

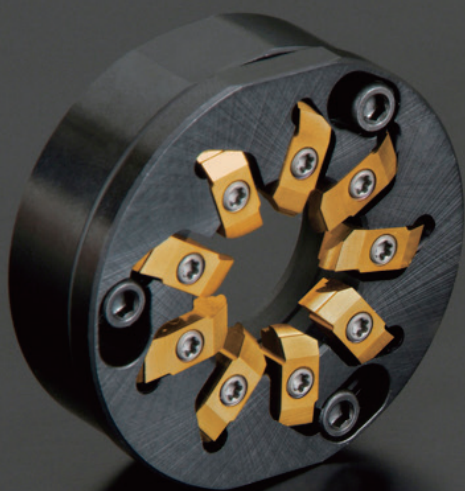
Thread Whirling **ECO**

High-efficiency threading | For CNC automatic lathe



Expanded lineups of cutter with 3-blade and 6-blade cutter, as well as cutters for left-hand threads, to provide more cost options for a wider range of applications

CERtainly | but not only | **CERamics**
Outstanding solutions for demanding applications



Single-pass machining is possible,
and multi-lead threads are also supported.
Significantly reduces the machining time of threading.

High-efficiency threading I for CNC automatic lathes

Thread Whirling

- Lineup of 3-blade and 6-blade cutter bodies
- 1-corner insert can be selected.

New

Thread Whirling **ECO**

- Lineup of cutter bodies for left-hand threads

I Performance

In automatic lathes, threading is performed by repeating multiple cutting passes. Therefore, when machining long screws, it is necessary to ensure that the workpiece does not fall off from the guide bush. However, threadwhirling allows for single-pass machining, eliminating the need for subsequent joining process.

In addition, single-pass machining is possible even for multi-lead threads such as double and triple lead screws. This eliminates the need for multiple cutting passes and subsequent joining processes, thus achieving high efficiency threading.

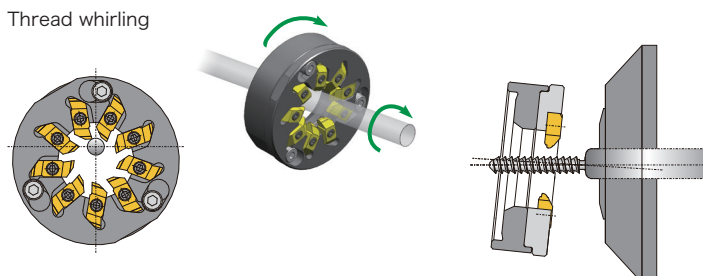
	Double-lead threads	Triple-lead threads
Component	Bone Screw	Worm Screw
Work material	Ti-6Al-4V ELI	brass
Workpiece		
Insert shape		
Major Dia.	$\phi 4.0$	$\phi 7.0$
Minor Dia.	$\phi 2.4$	$\phi 4.7$
Lead	3.42mm	4.9mm

When machining multi-lead threads by in a single pass, numerous process requirements must be met. Please contact us to discuss mechanical, Spindle, Insert, tooling specification.

I Machining overview

In thread whirling, the whirling head is tilted to a specific helix angle, and the cutter is rotated at high speed while the bar stock (c axis) is rotated at a low speed. It is possible to machine the outer dimension by adding a wiper to the insert.

Thread whirling



I Cutter body with selectable number of inserts

The number of inserts can now be selected according to the balance between machining time and cost.

Thread Whirling **ECO**



3 inserts

Emphasis on cost



6 inserts

Balance



9 inserts

Emphasis on machining efficiency

I Select the number of corners according to your needs

The number of corners can now be selected according to the number of workpieces produced.

Thread Whirling **ECO**



1 corner type

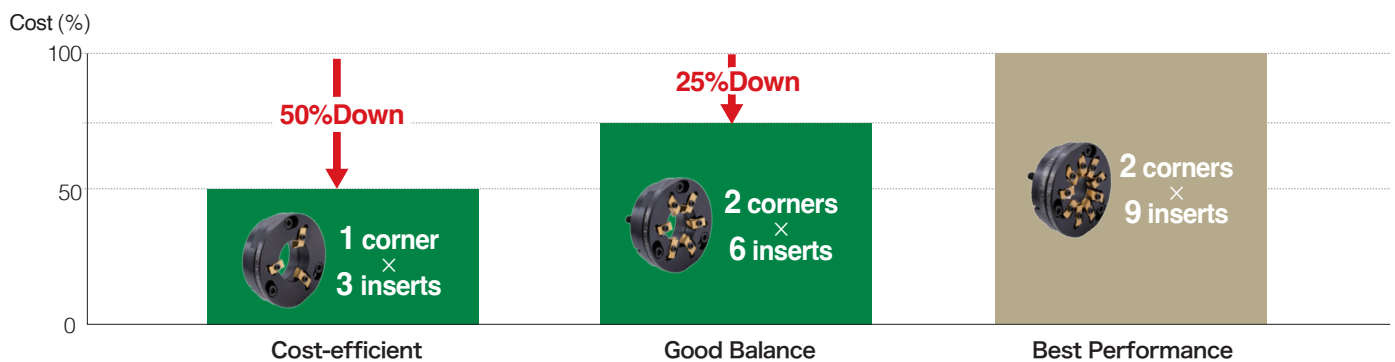
For prototyping and small-lot, high-mix production



2 corner type

For mass production

I Cost-saving effect

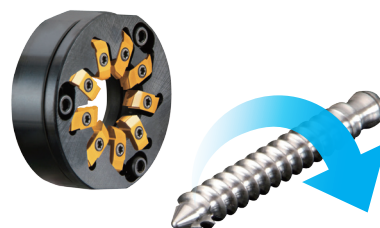


I Cutter bodies are available for Left/Right-hand screws

A head for left-hand threads has been added to accommodate a wide range of workpieces.

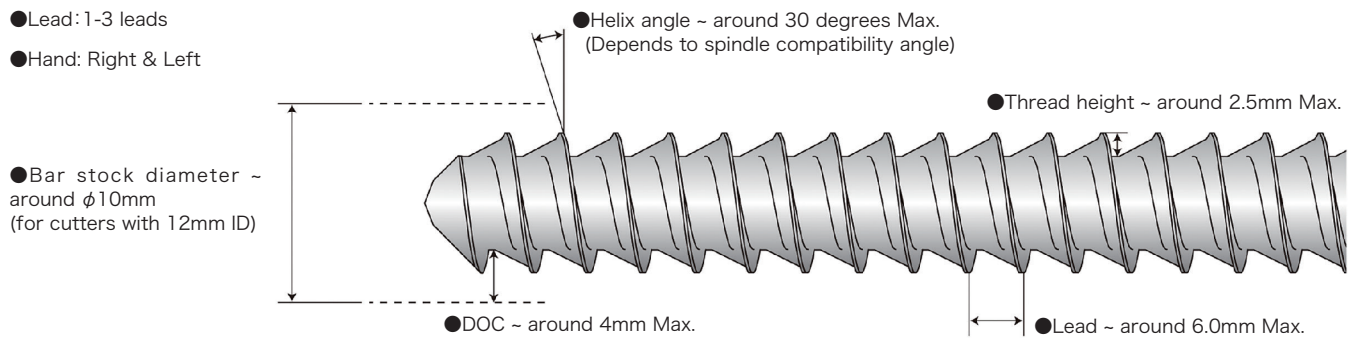


Left hand Screw



Right hand Screw

I Applicable Thread Geometry (Approximated)



The geometries shown above are approximated and could vary by actual applications

I Recommended Cutting Conditions

Conditions / No. of teeth		9	6	3
Main spindle	min-1	10 - 40	10 - 25	5 - 12
Whirling cutter	min-1	1,500 - 4,000		
Feed rate		Same as thread lead = pitch		
Bar stock	mm	$-\phi 10$	$-\phi 10$	$-\phi 10$
Work Material		Ti-6Al-4V EL / SUS316 / 17-4PH / Titanium / Brass etc.		

Formula for calculating thread whirling process time

$$T(\text{seconds}) = \frac{60 \times \text{Thread length}}{\text{Main spindle rpm} \times \text{Feed rate (Thread Lead)}}$$

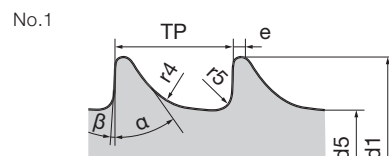
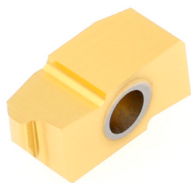
Ex.) Double lead / 50mm length / 2mm lead (2 × 1mm pitch) / 30rpm

$$T(\text{seconds}) = \frac{60 \times 50\text{mm}}{30\text{rpm} \times 2\text{mm lead}} = 50 \text{ second}$$

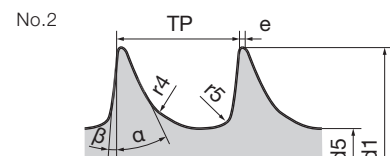
I Standard Thread Whirling Inserts (two-sided) for Medical ISO Style Threads

TWC.. series/Inserts Carbide

ISO5835 with chipbreaker



ISO5835 HA



ISO5835 HB

P	Steel	★
M	Stainless	★
N	Non-ferrous	★
S	Superalloys	★
H	Hard materials	★

★ : First choice
☆ : Second choice

Designation	HAND	Coated	ISO	Pitch	d1	d5	e	r4	r5	α	β	Figure
		ZM3										
TW5835-HA1.5-D12	R	●	HA1.5	0.5	1.5	1.1	0.1	0.3	0.1	35	3	1
TW5835-HA2.0-D12	R	●	HA2.0	0.6	2	1.3	0.1	0.4	0.1	35	3	1
TW5835-HA2.7-D12	R	●	HA2.7	1	2.7	1.9	0.1	0.6	0.2	35	3	1
TW5835-HA3.5-D12	R	●	HA3.5	1.25	3.5	2.4	0.1	0.8	0.2	35	3	1
TW5835-HA4.0-D12	R	●	HA4.0	1.5	4	2.9	0.1	0.8	0.2	35	3	1
TW5835-HA4.5-D12	R	●	HA4.5	1.75	4.5	3	0.1	1	0.3	35	3	1
TW5835-HA5.0-D12	R	●	HA5.0	1.75	5	3.5	0.1	1	0.3	35	3	1
TW5835-HB4.0-D12	R	●	HB4.0	1.75	4	1.9	0.1	0.8	0.3	25	5	2
TW5835-HB6.5-D12	R	●	HB6.5	2.75	6.5	3	0.2	1.2	0.8	25	5	2

Must use Thread whirling cutters with 12mm ϕ Dm dimension

● : Line up

Cutter Lineup

Machine maker	Model	Location	Spindle maker	Spindle model	Helix angle	No.	Cutter body	No. of teeth	φDm (mm)	φDs	P.C.D.	Mount adapter bolt								
CITIZEN	A20	Gang	CITIZEN	BTW-5000	0°-15°	1	TWC3C1040HP1 TWC3C1040HP1-LH TWC6C1040HP1	3 3 6	φ12 φ12 φ12	φ33	φ40	M3 (Provided with spindle)								
	A20(2F)/A20(3F)			BTW-2000	±25°		TWC6C1040HP1-LH TWC9C1040HP1 TWC9C1040HP1-LH TWC9C1040HP1-D16	6 9 9 9	φ12 φ12 φ12 φ16											
							A32													
	C12/16		JARVIS	LTRO170	±15°	2	TWC9C1037P2	9	φ12	φ37	φ30.5	CS0310 (M3)								
	C20/C32(2M)			CITIZEN	BTW-1000	±25°	1	TWC3C1040HP1 TWC3C1040HP1-LH TWC6C1040HP1 TWC6C1040HP1-LH TWC9C1040HP1 TWC9C1040HP1-LH TWC9C1040HP1-D16	3 3 6 6 9 9 9	φ12 φ12 φ12 φ12 φ12 φ12 φ16	φ33	φ40	M3 (Provided with spindle)							
					C32	BTW-3100		0°-15°												
									D25	BTW-6000				±25°						
	D25(1M)																			
	K16	Attachment	PCM	GSW-101	±15°	1	TWC6P1620HP1-D9	6	φ9	φ32	φ26	M4 (Provided with spindle)								
	L20			CITIZEN	BTW-1000	±25°	1	TWC3C1040HP1 TWC3C1040HP1-LH TWC6C1040HP1 TWC6C1040HP1-LH TWC9C1040HP1 TWC9C1040HP1-LH TWC9C1040HP1-D16	3 3 6 6 9 9 9	φ12 φ12 φ12 φ12 φ12 φ12 φ16	φ33	φ40	M3 (Provided with spindle)							
								JARVIS	LTRO183	±15°				2	TWC9J1040P2	9	φ12	φ40	φ32.5	H-M4 × 12
									PCM	LSW-101-L20					±10°	TWC9P1340P2	9			φ12
				L20/L20E/L20X			BTW-3000 BTW-3100	0°-15°	1	TWC9C0746HP1	9	φ12	φ46	φ35	M3 (Provided with spindle)					
				L20/L20X			BTW-2000	±25°	1	TWC3C1040HP1 TWC3C1040HP1-LH TWC6C1040HP1 TWC6C1040HP1-LH TWC9C1040HP1 TWC9C1040HP1-LH TWC9C1040HP1-D16	3 3 6 6 9 9 9	φ12 φ12 φ12 φ12 φ12 φ12 φ16	φ33	φ40	M3 (Provided with spindle)					
		L20(7M)			BTW-1000															
		L20E(1M)	Gang	CITIZEN	BTW-3000	±15°	1	TWC9C0746HP1	9	φ12	φ46	φ35	M3 (Provided with spindle)							
					BTW-1000	±25°	1	TWC3C1040HP1 TWC3C1040HP1-LH TWC6C1040HP1 TWC6C1040HP1-LH TWC9C1040HP1 TWC9C1040HP1-LH TWC9C1040HP1-D16	3 3 6 6 9 9 9	φ12 φ12 φ12 φ12 φ12 φ12 φ16	φ33	φ40	M3 (Provided with spindle)							
		BTW-5000																		
		BTW-3100			±15°															
		BTW-2000			±25°															
		L20E(2M)/L20E(3M)			BTW-6000															
		L20X					BTW-3000 BTW-3100	0°-15°	1	TWC9C0746HP1	9	φ12	φ46	φ35	M3 (Provided with spindle)					
		L32/L32X					BTW-2000	±25°	1	TWC3C1040HP1 TWC3C1040HP1-LH TWC6C1040HP1 TWC6C1040HP1-LH TWC9C1040HP1 TWC9C1040HP1-LH TWC9C1040HP1-D16	3 3 6 6 9 9 9	φ12 φ12 φ12 φ12 φ12 φ12 φ16	φ33	φ40	M3 (Provided with spindle)					
	BTW-6000						±15°													
	L32(1M)			BTW-2000	±25°															
				BTW-6200	±15°															
L32(2M)			BTW-6000	±25°																
			BTW-3100	±15°																
L32X			BTW-2000	±25°																
M12/M16(2M)	Turret		MSW105	±15°	2	TWC9C1037P2	9	φ12	φ37	φ30.5	CS0310 (M3)									
M16	Gang			BTW-5000	±25°	1	TWC3C1040HP1 TWC3C1040HP1-LH TWC6C1040HP1 TWC6C1040HP1-LH TWC9C1040HP1 TWC9C1040HP1-LH TWC9C1040HP1-D16	3 3 6 6 9 9 9	φ12 φ12 φ12 φ12 φ12 φ12 φ16	φ33	φ40	M3 (Provided with spindle)								
M2/16	Turret	JARVIS	LTRO 128 LTRO168	±15°	2	TWC9C1037P2	9	φ12	φ37	φ30.5	CS0310 (M3)									

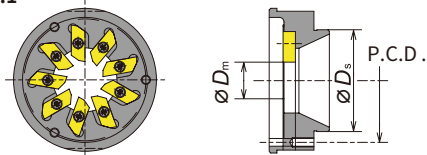
Machine maker	Model	Location	Spindle maker	Spindle model	Helix angle	No.	Cutter body	No. of teeth	φDm (mm)	φDs	P.C.D.	Mount adapter bolt					
	M2/16III	Turret	CITIZEN	MSW105	±15°	2	TWC9C1037P2	9	φ12	φ37	φ30.5	CS0310 (M3)					
	M20	Gang		BTW-2000	±25°	1	TWC3C1040HP1 TWC3C1040HP1-LH TWC6C1040HP1	3 3 6	φ12 φ12 φ12	φ33	φ40	M3 (Provided with spindle)					
				BTW-1000	+20°- -25°		TWC6C1040HP1-LH TWC9C1040HP1 TWC9C1040HP1-LH TWC9C1040HP1-D16	6 9 9 9	φ12 φ12 φ12 φ16								
	M20/16	Turret	PCM	NSW-101	±10°	2	TWC9P1340P2	9	φ12	φ40	φ32.5	M4 (Provided with spindle)					
	M20/32	Gang	JARVIS	LTRO183 LTRO169	±15°		TWC9J1040P2					H-M4 × 12					
	M20/32III	Turret	CITIZEN	KSW110			TWC9C1037P2					φ37	φ30.5	CS0310 (M3)			
	M20/M32		PCM	KSW-101	±10°		TWC9P1340P2					φ40	φ32.5	M4 (Provided with spindle)			
	M20/M32(3M)	Gang	CITIZEN	KSW110	±15°	1	TWC9C1037P2	9	φ12	φ37	φ30.5	CS0310 (M3)					
				BTW-1000	±25°		TWC3C1040HP1 TWC3C1040HP1-LH TWC6C1040HP1 TWC6C1040HP1-LH TWC9C1040HP1 TWC9C1040HP1-LH TWC9C1040HP1-D16						3 3 6 6 9 9 9	φ12 φ12 φ12 φ12 φ12 φ12 φ16	φ33	φ40	M3 (Provided with spindle)
	M20/M32(4M)	Gang	CITIZEN	BTW-4000	±15°	1	TWC9C0746HP1	9	φ12	φ46	φ35	M3 (Provided with spindle)					
	M32			BTW-2000	±25°	1	TWC3C1040HP1 TWC3C1040HP1-LH TWC6C1040HP1 TWC6C1040HP1-LH TWC9C1040HP1 TWC9C1040HP1-LH TWC9C1040HP1-D16	3 3 6 6 9 9 9	φ12 φ12 φ12 φ12 φ12 φ12 φ16	φ33	φ40	M3 (Provided with spindle)					
M32(5M)	BTW-6000 BTW-2000																
STAR	SL-10	Attachment	STAR	10159	±20°	1	TWC4S1433HP1	4	φ8	φ38	φ27	CS0310 (M3)					
	SW-12			68172	-20°-0°	2	TWC3S1640P2 TWC3S1640P2-LH TWC6S1640P2 TWC6S1640P2-LH TWC9S1640P2 TWC9S1640P2-LH	3 3 6 6 9 9 9	φ12	φ40	φ33	CS04148S (M4)					
	SW-20			54178	±10°												
	ECAS-12/20	Turret		59172	±20°												
	ECAS-20T			58171	±10°												
	ECAS-32T			0M171	-20°-0°												
	SB-20R	Attachment		68172	±20°												
	SB-20/23RII			10172													
	SR-20J/20RIII 20RIV/32JII			0M171									-20°-0°				
	SR-38			19121	±20° (MAX φ8)								19122 ±25° (MAX φ6)				
	SD-26 (Common to all types)	0M171		-20°-0°													
	SD-26 type S	Swivel type unit		19121	±20° (MAX φ8)												
	SP-20	Attachment		19122	±25° (MAX φ6)												
	ST-20	Turret		0M171	-20°-0°												
	ST-38			59172	±20°												
	SV-12			43156	±10°												
	SV-20			45172													
	SV-20R			42173													
	SV-32			59172	±20°												
	SV-38R			43172	±10°												
	SX-38 type A			43156	±20°												
	SX-38 type B			12174													
	Attachment	68172	-20°-0°														

Machine maker	Model	Location	Spindle maker	Spindle model	Helix angle	No.	Cutter body	No. of teeth	φDm (mm)	φDs	P.C.D.	Mount adapter bolt										
TSUGAMI	BH20/BH38	Turret	TSUGAMI	3263-Y481	±10°	2	TWC3TS2252P2 TWC3TS2252P2-LH TWC6TS2252P2 TWC6TS2252P2-LH TWC9TS2252P2 TWC9TS2252P2-LH	3 3 6 6 9 9	φ12	φ52	φ42	CS0515 (M5)										
	B038T			3263-Y2481																		
	BS20			3214-Y1371			2	TWC9TS20550P2					9	φ16	φ50	φ40						
	SS20/SS26/SS32	Attachment		3268-Y451	0°-10° 0°-20° 0°-25° 0°-30°	3	TWC3TS2244HP1 TWC3TS2244HP1-LH TWC6TS2244HP1 TWC6TS2244HP1-LH TWC9TS2244HP1 TWC9TS2244HP1-LH TWC9TS1944HP1 TWC9TS1644HP1 TWC9TS1044HP1	3 3 6 6 9 9 9 9 9	φ12	φ52	φ44	CS0520 (M5) CS0520 (M5) CS0520 (M5) CS0520 (M5) CS0520 (M5) CS0520 (M5) CS0520 (M5) CS0515 (M5) CS0515 (M5)										
	B0265/B0266-II																					
	B0325/B0326-II																					
	B0265/B0266(V)-III																					
	B0325/B0326(V)-III																					
	BW329Z/B0385 386(L)-III																					
	S205/S206																					
	S205/S206-II																					
	B0123/124/126-II B0-V/B0-VR																					
	B0203/204/205 205-III/206-II																					
	SS20/SS26/SS32																					
	SS207/SS267/SS327												B-axis	Using B-axis	0°-15°	4	TWC4TS3010HP1	4	φ7	φ10	For single-corner inserts only	
	SS267/SS327-III												Attachment	3293-Y3031		3	TWC9TS1944HP1	9	φ12	φ52	φ44	CS0520 (M5)
	TORNOS												DECO 10/10a	Attachment	TORNOS	224-1900	±15°	3	TWC6TO11542HP1	6	φ12	φ42
		Evo DECO 10/10		242-1900																		
		DECO 13a/13e		226-1900																		
Evo DECO 16/10		243-1900	±15°	2	TWC9TO10540P2	9	φ12	φ40	φ31	CS0410 (M4)												
Swiss ST26		246-1900																				
DECO 20a		223-1900																				
DECO 26a		225-1900	±25°	2	TWC9TO12050P2-D18	9	φ18	φ50	φ40	CS0410 (M4)												
Sigma 20		234-2750																				
Sigma 32		236-2750																				
HASEGAWA	JS-1W	-	HASEGAWA	-	0° -20°	2	TWC9HA22594P2	9	φ16	φ94	φ76	CS0620 (M6)										
Various Machines	-	-	WTO	42BJ	-22°	1	TWC9WT42BJ20D12RH	9	φ12	-	-	-										
	-	-		54BJ	30°	1	TWC9WT54BJ30D12RH	9	φ12	-	-	-										
	-	-		54BJ	30°	1	TWC9WT54BJ25D22RH	9	φ22	-	-	-										

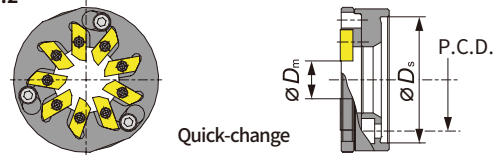
※Screws for insert-thickness 4.0/6.0mm are supplied with the cutter body.
Use screws for the thickness of the insert you are using.

Number of inserts and product appearance vary by part number.

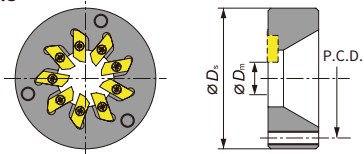
No.1



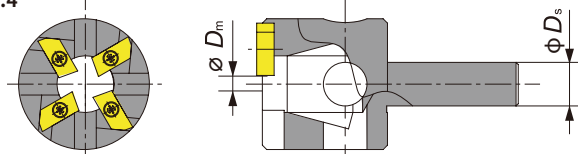
No.2



No.3



No.4



Guideline: Raw material diameter up to φ6, machinable up to length 18mm
(Contact for further information)

Spare Insert Holder (Cartridge)

Item number	No. of teeth	φDm (mm)
TWC6HP2	6	12
TWC9HP2	9	12
TWC9HP2-D16	9	12

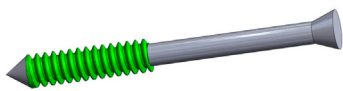
※Cannot be used for TWC9TS20550P2, TWC9TO12050P2-D18 and TWC9HA22594P2

Note(s): Note: Insert holder comes with insert screws and wrench Insert holder mounting screw is not included

Spare Parts

Description		Designation
Insert Screw	for 4mm thick inserts	FS117-2.2×6.0
	for 6.5mm thick inserts	FS124-2.2×7.9
Wrench		T-07
Cutter body Mounting Bolt		CS0309-TW

I Practical examples

Single-lead Bone Screw					
Work Material	Titanium alloys	Major Dia.	φ3.6		
Material Diameter	φ4.0	Minor Dia.	φ2.4		
Spindle Speed	15rpm	Number of Threads	1	Thread Whirling ECO	50%
Cutter Speed	4,000rpm	Edges par insert	1	Competitor Thread Whirling	100%
Pitch/Feed	1.25mm	Thread Direction	Right-hand thread		

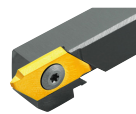
Cost ratio / workpiece (%)

The **Thread Whirling ECO** allows for more economical performance.

In this case, by reducing the number of teeth from 9 to 3 and the number of insert corners from 2 to 1, total machining costs can be reduced by 48% while maintaining the same tool life.

Double-lead Bone Screw					
Work Material	Titanium alloys	Major Dia.	φ4.0	NTK Thread Whirling 9-Blade Specification	
Material Diameter	φ9.5	Minor Dia.	φ0.5		
Spindle Speed	15rpm	Number of Threads	2	Competitor Chasing Processing	170 sec
Cutter Speed	3,500rpm	Edges par insert	2		
Pitch/Feed	5.5mm	Thread Direction	Right-hand thread		

26 sec

Single-lead Bone Screw					
Work Material	SUS316	Major Dia.	φ3.5	NTK Thread Whirling 9-Blade Specification	
Material Diameter	φ8.0	Minor Dia.	φ2.5		
Spindle Speed	23rpm	Number of Threads	1	Competitor Thread Whirling 6 Blade Specification	1,000 pcs
Cutter Speed	2,000rpm	Edges par insert	2		
Pitch/Feed	1.2mm	Thread Direction	Right-hand thread		

2,600 pcs



NTK CUTTING TOOLS JAPAN

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www.ntkcuttingtools.com/global/contact/