ZBMT series

NEW

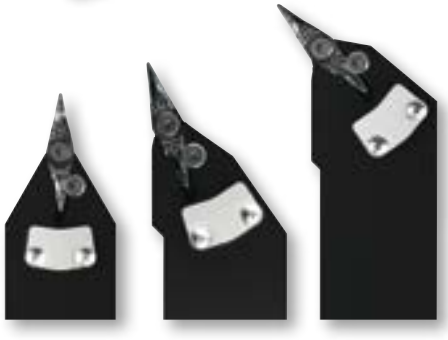
25° insert tip with greater maneuverability shortens machining processes and reduces costs

Wide lineup of toolholders from external turning to boring bars. Supports a wide range of applications, including copying, undercutting, tapering, V-slotting, etc.

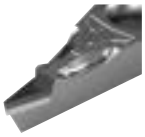
Improved dimensional accuracy with unique clamp structure. Firm insert clamping results in high precision and stable machining

GF chipbreaker for ZBMT inserts reduces chip control issues when machining at minute depths of cut

15° insert tip angle also available



NEW



Diamond insert

Cermet insert

KEEPS YOU AHEAD

25° insert profiling tools

ZBMT series

Unique clamping structure and a wide lineup of external toolholders and boring bars. High precision and stable machining in a wide range of applications including copying, undercutting, tapering, V-slotting, spherical machining, and more.

New 25° inserts achieve excellent results using a large variety of toolholders

Challenges

Workpiece geometries are becoming more complex and can be difficult to machine with typical 35° V-style design inserts. Specialized tools focusing on shape often sacrifice rigidity, accuracy, or chip control.

SOLUTION

The 25° ZBMT insert adopts a strong and unique clamp mechanism for added rigidity. This rigidity adds precision and stability in a variety of machining applications for shorter cycle times and lower machining costs.

Please contact your Kyocera sales representative for details.

1 Newly developed unique-clamping mechanism achieves a higher rigidity

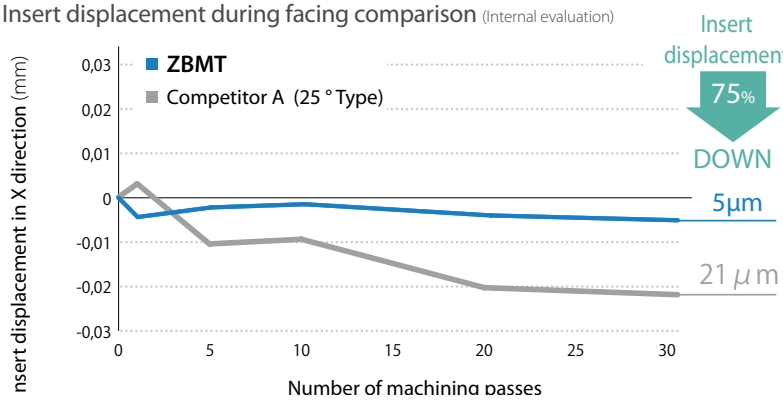
Side lock mechanism

Unique design holds insert at 2 points
Safe even for insert with small tip angle that is difficult to mount

Indentations for screw clamp are designed into the insert's body

Uses a large screw size (M3)

Insert displacement during facing comparison (Internal evaluation)



Cutting conditions : Vc = 230 m/min, ap = 0.3 mm, f = 0.15 mm/rev, wet workpiece SCM435

*The above figures are not guaranteed. It depends on cutting conditions.

Check

By controlling insert displacement,

– Machining precision is stabilized and long tool life is enable

– Reduces defect rate due to sudden dimensional deviation

*Please check P9 for how to attach and detach insert using the new insert clamp

Provides high quality and stable machining in various machining applications

Excellent performance in various machining applications including copying, undercutting, tapering, V-slotting, spherical machining, etc.

Shaft copying

Internal undercutting

End face tapering

CG images

2 Unique holder design to meet customers' needs

Both boring bars and external toolholders are compatible with internal coolant.

Unique double coolant hole design

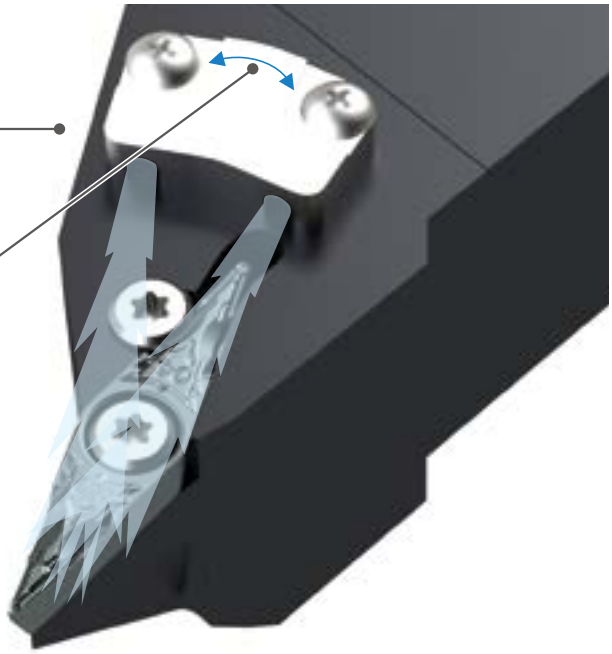
Supplies coolant directly to the cutting edge and provides improved chip evacuation and long tool life (Coolant discharge direction: Fine adjustment possible)

*Though coolant stream hits side clamp screw, machining performance is not affected

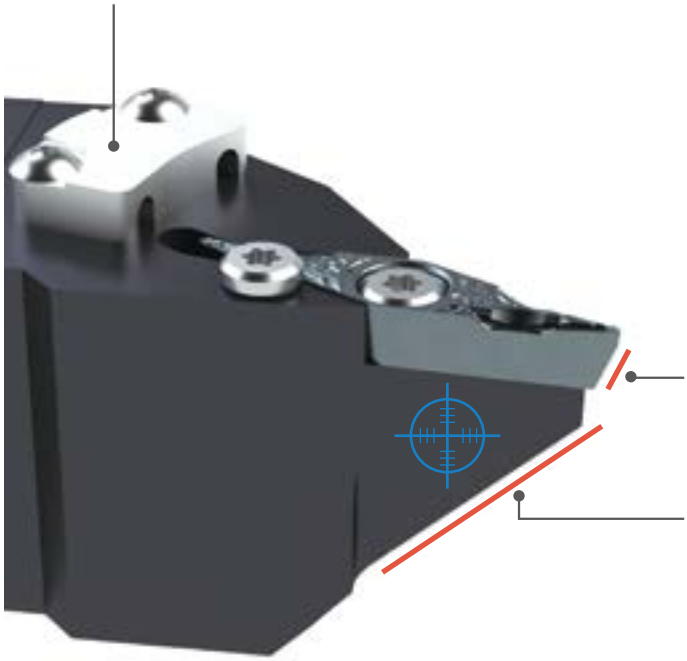
*Pressure resistance: ~ 3 MPa

Fine tuned and adjustable

± 4° Adjustable oscillation



Uses a coolant guide with a small thickness that does not prevent chip flow



Easy to use for Facing

Insert corner:
2-Step Positive Type (20°)

*Excluding ZBMT13T308GF and ZBMT13T304NE

Holder: Tapered shape

Inserts and toolholders have a unique end shape.

No additional machining is required when trying to avoid interference with workpiece.

Effective for facing applications

CG Image

Solution Significant reduction in quality defect costs

(User evaluation)

Suppresses dimensional fluctuations due to insert displacement. Reduces defect rates.

CG image

Dimension defect rate

GF chipbreaker

Competitor B **100+/month**

Defect rate Reduction DOWN

Cutting conditions: Vc = 230 m/min, ap = 0.3 mm, f = 0.15 mm/rev, wet workpiece SCM435

GF chipbreaker chip condition

User feedback

– Some parts require an insert with a tip angle of 25 ° to allow machining.

– The dimensional error of the GF chipbreaker was drastically improved in comparison with the competitors.

– Greatly reduced the cost of quality defects.

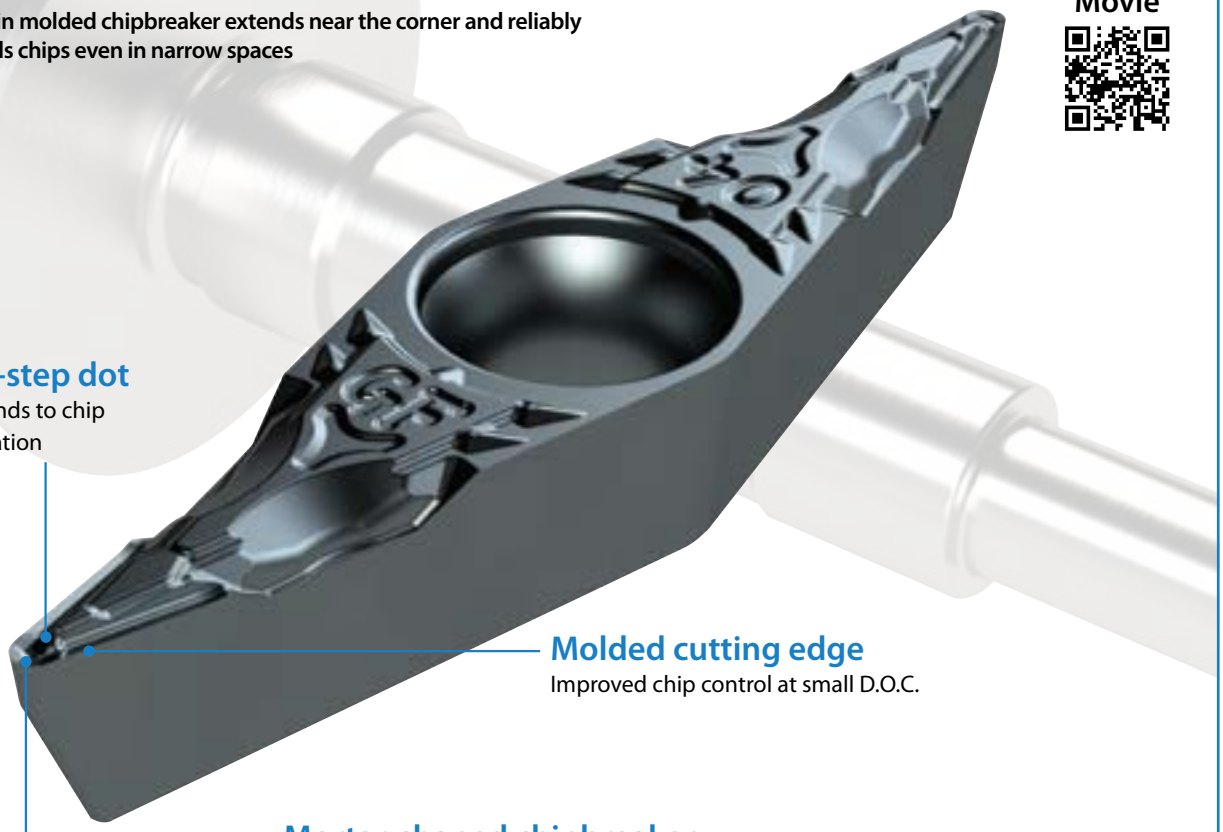
3 GF chipbreaker for ZBMT inserts reduces chip control issues when machining at minute depths of cut

GF chipbreaker

Solving chip control issues leads to high-quality surface finishes

The thin molded chipbreaker extends near the corner and reliably controls chips even in narrow spaces

Movie



Two-step dot
Responds to chip fluctuation

Molded cutting edge
Improved chip control at small D.O.C.

Mortar-shaped chipbreaker
Low resistance and excellent chip control even in ductile workpieces

Chip control comparison (Internal evaluation)

GF chipbreaker

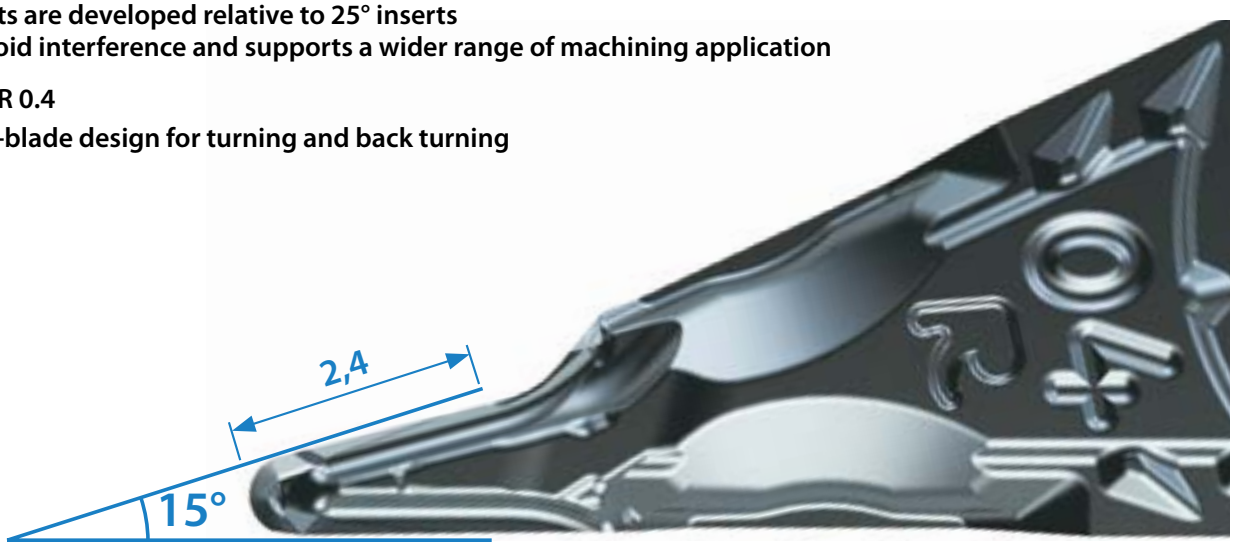
Competitor A (25° type)

Cutting conditions : Vc = 230 m/min, f = 0.15 mm/rev, ap = 0.2 - 0.5 mm, wet, workpiece SCM435 facing

4 15° inserts are also available upon customer requests

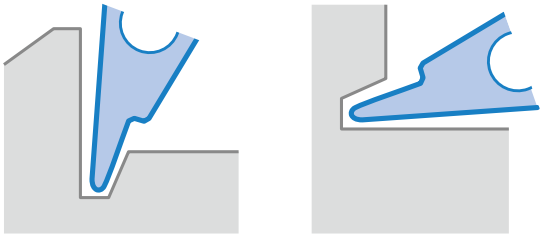
15° inserts are developed relative to 25° inserts
Helps avoid interference and supports a wider range of machining application

- Corner-R 0.4
- Double-blade design for turning and back turning

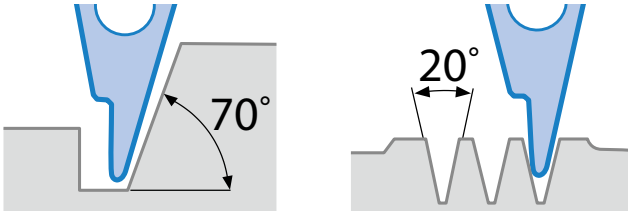


Examples

When using the toolholder in reverse mounting position



When using the toolholder in normal mounting position *Holder: Special order specification



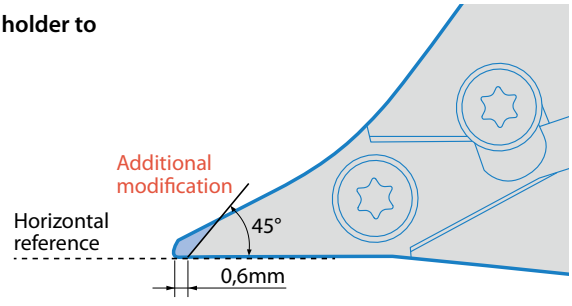
To avoid holder interference, additional modifications is required as shown in the figure below.
Also, as shown in the figure below, special order for holders may be required depending on machining application.

How to modify toolholder when using 15 ° insert

When using 15 ° insert, additional modification is required for the holder to avoid interference.

Recommended additional modification

- Set the edge of insert bearing surface at the end of the holder at horizontal reference shown below.
- Modify the holder to 0,6 mm from the tip at an angle of not less than 45° from the horizontal.



Kyocera's high-performance insert grade

PVD coating

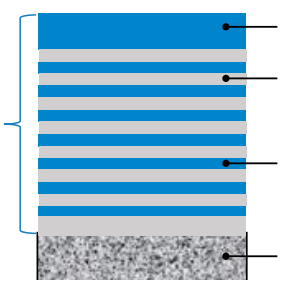
PR1725

First recommendation for steel machining.
Excellent surface finish and long tool life

MEGACOAT NANO PLUS

AlTiN/AlCrN Nano laminated film with superior wear resistance and adhesion resistance

<Reduces cracking>
Reduces abnormal damages such as chipping because of increased lamination layer with a thinner gap than conventional coatings.



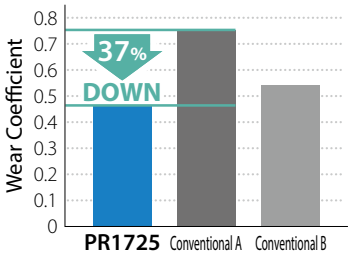
Special surface layer with high lubricity

High aluminum content AlTiN layer
High hardness/Oxidation resistance

Optimized AlCrN layer
Superior adhesion resistance

Tough micro-grain carbide substrate
High stability

Wear coefficient comparison
(Internal evaluation)



Superior wear and chipping resistance

High hardness with nano laminated film layer.
Internal stress optimization reduces chipping

Excellent Surface Finish

Special surface layer with great lubricity reduces adhesion

Applicable to various workpiece materials

Excellent oxidation resistance. Superior high temperature properties maintains good performance in steel, stainless steel and free-cutting steel

High machining stability

Tough micro-grain carbide substrate provides stable machining

PVD coated carbide

PR1535

The combination of a tough substrate and a special nano coating layer creates long tool life and stable machining in stainless steel machining

MEGACOAT NANO

Point 1 An increase in cobalt content yields a substrate with greater toughness
*In comparison to our conventional material grade

UP 23% Fracture toughness *

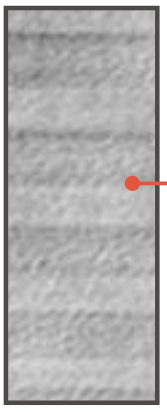
Point 2 Improved stability by optimization and homogenization of grains in the base material

Point 3 MEGACOAT NANO coating technology for long tool life and stable machining

Cracking Comparison by Diamond Indenter (Internal evaluation)

Long Cracks Short Cracks

UP Shock Resistance



MEGACOAT Base Layer Structure

Enlarged view

Point

PR1535 also shows superior performance in steel machining under unstable conditions

NEW

Hybrid cermet for steel machining

PV720 / PV730

New cermet for high quality surface finish machining

NEW

Uncoated CERMET

TN620

Three attributes of the hybrid technology contributes to excellent fracture and wear resistance

Point 1 Kyocera's top leading Cermet

General use PV720

1st recommendation
Excellent wear resistance

Stability oriented PV730

Tough cermet
High stability

Fracture resistance: 2X more than competitors (Internal evaluation)

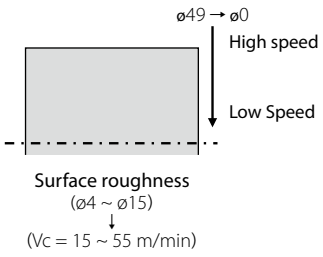
TN620

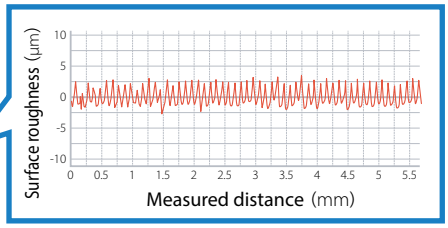
Non-coated
Cost-efficient

Point 2 High quality surface finish

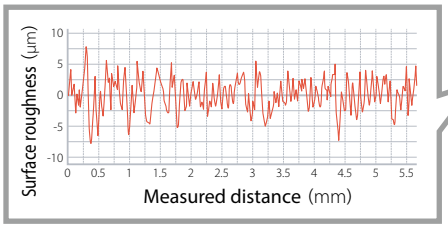
Surface finish comparison (Internal evaluation)

Cutting conditions: Vc=180 ~ 0 m/min (Constant rate)
ap = 0.5 mm, f = 0.1 mm/rev, Wet
CNMG120404 type Workpiece: S10C





Excellent surface finish



The finished surface is clouded

Case studies (ZBMT)

Shaft S45C

Vc = 115 m/min
ap = 0.05 mm
f = 0.08 mm/rev
Wet
ZBMT13T304GF
SZLBR2525M-13C

Number of products

ZBMT (PV720) **135 pcs/edge**

Competitor D **55 pcs/edge**

x2.4 Tool Life

Side lock mechanism in ZMBT reduces the displacement in the Z-direction. Improves work efficiency with no dimension correction. Excellent surface finish with PV720

(User evaluation)

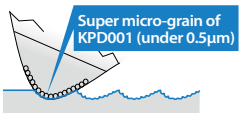
NEW

PCD (Polycrystalline diamond)

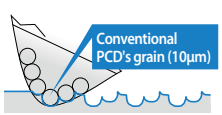
KPD001

Excellent aluminum alloy surface finish with micro-grain PCD

Point 1 Good surface finish (Image)

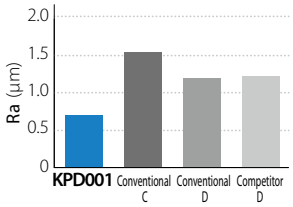


Excellent surface finish of super micro-grain KPD001



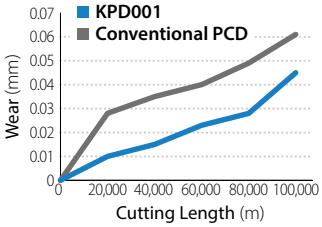
Surface finish of conventional PCD Tool

Surface finish comparison
(Internal evaluation)



Point 2 Improved wear resistance

Wear resistance comparison
(Internal evaluation)



Cutting conditions:
Vc = 540 m/min
ap = 0.15 mm
f= 0.22 mm/rev, Wet
Workpiece AC8A
*Cutting length =
Cutting length that cutting edge runs on w2orkpiece periphery

Case studies (ZBMT)

Spacer A2017/A5052/A7075

Vc = 540 m/min
ap = 0.1 mm (Facing) / 0.2 mm (Internal)
f = 0.05 mm/rev,
Wet
ZBMT13T304NE
A25S-SZQBR13-32AE

Number of products

ZBMT (KPD001) **200 pcs/edge** Dimensional accuracy, Stable

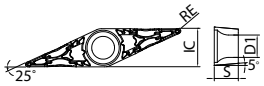
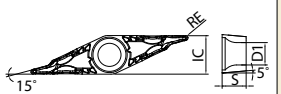
Competitor F **200 pcs/edge** Dimentional accuracy, Unstable

Good
Dimentional accuracy, Cutting Edge

Competitor's products had dimensional fluctuations, but ZBMT has excellent stability even with more than 200 pcs. Good cutting edge condition and high dimensional accuracy with H6 tolerance
(User evaluation)

Insert description

Carbide coating, Cermet, PCD

Shape		Description	Dimensions (mm)				MEGACOAT NANO PLUS	MEGACOAT NANO	PVD coated cermets (NEW)		Non-coated cermets (NEW)	PCD (NEW)
			IC	S	D1	RE	PR1725	PR1535	PV720	PV730	TN620	KPD001*1
 Tip angle 25 °		ZBMT 13T302GF	6.35	3.97	3.7	0.2	●	●				
		13T304GF				0.4	●	●	●	●	●	
		13T308GF				0.8	●	●	●	●	●	
 Tip angle 25 ° 1-edge		ZBMT 13T301NE	6.35	3.97	3.7	0.1						●
		13T302NE				0.2						●
		13T304NE				0.4						●
 Tip angle 15 ° (Right-Hand R)		ZBMT 13T304R-GF-15D	6.35	3.97	3.7	0.4	●	●				

- Because insert has a molded shape, the tip angle may be 24 ° depending on the measurement location.
- A PCD insert (KPD001) can not be reground.
- When a PCD insert (KPD001) enters a workpiece or contacts a wall, keep the feed rate below 50% of normal use to prevent damage to the insert. If feed is not reduced, the edge may defect.

●: Available
Inserts are sold in 10 piece boxes
*1.PCD Insert (KPD001) is sold in 1 piece boxes

Recommended cutting conditions

Workpiece	Insert tip angle	Corner-R (RE)	Insert grade	Vc (m/min)	ap (mm)	f (mm/rev)
Carbon steel / Alloy steel	25°	0.2	PR1725	60 - **150** - 200	0.2 - **0.3** - 1.5	0.05 - **0.15** - 0.15
			PR1535	60 - **120** - 180	0.2 - **0.3** - 1.5	0.05 - **0.15** - 0.15
		0.4 / 0.8	PR1725	60 - **150** - 200	0.2 - **0.3** - 2.0	0.05 - **0.15** - 0.25
			PR1535	60 - **120** - 180	0.2 - **0.3** - 2.0	0.05 - **0.15** - 0.25
			PV720	140 - **180** - 240	0.2 - **0.3** - 1.5	0.05 - **0.13** - 0.20
			PV730	140 - **180** - 240	0.2 - **0.3** - 1.5	0.05 - **0.13** - 0.20
			TN620	140 - **180** - 240	0.2 - **0.3** - 1.5	0.05 - **0.13** - 0.20
	15°	0.4	PR1725	60 - **150** - 200	0.2 - **0.3** - 1.0	0.05 - **0.10** - 0.15
			PR1535	60 - **120** - 180	0.2 - **0.3** - 1.0	0.05 - **0.10** - 0.15
Stainless steel	25°	0.2	PR1725	60 - **150** - 180	0.2 - **0.3** - 1.0	0.05 - **0.10** - 0.15
			PR1535	60 - **120** - 150	0.2 - **0.3** - 1.0	0.05 - **0.10** - 0.15
		0.4 / 0.8	PR1725	60 - **150** - 180	0.2 - **0.3** - 1.0	0.05 - **0.15** - 0.25
			PR1535	60 - **120** - 150	0.2 - **0.3** - 1.0	0.05 - **0.15** - 0.25
	15°	0.4	PR1725	60 - **150** - 180	0.2 - **0.3** - 1.0	0.05 - **0.10** - 0.15
			PR1535	60 - **120** - 150	0.2 - **0.3** - 1.0	0.05 - **0.10** - 0.15
Cast iron	25°	0.2	PR1725	60 - **150** - 180	0.2 - **0.3** - 1.5	0.05 - **0.10** - 0.15
		0.4 / 0.8	PR1725	60 - **150** - 180	0.2 - **0.3** - 2.0	0.05 - **0.15** - 0.25
	15°	0.4	PR1725	60 - **150** - 180	0.2 - **0.3** - 1.0	0.05 - **0.10** - 0.15
Non-ferrous metals (Aluminum alloys)	25°	0.1 / 0.2 / 0.4	KPD001	200 - **500** - 800	0.1 - **0.2** - 0.5	0.03 - **0.05** - 0.07

- When using machining at ap 1.5 mm or more, reduce the feed by about 50%.
- Diamond inserts (KPD001) can not be reground.
- When a diamond insert (KPD001) enters a workpiece or contacts a wall, keep the feed rate below 50% of normal use to prevent damage to the insert. If feed is not reduced, the edge may defect.

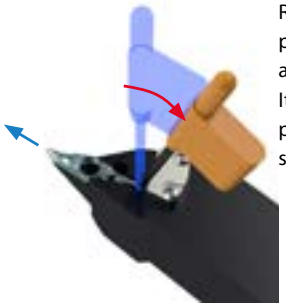
Instructions

When mounting the insert (Tightening torque: 1.2 N • m)

1. Tighten the main screw with the insert pressed against the contact surface with fingertips.

2. Tighten the side screw to complete the installation.

When removing the insert

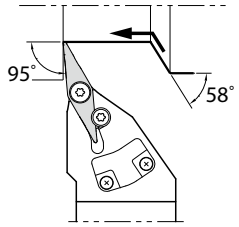


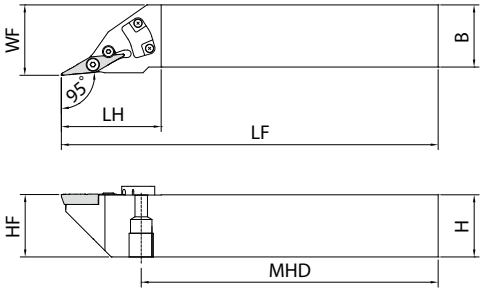
Remove the two screws and put the wrench into the gap at the back end of the insert. It can be easily removed by pushing out the insert as shown on the left.

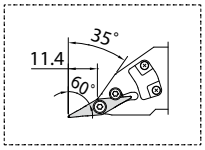
External

SZLB (External/ Copying)

Pressure resistance : ~ 3 MPa







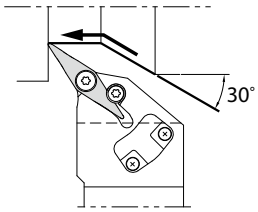
Side rake angle : 0°
Angle of inclination : 0°

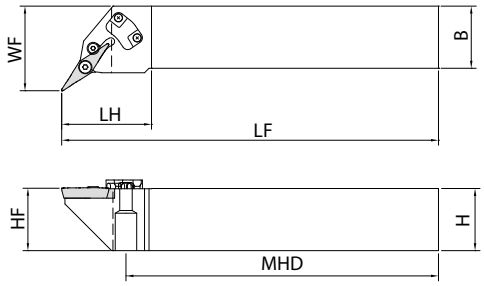
·Right-hand shown

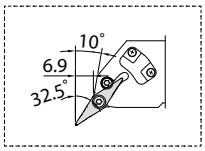
For **ZBMT13T304R-GF-15D**, the right-hand holder (R) is applicable.

SZPB (External/ Facing/ Copying/ Undercutting)

Pressure resistance : ~ 3 MPa





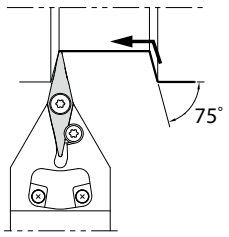


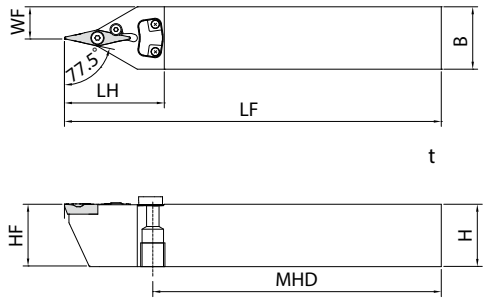
Side rake angle : 0°
Angle of inclination : 0°

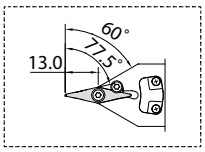
·Right-hand shown

SZVBN (External/ Copying)

Pressure resistance : ~ 3 MPa

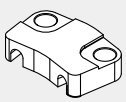
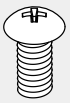
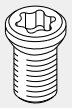
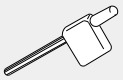






Side rake angle : 0°
Angle of inclination : 0°

Toolholder dimensions

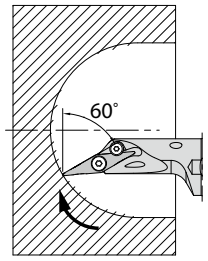
Description		Availability			Dimensions (mm)							Standard corner-R (RE)	Coolant hole	Parts			
														Coolant guide	Screw for coolant guide	Clamp screw	Wrench
		R	N	L	H	HF	B	LF	LH	WF	MHD						
SZLB$^{R}_{L}$	2020K-13C	●		●	20	20	20	125	40	23	92.6	0.4	Yes	ZCP-13	BH2X6	SB-3079TR	FT-8
	2525M-13C	●		●	25	25	25	150	40	28.2	118						
SZPB$^{R}_{L}$	2020K-13C	●		●	20	20	20	125	37	27.2	95	0.4	Yes				
	2525M-13C	●		●	25	25	25	150	36	33.9	124.2						
SZVBN	2020K-13C		●		20	20	20	125	40	10	89.6	0.4	Yes			Recommended tightening torque 1.2 N·m	
	2525M-13C		●		25	25	25	150	40	12.5	114.6						

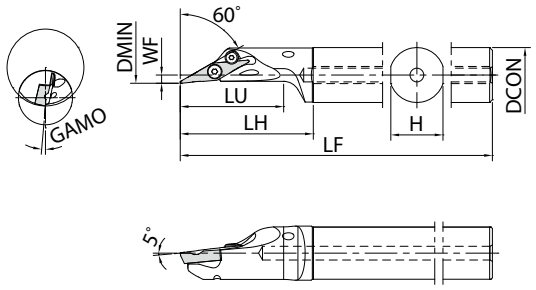
●: Available

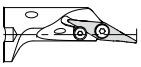
Boring bar

Maximum overhang length L/D = ~ 5.5

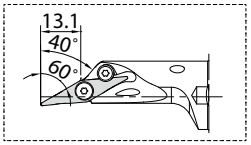
A-SZJB-AE Excellent bar (Internal spherical machining/ Internal Facing/ Copying)







Left-hand (L) is the above shape

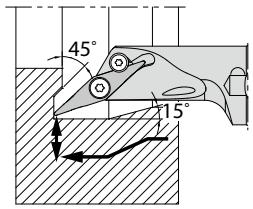


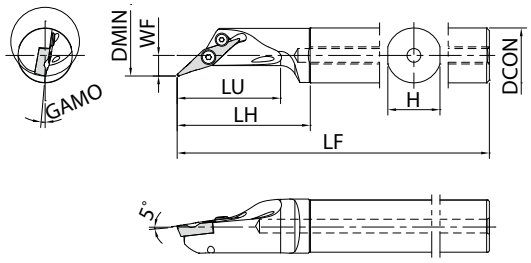
Shank diameter	Straight hole diameter
ø20	ø5
ø25	
ø32	

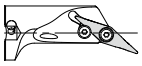
·Right-hand shown

For **ZBMT13T304R-GF-15D**, the right-hand holder (R) is applicable.

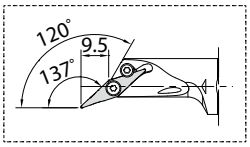
A-SZXB-AE Excellent bar (Internal facing/ Copying/ Undercutting)







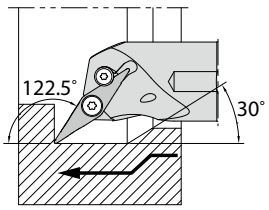
Left-hand (L) is the above shape

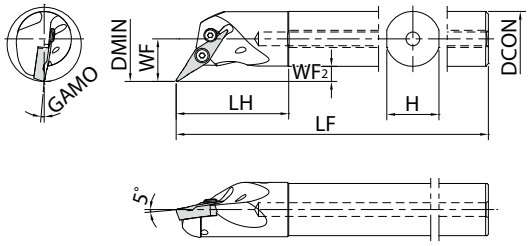


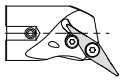
Shank diameter	Straight hole diameter
ø20	ø5
ø25	
ø32	

·Right-hand Shown

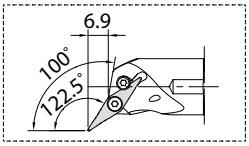
A-SZQB-AE Excellent bar (Copying/ Undercutting)







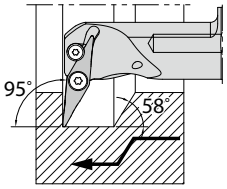
Left-hand (L) is the above shape

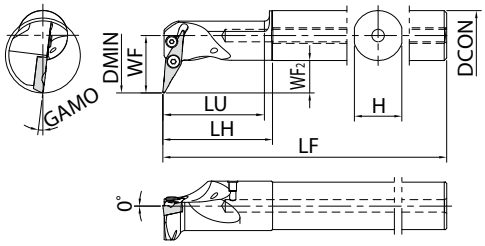


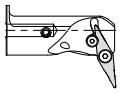
Shank diameter	Straight hole diameter
ø20	ø5
ø25	
ø32	

·Right-hand Shown

A-SZLB-AE Excellent bar (Copying)







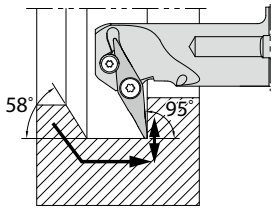
Left-hand (L) is the above shape

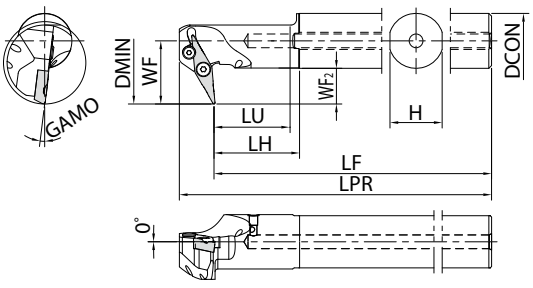
Shank diameter	Straight hole diameter
ø20	ø5
ø25	
ø32	

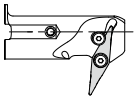
·Right-hand Shown

Left-hand (L) Toolholder for **ZBMT13T304R-GF-15D**

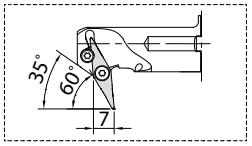
A-SZZB-AE Excellent bar (Back boring)







Left-hand (L) is the above shape



Shank diameter	Straight hole diameter
ø20	ø5
ø25	
ø32	

·Right-hand Shown

For **ZBMT13T304R-GF-15D**, the right-hand holder (R) is applicable.

Boring bar

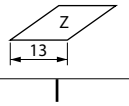
Toolholder dimensions

	Description	Availability		Minimum cutting Ddia.	Dimensions (mm)								GAMO	Standard corner-R (RE)	Coolant hole	Parts	
																Clamp screw	Wrench
		R	L	DMIN	DCON	H	LPR	LF	LU	LH	WF	WF2					
Excellent bar	A20R-SZJB$^{R}_{L}$13-28AE	●	●	28	20	19		200	37.5	48	3.0	-	5°	0.4	Yes	SB-3079TR	FT-8
	A25S-SZJB$^{R}_{L}$13-30AE	●	●	30	25	24	-	250	47	58	3.5	-				Recommended tightening torque 1.2 N•m	
	A32S-SZJB$^{R}_{L}$13-40AE	●	●	40	32	31		250	61.5	74	3.5	-					
	A20R-SZXB$^{R}_{L}$13-25AE	●	●	25	20	19		200	37.5	48	7.5	-	5°	0.4	Yes	SB-3079TR	FT-8
	A25S-SZXB$^{R}_{L}$13-30AE	●	●	30	25	24	-	250	45	58	7	-				Recommended tightening torque 1.2 N•m	
	A32S-SZXB$^{R}_{L}$13-40AE	●	●	40	32	31		250	60	74	7	-					
	A20R-SZQB$^{R}_{L}$13-27AE	●	●	27	20	19		200	-	41	15.5	5.5	5°	0.4	Yes	SB-3079TR	FT-8
	A25S-SZQB$^{R}_{L}$13-32AE	●	●	32	25	24	-	250	-	51	18	5.5				Recommended tightening torque 1.2 N•m	
	A32S-SZQB$^{R}_{L}$13-40AE	●	●	40	32	31		250	-	54	22.5	6.5					
	A20R-SZLB$^{R}_{L}$13-30AE	●	●	30	20	19		200	40	43	23	13	7°	0.4	Yes	SB-3079TR	FT-8
	A25S-SZLB$^{R}_{L}$13-34AE	●	●	34	25	24	-	250	62	66	25.5	13				Recommended tightening torque 1.2 N•m	
	A32S-SZLB$^{R}_{L}$13-40AE	●	●	40	32	31		250	84	87	29	13					
	A20R-SZZB$^{R}_{L}$13-30AE	●	●	30	20	19	200	187	27	43	23	13	7°	0.4	Yes	SB-3079TR	FT-8
	A25S-SZZB$^{R}_{L}$13-34AE	●	●	34	25	24	250	237	43	60	25.5	13				Recommended tightening torque 1.2 N•m	
	A32S-SZZB$^{R}_{L}$13-40AE	●	●	40	32	31	250	237	59	75	29	13					

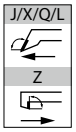
●: Available

Minimum cutting dia. when installing with standard corner-R (RE) insert
When machining with an insert other than the standard corner-R (RE), there may be interference.

Identification system

Shank	Toolholder length	Insert shape	Relief angle	Cutting edge length	Others
A : Steel With coolant hole	S : 250	Z : 25° Rhombic (15° Rhombic)	B : 5° Positive		Dynamic bar excellent bar specification

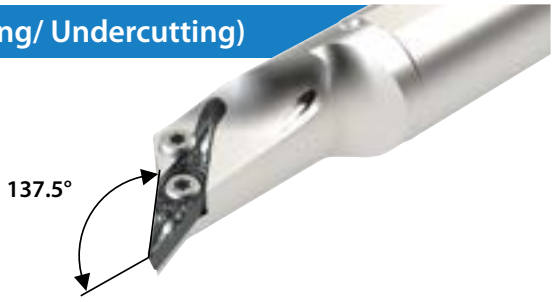
A 25 S - S Z J B R 13 - 30 AE

Shank diameter	Clamping system	Cutting edge angle	Hand	Minimum cutting dia.
25 : ø25	S : Screw Clamp	J : 150° X : 137.5° Q : 122.5° L : 95° Z : 95° 	R : R Hand L : L Hand	30 : ø30

Unique cutting angle A-SZXB-AE (Internal facing/ Copying/ Undercutting)

Features

- **Chatter-resistant shape**
  The insert is placed near the center of the shank to ensure the thickness of the lower jaw of the insert.
- **User-friendly design**
  The holder width (WF + Neck radius) is small, and it is easy to apply to the narrow gap of the workpiece (Minimum cutting dia. DMIN: Determined by R near the holder edge).

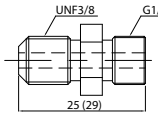
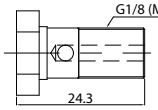


Piping parts for external toolholders

JCT series piping parts can be used for machining with internal coolant (Sold separately).
For details, please refer to the 2022 to 2024 Kyocera general catalog.

Joint/ Banjo bolt

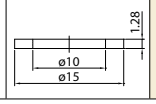
Pressure resistance : ~ 30 MPa

Shape		Description	Availability	Thread standard Toolholder machine connection side
		J-G1/8-UNF3/8	●	G1/8
		J-M10X1.5-UNF3/8	●	M10X1.5
Banjo bolt (For angle hose) 		BB-G1/8	●	G1/8
		BB-M10X1.5	●	M10X1.5

●: Available

Washer

Pressure resistance : ~ 30 MPa

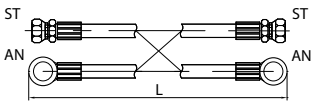
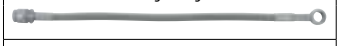
Shape		Description	Availability
		WS-10	●

*When using banjo bolts, two washers are required.

●: Available

Hose

Pressure resistance : ~ 30 MPa

Shape		Description	Availability	Thread standard		Dimensions (mm) L
Straight/Straight 		HS-ST-ST-200	●	UNF3/8	UNF3/8	200
		HS-ST-ST-250	●			250
Straight/Angle 		HS-ST-AN-200	●	UNF3/8	– (Banjo bolt)	200
		HS-ST-AN-250	●			250
Angle/Angle 		HS-AN-AN-200	●	– (Banjo bolt)	– (Banjo bolt)	200
		HS-AN-AN-250	●			250

●: Available

Boring/ Facing available cutting diameter and maximum D.O.C.

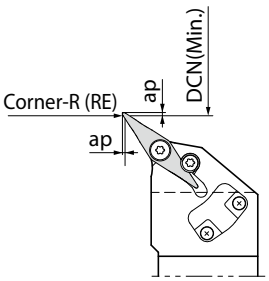
CG Image

Standard corner-R 0.4 (RE)

Cutting dia.	Depth (mm)
ø30	0.5
ø50	1.5
ø65	3.0
ø80	6.0
ø100	10.0
ø150	14.0

Excluding PCD insert (KPD001)

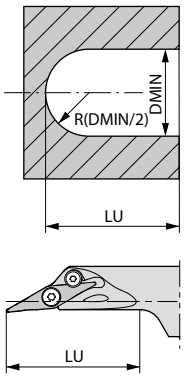
SZPB Type cutting diameter for undercutting



Corner-R (RE)	ap (mm)	DCN (Min.)
0.1	0.5	ø30
	1	ø35
0.2	0.5	ø30
	1	ø35
0.4	0.5	ø30
	1	ø35
0.8	0.5	ø110
	1	ø150

Inner spherical machining/ Internal facing/ Copying (A-SZJB-AE)

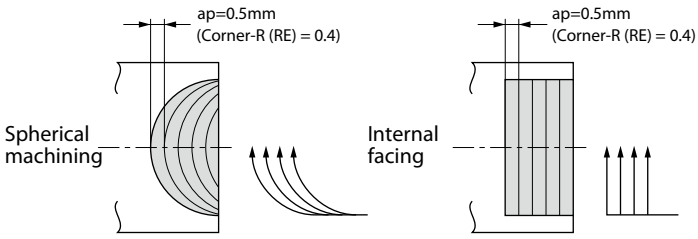
Application range



DMIN : ø28 - ø40

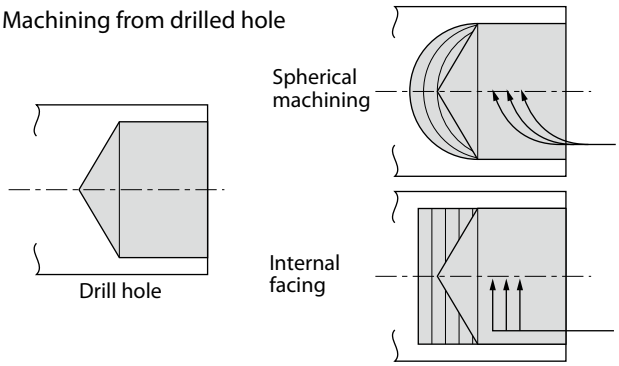
Applications

Without pre-drilled hole



* f should be 0.05 mm/rev or less at internal facing.

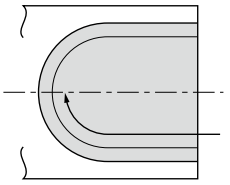
Machining from drilled hole



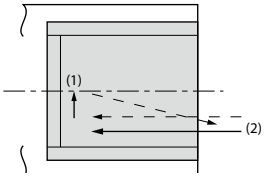
* f should be 0.05 mm/rev or less at internal facing.

Finishing

Spherical machining

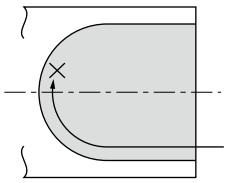


Internal facing

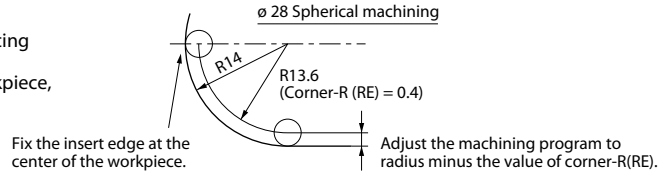


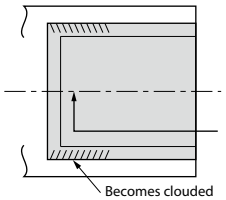
Machining process
1. Finish the internal face first.
2. Next, finish the internal surface.

Caution



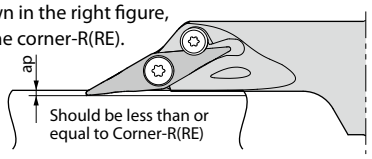
Internal spherical machining and internal facing
(Especially internal spherical machining)
When machining past the center of the workpiece,
insert may break.





This type of machining is possible,
but the chips might scratch the surface.

When internal copying as shown in the right figure,
keep ap less than or equal to the corner-R(RE).



[Burrs may occur, if ap is Corner-R(RE) and more]

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