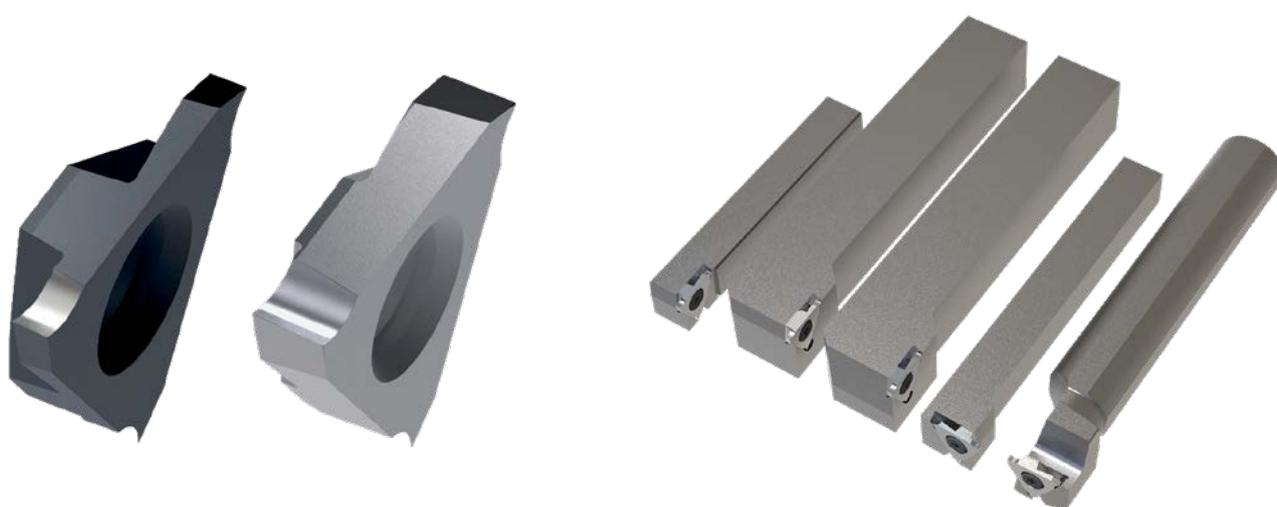
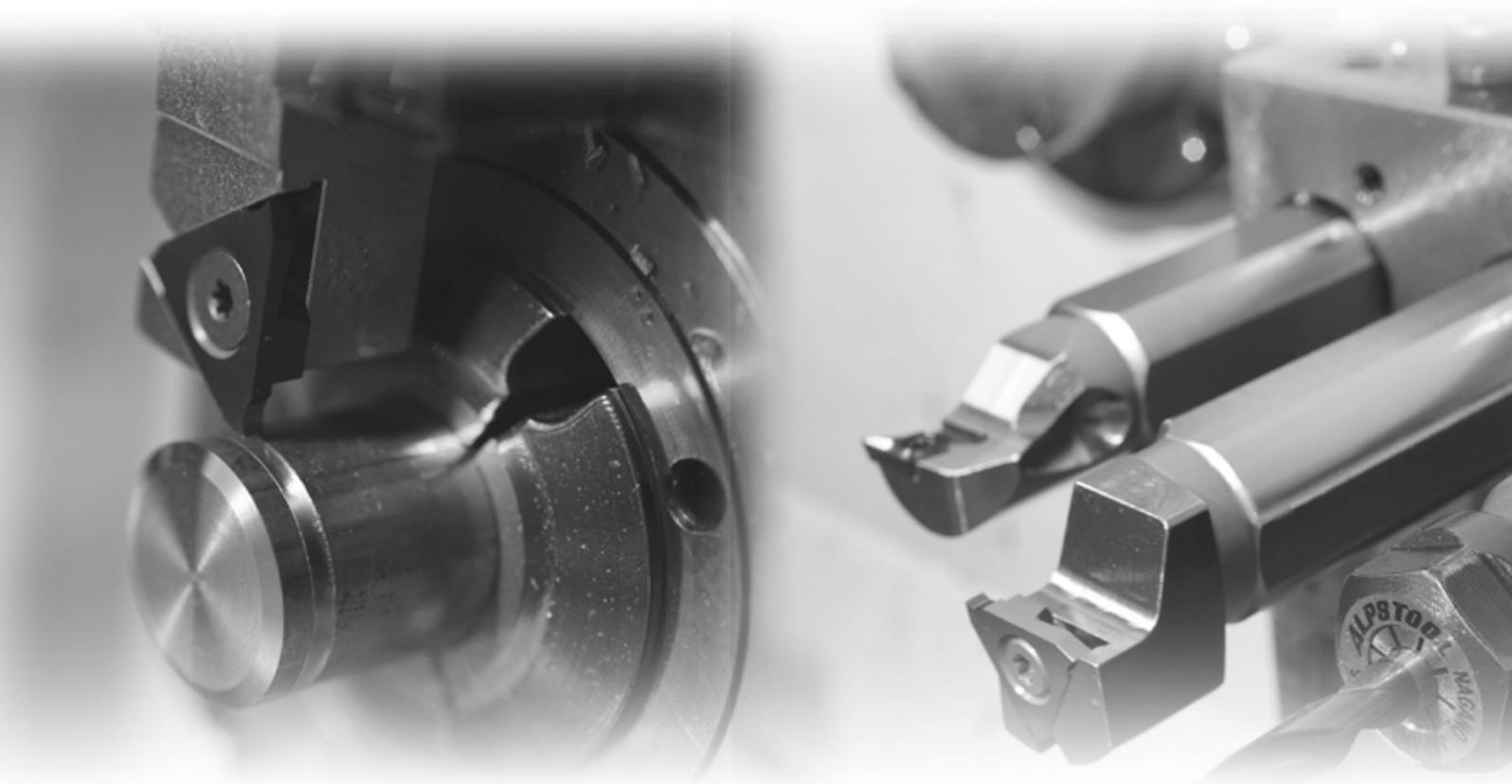


GT SERIES

FOR EXTERNAL AND INTERNAL APPLICATIONS



GT HOLDER

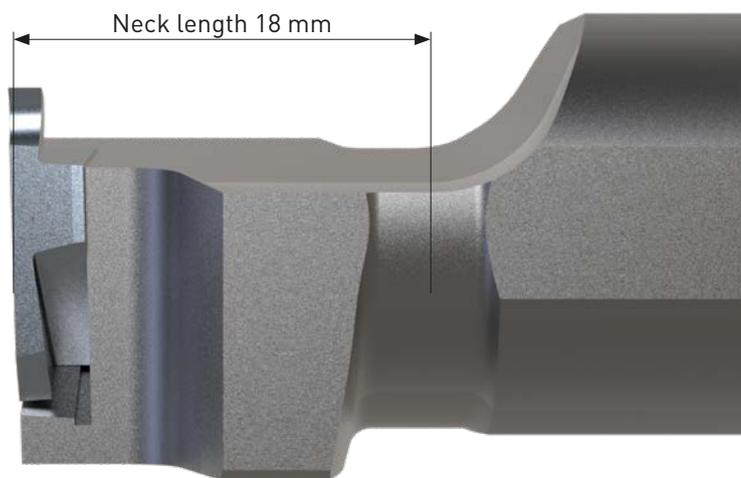
EXTERNAL GROOVING FOR SMALL PARTS MACHINING

NEW - 90° HOLDER

The neck dimensions have been optimised to improve resistance to chatter and vibration.

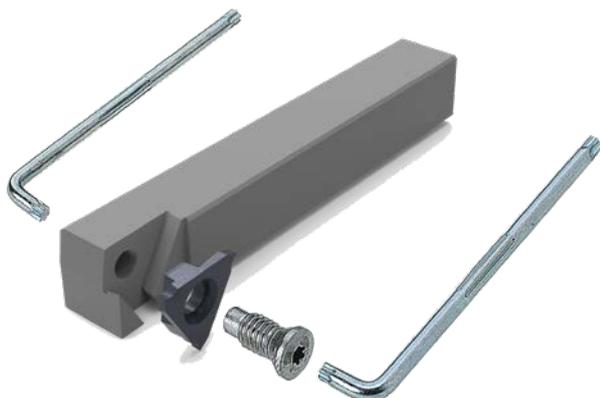


ROUND SHANK HOLDER FOR REAR TOOL POST



BACK CLAMPING MECHANISM

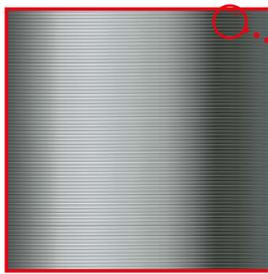
For gang type tool posts on Swiss automatic lathes, tools can be changed quickly and accurately using the same wrench on both sides, improving machine operating efficiency. Offset type is not included.



COATING

MS7025 – NANO-MULTILAYER COATING

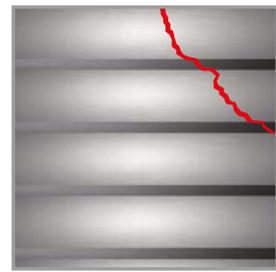
By combining the high lubrication layer with excellent welding resistance and the high hardness layer with a greater wear resistance that suppresses the progress of wear at the nano-level, the film damage is significantly reduced and the welding and wear resistance are dramatically improved.



Nano-multilayer coating



Enlarged image

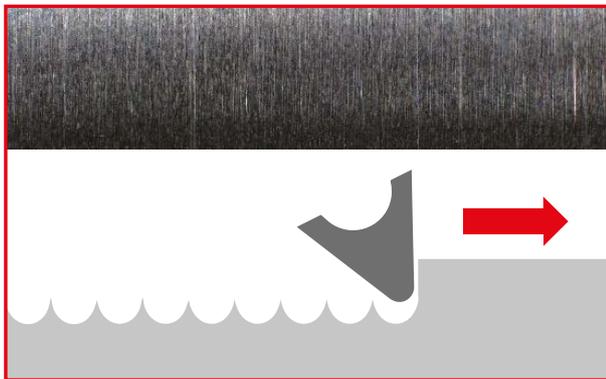


Conventional multilayer coating

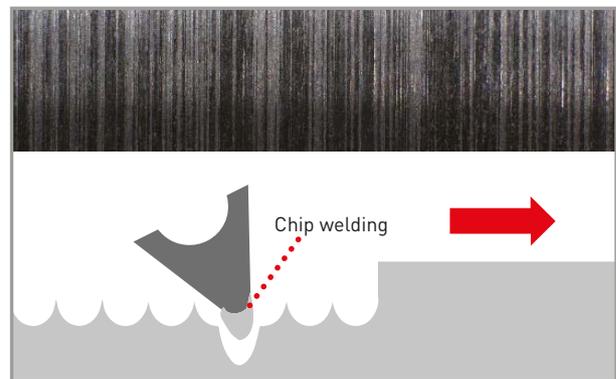
EFFECTS OF THE HIGH LUBRICATION LAYER

The nano-level, high lubrication layer suppresses built-up edge caused by chip welding which tends to occur in low feed machining. Additionally, this reduces blemishes on the machined surface of the component.

Surface Finish



MS7025



Conventional

MT2015 – CARBIDE GRADE (NON COATED)

Has the usual high wear resistance of carbide but is also tough and therefore resists sudden fracturing. Expected to extend the tool life when machining non-ferrous metals such as aluminium alloys.

VP15TF/VP15KZ – PVD COATED GRADES

(Al,Ti)N coated grade with excellent heat resistance and has high adhesion strength to the carbide substrate. Highly versatile and can be used in a variety of machining processes.

GT SERIES

SELECTION STANDARD

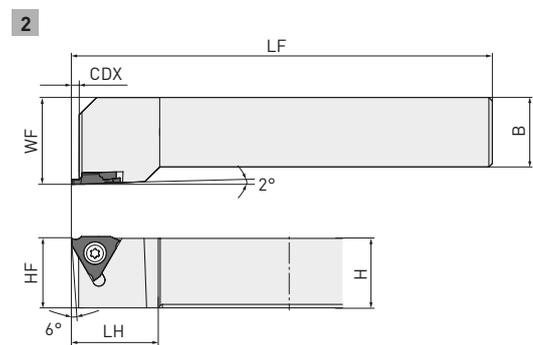
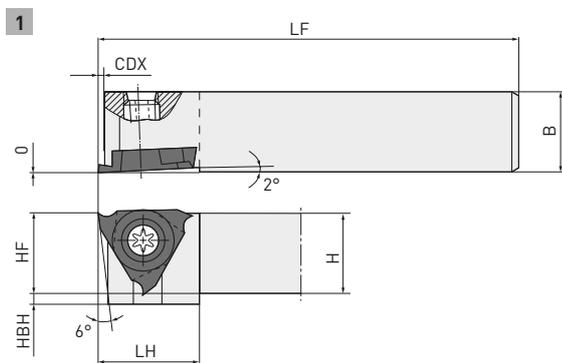
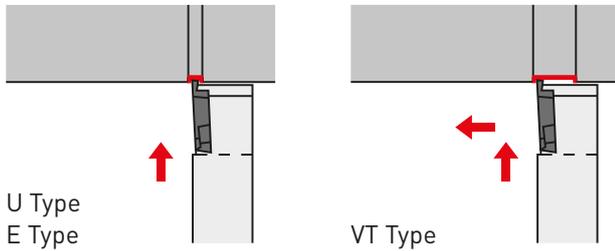
Angle	Name of tool holder	Note	Shank size	Applicable insert type	
SQUARE SHANK					
0°	GTAH	CW (Groove width) 0.25 – 3.0 mm	Without offset	8 x 8 x 80	GTAT GTBT GTCT
				8 x 8 x 120	
				10 x 10 x 80	
				10 x 10 x 120	
				12 x 12 x 80	
				12 x 12 x 120	
				With offset	16 x 16 x 120
					20 x 20 x 120
					25 x 25 x 150
					10 x 10 x 80
					10 x 10 x 120
					12 x 12 x 120
	GTBH	CW (Groove width) 1.45 – 3.0 mm	Without offset	16 x 16 x 120	GTBT GTCT
				20 x 20 x 120	
				25 x 25 x 150	
				20 x 20 x 120	
				25 x 25 x 150	
				10 x 10 x 80	
	GTCH	CW (Groove width) 2.5 – 3.0 mm	Without offset	10 x 10 x 120	GTCT
				10 x 10 x 100	
				12 x 12 x 100	
				16 x 16 x 120	
				20 x 20 x 120	
				25 x 25 x 120	
90°	GTAF	CW (Groove width) 0.25 – 3.0 mm		16 x 85	GTAT GTBT GTCT
				19.05 x 115	
				20 x 100	
				22 x 120	
				25 x 120	
				25.4 x 115	
ROUND SHANK					
90°	SH-GTAF	CW (Groove width) 0.25 – 3.0 mm	For back tool post	16 x 85	GTAT GTBT GTCT
				19.05 x 115	
				20 x 100	
				22 x 120	
				25 x 120	
				25.4 x 115	

1/1

 = NEW

GTAH / GTBH / GTCH

EXTERNAL GROOVING



Right hand tool holder shown.

Order number	Stock		H	B	HF	LF	WF	CDX*	LH	HBH	Cutting width		Type	Insert
	R	L									min.	max.		
GTAHR/L0808-20S	●	●	8	8	8	80	—	2	15	5	0.25	3.0	1	
GTAHR/L0808-20	●	●	8	8	8	120	—	2	15	5	0.25	3.0	1	
GTAHR/L1010-20S	●	●	10	10	10	80	—	2	15	3	0.25	3.0	1	
GTAHR/L1010-20	●	●	10	10	10	120	—	2	15	3	0.25	3.0	1	GTAT
GTAHR/L1212-20S	●	●	12	12	12	80	—	2	15	1	0.25	3.0	1	GTBT*
GTAHR/L1212-20	●	●	12	12	12	120	—	2	15	1	0.25	3.0	1	GTCT*
GTAHR/L1616-20	●	●	16	16	16	120	—	2	15	—	0.25	3.0	1	
NEW GTAHR/L2020-20	●	●	20	20	20	120	25	2	25	—	0.25	3.0	2	
NEW GTAHR/L2525-20	●	●	25	25	25	150	32	2	25	—	0.25	3.0	2	
GTBHR/L1010-30S	●	●	10	10	10	80	—	3	15	3	1.45	3.0	1	
GTBHR/L1010-30	●	●	10	10	10	120	—	3	15	3	1.45	3.0	1	
GTBHR/L1212-30	●	●	12	12	12	120	—	3	15	1	1.45	3.0	1	GTBT
GTBHR/L1616-30	●	●	16	16	16	120	—	3	15	—	1.45	3.0	1	GTCT
NEW GTBHR/L2020-30	●	●	20	20	20	120	25	3	25	—	1.45	3.0	2	
NEW GTBHR/L2525-30	●	●	25	25	25	150	32	3	25	—	1.45	3.0	2	
GTCHR/L1010-30S	●	●	10	10	10	80	—	3	15	3	2.5	3.0	1	
GTCHR/L1010-30	●	●	10	10	10	120	—	3	15	3	2.5	3.0	1	GTCT

1/1

(Each case contains 5 inserts. Blank inserts are packed in 10 per case.)

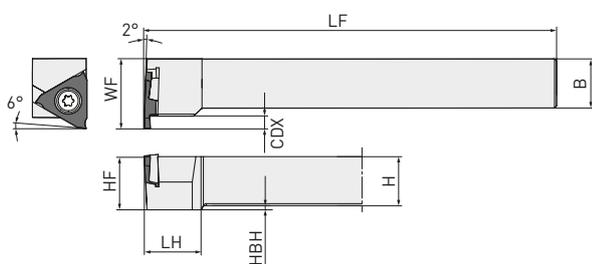
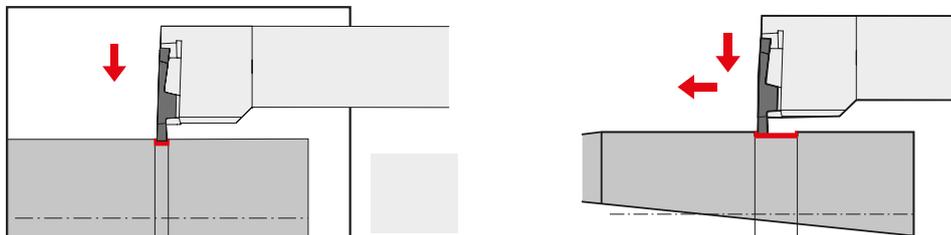
* It is not possible to machine depths over CDX dimensions (max. groove depth).
For the actual maximum depth that can be machined, only check the CDX of the insert.

1. Please use right hand inserts for right hand holders and left hand inserts for left hand holders.

● : Inventory maintained. ★ : Inventory maintained in Japan.

GTAF

EXTERNAL GROOVING



Right hand tool holder shown.

Order number	Stock		H	B	HF	LF	WF	CDX*	LH	HBH	Cutting width		Insert
	R	L									min.	max.	
	GTAFR/L1010-30	●									●	10	
GTAFR/L1212-30	●	●	12	12	12	100	17	3	14	1	0.25	3.0	
GTAFR/L1616-30	●	●	16	16	16	120	21	3	14	—	0.25	3.0	
GTAFR/L2020-30	●	●	10	10	10	120	25	3	14	—	0.25	3.0	
GTAFR/L2525-30	●	●	25	25	25	120	30	3	14	—	0.25	3.0	

1/1

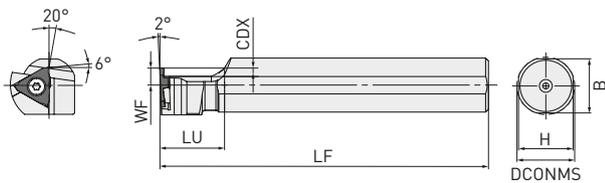
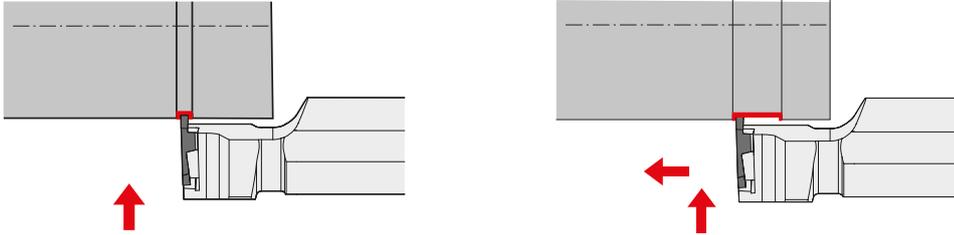
* It is not possible to machine depths over CDX dimensions (max. groove depth).
For the actual maximum depth that can be machined, only check the CDX of the insert.

1. Please use left hand insert for right hand holder and right hand insert for left hand holder.

NEW

SH-GTAF

EXTERNAL GROOVING



Left hand tool holder shown.

Order number	Stock		H	B	DCONMS	LF	LU	WF	CDX*	Cutting width		Insert
	R	L								min.	max.	
SH160-GTAF-30	●		15	15	16	85	18	6	3	0.25	3.0	GTAT GTBT* GTCT*
SH190-GTAF-30	●		18	18	19.05	115	18	6	3	0.25	3.0	
SH200-GTAF-30	●		19	19	20	100	18	6	3	0.25	3.0	
SH220-GTAF-30	●		21	21	22	120	18	6	3	0.25	3.0	
SH250-GTAF-30	●		24	24	25	120	18	10	3	0.25	3.0	
SH254-GTAF-30	●		24	24	25.4	115	18	10	3	0.25	3.0	

1/1

* It is not possible to machine depths over CDX dimensions (max. groove depth).
For the actual maximum depth that can be machined, only check the CDX of the insert.

1. Please use left hand insert for right hand holder and right hand insert for left hand holder.

SPARE PARTS

GTAH/GTBH/GTCH

Holder type			
	Clamp screw	Clamp torque (Nm)	Wrench
GT [○] H-0808, 1010, 1212, 1616	NS404W	1.0	NKY15S
GT [○] H-2020, 2525	FC400890T	2.5	TKY10F

GTAF

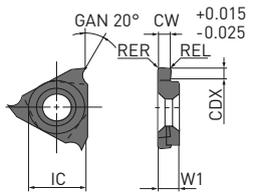
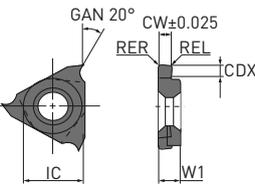
		
Clamp screw	Clamp torque (Nm)	Wrench
FC400890T	2.5	TKY10F

SH-GTAF

		
Clamp screw	Clamp torque (Nm)	Wrench
FC400890T	2.5	TKY10F

GT SERIES

INSERTS

Order number	Hand	MS7025	VP15TF	VP15KZ	MT2015	TF15	CW	CDX*	RER/L	IC	W1	Geometry
NEW GTAT02506V3RP-E	R	●			●		0.25	0.27	0.03	9.525	3.18	Precision Groove E Type (Ring and circlip grooving) 
NEW GTAT03006V3RP-E	R	●			●		0.30	0.27	0.03	9.525	3.18	
NEW GTAT03306V3RP-E	R	●			●		0.33	0.27	0.03	9.525	3.18	
NEW GTAT04312V3RP-E	R	●			●		0.43	0.9	0.03	9.525	3.18	
NEW GTAT05312V5RP-E	R	●			●		0.53	0.9	0.05	9.525	3.18	
NEW GTAT05312V5LP-E	L	●			●		0.53	0.9	0.05	9.525	3.18	
GTAT03306V3R-E	R		●				0.33	0.27	0.03	9.525	3.18	E Type (Ring and circlip grooving) 
GTAT03306V3L-E	L		★				0.33	0.27	0.03	9.525	3.18	
GTAT04312V3R-E	R		●				0.43	0.9	0.03	9.525	3.18	
GTAT04312V3L-E	L		★				0.43	0.9	0.03	9.525	3.18	
GTAT05312V5R-E	R		●				0.53	0.9	0.05	9.525	3.18	
GTAT05312V5L-E	L		★				0.53	0.9	0.05	9.525	3.18	
NEW GTAT06512V5R-E	R	●			●		0.65	0.9	0.05	9.525	3.18	
NEW GTAT06512V5L-E	L	●			●		0.65	0.9	0.05	9.525	3.18	
GTAT07520V5R-E	R	●	●		●		0.75	1.8	0.05	9.525	3.18	
GTAT07520V5L-E	L	●	★		●		0.75	1.8	0.05	9.525	3.18	
GTAT09520V5R-E	R	●	●		●		0.95	1.8	0.05	9.525	3.18	
GTAT09520V5L-E	L	●	★		●		0.95	1.8	0.05	9.525	3.18	
GTAT10020V5R-E	R	●	●		●		1.00	1.8	0.05	9.525	3.18	
GTAT10020V5L-E	L	●	★		●		1.00	1.8	0.05	9.525	3.18	
GTAT1002001R-E	R		●				1.00	1.8	0.1	9.525	3.18	
GTAT1002001L-E	L		★				1.00	1.8	0.1	9.525	3.18	
NEW GTAT11020V5R-E	R	●			●		1.10	1.8	0.05	9.525	3.18	
NEW GTAT11020V5L-E	L	●			●		1.10	1.8	0.05	9.525	3.18	
GTAT12020V5R-E	R	●	●		●		1.20	1.8	0.05	9.525	3.18	
GTAT12020V5L-E	L	●	★		●		1.20	1.8	0.05	9.525	3.18	
GTAT1202001R-E	R		●				1.20	1.8	0.1	9.525	3.18	
GTAT1202001L-E	L		★				1.20	1.8	0.1	9.525	3.18	
NEW GTAT12520V5R-E	R	●			●		1.25	1.8	0.05	9.525	3.18	
NEW GTAT12520V5L-E	L	●			●		1.25	1.8	0.05	9.525	3.18	
GTAT14020V5R-E	R	●	●		●		1.40	1.8	0.05	9.525	3.18	
GTAT14020V5L-E	L	●	★		●		1.40	1.8	0.05	9.525	3.18	
GTBT14530V5R-E	R	●			●		1.45	2.8	0.05	9.525	3.18	
GTBT14530V5L-E	L	●			●		1.45	2.8	0.05	9.525	3.18	
GTBT15030V5R-E	R	●	●		●		1.50	2.8	0.05	9.525	3.18	
GTBT15030V5L-E	L	●	★		●		1.50	2.8	0.05	9.525	3.18	
GTBT1503001R-E	R		●				1.50	2.8	0.1	9.525	3.18	
GTBT1503001L-E	L		★				1.50	2.8	0.1	9.525	3.18	
GTBT17030V5R-E	R	●			●		1.70	2.8	0.05	9.525	3.18	
GTBT17030V5L-E	L	●			●		1.70	2.8	0.05	9.525	3.18	
GTBT17530V5R-E	R	●			●		1.75	2.8	0.05	9.525	3.18	
GTBT17530V5L-E	L	●			●		1.75	2.8	0.05	9.525	3.18	

Right hand insert shown.

(Each case contains 5 inserts. Blank inserts are packed in 10 per case.)

* CDX is a value that assumes the machining diameter of $\varnothing 42$ or less.
Please note that the maximum machining depth is limited by the holder used.

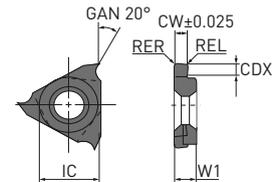


Expansion

● : Inventory maintained. ★ : Inventory maintained in Japan.

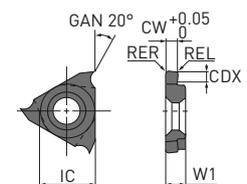
GT SERIES – INSERTS

Order number	Hand	MS7025	VP15TF	VP15KZ	MT2015	TF15	CW	CDX*	RER/L	IC	W1	Geometry
GTBT18030V5R-E	R	●	●		●		1.80	2.8	0.05	9.525	3.18	E Type (Ring and circlip grooving)
GTBT18030V5L-E	L	●	★		●		1.80	2.8	0.05	9.525	3.18	
GTBT20030V5R-E	R	●	●		●		2.00	2.8	0.05	9.525	3.18	
GTBT20030V5L-E	L	●	★		●		2.00	2.8	0.05	9.525	3.18	
GTBT2003001R-E	R	●	●				2.00	2.8	0.1	9.525	3.18	
GTBT2003001L-E	L	●	★				2.00	2.8	0.1	9.525	3.18	
GTBT22530V5R-E	R	●	●		●		2.25	2.8	0.05	9.525	3.18	
GTBT22530V5L-E	L	●	★		●		2.25	2.8	0.05	9.525	3.18	
GTBT2253001R-E	R	●					2.25	2.8	0.1	9.525	3.18	
GTBT2253001L-E	L	●					2.25	2.8	0.1	9.525	3.18	
GTCT25030V5R-E	R	●	★		●		2.50	2.8	0.05	9.525	3.18	
GTCT25030V5L-E	L	●	★		●		2.50	2.8	0.05	9.525	3.18	
GTCT2503001R-E	R	●					2.50	2.8	0.1	9.525	3.18	
GTCT2503001L-E	L	●					2.50	2.8	0.1	9.525	3.18	
GTCT27530V5R-E	R	●	★		●		2.75	2.8	0.05	9.525	3.18	
GTCT27530V5L-E	L	●	★		●		2.75	2.8	0.05	9.525	3.18	
GTCT30030V5R-E	R	●	★		●		3.00	2.8	0.05	9.525	3.18	
GTCT30030V5L-E	L	●	★		●		3.00	2.8	0.05	9.525	3.18	
GTCT3003001R-E	R	●					3.00	2.8	0.1	9.525	3.18	
GTCT3003001L-E	L	●					3.00	2.8	0.1	9.525	3.18	
GTAT03006V3R-U	R	●	●		●		0.30	0.27	0.03	9.525	3.18	U Type (General purpose grooving)
GTAT03006V3L-U	L	●	★		●		0.30	0.27	0.03	9.525	3.18	
GTAT05012V5R-U	R	●	●		●		0.50	0.9	0.05	9.525	3.18	
GTAT05012V5L-U	L	●	★		●		0.50	0.9	0.05	9.525	3.18	
GTAT07520V5R-U	R	●	●		●		0.75	1.8	0.05	9.525	3.18	
GTAT07520V5L-U	L	●	★		●		0.75	1.8	0.05	9.525	3.18	
GTAT09520V5R-U	R	●	●		●		0.95	1.8	0.05	9.525	3.18	
GTAT09520V5L-U	L	●	★		●		0.95	1.8	0.05	9.525	3.18	
GTAT10020V5R-U	R	●	●		●		1.00	1.8	0.05	9.525	3.18	
GTAT10020V5L-U	L	●	★		●		1.00	1.8	0.05	9.525	3.18	
GTAT10320V5R-U	R		●				1.03	1.8	0.05	9.525	3.18	
GTAT12520V5R-U	R	●	●		●		1.25	1.8	0.05	9.525	3.18	
GTAT12520V5L-U	L	●	★		●		1.25	1.8	0.05	9.525	3.18	
GTBT14530V5R-U	R	●	●		●		1.45	2.8	0.05	9.525	3.18	
GTBT14530V5L-U	L	●	★		●		1.45	2.8	0.05	9.525	3.18	
GTBT15030V5R-U	R	●	●		●		1.50	2.8	0.05	9.525	3.18	
GTBT15030V5L-U	L	●	★		●		1.50	2.8	0.05	9.525	3.18	
GTBT17530V5R-U	R	●	●		●		1.75	2.8	0.05	9.525	3.18	
GTBT17530V5L-U	L	●	★		●		1.75	2.8	0.05	9.525	3.18	
GTBT20030V5R-U	R	●	●		●		2.00	2.8	0.05	9.525	3.18	
GTBT20030V5L-U	L	●	★		●		2.00	2.8	0.05	9.525	3.18	
GTCT25030V5R-U	R	●	★		●		2.50	2.8	0.05	9.525	3.18	
GTCT25030V5L-U	L	●	★		●		2.50	2.8	0.05	9.525	3.18	



Right hand insert shown.

U Type
(General purpose grooving)



Right hand insert shown.

(Each case contains 5 inserts. Blank inserts are packed in 10 per case.)

* CDX is a value that assumes the machining diameter of $\varnothing 42$ or less.
Please note that the maximum machining depth is limited by the holder used.

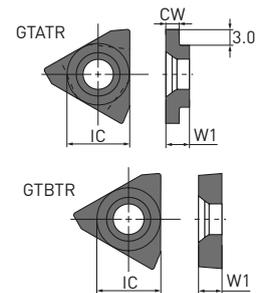
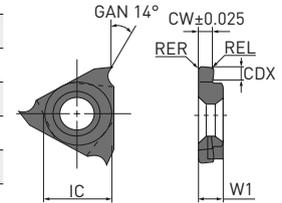


● / ★ = Expansion

● : Inventory maintained. ★ : Inventory maintained in Japan.

GT SERIES – INSERTS

Order number	Hand	MS7025	VP15TF	VP15KZ	MT2015	TF15	CW	CDX*	RER/L	IC	W1	Geometry
GTAT0330600R-VT	R			●			0.33	0.25	0	9.525	3.18	VT Type (Grooving, Side turning)
GTAT0431200R-VT	R			●			0.43	0.9	0	9.525	3.18	
GTAT0532000R-VT	R			●			0.53	1.6	0	9.525	3.18	
GTAT0652000R-VT	R			●			0.65	1.6	0	9.525	3.18	
GTAT0752000R-VT	R			●			0.75	1.6	0	9.525	3.18	
GTAT0802000R-VT	R			●			0.80	1.6	0	9.525	3.18	
GTAT0852000R-VT	R			●			0.85	1.6	0	9.525	3.18	
GTAT0952000R-VT	R			●			0.95	1.6	0	9.525	3.18	
GTAT1002000R-VT	R			●			1.00	1.6	0	9.525	3.18	
GTAT1102000R-VT	R			●			1.10	1.6	0	9.525	3.18	
GTAT1202000R-VT	R			●			1.20	1.6	0	9.525	3.18	
GTAT1302000R-VT	R			●			1.30	1.6	0	9.525	3.18	
GTAT1402000R-VT	R			●			1.40	1.6	0	9.525	3.18	
GTBT1503000R-VT	R			●			1.50	2.7	0	9.525	3.18	
GTBT2003000R-VT	R			●			2.00	2.7	0	9.525	3.18	
GTATR	R					★	1.76	—	—	9.525	3.18	
GTATL	L					★	1.76	—	—	9.525	3.18	
GTBTR	R					★	—	—	—	9.525	3.18	
GTBTL	L					★	—	—	—	9.525	3.18	



Right hand insert shown.

(Each case contains 5 inserts. Blank inserts are packed in 10 per case.)

* CDX is a value that assumes the machining diameter of $\varnothing 42$ or less.
Please note that the maximum machining depth is limited by the holder used.



GT SERIES

RECOMMENDED CUTTING CONDITIONS

	Material	Hardness	Grade	Vc	f
P	Pure iron, Free cutting steel	—	MS7025, VP15TF	110 (30 – 180)	0.05 (0.01 – 0.09)
	Carbon steel, Alloy steel	180HB – 280HB	MS7025, VP15TF	100 (50 – 150)	0.05 (0.02 – 0.09)
M	Stainless steel	≤200HB	MS7025	80 (50 – 120)	0.03 (0.02 – 0.05)
N	Non-Ferrous metal	—	MT2015	150 (70 – 230)	0.07 (0.03 – 0.11)

1/1



SH-GTAF

APPLICATION EXAMPLES

SUS304: COMPARISON OF MACHINED SURFACES (ROUND SHANK HOLDER)

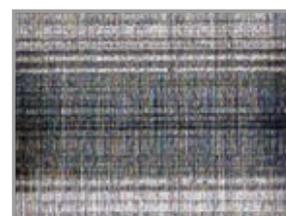
High rigidity and large machining depth provide excellent resistance to chatter and vibration.

Material	SUS304 \varnothing 16 mm
Vc (m/min)	80
f (mm/rev)	0.03, 0.07
Groove width (mm)	3.0
Groove depth (mm)	1.5
Cutting mode	Wet cutting

f = 0.03 (mm/rev)

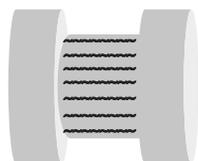


SH-GTAF



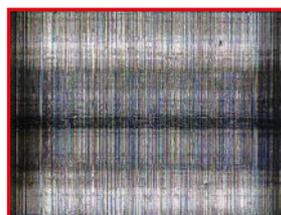
Conventional

Chatter and vibration occurred.

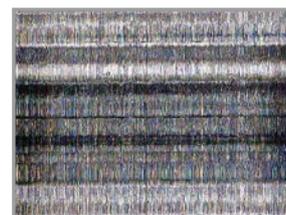


Traces of chatter and vibration

f = 0.07 (mm/rev)



SH-GTAF



Conventional

Chatter and vibration occurred.

MT2015

APPLICATION EXAMPLES

COMPARISON OF CUTTING EDGE DAMAGE : A6061

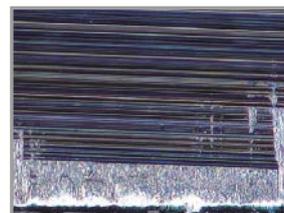
By suppressing damage to the cutting edge caused by chip welding, longer tool life can be expected.

Material	A6061 \varnothing 18 mm
Vc (m/min)	150
f (mm/rev)	0.04
Radial depth of cut (mm)	2.5
Cutting mode	Wet cutting

AFTER 1 MACHINING PASS

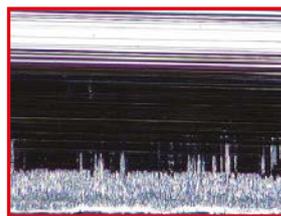


GTBT - MT2015

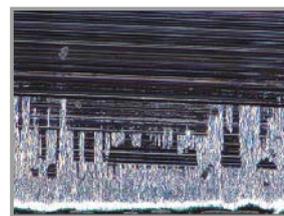


Conventional

AFTER 50 MACHINING PASSES

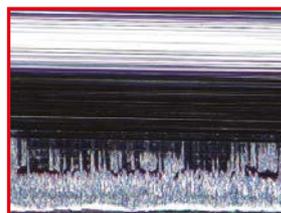


GTBT - MT2015

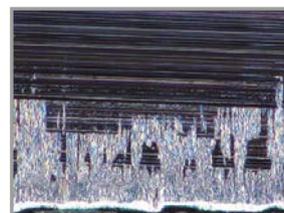


Conventional

AFTER 100 MACHINING PASSES



GTBT - MT2015



Conventional

MS7025

APPLICATION EXAMPLES

COMPARISON OF SURFACE ROUGHNESS AND CUTTING EDGE DAMAGE: PURE IRON-BASED SOFT MAGNETIC MATERIALS

The component surface roughness is excellent because damage caused by welding is suppressed. It also has excellent wear resistance.

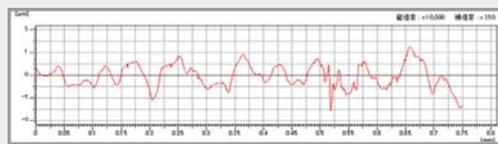
SURFACE ROUGHNESS WHEN FINISHING A GROOVE WITH A BOTTOM DIAMETER OF 11MM

MS7025 achieves a good component surface finish from the start of machining and maintains excellent consistency even after 100 passes.

AFTER 50 MACHINING PASSES

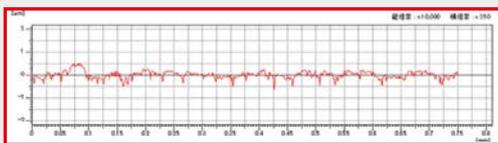


GTBT - MS7025

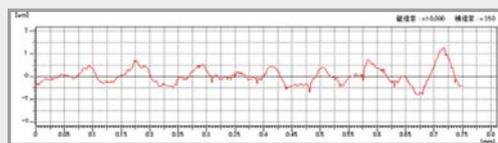


Conventional

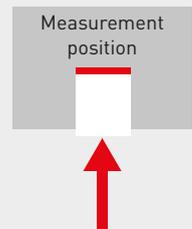
AFTER 100 MACHINING PASSES



GTBT - MS7025



Conventional



CUTTING EDGE DAMAGE

Material	Pure iron-based soft magnetic material $\varnothing 16$ mm
V_c (m/min)	150
f (mm/rev)	0.04
Radial depth of cut (mm)	2.5
Cutting mode	Wet cutting

AFTER 50 MACHINING PASSES



GTBT - MS7025



Conventional
Chipping occurred due to welding.



AFTER 100 MACHINING PASSES



GTBT - MS7025



Conventional

SYMBOLS

RECOMMENDED CUTTING CONDITIONS		MACHINING TYPE	
	Recommended cutting conditions		Roughing
NEW	Completely new products or expansions released in the current Spring or Autumn product launch and are not included in the latest version of the General Catalogue.		Medium cutting
NEW	Products or expansions that have already been introduced in one of the previous Spring or Autumn product launches but are not included in the latest General Catalogue.		Light cutting
APPLICATION			Pre-finishing
	Face milling		Finishing
	Chamfer milling		Fine-finishing
	Shoulder milling with R	TOOL MATERIAL	
	Face milling close to a wall		Ultra micro grain carbide Ultra micro grain carbide substrate material.
	Shoulder milling		Cubic boron nitride Mitsubishi Materials' original CBN material.
	Side milling		Ceramic For high speed efficient machining of super alloys due to the excellent high temperature strength property.
	Slot milling		High hardness powder metallurgy HSS High hardness powder metallurgy HSS substrate material.
	Ramping		High grade high alloy HSS High grade high alloy HSS substrate material.
	Pocket milling		Cobalt high speed steel Cobalt high speed steel substrate material.
	Slot milling with R		High speed steel High speed steel substrate material.
	Copy milling		
	T-Slot milling		

SYMBOLS

COATING



SMART MIRACLE coating

New smooth and dense coating technology for high efficiency milling of difficult to cut materials.



CRN coating

Newly developed CrN coating for Copper Electrodes machining.



Violet coating

Increased tool life of 2-3 times more than TiN coated products.



DP coating

New generation coating suitable for a wide range of materials.



MIRACLE coating

The original Miracle (Al,Ti)N coating. Also suitable for dry cutting.



[Al, Ti]N coating

[Al,Ti]N highly versatile application range.



[Al,Ti,Cr]N multi-layer coating

For carbon, alloy and hardened steels.



IMPACT MIRACLE coating

Single phase nano crystal coating technology has higher film hardness and heat resistance.



MIRACLE coating

The original MIRACLE (Al,Ti)N coating. Also suitable for dry cutting.



VFR coating

The (AlCrSi)N/(AlTiSti)N PVD multilayer coating is ideal for machining of extremely hard materials up to 70 HRC.



DLC coating

Hardness similar to CVD diamond coating achieved with high adhesion strength.



Diamond coating

Suitable for CFRP and CFRP-aluminium materials.



Diamond coating

Suitable for graphite machining.



Diamond coating

The original CVD diamond coating.



CVD Diamond coating

Unique multi-layer micro-grain diamond crystal control technology drastically improves wear resistance and smoothness.

CUTTING EDGE PROPERTIES



Sharp corner edge

Indicates the end mill has a sharp corner edge.



Gash land

Indicates the end mill cutting edge has a protective chamfer.



Rake angle



Helix angle

Indicates the helix angle of the end mill.



Point angle

Indicates the drill point angle.



Roughing flute geometry



Variable helix



Rounded gash



Corner angle

WEB THINNING



X type point geometry

X web thinning used at the drill point.



XR type point geometry

XR web thinning used at the drill point.



S type point geometry

Easy cutting geometry.



N type point geometry

Effective when the point web is thick.



Chipbreaker

SYMBOLS

TOLERANCES



Tolerance of taper angle
Indicates the tolerance of the taper angle.



R tolerance
Indicates the radial tolerance of a ball nose end mill.



R tolerance
Indicates the radial tolerance of the corner radius.



R tolerance
Indicates the radial tolerance of a cutter with a corner radius.



Outside diameter tolerance
Indicates the diameter tolerance of the end mill.



Peak tolerance
Indicates the tolerance for the end diameter.



Shank diameter tolerance



Shank diameter tolerance



Drill tolerance / diameter

COOLANT HOLES



External coolant



Internal coolant



Internal coolant



Centered, internal coolant hole



Radial, internal coolant holes



Internal coolant holes



Internal coolant holes

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