

Designation	Wrench
EZ...	P-2.5

DW



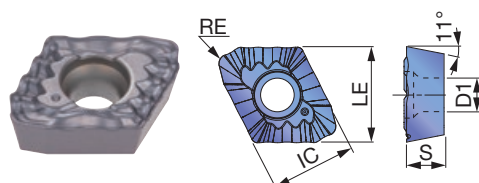
P	Steel	☆	☆	★	★	☆			
M	Stainless	☆	☆	★	★	☆			
K	Cast iron		★	☆	☆	★			
N	Non-ferrous	☆		★	★				
S	Superalloys	☆	☆	★	★	☆			
H	Hard materials	☆	☆	★	★	☆			

★ : First choice
☆ : Second choice

Designation	IC	LE	Coated										S	D1	RE	DCN	DCX	
			▲	●	●	▲	▲											
			AH725	AH7020	AH7030	AH6030	AH9030											
XPMT040104R-DW	0.169	0.177	●	●	●	▲	▲							0.063	0.090	0.016	0.500	0.562
XPMT050204R-DW	0.205	0.213	●	●	●	▲	▲							0.094	0.090	0.016	0.625	0.625
XPMT06X308R-DW	0.236	0.276	●	●	●	▲	▲							0.118	0.100	0.032	0.687	0.812
XPMT07H308R-DW	0.276	0.323	●	●	●	▲	▲							0.142	0.110	0.032	0.875	1.000
XPMT08T308R-DW	0.335	0.390	●	●	●	▲	▲							0.156	0.130	0.032	1.062	1.250
XPMT110412R-DW	0.441	0.492	●	●	●	▲	▲							0.187	0.170	0.047	1.312	1.562
XPMT150512R-DW	0.591	0.634	●	●	●	▲	▲							0.219	0.220	0.047	1.625	2.125

●: New product
●: Line up
▲: To be discontinued

DG



P	Steel	★			
M	Stainless	☆			
K	Cast iron				
N	Non-ferrous	★			
S	Superalloys	☆			
H	Hard materials				

★ : First choice
☆ : Second choice

Designation	IC	LE	Coated									S	D1	RE	DCN	DCX
			AH725													
XPMT08T308R-DG	0.335	0.390	●									0.156	0.130	0.032	1.062	1.250
XPMT110412R-DG	0.441	0.492	●									0.187	0.170	0.047	1.312	1.562
XPMT150512R-DG	0.591	0.634	●									0.219	0.220	0.047	1.625	2.125

●: Line up

RECOMMENDED INSERT

ISO	Workpiece material	First choice	Wear resistance	Chip control
P	Low carbon steel (C ≤ 0.3%)	DJ AH7030	DJ AH7020	DW AH7030 / DG AH725
	Carbon steel (C > 0.3%), Low alloy steel, Alloy steel	DJ AH7030	DJ AH7020	DW AH7030
M	Stainless steel	DS AH7030	DS AH7020	DJ AH7030
K	Grey cast irons	DJ AH7020	DJ T1115	-
	Ductile cast irons	DJ AH7030	DJ AH7020	-
N	Aluminium alloy	DJ AH725	-	DG AH725
S	Heat-resistant alloys, Titanium alloys	DJ AH7030	DJ AH7020	-
H	Hardened steel	DJ AH7030	DJ AH7020	-

STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Hardness	Cutting speed Vc (sfm)	Series L/D	Feed: f (ipr)				
					ø0.500" ~ ø0.562"	ø0.625"	ø0.687" ~ ø1.000"	ø1.062" ~ ø1.25"	ø1.312" ~ ø2.000"
P	Low carbon steels (C < 0.3) SS400, SM490, S25C, etc. st42-1, St52-3, C25, etc.	- 200 HB	525 - 1050	2D, 3D	0.0008 - 0.0024	0.0008 - 0.0024	0.0016 - 0.0039	0.0016 - 0.0039	0.0016 - 0.0039
				4D, 5D	0.0008 - 0.0024	0.0008 - 0.0024	0.0016 - 0.0039	0.0016 - 0.0039	0.0016 - 0.0039
	Carbon steels (C > 0.3) S45C, S55C, etc. C45, C55, etc.	- 300 HB	262 - 820	2D, 3D	0.0016 - 0.0039	0.0016 - 0.0047	0.0024 - 0.0051	0.0024 - 0.0059	0.0031 - 0.0071
				4D, 5D	0.0016 - 0.0031	0.0016 - 0.0031	0.0024 - 0.0039	0.0024 - 0.0047	0.0031 - 0.0055
M	Low alloy steels SCM415, etc.	- 200 HB	525 - 820	2D, 3D	0.0016 - 0.0031	0.0016 - 0.0031	0.0024 - 0.0047	0.0024 - 0.0047	0.0024 - 0.0055
				4D, 5D	0.0016 - 0.0031	0.0016 - 0.0031	0.0024 - 0.0047	0.0024 - 0.0047	0.0024 - 0.0055
	Alloy steels SCM440, SCR420, etc. 42CrMo4, 20Cr4, etc.	- 300 HB	262 - 656	2D, 3D	0.0016 - 0.0039	0.0016 - 0.0047	0.0024 - 0.0051	0.0024 - 0.0059	0.0031 - 0.0071
				4D, 5D	0.0016 - 0.0031	0.0016 - 0.0031	0.0024 - 0.0039	0.0024 - 0.0047	0.0031 - 0.0055
	Stainless steels (Austenitic) SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-2, etc.	- 200 HB	328 - 656	2D, 3D	0.0008 - 0.0031	0.0008 - 0.0031	0.0016 - 0.0039	0.0016 - 0.0047	0.0016 - 0.0047
				4D, 5D	0.0008 - 0.0031	0.0008 - 0.0031	0.0016 - 0.0039	0.0016 - 0.0047	0.0016 - 0.0047
K	Grey cast irons FC250, etc., 250, etc.	150 - 250 HB	262 - 820	2D, 3D	0.0024 - 0.0047	0.0024 - 0.0047	0.0024 - 0.0059	0.0024 - 0.0071	0.0031 - 0.0079
				4D, 5D	0.0024 - 0.0039	0.0024 - 0.0039	0.0024 - 0.0047	0.0024 - 0.0055	0.0031 - 0.0063
	Ductile cast irons FCD700, etc., 600-3, etc.	150 - 250 HB	262 - 656	2D, 3D	0.0016 - 0.0047	0.0016 - 0.0047	0.0024 - 0.0059	0.0024 - 0.0071	0.0031 - 0.0079
				4D, 5D	0.0016 - 0.0039	0.0016 - 0.0039	0.0024 - 0.0047	0.0024 - 0.0055	0.0031 - 0.0063
N	Aluminium alloy A2017, ADC12, etc. AlCu4SiMg, AlSi11Cu3, etc.	-	656 - 1312	2D, 3D	0.0039 - 0.0047	0.0039 - 0.0059	0.0059 - 0.0079	0.0059 - 0.0079	0.0059 - 0.0098
S	Heat-resistant alloys Inconel 718, etc.	- 40 HRC	66 - 197	2D, 3D	0.0016 - 0.0031	0.0016 - 0.0031	0.0016 - 0.0039	0.0016 - 0.0039	0.0016 - 0.0039
				4D, 5D	0.0016 - 0.0031	0.0016 - 0.0031	0.0016 - 0.0039	0.0016 - 0.0039	0.0016 - 0.0039
	Titanium alloys Ti-6Al-4V, etc.	- 40 HRC	131 - 394	2D, 3D	0.0024 - 0.0039	0.0024 - 0.0039	0.0024 - 0.0047	0.0024 - 0.0047	0.0024 - 0.0047
				4D, 5D	0.0024 - 0.0031	0.0024 - 0.0031	0.0024 - 0.0039	0.0024 - 0.0039	0.0024 - 0.0039
H	Hardened steel	- 50 HRC	131 - 328	2D, 3D	0.0016 - 0.0031	0.0016 - 0.0031	0.0016 - 0.0039	0.0016 - 0.0039	0.0016 - 0.0039
			131 - 328	4D, 5D	0.0016 - 0.0031	0.0016 - 0.0031	0.0016 - 0.0031	0.0016 - 0.0031	0.0016 - 0.0031

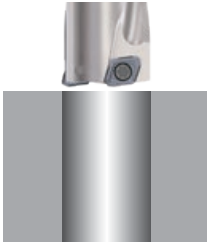
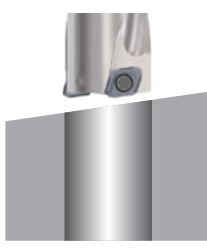
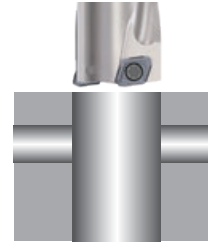
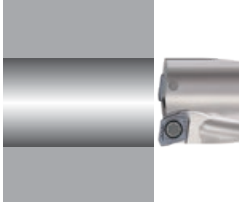
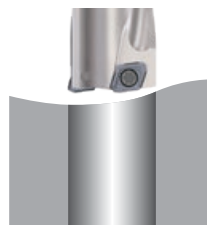
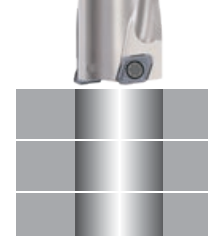
STANDARD CUTTING CONDITIONS FOR DG CHIPBREAKER

ISO	Workpiece material	Hardness	Cutting speed Vc (sfm)	Series L/D	Feed: f (ipr)	
					ø1.063" ~ ø1.250"	ø1.312" ~ ø2.125"
P	Low carbon steels (C < 0.3) SS400, SM490, S25C, etc. st42-1, St52-3, C25, etc.	- 200 HB	197 - 591	2D, 3D 4D, 5D	0.0016 - 0.004	

- When using the smaller side of the diameter range, the feed rate should be set lower.
- When using DW chipbreaker for work materials of 40 HRC, the feed rate should be set below 50%.
- For difficult-to-cut materials (heat-resistant alloys, etc.), the cutting speed should be set 25% below that of carbon steels.
- High speed machining means cutting speeds over 492 sfm.

- For high-feed machining, apply a feed rate that is approximately 1.5 times the standard feed conditions.
- When using DW chipbreaker for troubleshooting, use it within the range of standard cutting conditions.
- DG chipbreaker is suitable for heavy machines that have low-rpm spindles. If chatter occurs, a lower feed rate is recommended.

APPLICATION RANGE

Feed f (ipr)	See page 20	0.002	0.002	0.002
Application	OK Plane surface 	OK Slant surface 	OK Cross hole 	OK Plunging 
Feed f (ipr)	0.004	0.002	Disapprove	Disapprove
Application	OK Boring 	OK Round surface 	X Stacked plate 	X Back boring 

In case of Interrupted cutting, feed should be decreased.

Maximum drilling diameter and maximum offset amount for each diameter

The drilling diameter can be adjusted by offsetting the drill using the X-axis of the machine or with the eccentric sleeve. Refer to the list below for the maximum drilling diameter and maximum offset amount available for the individual drill diameters.

DC	Max. drilling diameter	Max. offset amount
0.500	0.56	0.03
0.531	0.579	0.024
0.562	0.598	0.018
0.625	0.677	0.026
0.687	0.783	0.048
0.750	0.804	0.027
0.812	0.842	0.015
0.875	0.965	0.045
0.938	0.995	0.029
1.000	1.026	0.013
1.063	1.18	0.059
1.125	1.211	0.043
1.187	1.239	0.026
1.250	1.27	0.01
1.312	1.488	0.088

DC	Max. drilling diameter	Max. offset amount
1.375	1.519	0.072
1.437	1.547	0.055
1.500	1.576	0.038
1.562	1.606	0.022
1.625	1.881	0.128
1.687	1.917	0.115
1.750	1.944	0.097
1.812	1.976	0.082
1.875	2.001	0.063
1.937	2.035	0.049
2.000	2.06	0.03
2.125	-	-

Special Indexable Tooling Competency —

Tungaloy's customized indexable combination drills for higher productivity

We at Tungaloy design and produce indexable combination drills tailored to meet your specific application needs. In addition to lower tooling cost thanks to indexable solution, one of the key benefits of these custom combination tools is the ability to perform several different operations such as drilling, chamfering, and counterboring in a single pass, thereby providing increased machine uptime and reduced cost per part.

Drilling + Counter boring



Drilling + Counter boring + Chamfering



L/D = 7 Deep drilling

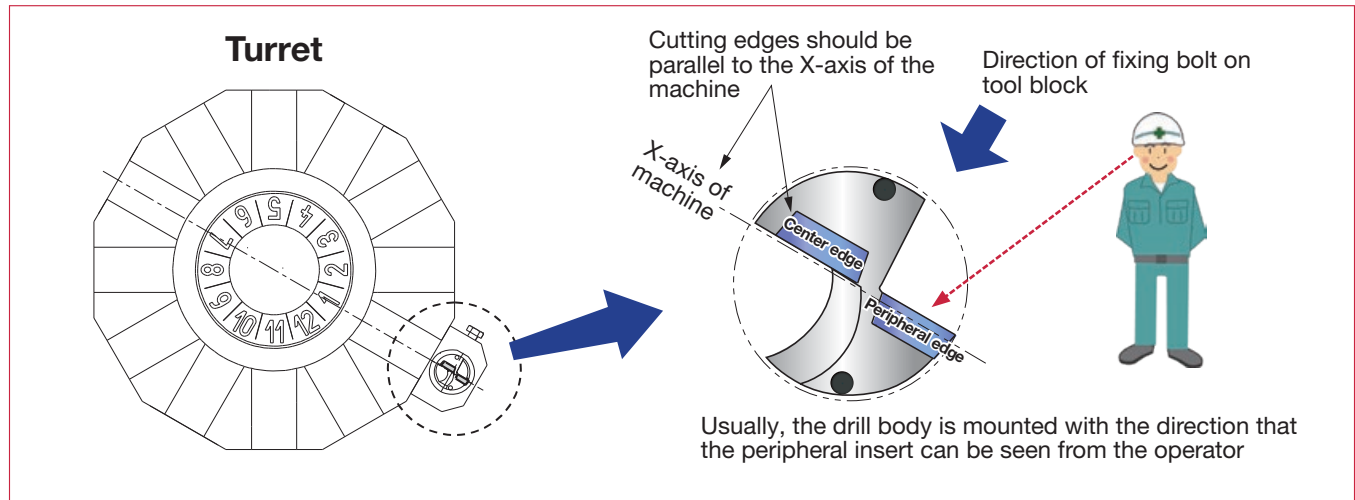


■ Use of TungDrillTwisted on lathes

Setting of drill body is critical for successful machining

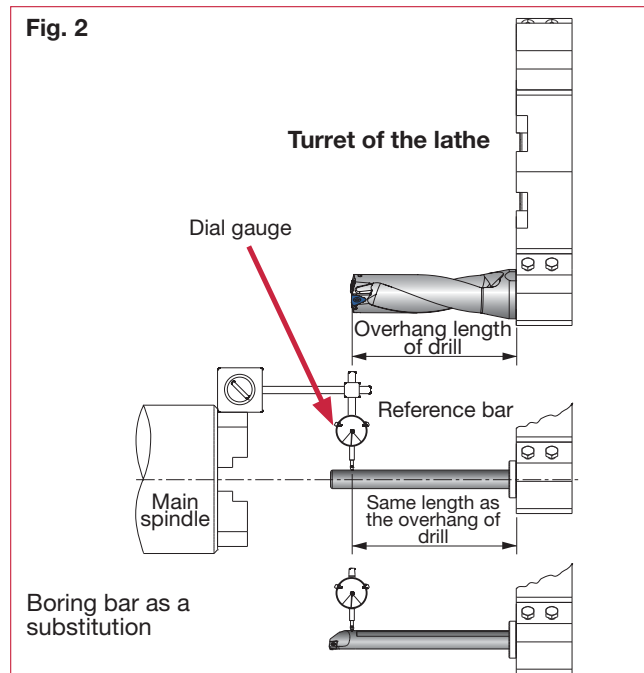
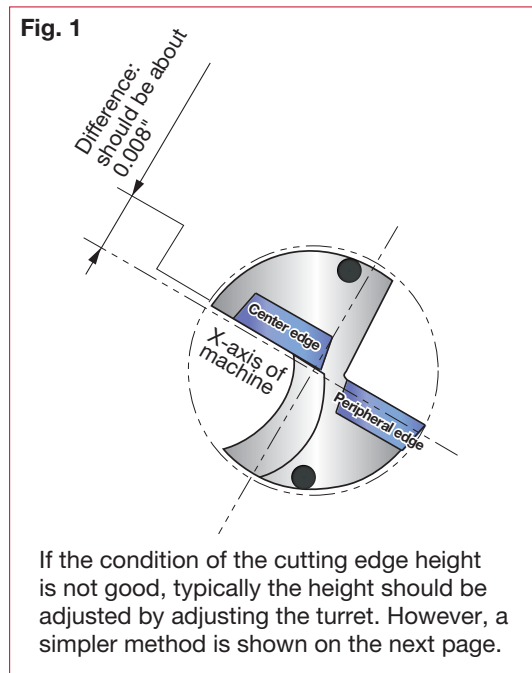
Mounting the drill on turret (tool post)

- 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 flat on the 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.



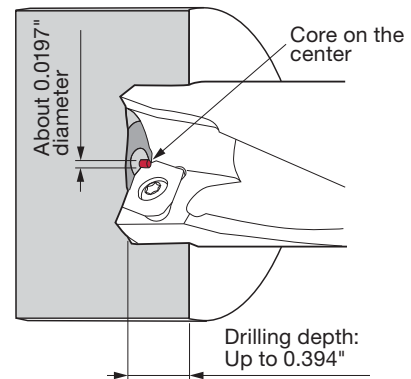
Checking of cutting edge height

- The cutting edge height is an important factor for stable machining.
- The cutting edge of center insert should be 0.008" 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 $\phi 0.0197$ " 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 $\phi 0.039$ ", it is "excessively below center". In these cases, the cutting edge height has to be checked again.
- When trial cutting, the feed should be 0.004 ipr or less, drilling depth should be up to 0.394".



Adjusting of cutting edge height

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

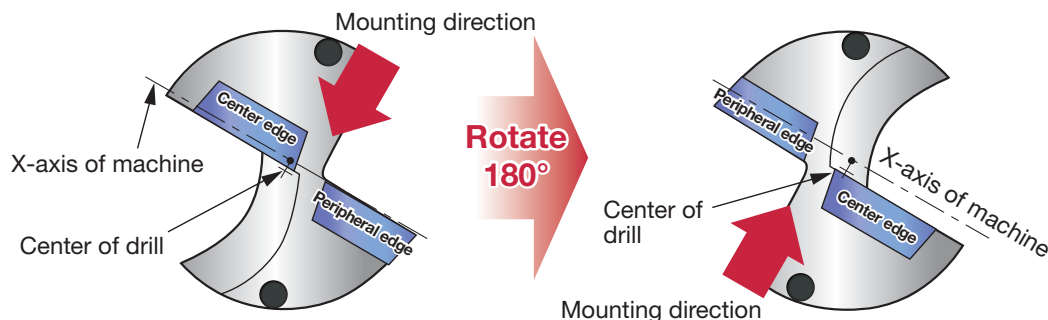
① In the case of "above-center"

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

Solution #1: Change the mounting direction.

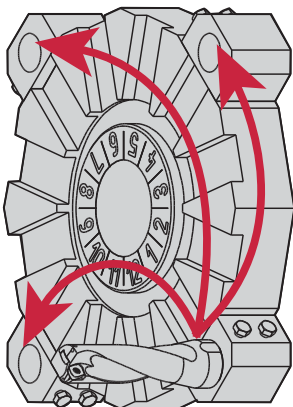
Solution #2: Rotate drill body 180°

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



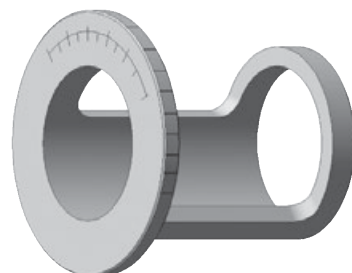
② In the case of "slightly above-center" (about 0.002")

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



③ In the case of "excessive below-center" (0.008" 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 16.

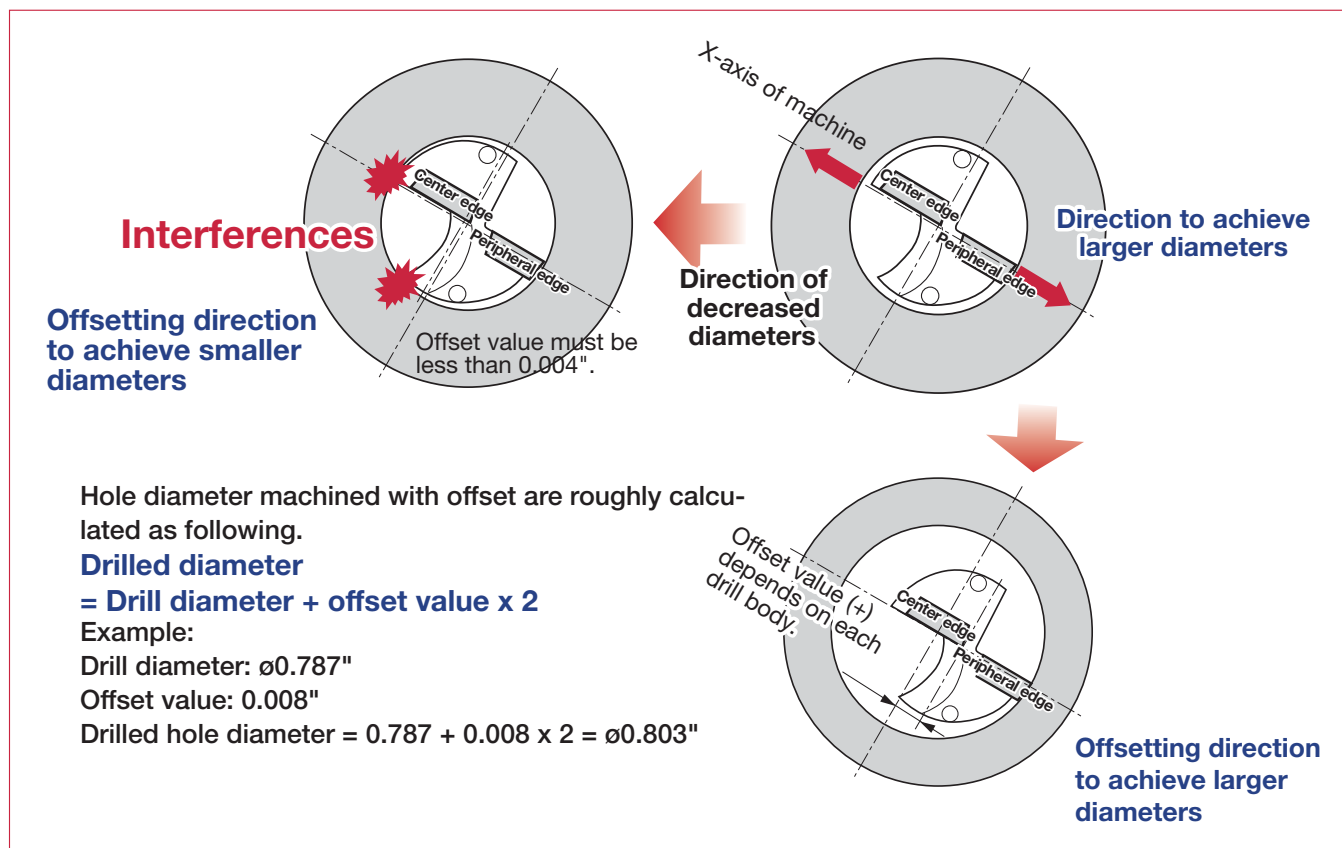


Machining with offset on the lathe

A larger hole than the drill diameter can be machined!

Drilling with offset

- When drilling on the lathe, the hole diameter can be adjusted by offsetting the drill body along the X-axis of machine.
- When drilling with offset, the drill body must be correctly mounted with cutting edges parallel to the X-axis of the machine. "Mounting the drill on the turret" can be viewed on page 23.



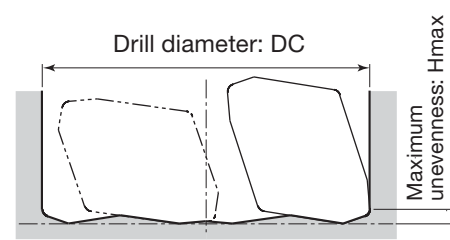
SHAPE OF THE HOLE BOTTOM

Un-evenness of the hole-bottom face when machined with **TungDrillTwisted** is smaller than with HSS drills!

The shape of the hole bottom machined with **TungDrillTwisted** is closer to flat compared with those machined with HSS drills.

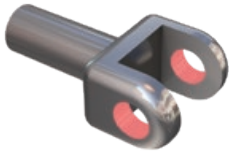
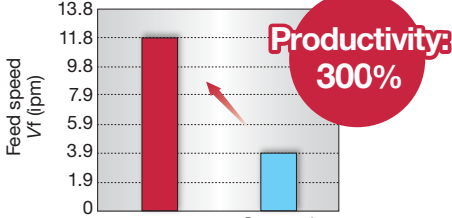
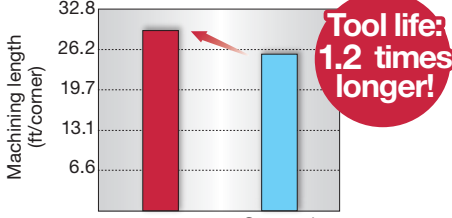
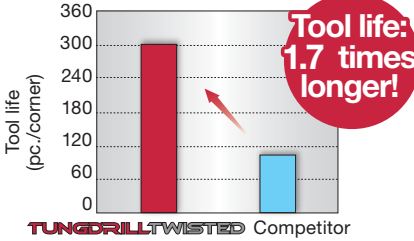
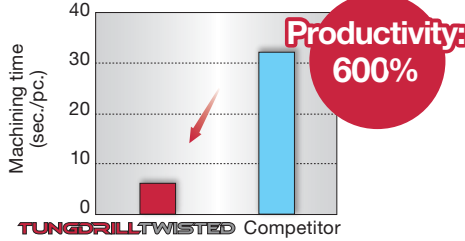
Drill diameter DC (in)	$\varnothing 0.500 - 0.562$	$\varnothing 0.625$	$\varnothing 0.687 - 0.812$	$\varnothing 0.875 - 1.000$	$\varnothing 1.062 - 1.250$	$\varnothing 1.312 - 1.562$	$\varnothing 1.625 - 2.000$
Insert	XPMT 04...	XPMT 05...	XPMT 06...	XPMT 07...	XPMT 08...	XPMT 11...	XPMT 15...
Hmax (in)	0.024	0.031	0.039	0.043	0.051	0.075	0.091

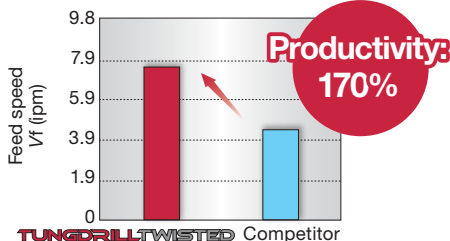
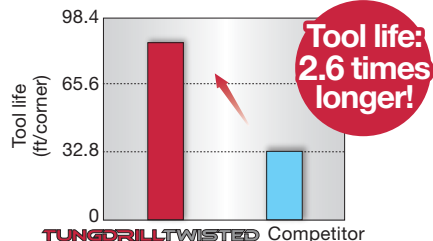
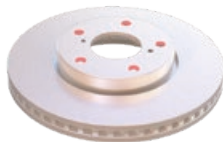
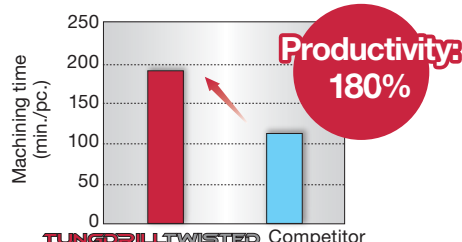
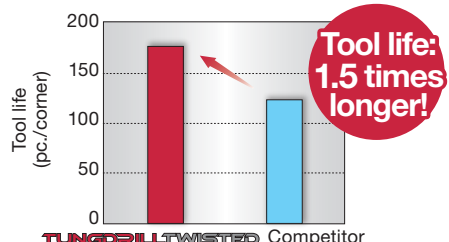
■ Hole bottom shape obtained with **TungDrillTwisted**



TUNGDRILLTWISTED

PRACTICAL EXAMPLES

Workpiece type		Pinion	York
Drill		TDX185F25-2	TDX200F25-3
Insert		XPMT06X308R-DW	XPMT06X308R-DJ
Grade		AH7020	AH725
Workpiece material		SCM435 / 34CrMo4	S33C
		 P	 P
Cutting conditions	Cutting speed: V_c (sfm)	525	453
	Feed: f (ipr)	0.004	0.002
	Feed speed: V_f (ipm)	11.811	5.197
	Drilling depth: H (in)	0.709	0.984
	Machine	NC lathe	Special-purpose machine
	Coolant	Wet	Wet
Results		 Productivity: 300% TUNGDRILLTWISTED Competitor Due to strong resistance against oxidation at high temperature, coating layer prevents damage on tools from expanding even at increased feed. Therefore, productivity is improved without shortening the tool life of cutting edges.	 Tool life: 1.2 times longer! TUNGDRILLTWISTED Competitor 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.
Workpiece type		Connecting rod	Bearing cover
Drill		TDX200F25-3	TDX180F25-2
Insert		XPMT06X308R-DW	XPMT06X308R-DS
Grade		AH725	AH7030
Workpiece material		S55C / C55	S45C / C45
		 P	 P
Cutting conditions	Cutting speed: V_c (sfm)	295	459
	Feed: f (ipr)	0.002	0.002
	Feed speed: V_f (ipm)	3.386	5.827
	Drilling depth: H (in)	0.866	0.512
	Machine	Special-purpose machine	Vertical lathe
	Coolant	Wet	Wet
Results		 Tool life: 1.7 times longer! TUNGDRILLTWISTED Competitor 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.	 Productivity: 600% TUNGDRILLTWISTED Competitor DS chipbreaker's good hole entry enables stable machining of workpiece materials with low rigidity. Even at double the cutting speed and triple the feed rate, no problems occur during operation, and tool life is increased by 3 times.

Workpiece type		Link	Shaft
Drill		TDX230F25-3	TDX190F20-3
Insert		XPMT07H308R-DW	XPMT06X308R-DJ
Grade		AH7030	AH7030
Workpiece material		S45C / C45	SUS316L
		 P	 M
Cutting conditions	Cutting speed: V_c (sfm)	492	492
	Feed: f (ipr)	0.004	0.005
	Feed speed: V_f (ipm)	8.189	12.205
	Drilling depth: H (in)	1.339	1.299
	Machine	Vertical M/C	NC lathe
	Coolant	Wet	Wet
Results		 Productivity: 170% 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.	 Tool life: 2.6 times longer! AH7030 with thick coating and oxide layer prevents wear and welding on tools and achieves 2.6 times longer tool life than the competitor.
Workpiece type		Valve	Brake rotor
Drill		TDX230F25-2	TDX235F25-2
Insert		XPMT07H308R-DS	XPMT07H308R-DJ
Grade		AH725	AH7020
Workpiece material		SUS316L	FC250 / 250
		 M	 K
Cutting conditions	Cutting speed: V_c (sfm)	459	486
	Feed: f (ipr)	0.004	0.003
	Feed speed: V_f (ipm)	7.638	6.299
	Drilling depth: H (in)	0.984	1.378
	Machine	NC lathe	Vertical M/C
	Coolant	Wet	Wet
Results		 Productivity: 180% 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.	 Tool life: 1.5 times longer! 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.

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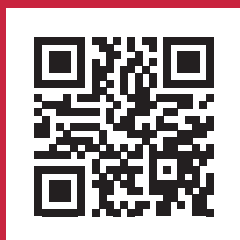
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