

TB



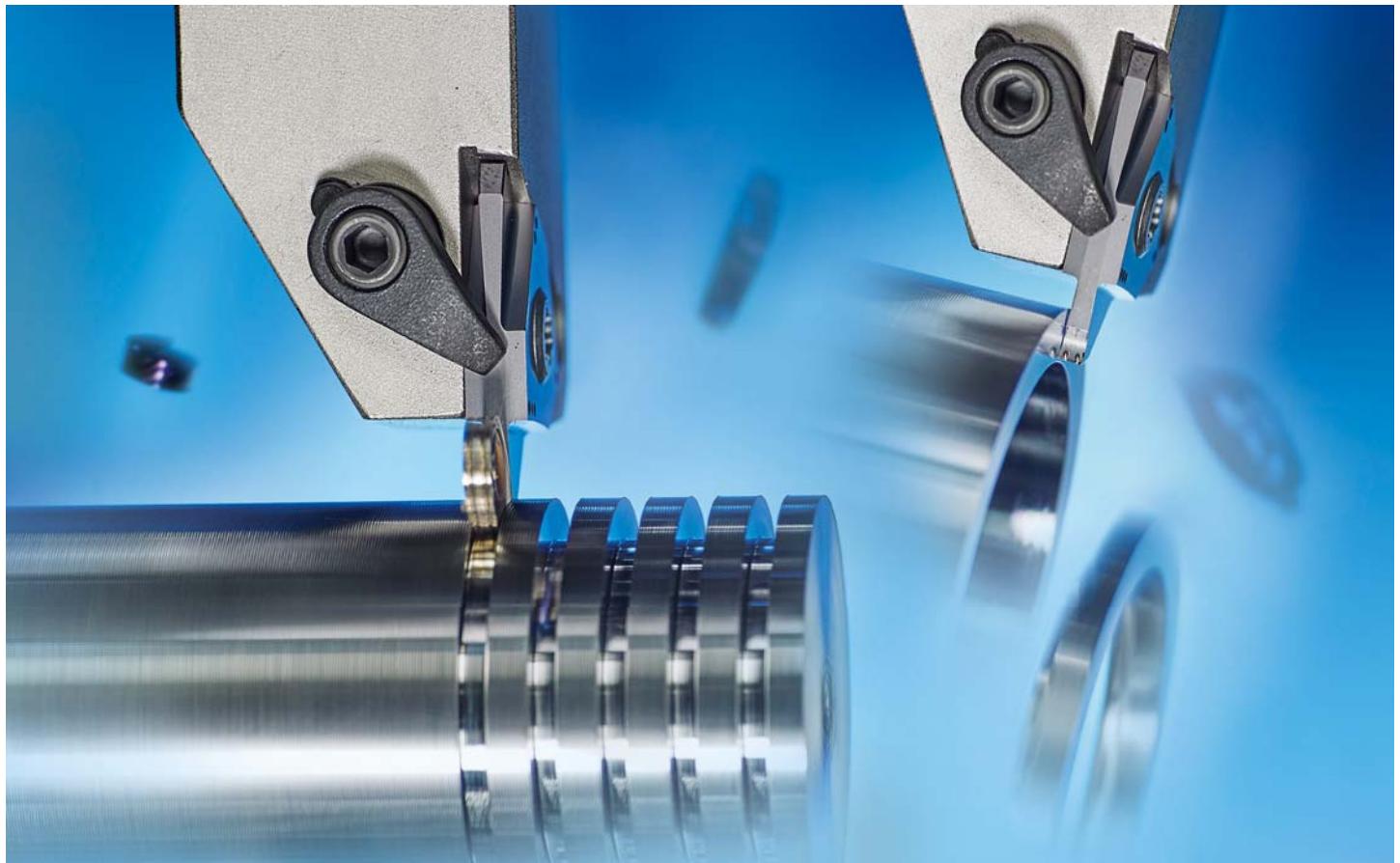
3-Corner Grooving & Parting Tools for High Speed, High Feed and Interrupted Machining

Machining Stability

Strong clamping prevents tool vibration to produce high quality finishes and longer tool life

Chip Control

Stable chip control boosts productivity at high speeds and high feeds



3-Corner Grooving & Parting Tools for High Efficiency

TB



TB3, TB4

Ground
chip breaker



TB4-M

M-class chip breaker



TB5-M

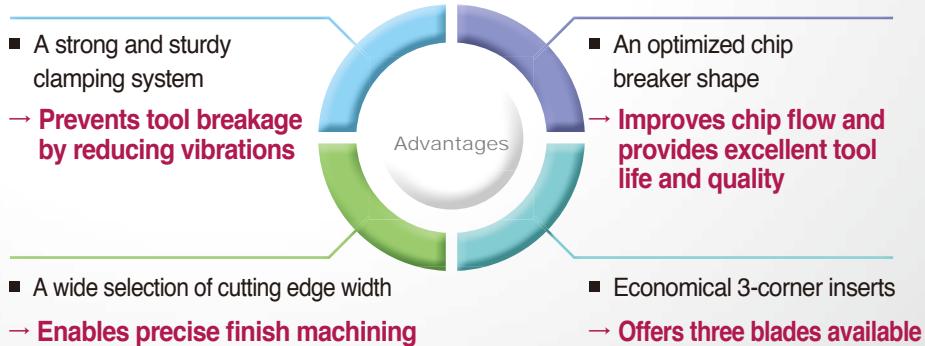
M-class chip breaker

Machining small components requires high productivity tools that are capable of high speed and high feed work. These tough cutting conditions often involve high spindle speeds over 2,000 RPM. These high speeds cause vibrations of the spindle, and the cutting tools are negatively affected by the vibrations.

Grooving and parting inserts normally have thin and narrow cutting edges, which leads to tool vibration at high speeds and feeds. Such vibrations can cause decreased level of surface finish, dimensional changes, and shortened tool life. Clamping stability and improved rigidity of the cutting edges are essential to cutting performance.

TB was designed to have wide supporting areas along the outer edge of the equilateral triangle-shaped insert, to maximize clamping stability. A double clamping system, using both a clamp and screw, also enables stable machining at high speeds, high feeds, and high interruptions. Additionally, its specialized chip breakers help to minimize cutting force and improve chip evacuation, which results in excellent surface finish.

TB is a combination of grooving and parting tools that can boost your productivity with its high stability at high speeds, high feeds, and high interruptions.



➔ Code System

[Insert]

TB	5	150	N	010	M
Triangle Blade	Inscribed circle 3: 9.525 mm 4: 12.7 mm 5: 15.875 mm	Cutting edge width 0.5~4.5 mm	Hand N: Neutral R: Right-handed L: Left-handed	Nose R 0.00~0.40mm	Chip breaker None M

[Holder]

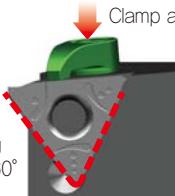
TBH	5	25	R
Triangle Blade Holder	Inscribed circle 3 : 9.525mm 4 : 12.7mm 5 : 15.875mm	Shank size 10~25mm	Hand R : Right-handed L : Left-handed

→ Common Problems When Grooving and Parting Off

- Vibrations and impacts are caused by low clamping stability in interrupted machining
→ **Burr creation, reduced surface quality and tool breakage**
- When chip flow is not smooth in high speed and high feed machining, chips are caught inside each groove and rough cutting edges
→ **Increased cutting force leads to inferior surface quality and shortened tool life**

→ Development of the TB

Higher clamping stability

Type	TB3, TB4, TB4-M	TB5-M
Shape	 <p>Clamp an insert Clamping area of 60°</p>	 <p>First, screw an insert Clamping area of 60°</p>
Features	<ul style="list-style-type: none"> • Stable clamping system with an internal angle of 60° • Clamp use 	<ul style="list-style-type: none"> • Stable clamping system with an internal angle of 60° • Double clamping using both a screw and a clamp

- Cutting conditions:
 vc (m/min) = 150
 ap (mm) = 3, wet

Improved chip control (M chip breaker)

Type	Competitor		TB4-M, TB5-M	
Feed, fn (mm/rev)	0.12	0.18	0.12	0.18
C45 (Carbon steel)				
X5CrNi18-9 (Stainless steel)				
Result	Decreased machining quality owing to unstable chip evacuation		Improved machining quality thanks to stable chip evacuation	

→ Development Effect



- Workpiece: 18CrMo4
- Cutting conditions :
 vc (m/min) = 120
 fn (mm/rev) = 0.1
 ap (mm) = 4.5, wet

Interrupted machining availability

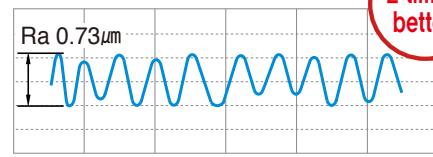
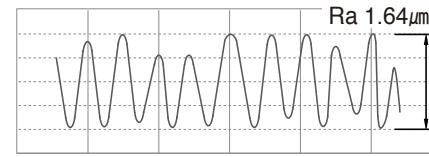


Reduced burrs



- Workpiece: C45
- Cutting conditions :
 vc (m/min) = 180
 fn (mm/rev) = 0.18
 ap (mm) = 5.0, wet

High speed and high feed machining availability



2 times better

→ TB Features

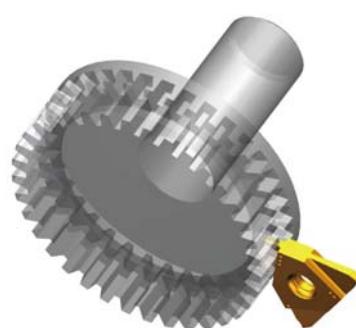
• **TB3, TB4, TB4-M**

(For grooving)
→ Recommended for continuous cutting

• **TB5-M (For grooving)**

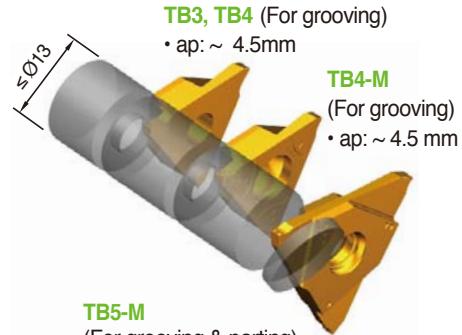
→ Recommended for both continuous and interrupted cutting

For interrupted machining



TB5-M (For grooving)
• ap: ~ 6.5 mm

For grooving and parting off



TB3, TB4 (For grooving)

• ap: ~ 4.5mm

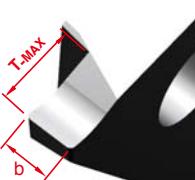
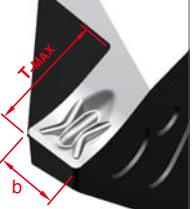
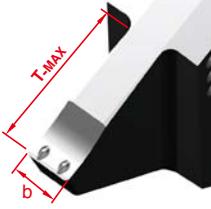
TB4-M (For grooving)

• ap: ~ 4.5 mm

TB5-M (For grooving & parting)
• ap: ~ 6.5 mm

→ **TB5-M is recommended for interrupted machining**

→ **TB5-M is capable of cutting off a steel bar with external diameter $\leq \text{Ø}13$**

Specification		TB3000R/L TB4000R/L	TB4000R-M	TB5000N-000-M 
Designation		TB3125R/L~TB3430R/L (Inscribed circle of 9.525 mm) TB4125R/L~TB4430R/L (Inscribed circle of 12.7 mm)	TB4150R-M ~TB4450R-M (Inscribed circle of 12.7 mm)	TB5050N-000-M ~TB5318N-020-M (Inscribed circle of 15.875 mm)
Insert shape				
Features	Chip breaker	Ground chip breaker	Pressed chip breaker	Pressed chip breaker
	Hand	Right/Left-handed	Right-handed	Neutral
	Cutting edge width (b)	TB3000: 1.25~4.3 mm TB4000: 1.25~4.5 mm	1.5~4.5 mm	0.5~3.18 mm
	Depth of cut (T-MAX)	TB3000: ~3.5 mm TB4000: ~5.0 mm	~5.0 mm	~6.5 mm
	Specialized	Shape ○	X	X
Chip breaker shape				
Application range		P	P, M, K	P, M, K
Grade		CN2000, PC5300	CN2000, PC5300	PC5300

⇒ Guide for TB

(mm)

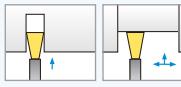
[Recommended machining method]

- TB3, TB4



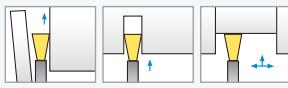
For grooving

- TB4-M



For grooving For turning

- TB5-M



For parting off For grooving For turning

Cutting edge width W	TB			Recommended feed rate (mm/rev)	TB3, TB4	TB4-M	TB5-M				
	Depth of cut T-MAX										
	TB3, TB4	TB4-M	TB5-M								
0.50	-	-	2.5	0.05 (0.03~0.1)	-	-	●				
0.80	-	-	1.6		-	-	●				
1.00	-	-	3.5		-	-	●				
1.04	-	-	2.0		-	-	●				
1.20	-	-	2.0		-	-	●				
1.25	2.0	-	2.0		●	-	-				
1.40	2.0	-	6.5		●	-	●				
1.45	2.0	-	-		●	-	-				
1.47	-	-	6.5		-	-	●				
1.50	3.5	3.5	6.5		●	●	●				
1.57	-	-	6.5		-	-	●				
1.70	-	-	6.5		-	-	●				
1.75	3.5	3.5	-		●	●	-				
1.78	-	-	6.5		-	-	●				
1.85	3.5	3.5	-		●	●	-				
1.96	-	-	6.5		-	-	●				
2.00	3.5	3.5	6.5		●	●	●				
2.15	3.5	3.5	-		●	●	-				
2.22	6.5	-	6.5		-	-	●				
2.30	3.5	3.5	6.5		●	●	●				
2.39	-	-	6.5		-	-	●				
2.47	-	-	6.5		-	-	●				
2.50	4.0	4.0	6.5		●	●	●				
2.65	4.0	4.0	6.5		●	●	-				
2.70	-	-	6.5		-	-	●				
2.80	4.0	4.0	-		●	●	-				
2.87	-	-	6.5		-	-	●				
3.00	4.0	4.0	6.5		●	●	●				
3.15	-	-	6.5		-	-	●				
3.18	-	-	6.5		-	-	●				
3.30	4.0	-	-		●	-	-				
3.50	5.0	5.0	-		●	●	-				
4.00	5.0	5.0	-		●	●	-				
4.30	5.0	5.0	-		●	●	-				
4.50	5.0	5.0	-		●	●	-				

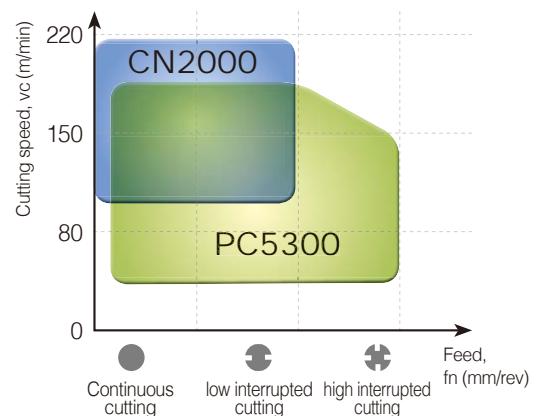
● : Managed item

⇒ Recommended Cutting Conditions

Recommended cutting speed, vc (m/min)

Workpiece	CN2000 (Cermet)			PC5300 (Coated)			
	Min.	Recommended	Max.	Min.	Recommended	Max.	
P	SMOOC type	100	160	220	80	140	200
	SCM type	100	150	200	80	130	180
M	STS type	-	-	-	40	80	150
	GC, GCD type	-	-	-	80	130	180

⇒ Recommended Cutting Range

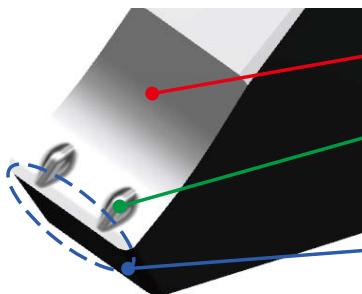


TB-M Chip Breaker

- Minimized cutting force at high speed and high feed → **Smooth chip evacuation outside each groove**
- High precision cutting performance → **Exceptional surface finish and accurate dimensions**
- Excellent chip flow and cutting results → **Ideal for automated and unmanned production**

- Purpose: Grooving, parting off and interrupted cutting ≤ 6.5 mm with T-MAX

TB5-M Chip breaker



Lowered back area: Minimizes chip frictions to prevent overload when evacuating chips.

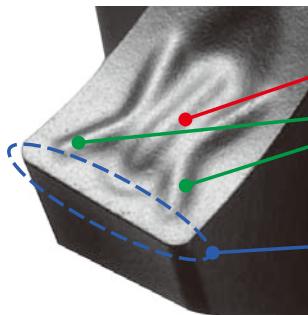
Beveled protruding dots: Facilitate smooth chip evacuation outside each groove. Minimize chip control work load at high depth of cuts. Form chip curls at regular intervals.

Cutting edge land: Prevents chipping and improves machining stability in interrupted cutting.

Designation	TB5050N-M ~TB5120N-M	TB5140N-M ~TB5178N-M	TB5196N-M ~TB5239N-M	TB5247N-M ~TB5287N-M	TB5300N-M ~TB5318N-M
Shape					
Cutting edge width (b)	0.5~1.2 mm	1.40~1.78 mm	1.96~2.39 mm	2.47~2.87 mm	3.0~3.18 mm

- Purpose: Grooving and turning ≤ 4.5 mm with T-MAX

TB4-M Chip breaker



Sub dots: Control stability of chip curls at high feed.

Main dots: Show exceptional chip control in turning and chamfering applications. Facilitate smooth chip evacuation outside each groove . Form chip curls at regular intervals.

Sharp cutting edges: Deliver sharp cutting performance.

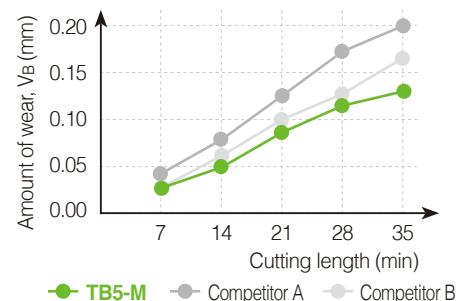
Designation	TB4150R-M ~TB4185R-M	TB4200R-M ~TB4228R-M	TB4300R-M ~TB4350R-M	TB4400R-M ~TB4450R-M
Shape				
Cutting edge width (b)	1.5~1.85 mm	2.0~2.8 mm	3.0~3.5 mm	4.0~4.5 mm

→ Wear Resistance Test



35 min. long machining

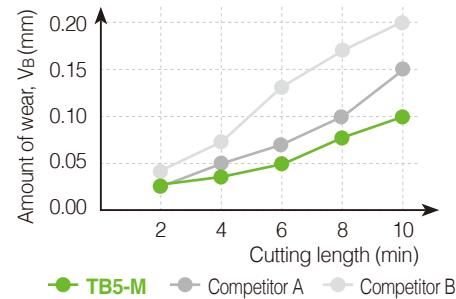
- Workpiece C45 (Carbon steel), External turning and grooving
- Cutting conditions v_c (m/min) = 200, a_p (mm) = 3, f_n (mm/rev) = 0.12, wet
- Tools TB5200N-020-M (PC5300)



Type	TB5200N-020-M (PC5300)	Competitor A (Universal grade)	Competitor B (Universal grade)
Picture of wear			
Tool life comparison	100%	70%	40%

10 min. long machining

- Workpiece X5CrNi18-9 (Stainless steel), External turning and grooving
- Cutting conditions v_c (m/min) = 120, a_p (mm) = 3, f_n (mm/rev) = 0.1, wet
- Tools TB5200N-020-M (PC5300)

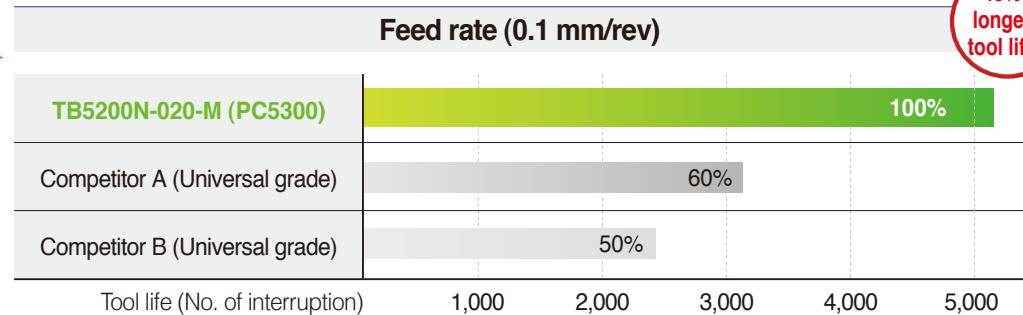


Type	TB5200N-020-M (PC5300)	Competitor A (Universal grade)	Competitor B (Universal grade)
Picture of wear			
Tool life comparison	100%	70%	40%

→ Evaluation of Wear

- Workpiece C45 (Carbon steel), Grooving with four times of interruption
- Cutting conditions v_c (m/min) = 100, a_p (mm) = 3, f_n (mm/rev) = 0.1, wet
- Tools TB5200N-020-M (PC5300)

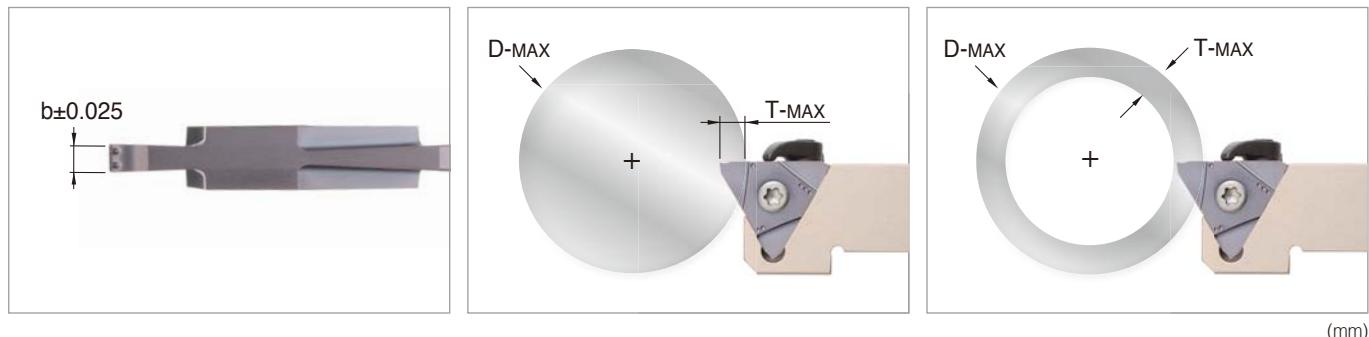
40% longer tool life



↗ TB5-M Machining Range

* There is a limit to cutting diameters of TB5-M when depth of cuts are over 5 mm.
(e.g. When cutting with a TB5200N-020-M insert at the depth of 6.2 mm, Ø60 D-MAX is available.)

* N.L = No limit



(mm)

Designation	b	g(T-MAX)	r	ØD-MAX									
				T≤ 3.0	T≤ 3.5	T≤ 4.0	T≤ 4.5	T≤ 5.0	T≤ 5.5	T≤ 6.0	T≤ 6.4	T≤ 6.5	
TB	5050N-000-M	0.50	1.0	0.00	-	-	-	-	-	-	-	-	
	5050N-004-M	0.50	2.5	0.04	-	-	-	-	-	-	-	-	
	5080N-000-M	0.80	1.6	0.00	-	-	-	-	-	-	-	-	
	5100N-006-M	1.00	3.5	0.06	-	-	-	-	-	-	-	-	
	5104N-000-M	1.04	2.0	0.00	-	-	-	-	-	-	-	-	
	5120N-000-M	1.20	2.0	0.00	-	-	-	-	-	-	-	-	
	5140N-000-M	1.40	6.5	0.00	N.L	N.L	N.L	N.L	N.L	Ø300	Ø170	Ø60	Ø40
	5147N-000-M	1.47	6.5	0.00	N.L	N.L	N.L	N.L	N.L	Ø300	Ø170	Ø60	Ø40
	5150N-010-M	1.50	6.5	0.10	N.L	N.L	N.L	N.L	N.L	Ø300	Ø170	Ø60	Ø40
	5150N-015-M	1.50	6.5	0.15	N.L	N.L	N.L	N.L	N.L	Ø300	Ø170	Ø60	Ø40
	5157N-015-M	1.57	6.5	0.15	N.L	N.L	N.L	N.L	N.L	Ø300	Ø170	Ø60	Ø40
	5170N-010-M	1.70	6.5	0.10	N.L	N.L	N.L	N.L	N.L	Ø300	Ø170	Ø60	Ø40
	5178N-018-M	1.78	6.5	0.18	N.L	N.L	N.L	N.L	N.L	Ø300	Ø170	Ø60	Ø40
	5196N-015-M	1.96	6.5	0.15	N.L	N.L	N.L	N.L	N.L	Ø300	Ø170	Ø60	Ø40
	5200N-020-M	2.00	6.5	0.20	N.L	N.L	N.L	N.L	N.L	Ø300	Ø170	Ø60	Ø40
	5222N-015-M	2.22	6.5	0.15	N.L	N.L	N.L	N.L	N.L	Ø300	Ø170	Ø60	Ø40
	5230N-020-M	2.30	6.5	0.20	N.L	N.L	N.L	N.L	N.L	Ø300	Ø170	Ø60	Ø40
	5239N-015-M	2.39	6.5	0.15	N.L	N.L	N.L	N.L	N.L	Ø300	Ø170	Ø60	Ø40
	5247N-020-M	2.47	6.5	0.20	N.L	N.L	N.L	N.L	N.L	Ø300	Ø170	Ø60	Ø40
	5250N-020-M	2.50	6.5	0.20	N.L	N.L	N.L	N.L	N.L	Ø300	Ø170	Ø60	Ø40
	5270N-010-M	2.70	6.5	0.10	N.L	N.L	N.L	N.L	N.L	Ø300	Ø170	Ø60	Ø40
	5287N-020-M	2.87	6.5	0.20	N.L	N.L	N.L	N.L	N.L	Ø300	Ø170	Ø60	Ø40
	5300N-000-M	3.00	6.5	0.00	N.L	N.L	N.L	N.L	N.L	Ø300	Ø170	Ø60	Ø40
	5300N-020-M	3.00	6.5	0.20	N.L	N.L	N.L	N.L	N.L	Ø300	Ø170	Ø60	Ø40
	5300N-040-M	3.00	6.5	0.40	N.L	N.L	N.L	N.L	N.L	Ø300	Ø170	Ø60	Ø40
	5315N-015-M	3.15	6.5	0.15	N.L	N.L	N.L	N.L	N.L	Ø300	Ø170	Ø60	Ø40
	5318N-020-M	3.18	6.5	0.20	N.L	N.L	N.L	N.L	N.L	Ø300	Ø170	Ø60	Ø40

↗ Application Examples



Servo piston

- Workpiece 18CrMo4
- Cutting conditions v_c (m/min) = 120, a_p (mm) = 2.0, f_n (mm/rev) = 0.1, wet
- Tools TB4200R-M (PC5300)



20%
more

➔ 20% longer tool life than the competitor, thanks to improved chip flow



Sleeve

- Workpiece C20
- Cutting conditions v_c (m/min) = 200, a_p (mm) = 2.0, f_n (mm/rev) = 0.12, wet
- Tools TB5200N-020-M (PC5300)



30%
more

➔ Reduced burr creation and 30% longer than the competitor, tool life thanks to improved stability at high speed



Clutch hub

- Workpiece 20Cr4
- Cutting conditions v_c (m/min) = 150, a_p (mm) = 4.5, f_n (mm/rev) = 0.12, wet
- Tools TB5200N-020-M (PC5300)



10%
more

➔ 10% longer tool life than the competitor, thanks to excellent machining stability and quality results even at high feed



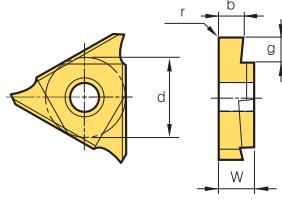
Gate valve spindle

- Workpiece B1
- Cutting conditions v_c (m/min) = 130, a_p (mm) = 3.5, f_n (mm/rev) = 0.1, wet
- Tools TB5200N-020-M (PC5300)

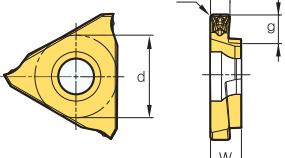
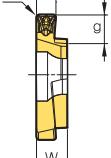
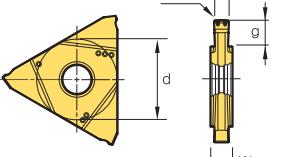
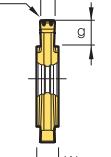


20%
more

➔ 20% longer tool life than the competitor, thanks to excellent machining quality

Shape	Designation	Cermet	Coated	Dimensions (mm)					Figure	
		CN2000	PC5300	b	g (T-MAX)	r	w	d		
TB (Right-handed)	3125R			1.25	1.5	0.20	4.76	9.525		
	3145R			1.45						
	3175R			1.75						
	3185R			1.85	2.5	3.5	0.30	12.7		
	3200R			2.00						
	3230R			2.30						
	3280R			2.80						
	3330R			3.30		4.0	0.40	4.76		
	3430R			4.30						
	4125R	●	●	1.25	2.0					
	4145R	●	●	1.45		3.5	0.20	9.525		
	4150R	●	●	1.50						
	4175R	●	●	1.75						
	4185R	●	●	1.85		4.0	0.30	12.7		
	4200R	●	●	2.00						
	4215R	●	●	2.15						
	4230R	●	●	2.30		5.0	0.40	4.76		
	4250R	●	●	2.50						
	4265R	●	●	2.65						
	4280R	●	●	2.80		3.5	0.20	9.525		
	4300R	●	●	3.00						
	4330R	●	●	3.30						
	4350R	●	●	3.50		4.0	0.30	12.7		
	4400R	●	●	4.00						
	4430R	●	●	4.30						
	4450R	●	●	4.50		TB (Left-handed)	4.76	9.525		
	3125L			1.25	1.5	0.20	9.525	12.7		
	3145L			1.45						
	3175L			1.75						
	3185L			1.85	2.5	3.5	0.20	9.525		
	3200L			2.00						
	3230L			2.30						
	3280L			2.80		4.0	0.30	12.7		
	3330L			3.30						
	3430L			4.30						
	4125L			1.25	2.0	3.5	0.20	9.525		
	4145L			1.45						
	4150L			1.50						
	4175L			1.75		4.0	0.30	12.7		
	4185L			1.85						
	4200L			2.00						
	4215L			2.15		5.0	0.40	4.76		
	4230L			2.30						
	4250L			2.50						
	4265L			2.65		3.5	0.20	9.525		
	4280L			2.80						
	4300L			3.00						
	4330L			3.30		4.0	0.30	12.7		
	4350L			3.50						
	4400L			4.00						
	4430L			4.30		5.0	0.40	4.76		
	4450L			4.50						

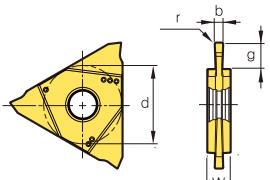
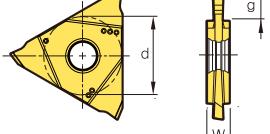
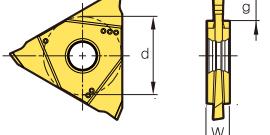
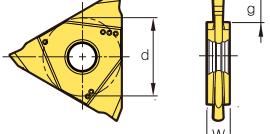
● : Managed item

Shape	Designation	Cermet	Coated	Dimensions (mm)					Figure	
		CN2000	PC5300	b	g (T-MAX)	r	w	d		
	TB (Right-handed)	4150R-M	●	●	1.50	3.5	0.20	4.76	 	
		4175R-M	●	●	1.75					
		4185R-M	●	●	1.85					
		4200R-M	●	●	2.00					
		4215R-M	●	●	2.15	4.0	0.30	12.7		
		4230R-M	●	●	2.30					
		4250R-M	●	●	2.50					
		4265R-M	●	●	2.65					
		4280R-M	●	●	2.80	5.0	0.40			
		4300R-M	●	●	3.00					
		4330R-M	●	●	3.30					
		4350R-M	●	●	3.50					
	TB (Neutral)	4400R-M	●	●	4.00	2.0	0.00	4.50	 	
		4430R-M	●	●	4.30					
		4450R-M	●	●	4.50					
		5050N-000-M		●	0.50					
		5050N-004-M		●	2.5	0.10	0.04	15.875		
		5080N-000-M		●	0.80					
		5100N-006-M		●	1.00					
		5104N-000-M		●	1.04					
		5120N-000-M		●	1.20					
		5140N-000-M		●	1.40					
		5147N-000-M		●	1.47					
		5150N-010-M		●	1.50					
		5150N-015-M		●	1.57					
		5157N-015-M		●	1.70					
		5170N-010-M		●	1.78					
		5178N-018-M		●	1.96					
		5196N-015-M		●	2.00					
		5200N-020-M		●	2.22					
		5222N-015-M		●	2.30	3.00	0.20	0.00		
		5230N-020-M		●	2.39					
		5247N-020-M		●	2.47					
		5250N-020-M		●	2.50					
		5270N-010-M		●	2.70					
		5287N-020-M		●	2.87					
		5300N-000-M		●	3.00					
		5300N-020-M		●	3.15					
		5300N-040-M		●	3.18					

● : Managed item

Insert

(mm)

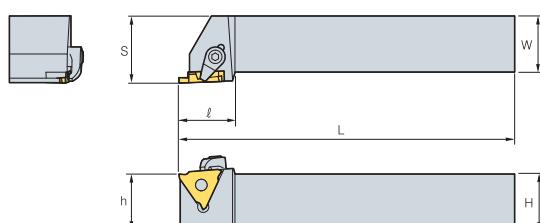
Shape	Designation	Cermet	Coated	Dimensions (mm)					Figure
		CN2000	PC5300	b	g (T-MAX)	r	a°	w	
	TB (Neutral)	5050N-004-P		0.50	1.0	0.04			
		5100N-010-P		1.00	3.5	0.10			
		5150N-010-P		1.50		0.20			
		5150N-020-P				0.10			
		5200N-010-P		2.00		0.20			
		5200N-020-P				0.15			
		5239N-015-P		2.39					
		5250N-020-P		2.50					
		5300N-020-P		3.00					
	TB (Neutral, Right cutting)	5100R-6D-P		1.00	3.5	6			
		5100R-15D-P				15			
		5150R-6D-P		1.50		6			
		5150R-15D-P				15			
		5200R-6D-P		2.00		6			
		5200R-15D-P				15			
	TB (Neutral, Left cutting)	5100L-6D-P		1.00	3.5	6			
		5100L-15D-P				15			
		5150L-6D-P		1.50		6			
		5150L-15D-P				15			
		5200L-6D-P		2.00		6			
		5200L-15D-P				15			
	TB (Neutral, Round shape)	5157N-079-P		1.57		0.79			
		5200N-100-P		2.00		1.00			
		5239N-120-P		2.39		1.20			
		5300N-150-P		3.00		1.50			

● : Managed item

Holder



TB3000R/L
TB4000R-M



This figure applies to right-hand

Fig. 1



TB5000N-000-M

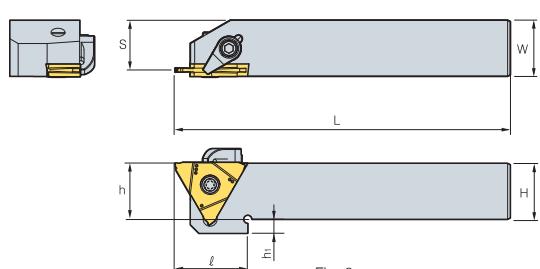


Fig. 2

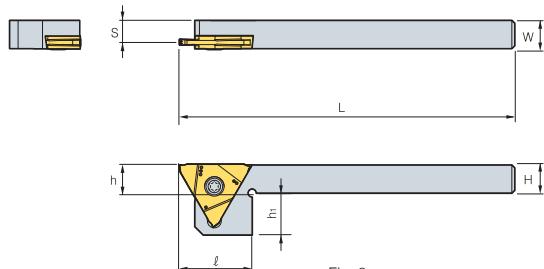


Fig. 3

(mm)

Designation		H = (h)	W	L	l	h ₁	S	Applicable insert	Clamp	Clamp screw	Screw	Wrench	Fig.
TBH	320R/L-23	20	20	125	25.5	-	25	TB3125~3230R/L	CS6R1	DHA0617	-	HW30L	1
	320R/L-33	20	20	125	25.5	-	25	TB3280~3330R/L					
	320R/L-45	20	20	125	25.5	-	25	TB3430R/L					
	325R/L-23	25	25	150	25.5	-	30	TB3125~3230R/L					
	325R/L-33	25	25	150	25.5	-	30	TB3280~3330R/L					
	325R/L-45	25	25	150	25.5	-	30	TB3430R/L					
	420R/L-23	20	20	125	25.5	-	25	TB4125~4230R/L					
	420R/L-33	20	20	125	25.5	-	25	TB4250~4330R/L					
	420R/L-45	20	20	125	25.5	-	25	TB4350~4450R/L					
	425R/L-23	25	25	150	25.5	-	30	TB4125~4230R/L					
TBH	425R/L-33	25	25	150	25.5	-	30	TB4250~4330R/L	TB5050~5318N	FTNA0512	TW20L	3	2
	425R/L-45	25	25	150	25.5	-	30	TB4350~4450R/L					
	510R/L	10	10	125	25	15	7.8						
	512R/L	12	12	125	25	13	9.8						
	516R/L	16	16	125	26	9	13.8						
TBH	520R/L	20	20	125	26	5	17.8	CS6R1	DHA0617	FTNA0516	HW30L TW20L	2	2
	525R/L	25	25	150	-	-	22.8						

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